OKLAHOMA

Helping Every Life and Parent
H.E.L.P. Task Force

- Governor Appointees
- The Oklahoma Attorney General
- The President Pro Tempore of the Oklahoma Senate
- The Speaker of the Oklahoma House of Representatives
- The Secretary of Health and Mental Health
- The Secretary of Human Services
- The Commissioner of Health

OCTOBER 28, 2022

OKLAHOMA

Helping Every Life and Parent
H.E.L.P. Task Force

The Honorable Governor J. Kevin Stitt, President Pro Tempore Treat and Speaker McCall:

We would like to thank each of you for the opportunity to serve as members on the Helping Every Life and Parent – H.E.L.P. Task Force. As a working task force with diverse backgrounds and qualifications, we have accepted our duties and responsibilities loyally and moved very quickly to study, evaluate and make recommendations regarding policies, programs and proposed legislation.

In our brief time together, the H.E.L.P. Task Force has worked diligently to examine what it would entail to support life, mothers, parents and the public in the State of Oklahoma. The governor's executive order was signed July 8, 2022, with the appointment of the chair on Sept. 2, 2022. The initial meeting of the task force was formally called and held on Sept. 18, 2022. Our cohesive team of task force members has established relationships with legislators, community leaders, state agencies, non-profits, public and private organizations, medical providers, health systems and the press. Our work has been precise, collaborative and expedient.

The task force took into consideration all public comments, legislative, legal, program and agency availability and task force experience brought to the table. These final recommendations were reviewed at the Oct. 18, 2022, meeting before the final vote to approve, disapprove or modify final recommendations on Oct. 25, 2022. It is the hope that our study, discussion, evaluation and votes, based on facts, experience and findings as well as input from public comment and health care facilities, help in assisting each of you and the Legislature in making imperative decisions moving forward.

While many of these recommendations are multi-layered and cross over within both the public and private sectors, we are confident in the synergy to be gained. There is more work to be done to support these recommendations which will take additional time to implement.

Enclosed is the task force submission of recommendations. Immediately following this letter and recommendations are the Appendix of Reports and research taken into consideration and held for discussion within our team.

Pursuant to the power and authority vested in the Honorable Kevin Stitt, Governor of the State of Oklahoma, President Pro Tempore and Speaker named in Executive Order 2022-14, we humbly submit our recommendations.

Respectfully,

Juli D. Merciez, Chair
MPC, BSN, RN
The Helping Every Life and Parent Task Force

OKLAHOMA

Educating Oklahoma on the Reality of Life and Resources Available

OKLAHOMA

Branding and Marketing

It is the recommendation of the H.E.L.P. Task Force to create an Oklahoma life and parenting brand with a landing page from an Oklahoma website that compiles life and parenting resources, initiatives, programs, assistance and educational information to fulfill task force objectives, with the request for funding from Legislature if needed.

a. Create a marketing campaign to promote the Oklahoma life and parenting brand and website that could include advertising through billboards, social media and television ads.
b. Add the Oklahoma life and parenting website to attorney general's SAFELINE cards.

(Attorney general – see Appendix A – website modeled after State of South Dakota)

OKLAHOMA

Abortion Pill Reversal

It is the recommendation of the Task Force to establish a statewide cooperative network and process for the availability of the Abortion Pill Reversal, in conjunction with Heartbeat International, Saint Francis Health System and other health systems, clinics, pregnancy centers and providers.

(St. Francis Health System and Heartbeat International program – see Appendix B)

OKLAHOMA

Supporting Pregnancy Centers in Oklahoma

OKLAHOMA

Tax Credit

It is the recommendation of the H.E.L.P. Task Force to create an Oklahoma life and parenting brand with a landing page from a Oklahoma website that compiles life and parenting resources initiative program assistance and education or the Legislature to study the Missouri Tax Credit for contributions to pregnancy help centers and consider a similar proposal for residents in the State of Oklahoma.

(Representative Danny Williams – see Appendix C)

OKLAHOMA

Continue Funding

It is the recommendation of the H.E.L.P. Task Force for the Oklahoma State Department of Health and Legislature to identify all opportunities to provide and expand available funding through the Choosing Childbirth Act and how it is allocated throughout the state.

(Oklahoma State Department of Health – see Appendix C)

OKLAHOMA

Eliminate Unnecessary Barriers to Adoption and Help Make Oklahoma the Most Adoption Friendly State in the United States

OKLAHOMA

Adoption Code

It is the recommendation of the H.E.L.P. Task Force to amend the Oklahoma Adoption Code (10 O.S. § 7505-3.2(C)) to increase the initial amount authorized to be expended on birth mother living and transportation expenses from $1,000 to $3,500 without first obtaining court approval.

(Attorney General – see Appendix B)

OKLAHOMA

Annual Adoption Month Training

It is the recommendation of the H.E.L.P. Task Force to support the attorney general in hosting and facilitating an annual Adoption Continuing Legal Education (CLE) Seminar to the benefit of lawyers and judges and other applicable individuals beginning November 2023 (National Adoption Awareness Month).

(Attorney General – see Appendix C – CLE Seminar Proposal)

OKLAHOMA

Encourage and Provide Resources to our Communities to Support Unplanned Pregnancies

OKLAHOMA

Maternity Desert Services Needed

It is the recommendation of the H.E.L.P. Task Force to identify opportunities to expand health services to women in all areas of the state and address the social determinants of health including improved access to care and reliable transportation for women.

(Oklahoma State Department of Health – see Appendix E)

Pregnancy Resource Navigator

It is the recommendation of the H.E.L.P. Task Force to seek support for the new Pregnancy Resource Navigator (PRN) program by the Oklahoma State Department of Health (OSDH) to expand home visiting and case management services to support and celebrate Oklahoma mothers, babies and families with request for funding if needed.

(Oklahoma State Department of Health – see Appendix E)

OKLAHOMA

Expansion of SoonerCare

a. It is the recommendation of the task force to raise the federal poverty level (FPL) for SoonerCare income eligibility for pregnancy and postpartum coverage from 138% to 205% FPL.

b. It is the recommendation of the task force to extend postpartum coverage from 60 days to 12 months continuous coverage.

(Oklahoma Healthcare Authority – see Appendix F)

OKLAHOMA

Scope of Practice for Advanced Practice Registered Nurses

It is the recommendation of the H.E.L.P. Task Force to recommend that Legislature adopt national best practices and allow certified nurse-midwives to practice at the top of their education and training, including removal of the overly burdensome regulations requiring physician supervision for the prescription of medication

It is the recommendation of the HELP Task Force that legislature review national best practices to allow Advanced Practice Registered Nurses to practice at the top of their education and training.

(American College of Nurse Midwives, March of Dimes Office of Government Affairs – see Appendix G)

(Oklahoma Advance Practice Nurses-see Appendix G)

OKLAHOMA

TEMPORARY ASSISTANCE FOR NEEDY FAMILIES (TANF)

As long as the parent is completing the treatment plan and following their TANF Work Plan, the TANF benefits should continue. If the parent does not fulfill these requirements, they should lose the cash payment and supportive services and the TANF case should be closed.

(Oklahoma Department of Human Services – see Appendix H)

OKLAHOMA

Positive Pregnancy Test & Deeming Dependent

It is the recommendation of the HELP Task Force for DHS to consider a woman, at the point of a positive pregnancy test, as having a dependent and therefore eligible for TANF services including case management, family stabilization classes and services, work training, educational assistance, transportation, and a small amount of income while they actively participate.

OKLAHOMA

Drug Test & Treatment

It is the recommendation of the HELP Task Force for the Legislature to consider amending state law to allow an applicant with a positive drug test to qualify for TANF as long as they agree to complete a substance abuse treatment plan, and to allow those treatment hours to count toward the 30-hour work activities requirement for TANF.

(Oklahoma Department of Human Services – see Appendix H)

OKLAHOMA

Car Equity Value

It is the recommendation of the HELP Task Force for the Legislature to consider amending state law to disregard the equity value of one automobile from the resource test for TANF eligibility.

(Oklahoma Department of Human Services – see Appendix H)

OKLAHOMA

Empower Nonprofit Organizations, Local Faith Communities and State Agencies to Support Families and Mothers Before, During and After Childbirth

Safe Haven Law

It is the recommendation of the task force to amend the Oklahoma Safe Haven Law (10A O.S. § 1-2-109) to increase the number of days to relinquish a child without prosecution for child abandonment or child neglect from 30 days of age or younger to 60 days of age or younger.

a. **Amend corresponding criminal law (21 O.S. § 851) consistent with the same.**

(Attorney general – see Appendix I)

OKLAHOMA

Fatherhood Program

It is the recommendation of the H.E.L.P. Task Force to support the current state fatherhood initiative for its expansion and additional funding that may be needed and collaborate with the State of Tennessee as they develop their fatherhood initiative.

(see Appendix I)

OKLAHOMA

Extension of Executive Order 2022-14

It is the recommendation of the H.E.L.P. Task Force to extend their service by either executive order or legislative process to formalize a committee with a four-year term of commitment and maintain all current task force members.

Educating Oklahoma on the Reality of Life and Resources Available

APPENDIX A

Branding and Marketing

Adoption

Safe Haven

OFFICE OF THE ATTORNEY GENERAL RECOMMENDATIONS

1. Amend the Oklahoma Adoption Code (10 O.S. § 7505-3.2(C)) to increase the initial amount authorized to be expended on birth mother living and transportation expenses from $1,000 to $3,500 without first obtaining court approval. (*See* Attachment A – Proposed Amendment)

2. Amend the Oklahoma Safe Haven Law (10A O.S. § 1-2-109) to increase the number of days to relinquish a child without prosecution for child abandonment or child neglect from 30 days of age or younger to 60 days of age or younger. (*See* Attachment B – Proposed Amendment)

    a. Amend corresponding criminal law (21 O.S. § 851) consistent with the same.

3. Attorney General to host and facilitate an annual Adoption CLE Seminar beginning November 2023 (National Adoption Awareness Month). (*See* Attachment C – CLE Seminar Proposal)

4. Create an Oklahoma pro-life brand with a website that compiles pro-life resources, initiatives, programs, assistance, and educational information to fulfill task force objectives, with request for funding from Legislature.

    a. Create a marketing campaign to promote the Oklahoma pro-life brand and website that could include advertising through billboards, social media, and television ads.

    b. Add the Oklahoma pro-life website to Attorney General's SAFELINE cards.

ATTACHMENT A

PROPOSED AMENDMENT TO OKLAHOMA SAFE HAVEN LAW – RAISING AGE OF CHILD FROM 30 DAYS TO 60 DAYS

Oklahoma Statutes – Title 10A. Children and Juvenile Code
Article 1 – Oklahoma Children's Code
Chapter 2 – Reporting and Investigations
Section 1-2-109 – Relinquishment of Child to Medical Services Provider or Child Rescuer

A. A parent subject to the provisions of this act shall not be prosecuted for child abandonment or child neglect under the provisions of any statute which makes child abandonment or child neglect a crime, when the allegations of child abandonment or child neglect are based solely on the relinquishment of a child ~~thirty (30)~~ sixty (60) days of age or younger to a medical services provider or a child rescuer as defined in this section.

B. The following entities shall, without a court order, take possession of a child ~~thirty (30)~~ sixty (60) days of age or younger if the child is voluntarily delivered to the entity by the parent of the child and the parent did not express an intent to return for the child:

1. A medical services provider; or

2. A child rescuer.

C. Delivery of the child may be effectuated by an in-person transfer of the child to the medical services provider or child rescuer or by leaving the child in a newborn safety device that is:

1. Voluntarily installed by the medical services provider or child rescuer;

2. Physically located inside a police station, fire station, child protective services agency, hospital or other medical facility; and

3. Located in an area that is conspicuous and visible to the employees of the police station, fire station, child protective services agency, hospital or other medical facility.

D. A medical services provider or child rescuer that installs a newborn safety device shall:

1. Be responsible for the cost of the installation; and

2. Install an adequate dual alarm system connected to the physical location of the newborn safety device that is:

a. tested at least one time per week to ensure the alarm system is in working order, and

b. visually checked at least two times per day to ensure the alarm system is in working order.

E. Any entity identified in subsection B of this section to which a parent seeks to relinquish a child pursuant to the provisions of this section may:

1. Request, but not demand, any information about the child that the parent is willing to share. The entity is encouraged to ask about, but not demand, the details of any relevant medical history relating to the child or the parents of the child. The entity shall respect the wish of the parent if the parent desires to remain anonymous; and

2. Provide the parent with printed information relating to the rights of the parents, including both parents, with respect to reunification with the child and sources of counseling for the parents, if desired.

F. Once a child has been relinquished to any entity identified in subsection B of this section, the entity receiving the child shall:

1. Perform or provide for the performance of any act necessary to protect the physical health or safety of the child; and

2. Notify the local office of the Department that a parent of a child ~~thirty (30)~~ sixty (60) days of age or younger, in the best judgment of the receiving entity, has relinquished such child and that the entity has taken possession of the child.

G. Upon being made aware that a medical services provider or child rescuer has possession of a child under the provisions of this section, the Department of Human Services shall immediately check with law enforcement authorities to determine if a child has been reported missing and whether the missing child could be the relinquished child.

H. The Department shall design and disseminate:

1. A simplified form for the recording of medical or other information that a relinquishing parent wishes to share with the entity to whom the child is being relinquished;

2. Easily understood printed materials that give information about parents' rights with regard to reunification with a child including, but not limited to, information on how a parent can contact the appropriate entity regarding reunification, and information on sources of counseling for relinquishing parents; and

3. Media information including printed material that creates public awareness about the provisions of this act.

I. For purposes of this section:

1. "Medical services provider" means a person authorized to practice the healing arts including a physician's assistant or nurse practitioner, a registered or practical nurse and a nurse aide; and

2. "Child rescuer" means any employee or other designated person on duty at a police station, fire station, child protective services agency, hospital or other medical facility.

J. A medical services provider or child rescuer with responsibility for performing duties pursuant to this section shall be immune from any criminal liability that might otherwise result from the actions of the entity, if acting in good faith in receiving a relinquished child. In addition, such medical provider or child rescuer shall be immune from any civil liability that might otherwise result from merely receiving a relinquished child.

Oklahoma Statutes – Title 21. Crimes and Punishments
Chapter 31 – Abandonment or Neglect of Wife or Children
Section 851 – Abandoning Child under Age Ten

A. Any parent of any child or children under the age of ten (10) years, and every person to whom such child or children have been confided for nurture or education, who deserts such child or children within this state, or takes such child or children without this state, with the intent wholly to abandon it shall be deemed guilty of a felony and upon conviction thereof shall be punished by imprisonment in the State Penitentiary for any period of time not less than one (1) year nor more than ten (10) years.

B. It is an affirmative defense to a prosecution under this section that a parent voluntarily delivered a child under the age of ~~thirty (30)~~ sixty (60) days to and left the child with, or voluntarily arranged for another person to deliver a child to and leave the child with, a medical services provider or child rescuer as provided in Section 1-2-109 of Title 10A of the Oklahoma Statutes.

ATTACHMENT B

PROPOSED AMENDMENT TO OKLAHOMA ADOPTION CODE – RAISING PRE-APPROVED BIRTH MOTHER EXPENSES FROM $1,000 TO $3,500

Oklahoma Statutes – Title 10. Children
Chapter 75 – Oklahoma Adoption Code
Chapter 2 – Reporting and Investigations
Section 7505-3.2 – Cost of Adoptive Family

A. 1. An affidavit shall be attached to the petition for adoption, or may be filed after the filing of the petition for adoption, but prior to the final decree of adoption, which discloses to the court all of the costs, funds, or monies expended by the adoptive family or expected to be expended in connection with the adoption of a minor.

2. No final decree of adoption shall be entered until the court is satisfied that all costs and expenses have been disclosed, are reasonable, and that the costs and expenses do not violate the provisions of subsection B of this section. Upon its review of the affidavit of monies expended, the court shall in writing disapprove any expenditure that the court deems unreasonable or in violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes and, to the extent necessary to comply with Oklahoma law, shall order reimbursement of any consideration given in violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes. Payments made pursuant to this section shall not be a violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes. Court approval of the affidavit of monies expended shall not exempt a person, attorney or licensed child-placing agency from prosecution if the information provided to the court is fraudulent or false.

B. 1. Except as otherwise specifically provided by law, the following list of adoption-related costs and expenses specified in this paragraph may be deemed proper items for a person to pay in connection with an adoption:

a. reasonable attorney fees and court costs,

b. reasonable medical expenses for birth mother and minor to be adopted,

c. reasonable adoption counseling expenses for birth parents before and after the birth of the minor, not to exceed six (6) months from placement of the minor,

d. reasonable fees of a licensed child-placing agency, including social services staff fees provided by agency employees that include:

(1) casework services,

(2) adoptive child and family studies,

(3) placement services,

(4) certification of agency facilities,

(5) admission assessments, and

(6) service planning,

e. (1) reasonable and necessary living expenses of the birth mother that are incurred during the adoption planning process or during the pregnancy, not to exceed two (2) months after the birth of the minor or after the consent or relinquishment of the birth mother. Reasonable and necessary living expenses include but are not limited to:

(a) housing expenses,

(b) utilities, such as electric, gas, water, or telephone bills,

(c) food for the birth mother and any minor child of the birth mother residing in the home of the birth mother,

(d) travel expenses for transportation to support the pregnancy, such as gasoline, bus fares, or providing for the temporary use of a vehicle during the pregnancy, and

(e) child care or foster care for any minor child of the birth mother associated with pregnancy-related medical care.

(2) Reasonable and necessary living expenses shall not include:

(a) any expenses met by existing resources of the birth mother,

(b) any expenses used for the support of family members who are not minor children of the mother,

(c) any expenses for recreational or leisure activities, and

(d) the purchase or gift of an automobile,

f. reasonable expenses for a home study,

g. reasonable and necessary costs associated with an international adoption,

h. reasonable expenses legally required by any governmental entity related to the adoption of a minor, and

i. a one-time gift to the birth mother from the prospective adoptive parents of no greater value than One Hundred Dollars ($100.00).

2. In addition, all expenses approved by the court should be commensurate with other customary fees for similar services by persons of equivalent experience and training where the services are performed. Any services provided outside this state shall be allowed in an amount as if the services had been performed within the State of Oklahoma.

3. The provisions of this subsection shall apply to living and transportation expenses incurred after the biological mother of the minor contacts the child-placing agency or attorney for adoption services.

4. The provisions of this subsection shall not prohibit a court from extending any time period, or including any additional costs and expenses in connection with an adoption other than those specified in this subsection based on unusual circumstances or need. If additional costs and expenses in connection with an adoption are approved by the court, the court shall specify in writing the unusual circumstances that justify the approval.

5. Except as otherwise ordered by the court except for good cause shown, all payments made pursuant to this section shall be paid directly to the third-party provider of services or goods. Any living expense paid on behalf of a birth mother in a domestic adoption which is not supported by an itemized receipt shall not be allowed for payment. If gift cards are issued to pay expenses, an itemized receipt verifying purchases shall be required for approval by the court. The accounting shall include vouchers for all monies expended, copies of all checks written and receipts for all cash payments attesting to the accuracy of the accounting.

6. No person, attorney or licensed child-placing agency shall have a financial interest in a third-party provider of services or goods, without disclosing in an affidavit the financial interest to the court and the other parties to the adoption.

C. Any person, attorney, or licensed child-placing agency desiring to pay living and transportation expenses on behalf of a birth mother is authorized to expend an initial amount not to exceed ~~One Thousand Dollars ($1,000.00)~~ Three Thousand Five Hundred Dollars ($3,500) plus deposits for housing and utilities for such costs and expenses without first obtaining court approval as required by paragraph 1 of subsection D of this section. Any such costs and expenses shall be disclosed as is otherwise required by the Oklahoma Adoption Code.

D. 1. Except for the amount authorized by subsection C of this section, the payment of any living or transportation expenses for benefit of the birth mother as authorized in subparagraph e of paragraph 1 of subsection B of this section shall be approved in advance by the court.

2. The person, attorney, or licensed child-placing agency desiring to pay living or transportation expenses on behalf of a birth mother which exceed the amount in subsection

C of this section shall file a petition for an order approving payment of adoption-related expenses.

3. The petition for an order approving payment of adoption-related expenses shall be filed in the district court where the adoption petition is to be filed, as provided in Section 7502-1.2 of this title.

4. The petition shall be captioned: "In the matter of Baby (name)." The petition shall include a listing of all anticipated living or transportation expenses to be paid on behalf of the birth mother for which court approval is being sought. If additional expenditures not previously authorized by the court are needed on behalf of the birth mother, an amended petition may be filed with the court.

5. The petition shall be heard by the court within ten (10) days of filing. The court clerk shall charge the same cost for a petition for payment of expenses as is charged for the filing of an adoption petition. In the event an adoption petition is later filed in the same county, the adoption petition shall be filed as an amended petition within the same case in which payment for expenses was approved and no additional court costs shall be required. In the event a petition for preadoption termination of parental rights is later filed in the same county, the court clerk shall not assess an additional filing fee and may use the same case number as for the petition for adoption.

6. Any order authorizing payment shall be attached to a petition for adoption. If no adoption petition is filed, the court shall retain jurisdiction to enter any orders deemed appropriate regarding the reimbursement of costs and expenses paid. If the child is placed for adoption outside the State of Oklahoma, any such order shall be submitted to the Interstate Compact of the Placement of Children and to the court in the other state where the petition for adoption is to be filed.

E. 1. In addition to the adoptive family affidavit requirement of subsection A of this section, a Disclosure Statement of Adoption-related Costs and Expenditures shall be prepared in writing by the person, attorney or child-placing agency in a direct-placement adoption. The Disclosure Statement of Adoption-related Costs and Expenditures shall include a declaration of all fees, expenses, and costs charged or expected to be charged for the adoption including, but not limited to, the following:

a. retainer fees, the hourly rate, and the number of hours billed for the adoption,

b. any fee charged for preplacement or other home studies of any prospective birth parents, regardless of whether the home study was performed by an outside agency,

c. any costs, fees or expenses or any other thing of value paid to or on behalf of the birth parents related to the adoption of a minor by any party other than the adoptive parents, and

d. any other fees and expenses related to the adoption not otherwise specifically listed in this section.

2. The Disclosure Statement of Adoption-related Costs and Expenditures containing true and accurate information shall be filed before or when the final decree of adoption is ordered in each adoption of a minor in this state. A statutory Disclosure Statement of Adoption-related Costs and Expenditures is provided in Section 2 of this act. A copy of the statement shall be a public record to be compiled and maintained by the court clerk and available for public inspection; provided, that any information identifying the person, attorney or child-placing agency in the direct adoption shall be redacted from the document prior to filing with the court clerk and shall not be made public. In addition, the identity of the child, the adoptive parents, and the birth parents shall be redacted from the document prior to filing with the court clerk and shall not be made public.

ATTACHMENT C

ATTORNEY GENERAL'S ANNUAL ADOPTION CLE SEMINAR PROPOSAL

- Full day seminar with six, 50-minute Continuing Legal Education (CLE) presentations (including one hour of ethics)
- Beginning November 2023 (National Adoption Awareness Month)
- Objectives:
    - Raise awareness for adoption in community and within the Oklahoma Bar
    - Create community enthusiasm for and interest in adoption
    - Build attorney competency for those practicing in adoption
    - Help lawyers stay up-to-date on current laws and trends in adoption
    - Give lawyers who practice in adoption an opportunity to connect
- Potential Topics:
    - Current laws and trends in adoption
    - Competency and candor in adoption practice (ethics)
    - Understanding the Oklahoma Adoption Code
    - Relative Adoptions
    - Private/infant Adoptions
    - DHS Adoptions
    - Contested adoptions
    - Indian Child Welfare Act (ICWA)
    - G.A.L., C.A.S.A., & Foster Care topics

ATTACHMENT D

life.sd.gov

Helping mothers and their babies before birth and after.

I am seeking help with...

Pregnancy

Educating Oklahoma on the Reality of Life and Resources Available

APPENDIX B

Abortion Pill Reversal Network

April 2018

Fact Sheet: Online Sales of Mifeprex and Misoprostol for Self-Abortion

In March 2018, CLI reviewed sites on the worldwide web that offer the two-component abortion pill regimen, either as their business focus or as part of a larger online pharmacy. We found:

- **At least 72 unique websites** that sell either just Misoprostol (10) or both Misoprostol and Mifepristone (62) in MTP (medical termination of pregnancy) kits.
- The reviewed websites fall into two categories: abortion-pill focused websites (many of which also market a few other categories of products, such as "birth control" and/or "men's health") and online pharmacy websites that sell abortion pills among a wide range of other drugs. In total, CLI found **30 abortion-pill focused websites** and **42 online pharmacy websites** that sell the abortion pill.

When reviewing the first category of websites, CLI looked for the following information: mention of Food and Drug Administration (FDA) approval, limits on gestational age at which the regimen can be used, side effects listed, precautions listed, whether medical information is required of the purchaser, and prices. When reviewing the second category of websites, CLI looked for mention of FDA approval, limits on gestational age at which the regimen can be used, and prices.

FDA mentions

- Thirteen out of 30 abortion-pill-focused websites mention FDA approval (43%)
- Fifteen out of 42 online pharmacy websites mention FDA approval (36%)
- A total of 39% of the 72 websites mention the FDA

Of the websites that do not mention the FDA, at least three mention the World Health Organization. Additionally, one of the websites, telabortion.org, exists for an FDA-reviewed clinical study being conducted in Hawaii, Maine, Oregon, and Washington. Another website is for a pharmacy registered by the Medicines and Healthcare Products Regulatory Agency (MHRA) in the United Kingdom.

Gestational limits at which the regimen can be used (FDA approval for use of Mifeprex as an abortion regimen was extended to 10 weeks' gestation in March 2016)[1]

- Seven weeks (8 websites)
- Nine weeks (25 websites)
- Ten weeks (11 websites)
- Twelve weeks (7 websites)
- Thirteen weeks ("up to 90 days," 1 website)
- No gestational limit cited (20 websites)

Many of the 20 websites that do not cite any gestational limit sell Cytotec (Misoprostol) as a treatment for stomach ulcers without mentioning pregnancy or abortion. No protections against the off-label use of the drug exist, however, as there is either little or no medical oversight.

[1] https://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm111323.htm

Side effects/precautions

With regard to side effects and precautions, every website (except for a few requiring doctor consultation/prescription) lists at least some. Some variation of the following list is typically displayed:

- (Heavy) bleeding
- Cramping
- Fatigue
- Headache
- Back/abdominal pain
- Vomiting
- Nausea
- Fever

There is little consistency from website to website as to what is listed. Some websites (approximately half) tell women to have access to a doctor in case they need it.

For precautions, there is also little consistency among the websites. Typically, a variation of the following list appears:

- Don't drink alcohol or smoke
- Remove IUDs before using the drugs
- Don't take in cases of ectopic pregnancy
- Don't take if you have liver/kidney/heart disorders
- Don't take if allergic to Mifepristone and Misoprostol
- Don't breastfeed while using drugs

False and confusing language

Many websites use false, misleading, confusing, or awkward language to describe medical abortion. Below is a small sample:

- One website mentions a "pain-free" abortion but further down lists a number of clearly painful side effects
- One website says the drugs are "100% working"
- One website says it is "completely safe, effective, pain-free and infection-free"
- Daynighthealthcare247.com advertises a "harmless and successful" "early stage pregnancy execution"

Medical information required

Of the abortion-pill focused sites, only nine of the 30 ask for at least some medical information.

- Two claim to require prescriptions
- Two require an online consultation with a doctor
- Five have medical questionnaires, although for three of the five, the purchaser may simply leave the default answers in place to proceed with a purchase

Prices

The average prices on the abortion-pill-focused websites for MTP kits are as follows:

- One kit for $167
- Of the websites that sell 2 kits as a bundle, the average is $289
- Of the websites that sell 3 kits as a bundle, the average is $396
- Of the websites that sell 4 kits as a bundle, the average is $488
- Of the websites that sell 5 kits as a bundle, the average is $537

Additionally, at least one website sells up to nine kits in a bundle for $600.

On the online pharmacy websites, the averages are almost consistently $50 less than these.

Compared to pricing at Planned Parenthood centers in and around the Washington, D.C. area, the abortion-pill-focused websites sell MTP kits for a much lower price. Three Planned Parenthood locations list medication abortion at $475 and one lists it at $375, a difference of about $200-300.

♦

CLI's review of 72 websites selling chemical abortion kits directly to consumers reveals a significant problem with medical standards oversight, potentially placing the health of many women at risk. Most of the abortion-focused websites do not require any medical background or prescription from the buyer and some sites do not note any limitation based on the gestational stage of pregnancy. That one person can buy 3, 4, 5, and, in some cases, even 9 abortion kits in one purchase – some hundreds of dollars less than those sold at an abortion center – raises major concerns about the possibility of stockpiling the abortion drugs and the reasons one might do so. With as many as 39 percent of these websites claiming to sell FDA-approved abortion drugs, the largely unregulated, easy-access availability of abortion pills on these websites is a situation warranting urgent attention beyond a statement of caution from the FDA.[2]

[2] https://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm111323.htm

CHARLOTTE LOZIER INSTITUTE

On Science
Issue 4 | September 2021

Abortion Pill Reversal:
A Record of Safety and Efficacy

Previous Reports:

Katrina Furth, Ph.D., *15 Facts at 15 Weeks*, On Science Series 3.
Tara Sander Lee, Ph.D., James Sherley, M.D., Ph.D., *A Policy and Funding Evaluation of Human Fetal Tissue Research*, On Science Series 2.
David A. Prentice, Ph.D., Tara Sander Lee, Ph.D., *A Visual Aid to Viral Infection and Vaccine Production*, On Science Series 1.

The full text of this publication can be found at: https://lozierinstitute.org/abortion-pill-reversal-a-record-of-safety-and-efficacy/

Comments and information requests can be directed to:

Charlotte Lozier Institute
2800 Shirlington Rd, Suite 1200
Arlington, VA 22206
E-mail: info@lozierinstitute.org
Ph. 202-223-8073/www.lozierinstitute.org

Introduction

Chemical abortions have been increasing over recent years to now account for 44 percent of reported abortions in the United States in 2019.[1] These percentages have grown consistently from 6% in 2001 and will likely rise even faster as abortion providers pressure the Food and Drug Administration (FDA) and lawmakers to allow them to sell chemical abortions to women online, without a single, in-person visit to a doctor to verify the gestational age or location of the baby.[2]

With this rise, there has also been a growing number of women who change their mind after taking the first pill in the abortion drug regimen. These women, who no longer want to continue in their abortion, represent the increased interest in the concept of abortion pill reversal (APR) as a potential antidote to chemical abortion.

Here we will analyze the science surrounding APR, the claim of the protocol's efficacy, and concerns regarding the potential side-effects of administration of progesterone. First, we will start by providing an overview of the chemical abortion process.

Chemical Abortion Process

Chemical abortion, also known as the "abortion pill regimen," "medication abortion," or "medical abortion," is a two-drug regimen that is taken up to 70 days (10 weeks), or even longer,[3] into a pregnancy with the intention of causing an abortion, the death of an unborn child.[4] [5] , The first drug a woman takes is mifepristone, which blocks progesterone's actions by binding to progesterone receptors in the ovaries, uterus and the placenta. Progesterone is a naturally occurring hormone in a woman's body that is necessary to nurture and sustain a pregnancy. Blocking this hormone essentially starves the baby of nutrients. Then, 24 to 72 hours after mifepristone is taken, the second drug, usually misoprostol, is taken to induce

[1] Tessa Longbons, "U.S. Abortion Trends: 2019 and Preliminary 2020," *The American Report Series* 19, Charlotte Lozier Institute (Sep. 10, 2021), https://s27589.pcdn.co/wp-content/uploads/2021/09/American-Report-Series_19.pdf.
[2] Michael J. New, "Ignoring the Science: House Democrats Push for Dangerous Mail-Order Abortion," *CBN News* (Sep. 17, 2021), https://www1.cbn.com/cbnnews/us/2021/september/ignoring-the-science-house-democrats-push-for-dangerous-mail-order-abortion.
[3] "The Abortion Pill," *Planned Parenthood*, Planned Parenthood Federation of America, https://www.plannedparenthood.org/learn/abortion/the-abortion-pill.
[4] "Mifeprex (mifepristone) Information," U.S. Food & Drug Administration (Apr. 13, 2021), https://www.fda.gov/drugs/postmarket-drug-safety-information-patients-and-providers/mifeprex-mifepristone-information.
[5] "Questions and Answers on Mifeprex," U.S. Food & Drug Administration (Apr. 13, 2021), https://www.fda.gov/drugs/postmarket-drug-safety-information-patients-and-providers/questions-and-answers-mifeprex.

labor, causing the uterus to contract and expel the deceased baby. This commonly occurs at home, outside of any clinical setting.

Abortion Pill Reversal Protocol

However, before taking the second drug, a woman might change her mind about continuing the chemical abortion. The Abortion Pill Reversal protocol is started within 72 hours after taking the first abortion drug, mifepristone, and before the second drug, misoprostol, is taken. The medical provider will prescribe bioidentical progesterone to outnumber and outcompete the mifepristone in order to reverse the effects of the mifepristone. An ultrasound is performed as soon as possible to confirm heart rate, placement, and dating of the pregnancy. The progesterone treatment will usually continue through the first trimester of pregnancy in an attempt to reverse the effects of the mifepristone.

Progesterone Use in Pregnancy

Bioidentical progesterone has been used to support healthy pregnancies since the 1950s,[6] receiving FDA approval in 1998.[7] Today, progesterone treatment is commonly used to reduce the risk of premature birth[8] and recurring miscarriage.[9] In addition, progesterone supplementation is an expected part of the management of IVF pregnancies after embryo transfer and has an extensive safety record.[10]

In early pregnancy, a woman's body produces extra progesterone to allow the mother's womb to be able to nourish the baby as well as to prevent uterine contractions which lead to miscarriage. In later pregnancy, progesterone also prepares a woman's breasts

---

[6] Gian Carlo Di Renzo et al., "Progesterone: History, facts, and artifacts," *Best Practice & Research Clinical Obstetrics and Gynaecology* 69 (Nov. 2020), https://doi.org/10.1016/j.bpobgyn.2020.07.012.
[7] "Drug Approval Package," Prometrium (Progesterone) Capsules, Application No. 020843, U.S. Food & Drug Administration (approved Dec. 26, 1998), https://www.accessdata.fda.gov/drugsatfda_docs/nda/98/020843_s000_PrometriumTOC.cfm.
[8] Line Rode et al., "Systematic review of progesterone for the prevention of preterm birth in singleton pregnancies," *Acta Obstetricia et Gynecologica Scandinavica* 88 (2009), doi:10.3109/00016340903280982.
[9] Lisa Jaffe, "Progesterone Helps Prevent Reoccurring Miscarriage," *EndocrineWeb*, Remedy Health Media (updated Mar. 10, 2020), https://www.endocrineweb.com/conditions/reproduction/progesterone-therapy-found-help-prevent-reoccurring-miscarriage.
[10] "Fact Sheet: Progesterone supplementation during IVF," *ReproductiveFacts.org*, American Society for Reproductive Medicine (revised 2016), https://www.reproductivefacts.org/globalassets/rf/news-and-publications/bookletsfact-sheets/english-fact-sheets-and-info-booklets/progesterone_supplementation_during_ivf_factsheet.pdf; Practice Committee of the American Society for Reproductive Medicine, "Progesterone supplementation during the luteal phase and in early pregnancy in the treatment of infertility: an educational bulletin," *Fertility and Sterility* 89, American Society for Reproductive Medicine (Apr. 2008) doi:10.1016/j.fertnstert.2008.02.012 C.

to produce milk for her soon-to-be newborn. It also makes her lungs capable of delivering more oxygen to her unborn baby.[11] In short, progesterone is vital to pregnancy.

Two studies published in 2020 in the American Journal of Obstetrics and Gynecology determined that progesterone is a potential treatment for women whose previous miscarriage or bleeding was the result of low progesterone.

The first study, which looked at more than 800 women in 45 hospitals in the United Kingdom and the Netherlands, found progesterone treatment led to a 3% greater live birth rate among those treated than those who were not. This study is known as the PROMISE study.[12] The second study, known as the PRISM study, followed over 4,000 women and produced similar results.[13] Both trials reported that improvement was higher among those who had more miscarriages. The PRISM study even showed a 15% benefit among women with three or more miscarriages and current pregnancy bleeding.

Supporting Research

Animal Research

In 1989, a notable animal study was done using pregnant rats to observe "[t]he effect of RU486 and progesterone on luteal function during pregnancy."[14] In order to do this, the researchers used three groups of rats. The first group was given no drugs, the second received mifepristone, and the third received mifepristone and then bioidentical progesterone. The study found that "100% of the no-drug group delivered live offspring. Only 33.3% of the mifepristone-only group delivered live offspring. In the mifepristone and then progesterone group, 100% delivered live offspring."[15]

Nearly three decades later, further research would demonstrate comparable success with the use of mifepristone and progesterone in human pregnancies.

---

[11] "Progesterone treatment to help prevent premature birth," March of Dimes (reviewed Dec. 2020), https://www.marchofdimes.org/complications/progesterone-treatment-to-help-prevent-premature-birth.aspx.
[12] Arri Coomarasamy et al., "PROMISE: first-trimester progesterone therapy in women with a history of unexplained recurrent miscarriages - a randomised, double-blind, placebo-controlled, international multicentre trial and economic evaluation," *Health Technology Assessment* 20 (May 2016), doi: 10.3310/hta20410.
[13] Arri Coomarasamy, "Progesterone to prevent miscarriage in women with early pregnancy bleeding: the PRISM RCT," *Health Technology Assessment* 24 (June 2020), doi: 10.3310/hta24330.
[14] S. Yamabe, "The effect of RU486 and progesterone on luteal function during pregnancy," *Nihon Naibunpi Gakkai Zasshi* 65 (May 1989), doi: 10.1507/endocrine1927.65.5_497.
[15] Practice Bulletin Committee, "The Reversal of the Effects of Mifepristone by Progesterone," *Practice Bulletin* 6, American Association of Pro-life Obstetricians & Gynecologists (Nov. 2019), https://aaplog.org/wp-content/uploads/2020/01/FINAL-PB-6-Abortion-Pill-Reversal-1.pdf.

Case Studies

In 2018, physician George Delgado (one of the two pioneers of the APR protocol) had a peer-reviewed study published in the medical journal, Issues in Law and Medicine.[16] The study followed 754 women who all wanted to stop their in-progress chemical abortions. Working with obstetrician-gynecologist Dr. Mary Davenport and five other scholars, Delgado demonstrated that when administered within 72 hours of taking mifepristone, the APR protocol has a 64-68% success rate in saving unborn babies.

Notably, the study also found zero increased risk of birth defects or preterm births. Indeed, as referenced in Practice Bulletin 225 from the American College of Obstetricians and Gynecologists (ACOG), mifepristone itself has not been shown to cause birth defects.[17]

Delgado's 2018 study was the first publicly available documentation on the protocol in the U.S. since 2012, when Delgado and Davenport published an article following seven women's progress in Annals of Pharmacotherapy.[18]

With that limited sample size, Delgado and Davenport showed a 66% success rate when the protocol was applied within 72 hours of a woman taking mifepristone. This is consistent with a 2017 study[19] published in The European Journal of Contraception and Reproductive Health Care that followed three women using progesterone to counteract the effects of mifepristone. In this study, two out of three women had successful reversals. The conclusion of the study states: "Progesterone use in early pregnancy is low risk and its application to counter the effects of mifepristone in such circumstances may be clinically beneficial in preserving her threatened pregnancy."

ACOG Practice Bulletin 225

Further evidence pointing to the efficacy of APR is found in the ACOG Practice Bulletin 225, published October of 2020.[20] The bulletin details ACOG's guidance on the provision of

[16] George Delgado et al., "A case series detailing the successful reversal of the effects of mifepristone using progesterone," *Issues in Law & Medicine* 33 (Spring 2018), https://pubmed.ncbi.nlm.nih.gov/30831017/.
[17] Committee on Practice Bulletins—Gynecology and the Society of Family Planning et al., "Medication Abortion Up to 70 Days of Gestation," *Practice Bulletin* 225, American College of Obstetricians and Gynecologists (Oct. 2020), https://www.acog.org/clinical/clinical-guidance/practice-bulletin/articles/2020/10/medication-abortion-up-to-70-days-of-gestation.
[18] George Delgado and Mary L. Davenport, "Progesterone Use to Reverse the Effects of Mifepristone," *Annals of Pharmacotherapy* 46 (Nov. 2012), https://doi.org/10.1345%2Faph.1R252.
[19] Deborah Garratt and Joseph V. Turner, "Progesterone for preventing pregnancy termination after initiation of medical abortion with mifepristone," *The European Journal of Contraception & Reproductive Health Care* 22 (Dec. 2017), doi: 10.1080/13625187.2017.1412424.
[20] Committee on Practice Bulletins et al., "Medication Abortion Up to 70 Days of Gestation."

"medication abortion." While they do claim in the bulletin, "There is no evidence that treatment with progesterone after taking mifepristone increases the likelihood of the pregnancy continuing," they go on to warn abortion providers to avoid administering depot medroxyprogesterone acetate (DMPA), a progestin-only birth control, on the same day that mifepristone is administered. ACOG states that doing so reduces the efficacy of the chemical abortion and increases the chances of embryonic and fetal survival by 4 times (0.9% vs 3.6%),[21] even after the woman has taken the second drug, misoprostol. "Patients who select depot medroxyprogesterone acetate (DMPA) for contraception should be counseled that administration of DMPA on day 1 of the medication abortion regimen may increase the risk of ongoing pregnancy."

The progestin provided in DMPA is notably less effective than natural progesterone and given at a much lower dose as compared to the bioidentical progesterone provided in the APR protocol, but still has a significant impact on fetal survival.

Mitchell Creinin, a known critic of abortion pill reversal, was one of the authors of this bulletin. In 2019, Creinin published results of a randomized controlled trial of mifepristone alone vs. mifepristone and then natural progesterone. The results of the 2019 study (which was eventually cut short) demonstrated the success of Abortion Pill Reversal. Among the patients who received progesterone, 80% were able to achieve an ongoing pregnancy. This is compared to only 40% of the women who received the placebo. In the progesterone group, four out of the five women had "gestational cardiac activity" (a fetal heartbeat) at follow-up.[22]

Current Usage of Abortion Pill Reversal (APR)

Since the protocol was first used by physicians George Delgado (in 2009) and Matthew Harrison (in 2007), statistics now show more than 2,500 babies have been saved following use of the APR protocol.[23]

Generally, APR is provided through the Abortion Pill Rescue Network, a global association of more than 1,000 volunteer medical providers and pregnancy help organizations. The Abortion Pill Rescue Network, which is operated by Heartbeat International, helps over 100 women per month to initiate the APR process.

---

[21] Elizabeth G. Raymond et al., "Effects of Depot Medroxyprogesterone Acetate Injection Timing on Medical Abortion Efficacy and Repeat Pregnancy: A Randomized Control Trial," *Obstetrics and Gynecology* 128 (Oct. 2016), doi: 10.1097/AOG.0000000000001627.
[22] Mitchell D. Creinin et al., "Mifepristone Antagonization With Progesterone to Prevent Medical Abortion: A Randomized Controlled Trial," *Obstetrics and Gynecology* 135 (Jan. 2020), doi: 10.1097/AOG.0000000000003620.
[23] "Abortion Pill Reversal: What is the Abortion Pill Reversal Process?" *Abortion Pill Rescue Network*, https://aprnworldwide.com/abortion-pill-reversal.

Legislative Efforts to Promote APR

With the growing number of successful reversals through the APR protocol, legislators both federally and locally have shown increased interest in ensuring women who choose to begin the chemical abortion process are aware of the possibility of reversing their abortion. Primarily this is being accomplished through informed consent laws. These require medical professionals who provide the abortion pill regimen to also inform the woman, either in writing or orally, that she could possibly reverse her abortion if she should change her mind. Fourteen states have passed such legislation into law, and 10 of those laws are currently in effect.[24]

There have also been congressional efforts to advance the legislation titled the "Second Chance at Life Act." It was introduced in the 116th and 117th Congress and each time received over 60 co-sponsors.[25]

Conflicting Research

The Creinin Study

In the 2019 paper referred to above, a study aiming to disprove the efficacy of abortion pill reversal was conducted by Mitchell Creinin and four other individuals, all who have been or currently are abortion providers. Dr. Creinin is an abortion provider who is and has been a paid consultant with Danco Laboratories,[26] which manufactures the abortion pill mifepristone.

His study was intended to involve 40 women who were seeking chemical abortions. They were to be given the first pill of the chemical abortion regimen, mifepristone, and then randomly selected to receive either progesterone or a placebo. Women in the study whose pregnancies progressed were to be offered a subsequent option of a surgical abortion.[27] In the end, the study only included 10 women, five of whom underwent the APR protocol and five who received the placebo.

[24] "Abortion Pill Reversal Factsheet," National Right to Life (July 7, 2021), https://www.nrlc.org/uploads/stateleg/AbortionPillReversalFactSheet.pdf.
[25] Second Chance at Life Act of 2019, H.R. 2010, 116th Cong. (2019), https://www.congress.gov/bill/116th-congress/house-bill/2010/cosponsors?q=%7B%22search%22%3A%5B%22mifepristone%22%5D%7D&r=3&s=3; Second Chance at Life Act of 2021, H.R. 552, 117th Cong, (2021), https://www.congress.gov/bill/117th-congress/house-bill/552/cosponsors?r=5&s=1.
[26] Creinin et al., "Mifepristone Antagonization With Progesterone to Prevent Medical Abortion."
[27] University of California, Davis, "Blocking Mifepristone Action With Progesterone," Identifier NCT03774745 (Feb. 2019 – Aug. 2019), https://clinicaltrials.gov/ct2/show/study/NCT03774745.

The study was cut short when three women experienced bleeding complications and visited the ER. In the group which did not receive progesterone, two of the five women (40%) required emergency D&Cs and one also required a transfusion. The third woman who bled heavily was part of the progesterone group. Her bleeding stopped on its own and she did not require any treatment or surgery.

There are many possible complications listed by medical authorities that are associated with chemical abortion.[28] These include an incomplete abortion, potentially resulting in the need for a follow-up surgical abortion,[29] heavy and prolonged bleeding, infection, fever and digestive system discomfort, according to the Mayo Clinic.[30]

The previously referenced 2020 Practice Bulletin 225 from ACOG, developed in collaboration with abortion providers Dr. Creinin and Dr. Daniel Grossman, states that, "limited available evidence suggests that use of mifepristone alone without subsequent administration of misoprostol may be associated with an increased risk of hemorrhage."[31] However, this speculative conclusion is refuted by the 2021 publication of the analysis of adverse event reports submitted to the FDA.[32] In this study of over 3,197 adverse events, "Hemorrhage occurred more often in those who took mifepristone and misoprostol (51.44%) than in those who took mifepristone alone (22.41%)."[33] This evidence clearly refutes the speculation that somehow taking mifepristone without misoprostol is more likely to result in hemorrhage than taking mifepristone alone. In fact, the 2019 Creinin study of mifepristone followed by misoprostol demonstrated that progesterone had a protective effect against hemorrhage.

Conclusion

Multiple studies throughout the world continuously produce positive results regarding the use of progesterone in pregnant women. Progesterone has been shown to help reduce the risk of miscarriages and lower the rates of preterm birth. APR is a cutting-edge application of this time-tested, FDA-approved treatment used for decades to provide women

[28] Kathi Aultman et al., "Deaths and Severe Adverse Events after the use of Mifepristone as an Abortifacient from September 2000 to February 2019," *Issues in Law & Medicine* 36 (Spring 2021), https://pubmed.ncbi.nlm.nih.gov/33939340/.
[29] Maarit Niinimäki et al., "Immediate complications after medical compared with surgical termination of pregnancy," *Obstetrics and Gynecology* 114 (Oct. 2009), doi: 10.1097/AOG.0b013e3181b5ccf9.
[30] Mayo Clinic Staff, "*Medical abortion*," Mayo Clinic, Mayo Foundation for Medical Education and Research (May 14, 2020), https://www.mayoclinic.org/tests-procedures/medical-abortion/about/pac-20394687/
[31] Committee on Practice Bulletins et al., "Medication Abortion Up to 70 Days of Gestation."
[32] Aultman et al., "Deaths and Severe Adverse Events after the use of Mifepristone."
[33] Ibid.

who regret taking the first abortion pill with a chance to reverse the effects and ultimately save their pregnancies.

Kevin Corbett | Chief Executive Officer

J. Kevin Stitt | Governor

Oklahoma Health Care Authority

Recommendation to the Helping Every Life and Parent (H.E.L.P.) Task Force

Purpose and Goals of the Drug Utilization Review Board

The Drug Utilization Review Board (DUR) was established to comply with Federal regulations contained in the Omnibus Budget Reconciliation Act of 1990 to advise OHCA about the appropriate and optimal use of pharmaceuticals for Oklahoma Medicaid recipients.

The primary goal of drug utilization review is to enhance and improve the quality of pharmaceutical care and patient outcomes by encouraging optimal drug use. This goal is accomplished primarily by educating physicians and pharmacists to ensure that drug therapy is appropriate, safe and effective.

The DUR is subject to the Open Meetings Act and consists of ten appointees recommended by the Oklahoma State Medical Association, Oklahoma Osteopathic Association, Oklahoma Pharmacists Association, and the Pharmaceutical Research and Manufacturers of America. Functional activities include:

- Making policy recommendations regarding medication coverage; establishing and/or approving criteria and standards for DUR; developing and evaluating the DUR program
- Making recommendations concerning the appropriate mix of education and intervention approaches to be carried out as a result of medication therapy problems identified in the prospective and retrospective review process

Recommendation to the H.E.L.P. Task Force:

Direct the DUR to research, examine and consider for coverage under SoonerCare the use of progesterone to reverse the effects of a chemical abortion attempt.

Support Pregnancy Centers in Oklahoma

APPENDIX C

Attachment 1

Tax Credit

Attachment 2

Continue Funding

ATTACHMENT 1

Tax Credit

Short Title: Revenue and taxation; tax credit; pregnancy resource centers; effective date.

Subject(s): Taxation - Credits

STATE OF OKLAHOMA

1st Session of the 59th Legislature (2023)

HOUSE BILL NO. _____ By: Williams

AS INTRODUCED

An Act relating to revenue and taxation; defining terms; creating tax credit for contributions made to pregnancy resource centers; limiting tax credit amount; limiting certain uses of tax credit; limiting ability to claim credit; authorizing director of Oklahoma Department of Human Services to classify pregnancy resource centers; requiring certain procedure; allowing pregnancy resource centers to decline contributions; requiring pregnancy resource centers to provide certain information; requiring director to provide certain information to Oklahoma Tax Commission; subjecting director to certain requirements; providing for codification; and providing an effective date.

BE IT ENACTED BY THE PEOPLE OF THE STATE OF OKLAHOMA:

SECTION 1. NEW LAW A new section of law to be codified in the Oklahoma Statutes as Section 2357.701 of Title 68, unless there is created a duplication in numbering, reads as follows:

A. As used in this section:

1. "Contribution" means a donation of cash, stock, bonds, or other marketable securities, or real property;

2. "Director" means the director of the Oklahoma Department of Human Services;

3. "Pregnancy resource center" means a nonresidential facility located in this state:

a. established and operating primarily to provide assistance to women and families with crisis pregnancies or unplanned pregnancies by offering pregnancy testing, counseling, emotional and material support, and other similar services or by offering services, such as:

(1) prenatal care,

(2) medical and mental health care,

(3) parenting skills,

(4) drug and alcohol testing and treatment,

(5) child care, and newborn and infant care,

(6) housing and utilities,

(7) educational services,

(8) food, clothing, and supplies relating to pregnancy, newborn care, and parenting,

(9) adoption assistance,

(10) job training and placement,

(11) establishing and promoting responsible paternity,

(12) ultrasound services,

(13) case management,

(14) domestic abuse protection, and

(15) transportation,

to encourage and assist such women and families in carrying their pregnancies to term,

b. where childbirths are not performed,

c. which does not perform, induce, or refer for abortions and which does not hold itself out as performing, inducing, or referring for abortions,

d. which provides direct client services at the facility, as opposed to merely providing counseling or referral services by telephone,

e. which provides its services at no cost to its clients,

f. when providing medical services, such medical services must be performed in accordance with Oklahoma statute, and

g. which is exempt from income taxation pursuant to the Internal Revenue Code; and

4. "Taxpayer" means a person, firm, a partner in a firm, corporation, or a shareholder in an S corporation doing business in the state and subject to the tax imposed by Section 2355 of Title 68 of the Oklahoma Statutes or an insurance company subject to the tax imposed by Section 624 or 628 of Title 36 of the Oklahoma Statutes or other financial institution subject to the tax imposed by Section 2370 of Title 68 of the Oklahoma Statutes.

B. For taxable years beginning after December 31, 2023, there shall be allowed a credit against the tax imposed pursuant to

Section 2355 of Title 68 of the Oklahoma Statutes in the amount of seventy percent (70%) of the amount a taxpayer contributed to a pregnancy resource center.

C. A taxpayer shall not be allowed to claim a tax credit in excess of Fifty Thousand Dollars ($50,000.00) per taxable year. However, any tax credit that cannot be claimed in the taxable year the contribution was made may be claimed in the next succeeding taxable year.

D. The credit authorized pursuant to the provisions of this section may not be used to reduce the tax liability of the taxpayer to less than zero (0). The credit authorized pursuant to the provisions of this section may not be assigned, transferred, or sold.

E. Except for any excess credit which is carried over pursuant to subsection C of this section, a taxpayer shall not be allowed to claim a tax credit unless the total amount of such taxpayer's contribution or contributions to a pregnancy resource center or centers in a taxable year has a value of at least One Hundred Dollars ($100.00).

F. The Director shall determine, at least annually, which facilities in this state may be classified as pregnancy resource centers. The Director may require of a facility seeking to be classified as a pregnancy resource center whatever information which is reasonably necessary to make such a determination. The Director

shall classify a facility as a pregnancy resource center if such facility meets the definition set forth in subsection A of this section. The Director shall establish a procedure by which a taxpayer can determine if a facility has been classified as a pregnancy resource center.

G. Pregnancy resource centers shall be permitted to decline a contribution from a taxpayer.

H. Each pregnancy resource center shall provide information to the Director concerning the identity of each taxpayer making a contribution to the pregnancy resource center who is claiming a tax credit pursuant to this section and the amount of the contribution. The Director shall provide the information to the Oklahoma Tax Commission. The Director shall be subject to the confidentiality and penalty provisions of Section 205 of Title 68 of the Oklahoma Statutes relating to the disclosure of tax information.

SECTION 2. This act shall become effective January 1, 2024.

59-1-5105 AQH 10/20/22

ATTACHMENT 2

Continue Funding

From:	Jackie Shawnee
To:	"jmerciez@cottageforlife.org"
Cc:	Beverly Hicks
Subject:	taskforce recs
Date:	Thursday, October 20, 2022 10:54:19 AM
Attachments:	2 Elmira 1986_Improving the Delivery of Prenatal Care and Outcomes of Pregnancy_A Randomized Trial of Nurse Home Visitation.pdf 4 Denver_Differences in Program Implementation Between Nurses and Paraprofessionals Providing Home Visits During Pregnancy and Infancy.pdf 3 Memphis_Effect-of-Prenatal-and-Infancy-Home-Visitation-by-Nurses-on-Pregnancy-Outcomes-Childhood-Injuries-and-Repeated-Childbearing-A-Randomized-Controlled.pdf image001.png CHW ROI Summary.pdf Oklahoma_2022_Maternity Deserts.pdf Recommendation_PRN,Deserts,Preg Centers.pdf

---

Good morning Chairwoman Merciez,

As requested please find below and attached supporting information, current resources and a proposed recommendation for the pregnancy resource navigators program, maternity deserts, and pregnancy resource centers funding. Supporting docs are attached, but also the info below is in a 3 page document that is attached as well for easy distribution.

If you have any questions or need anything additional please let me know. Thank you and see you next Tuesday!

PREGNANCY RESOURCE NAVIGATORS

Supporting Research & Evidence: *see attachments for additional data*

- The experiences of the first two months of life have an important impact on long-term health and development. This has to do with the remarkably rapid growth of the brain early in life, and the organization of core regulatory networks that form our ability to cope.
- Studies highlight the importance of initial and ongoing CHW training, appropriate caseloads, effective communication, and community solutions to barriers.
- Successful CHW programs include recruitment of peers from the community, close proximity of services to households, provision of home-based services, and strengthened referral/follow up to resources. Oklahoma State Department of Health (OSDH) currently has 42 CHW's in a variety of settings.
- High-quality home visiting programs can improve outcomes for children and families, particularly those that face added challenges such as teen or single parenthood, maternal depression and lack of social and financial supports.

Current Programs & Resources:

Home visiting programs are a long-proven model for supporting the physical, cognitive and emotional development of children, and can improve family economic self-sufficiency and enhance parents' abilities to support their children's development. Oklahoma currently has 70 Children's First nurses available for home visits.

Community health workers are generally peers who provide tailored social support to those they serve, helping to navigate complex systems. This workforce is trained and supported by professionals to assess needs, connect to care and follow up on next steps.

Budget: $2.9M annually

- 25 Community Health Workers
- Target population served: 24,000 newborns and families (40% of annual births)
- See attached budget for details

Conclusion: Pregnancy Resource Navigators benefit Oklahoma families by integrating the proven home visiting and community health worker models for prosperous babies, mothers and families.

> **Proposed Recommendation**: Seek support for the Pregnancy Resource Navigator (PRN) program by the Oklahoma State Department of Health (OSDH) to expand home visiting and case management services to support and celebrate Oklahoma mothers, babies and families.

MATERNITY DESERTS

Supporting Research & Evidence:

- According to the March of Dimes, 41 of our 77 counties are in maternity care deserts (impacting ~ 109,385 women) and another 20 counties have low access to maternity care (impacting 173,911 more women) in our state
- Thus, 61 out of 77 counties affecting ~ 283,296 women annually in our state do not have adequate access to maternity care for our Oklahoma mothers
- 63% of deaths of mothers were determined to have been preventable.
    - The Maternal Mortality Review Committee decisions indicated that most women who died within one year of a pregnancy ending could possibly have had better outcomes had particular health-related issues been better managed prior to, during, or after the pregnancy.
    - Such health-related issues include receiving preconception health screenings, increased access to appropriate prenatal care, increased awareness of possible complications post-delivery and seeking medical intervention as soon as warning signs are identified.

Current Programs & Resources:

- OSDH is working to address maternity deserts through county health department mobile units throughout the sate

- This is in various stages of implementation with plans to expand to all ten public health districts in collaboration with their communities in 2023.
- Mobile units care to for mothers where they are and work with community partners to provide quality prenatal care needed for best outcomes for Oklahoma moms and babies.

Conclusion: Oklahoma has a number of maternity desert areas, causing access to care for mothers before, during and after pregnancy difficult.

Proposed Recommendation: Identify opportunities to expand health services to women in all areas of the state and address the social determinants of health including improved access to care and reliable transportation women.

PREGNANCY RESOURCE CENTER FUNDING

Supporting Research & Evidence:

- Legislation passed in 2018 to reimburse non-profit organizations to assist mothers in carrying their children to term and provide support to mothers and infants for an additional year following birth.
- Modeled after the Texas Pregnancy Care Network model.

Current Programs & Resources:

- OSDH is currently contracted with the Oklahoma Pregnancy Care Network (OPCN).
  - $3M per year in available funding for non-profit organizations in Oklahoma to reimburse for counseling, referrals, classes and materials assistance.
  - Currently $9M in carryover funding available
  - Service options include, but not limited to:
    - Provide medical attention for the duration of pregnancy;
    - Nutritional support services;
    - Housing assistance;
    - Education and employment assistance;
    - Parenting education and support services.
-

Conclusion: Oklahoma has available funds for supporting Oklahoma mothers, babies and families through pregnancy resource centers statewide.

Proposed Recommendation: Identify opportunities to expand ways in which available funding flows to pregnancy resource centers throughout the state.

Sincerely,

Jackie Shawnee | Chief of Staff
Office of the Commissioner | Oklahoma State Department of Health
Oklahoma.gov | health.ok.gov

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation

David L. Olds, Charles R. Henderson, Jr, Robert Tatelbaum and Robert Chamberlin

Pediatrics 1986;77;16-28

Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation

David L. Olds, PhD, Charles R. Henderson, Jr, Robert Tatelbaum, MD, and Robert Chamberlin, MD

From the Departments of Pediatrics and Obstetrics and Gynecology, University of Rochester, Rochester, New York; Comprehensive Interdisciplinary Developmental Services, Inc, Elmira, New York; Department of Human Development and Family Studies, Cornell University, New York; and New Hampshire State Department of Health and Welfare, Concord

ABSTRACT. We evaluated a comprehensive program of prenatal and postpartum nurse home visitation. The program was designed to prevent a wide range of health and developmental problems in children born to primiparous women who were either teenagers, unmarried, or of low socioeconomic status. During pregnancy, women who were visited by nurses, compared with women randomly assigned to comparison groups, became aware of more community services; attended childbirth classes more frequently; made more extensive use of the nutritional supplementation program for women, infants, and children; made greater dietary improvements; reported that their babies' fathers became more interested in their pregnancies; were accompanied to the hospital by a support person during labor more frequently; reported talking more frequently to family members, friends, and service providers about their pregnancies and personal problems; and had fewer kidney infections. Positive effects of the program on birth weight and length of gestation were present for the offspring of young adolescents (<17 years of age) and smokers. In contrast to their comparison-group counterparts, young adolescents who were visited by nurses gave birth to newborns who were an average of 395 g heavier, and women who smoked and were visited by nurses exhibited a 75% reduction in the incidence of preterm delivery. ($P \leq .05$ for all findings.) *Pediatrics* 1986;77:16–28; *prenatal care, pregnancy, nurse, home visitation, birth weight, health habit.*

Despite improvements in perinatal care and reductions in infant mortality, the incidence of low-birth-weight infants (≤2,500 g) has decreased only slightly during the past decade.[1,2] Low birth weight is still the greatest threat to the life and well-being of infants in the United States.[3,4] It is more prevalent in lower socioeconomic groups, a phenomenon that can be explained, in large part, by differences in maternal health habits (such as smoking and alcoholism) and behavioral choices (such as age at conception and use of prenatal care) but not by differences in medical complications.[5]

During the 1960s and early 1970s, in an effort to improve the outcomes of pregnancy and early child rearing among the poor, the federal government funded a number of health service demonstration programs for poor, young, pregnant women and their children.[6–10] Most of the programs provided a greater array of services (eg, medical, psychologic, social) than had been available previously, but they continued to be delivered from traditional clinic-based settings. Although this greater variety of services represents an improvement over what was previously available, office-based services often do not reach those in greatest need. Moreover, without an appreciation for the full set of stressful family and community influences on women's health habits and behaviors, office-based personnel are not in a strong position to foster change. This is especially true in the case of socially disadvantaged women, for whom there are many difficult life circumstances that interfere with appropriate health habits. The evaluations of clinic-based programs have been difficult to interpret because the control groups, when used at all, were not randomly assigned.

Randomized and other controlled trials of prematurity and low-birth-weight prevention strategies have been carried out, but they typically have tested single preventive agents[11–19]; thus, the greater

Received for publication March 4, 1985; accepted June 12, 1985.
Reprint requests to (D.L.O.) Department of Pediatrics, University of Rochester, Rochester, NY 14642.

rigor in design was offset by the futile search for a "magic bullet." The results of these single-agent interventions have been inconsistent. Because preterm delivery and low birth weight have multiple determinants, it was our judgment that the problem needed to be addressed with home visitation services that could moderate a range of risk factors simultaneously.

Home visitation has been given considerable attention as a possible means of improving child health.[20,21] Prior to this report, however, the effect of prenatal home visitation on pregnancy outcomes had not been studied in rigorous fashion, although a few studies had examined postnatal home visitation programs.[22-24] The prenatal phase of the home visitation program evaluated in the present study was based on the premise that comprehensive home visitation by nurses should be an effective means of (1) reaching women who are reluctant to use traditional health and human services, (2) responding flexibly to the stressful life circumstances with which socially disadvantaged women must contend, (3) improving their health habits and behaviors, and (4) ultimately, reducing the rates of preterm delivery and low-birth-weight infants. The prenatal and postpartum home visitation service was designed to prevent a wide range of childhood health and developmental problems. This report evaluates the effectiveness of the prenatal program as a means of enhancing the antepartum social support, health habits, and obstetrical health status of socially disadvantaged women and of improving the length of gestation and birth weight of their babies.

DESIGN AND METHODS

The study design consisted of a randomized, clinical trial. Participating families were assigned at random to one of the four treatment conditions outlined in Table 1.

Treatment Conditions

Treatment 1. Families in the first group served as a control. During pregnancy, no services were provided through the research project. When the babies were 1 and 2 years of age, an infant specialist hired by the research project screened them for sensory and developmental problems. Suspected problems were referred to other specialists for further evaluation and treatment.

Treatment 2. Families in the second group were provided free transportation for regular prenatal and well-child care at local clinics and physicians' offices through a contract with a local taxicab company. Sensory and developmental screening, as in treatment 1, was provided when the babies were 1 and 2 years of age.

Treatment 3. Families in the third group were provided a nurse home-visitor during pregnancy in addition to the screening and transportation services. The nurses visited families about once every 2 weeks and made an average of nine visits during pregnancy, each of which lasted approximately one hour and 15 minutes.

Treatment 4. Families assigned to the fourth group received the same services during pregnancy as those in treatment 3, but, in addition, the nurses continued to make visits until the babies were 2 years of age. For the first month after delivery, the nurses visited once a week; thereafter, they visited on a schedule of diminishing frequency until the infants were 18 to 24 months of age, when visits were made every 6 weeks.

Prenatal Home Visitation Program

During their visits, the nurses carried out three basic activities: parent education, the enhancement of the women's informal support systems, and the linkage of the parents with community services. A central aspect of the nurses' approach was to emphasize the strengths of the women and their families.

An average of 83% of the nurses' home-visiting time during the prenatal period was devoted to education. The prenatal education program provided information on fetal and infant development, with the ultimate objective of improving parental behavior that theoretically affects fetal growth and

TABLE 1. Services Provided (+) in Each of the Four Treatment Groups

Services Provided	Treatment Group			
	1 (n = 90)	2 (n = 94)	3 (n = 100)	4 (n = 116)
Health and developmental screening at the child's 12th and 24th month of life	+	+	+	+
Free transportation to regular prenatal and well-child visits		+	+	+
Nurse home visitation during pregnancy			+	+
Nurse home visitation during the child's first 2 years of life				+

well-being of the newborn. Specific objectives included improving women's diets; helping women monitor their weight gain and eliminate the use of cigarettes, alcohol, and drugs; teaching parents to identify the signs of pregnancy complication; encouraging regular rest, appropriate exercise, and good personal hygiene related to obstetrical health; and preparing parents for labor, delivery, and early care of the newborn. The nurses used a detailed curriculum to guide their educational activities but tailored the content of their visits to the family's individual needs.

The second major activity of the nurses was to enhance the informal support available to the women during pregnancy, birth, and subsequent early child rearing. The nurses encouraged the women's relatives (usually their husbands and own mothers) as well as their close friends (including boyfriends) to participate in the home visits, to accompany the women to childbirth classes, to help them with household responsibilities, and to act as coaches during labor and delivery.

The nurses also linked families with community-based health and human services. Parents were urged to keep prenatal care appointments, to enroll in childbirth education classes, and, when needed, to seek other community services, such as the nutritional supplementation program for women, infants, and children.

The nurses worked closely with the clinic personnel and private office staff members responsible for the women's primary prenatal care. The women themselves were encouraged to call the physician or clinic at the first sign of any complication of pregnancy. In addition, the nurses sent two formal reports to the private obstetricians and the clinic staff informing them of the nurses' observations of maternal medical, social, and emotional conditions. The nurses clarified and reinforced physicians' recommendations in the home.

Detailed record-keeping systems and regular case reviews were used to make sure that the home visit protocol was followed by each nurse. Detailed descriptions of both the prenatal and postpartum programs are provided elsewhere.[25-27]

Setting

The study was carried out in a small, semirural county of approximately 100,000 residents in the Appalachian region of New York State. The community was well served from the standpoint of health and human services. Prenatal care was available through nine obstetricians and a free antepartum clinic sponsored by the health department. Prior to 1974, the county had one of the highest rates of infant mortality in the state (an average of 21.8 deaths per 1,000 births for the years 1971 to 1973). After the recruitment of a full-time neonatologist at a local hospital in 1974, the rates of infant mortality declined. For the 3-year period immediately preceding the current study (1975 to 1977), the mortality rate was 15.2 deaths per 1,000 births.[28] Moreover, the community has consistently exhibited the highest rates of reported and confirmed cases of child abuse and neglect in the state.[29] In 1980, the community was rated the worst Standard Metropolitan Statistical Area in the United States in terms of its economic conditions.[30]

Sample

Pregnant women were actively recruited if they had no previous live births and had any one of the following characteristics that predispose to infant health and developmental problems: (1) young age (<19 years), (2) single-parent status, (3) low socioeconomic status. The study design, however, allowed any woman who asked to participate and who was bearing a first child to be enrolled. This avoided creating a program that was stigmatized as being exclusively for the poor, and it enabled us to determine whether the effects of the program were greater for families at greater risk by creating sample heterogeneity. Women more than 25 weeks pregnant were to be excluded, but because of the difficulty of estimating length of gestation at the time of registration, 30 women were enrolled between the 26th and 29th week of pregnancy.

Women were recruited through the health department antepartum clinic, the offices of private obstetricians, Planned Parenthood, the public schools, and a variety of other health and human service agencies. Approximately 10% of the target population was missed due to late registration for prenatal care. An additional 10% was missed because some eligible women from the offices of private obstetricians were not referred. Between April 1978 and September 1980, 500 women were interviewed, and 400 enrolled. Appropriate informed consent was obtained. There were no differences in age, marital status, or education between those women who participated and those who declined. Ninety-four percent of the nonwhite women (mostly black) enrolled as opposed to 80% of the white women ($P = .02$).

At enrollment, 47% of the participating women were younger than 19 years of age, 62% were unmarried, and 61% came from families in Hollingshead's[31] social classes IV and V (semiskilled and unskilled laborers). (Hollingshead's index was adapted slightly to accommodate the variety of household compositions found in our sample. Details of the procedure can be obtained from the

first author.) Fifteen percent of the women were not at risk according to either the age, marital status, or socioeconomic status criteria, and 23% possessed all three risk characteristics. Sixty-eight percent of the women obtained antepartum care at the health department clinic, whereas the remaining 32% received care from private obstetricians.

Forty-six nonwhite women were removed from the analyses reported here because the sample of nonwhite women was too small to cross-classify race with other variables of importance in the statistical analyses. Twenty cases with maternal or fetal conditions predisposing to preterm delivery and/or aberrations in fetal growth were removed from the analysis in order to minimize the number of cases unalterable by the home-visiting service. The design-matrix location of these nonwhite women and medically complicated cases is presented in Table 2; the results of analyses including these cases are presented elsewhere[32] but are virtually the same as those reported in this paper.

Treatment Assignment

Families enrolled in the program were stratified by marital status, race, and seven geographic regions within the county (based on census tract boundaries). These families were assigned at random to one of the four treatment conditions. At the end of the intake interview, the women drew their treatment assignments from a deck of cards. The stratification was executed by using separate decks for the groups defined by the women's race, marital status at intake, and, for white women, the geographic region in which they resided. To ensure reasonably balanced subclasses, the decks were reconstituted periodically to overrepresent those treatments with smaller numbers of subjects, a procedure similar to Efron's[33] biased-coin designs. Women in treatments 3 and 4 subsequently were assigned on a rotating basis, within their stratification blocks, to one of five home visitors.

There were two departures from the randomization procedure. First, in six cases, women who enrolled were living in the same household as other women already participating in the study. To avoid potential horizontal diffusion of the treatment in the case of different assignment within households, the six new enrollees were assigned to the same treatment as their housemates.

Second, during the last 6 months of the 30-month enrollment period, the number of cards representing treatment 4 was increased in each of the decks in order to enlarge the size of that group and to enhance the statistical power of the design to compare, during the postpartum phase of the research, the infancy home-visiting program with treatments 1 and 2. Analysis of selected dependent variables confirmed that this slight confounding of treatments with time did not affect the pattern of treatment differences reported below.

Data Collection

Interviews were carried out with participating women by project staff members at the time of registration in the project (prior to their assignment to treatments) and again at the 32nd week of pregnancy. Obstetrical, labor, delivery, and newborn records were abstracted by two registered nurses

TABLE 2. Distribution of Nonwhite Women and Serious Fetal or Maternal Medical Conditions Associated With Fetal Growth Retardation Removed From Analysis of Pregnancy Data

Condition	Treatment Group	Age 14–16 yr		Age 17–34 yr	
		Smokers	Nonsmokers	Smokers	Nonsmokers
Nonwhite	Nurse-visited	1	9	3	14
	Comparison	2	4	1	12
Fetal conditions					
Twins	Nurse-visited				1
	Comparison				1
Major malformations	Nurse-visited	1		3*	
	Comparison			1	1
Maternal conditions					
Diabetes	Nurse-visited				
	Comparison			1†	1
Hypertension	Nurse-visited			1*	2
	Comparison			4†	1
Uterine malformation	Nurse-visited				1
	Comparison				
Stillbirths	Nurse-visited			1	1
	Comparison			1	

* In one case, the newborn had major malformations and the mother had hypertension.
† One woman had both diabetes and hypertension.

who were trained to reliability by our obstetrical co-investigator (R.T.).[32] Diagnoses used for this study were those recorded in the medical record. Nurses in the labor and delivery room completed forms indicating whether the women were accompanied to labor and delivery by a support person. The interviewers and medical record reviewers hired by the research project did not know to which treatment the women had been assigned.

At intake, the women were interviewed to determine their family structure, socioeconomic background, psychologic characteristics, health conditions, health habits, the availability of informal support, and their child-rearing histories. At the 32nd week of pregnancy, they were interviewed regarding their use of other health and human services, the support provided to them by significant persons in their informal networks, and their health habits.

Dietary intake was measured at both assessment periods, using 24-hour diet records and 24-hour recalls. For 74% of the sample, dietary data were gathered for two consecutive 24-hour periods at each assessment period; for an additional 14% of the sample, data were available for a single 24-hour period. These data were aggregated into a nutrient-adequacy ratio (NAR index), which converted the intake of 12 nutrients into a summary of percentages of Recommended Dietary Allowances.[34] Using an extension of intraclass correlation techniques, we found the reliability of the dietary data to be acceptable.[32]

Serum cotinine assays were done to validate the women's reported level of smoking on a subsample of 116 patients who received their antepartum care at the health department clinic. Serum was derived from blood samples drawn routinely at the patients' registration in the clinic and at approximately the 36th week of pregnancy. Cotinine levels were determined by radioimmunoassay.[35,36]

Estimates of length of gestation gave priority to newborn physical and neurologic examinations (based on the Dubowitz procedure) and to ultrasound readings taken before the 28th week of pregnancy. Reported last menstrual periods (LMPs) and measurements of uterine size made before 20 weeks were used when newborn examination and ultrasound data were not available. The gestational age of all low-birth-weight babies was estimated from the newborn physical examination findings.

Statistical Models and Methods of Analysis

For all analyses, a core statistical model was derived that consisted of a $2 \times 2 \times 2 \times 2$ factorial structure (leading to 16 smallest subclasses): treatments (1 and 2 v 3 and 4) $\times$ maternal smoking status (zero to four v five or more cigarettes per day) $\times$ maternal age (<17 v ≥ 17 years) $\times$ sex of child. This model was extended to include a repeated-measures structure for dependent variables measured both early and late in pregnancy. Three covariates measured at registration (maternal prepregnant weight, prepregnant height, and number of cigarettes smoked per day at intake) were included in the model when birth weight and length of gestation were analyzed as dependent variables in order to reduce error variance and improve the precision of our estimates.

A thorough investigation was carried out for each covariate to determine whether its relationship with the dependent variable was the same for contrasting groups defined by levels of the classification factors; that is, whether the slopes were parallel. This was to ensure the correct interpretation of adjusted mean differences and to evaluate any substantive findings resulting from such interactions of the covariate with classification factors.[37] Separate regressions of birth weight on prepregnant height were specified for older and younger women, because we found a trend for height, even after adjustment for prepregnant weight, to be related to birth weight among the young adolescents but not among the older women. For certain analyses of birth weight, length of gestation was added to the model as a covariate; in these cases, the square root of length of gestation was used instead of a linear term, because the relationship between birth weight and length of gestation is steeper at earlier dates (eg, between 27 and 37 weeks) than later. This transformed length-of-gestation variable was specified separately for older and younger women because we found, as did Horon *et al*,[38] that the relationship between birth weight and length of gestation differed depending on age of the mother.

Treatments 1 and 2 were combined for purposes of analysis after it was determined that there were no differences between these two groups in their use of routine prenatal care, the primary means by which transportation was hypothesized to affect pregnancy outcomes. Treatments 3 and 4 also were combined for the prenatal analysis because they were identical during this phase of the research. In the remainder of this paper, we refer to the combination of treatments 3 and 4 as the nurse-visited group. Planned treatment comparisons focused on the smokers (five or more cigarettes per day) and young adolescents (<17 years).

Dependent variables for which a normal distribution was assumed were analyzed in the general linear model and dichotomous outcomes (eg, preterm delivery and low birth weight) in the logistic linear model (assuming a binomial distribution).

Estimates and tests were adjusted for all covariates, classification factors, and interactions. Analysis was by our own computer programs, except that in the logistic case the model-fitting algorithm of Generalized Linear Interactive Modeling (GLIM) program[39] was invoked as a subroutine.

Comparisons of means pooled across two or more model subclasses (as in main effects and lower order interactions) are averaged equally over levels of the cross-classified fixed factors, except for maternal age, for which a 6:1 weighting of older women to young adolescents was used, in accordance with their proportions in the general population. The means presented correspond directly to the tests: they are functions of the 16 smallest-subclass means that have been adjusted for any covariates in the model. In the logistic case, means are given in incidence form because this approach corresponds more closely to the presentation of general linear model results than would, for example, log odds ratios. Except where indicated, variations in n are attributable to missing data.

RESULTS

Preintervention Equivalence of Treatment Conditions

The treatment conditions were evaluated carefully to determine their equivalence at registration. Before assignment to treatment conditions, the nurse-visited and comparison-group women were equivalent on all standard sociodemographic and health characteristics (Table 3). In the area of social support, however, in contrast to the comparison-group women, there were trends for the women assigned a nurse to have fewer family members in their helping network ($P = .08$) and less confidence that someone would accompany them to labor and delivery ($P = .07$). Moreover, the nurse-visited nonsmokers in the older than 16-year age group were

TABLE 3. Preintervention Background Characteristics of Sample

Variable	Range	Comparison Group (n ≃ 165)	Nurse-Visited Group (n ≃ 189)	Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
Sociodemographics				
Age of mother (yr)	14–34	19.57	19.53	0.04 ± 0.66
No. of weeks pregnant (at registration in research)	7–29	17.12	17.44	−0.32 ± 1.01
Education of mother (yr completed)	7–17	11.21	11.34	−0.13 ± 0.32
Proportion of households in socioeconomic classes IV and V (semi-skilled and unskilled workers)[31]	0–1	0.61	0.61	0.00 ± 0.10
Proportion married	0–1	0.43	0.41	0.02 ± 0.10
Proportion nonrisk (older, married, not poor)	0–1	0.17	0.14	0.03 ± 0.08
Maternal health status/behavior				
Prepregnant wt (lb)	80–308	129.98	131.22	−1.24 ± 6.20
Prepregnant ht (cm)	140–180	162.15	162.23	−0.08 ± 1.40
Diastolic blood pressure (mm Hg) at first antepartum visit	30–98	64.43	62.83	1.60 ± 2.16
No. of drinks during previous week	0–15	0.23	0.25	−0.02 ± 2.03
No. of cigarettes/d	0–55	6.94	7.65	−0.71 ± 1.97
Adequacy of diet (average % Recommended Dietary Allowances of 12 nutrients)	14–100	72.46	69.34	3.12 ± 3.77
Maternal personality and social support				
Personal control (items)†	7–14	12.19	12.43	−0.24 ± 0.30
No. of people/helping network	0–10	5.24	4.95	0.29 ± 0.49
No. of intimates/helping network	0–10	1.85	1.69	0.16 ± 0.32
No. of kin/helping network	0–10	3.22	2.86	0.36 ± 0.41*
Expected accompaniment to hospital for labor and delivery‡	2–16	9.61	9.08	0.53 ± 0.56*
Husband/boyfriend support§	−13–12	−0.19	0.42	−0.61 ± 1.63
Mother support‖	−7–16	0.12	−0.46	0.58 ± 1.18

* $P \leq .10$.

† Personal control summarized the extent to which the women felt control over their life circumstances using a short-form variant of Rotter's Locus of Control scale.[40]

‡ Scale based on addition of ratings of confidence in being accompanied to labor and delivery.

§ Scale characterizing availability, contact, and anticipated help from the women's husbands or boyfriends.

‖ Scale characterizing availability, contact, and anticipated help from the women's mothers.

less securely embedded in a helpful kin network (P = .007), had less confidence that someone would accompany them to labor and delivery (P = .06), and were older (P = .04) than their counterparts in the comparison group.

Attrition

The rates of attrition were distributed equally across the treatment conditions: 12 comparison and 14 nurse-visited women dropped out. The women who discontinued the nurse-visited condition, however, had a greater sense of personal control (P = .009), a higher level of education (P = .002), and enrolled in the project earlier in their pregnancies (P = .02) than those who discontinued the comparison group. An examination of the reasons for these women's discontinuation showed that they had either moved or miscarried. Even though more advantaged women dropped out of the nurse-visited group than from the comparison group, the women who remained in the comparison and nurse-visited groups at the time of delivery were essentially equivalent.

Formal and Informal Support Systems

In contrast to their counterparts assigned to the comparison group, by the end of pregnancy, nurse-visited women were aware of more of the community services available to them (P = .01), attended childbirth education classes more frequently (P = .01), received more WIC vouchers (P = .03), reported that they talked more frequently with service providers and members of their informal networks about the stresses of pregnancy and family life (P = .02), indicated that their babies' fathers showed a greater interest in their pregnancies (P = .02), and were accompanied by someone to the labor room more frequently (P = .01) (Table 4).

Maternal Obstetrical Conditions and Health Habits

The nurse-visited women had fewer kidney infections after enrollment (P = .005) (Table 5).

Nurse-visited women made greater improvements in the quality of their diets from registration to the 32nd week of pregnancy than women in the comparison group (Table 6), an effect that was especially strong among the smokers (P = .04 for both contrasts). During the course of pregnancy, nurse-visited smokers made greater reductions in the number of cigarettes smoked than smokers assigned to the comparison group, leading to a four cigarette-per-day difference at the end of pregnancy (P = .0001).

The relationship between the reported number of cigarettes smoked and serum cotinine was analyzed at intake and at 32 weeks of pregnancy. Highly significant regressions for both nurse-visited and comparison-group women are shown in Table 7. Among smokers, the relationship between

TABLE 4. Women's Use of Services and Support Person Behavior Reported at the 32nd Week of Pregnancy and Observed at Hospital Admission for Labor and Delivery

Variable	Range	Comparison Group		Nurse-Visited Group		Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
		$\bar{x}$	n	$\bar{x}$	n	
Use of services						
No. of services known	0–10	4.91	137	5.47	157	−0.56 ± 0.45*
Childbirth education (proportion)	0–1	0.54	120	0.70	129	−0.16 ± 0.13*
No. of nutritional supplementation vouchers	0–8	1.56	136	2.18	152	−0.62 ± 0.55†
No. of antepartum visits	0–19	10.50	136	10.49	156	0.01 ± 0.67
No. of calls to physician or clinic	0–10	1.72	136	1.43	156	0.29 ± 0.40
Support person behavior						
Talk about problems‡	20–74	36.19	138	38.39	158	−2.20 ± 1.87†
Father interest pregnancy	1–5	3.72	132	4.07	146	−0.35 ± 0.29†
Accompany to labor (proportion)	0–1	0.87	127	0.95	142	−0.08 ± 0.07*
Accompany to delivery (proportion)	0–1	0.39	125	0.45	139	−0.06 ± 0.12
Help with household§	5–35	16.57	138	15.39	158	1.18 ± 1.68

* $P \leq .01$; † $P \leq .05$.
‡ Scale based on addition of number of times that women spoke with specific family members, friends, and professional service providers about the women's problems.
§ Scales based on addition of maternal ratings regarding amount of help the women had for house cleaning, shopping, etc.

TABLE 5. Obstetrical Complications After Enrollment

Variable	Range	Comparison Group		Nurse-Visited Group		Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
		$\bar{x}$	n	$\bar{x}$	n	
Kidney infection (proportion)	0–1	0.03	141	0.00	165	0.03 ± 0.02*
Bladder infection (proportion)†	0–1	0.06	141	0.10	165	−0.04 ± 0.06
Hematocrit (%) (last before delivery)	22–46	36.67	142	36.76	166	−0.09 ± 0.74
Proteinuria (≥2+) (proportion)‡	0–1	0.03	142	0.05	166	−0.02 ± 0.04
Edema (proportion)	0–1	0.58	142	0.62	166	−0.04 ± 0.08
Hypertensive disorder of pregnancy (proportion)	0–1	0.07	142	0.04	166	0.03 ± 0.05

* $P \leq .01$.
† Includes diagnosed bladder infections as well as urinary tract infections not identified specifically as kidney infections.
‡ Protein is measured on a 6-point scale with a range of values from 0 to 4+.

TABLE 6. Obstetrical Conditions and Health Habits Measured Early and Late in Pregnancy*

Variable	Range	Assessment Period	Comparison Group		Nurse-Visited Group		Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
			$\bar{x}$	n	$\bar{x}$	n	
Bleeding (proportion)	0–1	Trimester 1	0.01	137	0.06	158	
	0–1	Trimester 3	0.06	137	0.06	158	
Δ			0.05		0.00		0.05 ± 0.07
Spotting (proportion)	0–1	Trimester 1	0.09	142	0.10	166	
	0–1	Trimester 3	0.03	142	0.07	166	
Δ			−0.06		−0.03		−0.03 ± 0.09
Blood pressure (diastolic mm Hg)	30–98	First visit	63.97	137	62.63	158	
	40–118	Last visit	71.10	137	70.23	158	
Δ			7.13		7.60		−0.47 ± 2.96
No. of alcoholic drinks/wk	0–15	Intake	0.18	136	0.22	157	
	0–15	32nd wk	0.12	136	0.18	157	
Δ			−0.06		−0.04		−0.02 ± 0.15
Weight gain (lb)	80–308	Prepregnant	127.58	136	128.69	153	
	99–313	Last visit	160.36	136	164.40	153	
Δ			32.78		35.71		−2.93 ± 3.13
Adequacy of diet (avg % Recommended Daily Allowances)	14–100	Intake	72.08	115	69.72	138	
	12–100	32nd wk	71.75	115	73.86	138	
Δ			−0.33		4.14		−4.47 ± 4.38†
No. of cigarettes/d	5–55	Intake	14.37	64	15.83	77	
	5–70	32nd wk	16.00	64	13.29	77	
Δ			1.63		−2.54		4.17 ± 1.01‡

* Δ, Early to late pregnancy change.
† $P \leq .05$; ‡ $P \leq .001$.

TABLE 7. Estimated Regression of Number of Cigarettes Smoked per Day on Serum Cotinine Value at Intake and the 32nd Week of Pregnancy for Nurse-Visited and Comparison Women

Sample	Treatment Group	Data Collection Period			
		Intake		32nd wk	
		$\hat{\beta}$ Value*	n	$\hat{\beta}$ Value*	n
Whole	Comparison	0.050†	18	0.060‡	17
	Nurse-visited	0.051†	20	0.086‡	29
Smokers (≥5 cigarettes/d)	Comparison	0.011	11	0.012	9
	Nurse-visited	−0.021	10	0.083‡	15

* Estimated regression coefficient.
† $P \leq .01$; ‡ $P \leq .001$.

reported cigarettes smoked and serum cotinine at the 32nd week of pregnancy was significantly greater for the nurse-visited women than for those in the comparison group ($P = .05$), suggesting that the nurse-visited smokers were more accurate in the recollection of their smoking habits at the end of pregnancy than smokers in the comparison group. Thus, the treatment difference in the reported number of cigarettes smoked did not derive from the nurse-visited women exaggerating their reduction.

Birth Weight and Length of Gestation

Although there were no overall treatment main effects for birth weight or length of gestation (Table 8), the nurse-visited young adolescents gave birth to babies who were an average of 395 g heavier than babies of young adolescents in the comparison group ($P = .02$). For the nurse-visited smokers, there was a 2% incidence of preterm delivery in contrast to 10% for smokers in the comparison group ($P = .04$). The nurse-visited older nonsmokers, in contrast to their comparison-group counterparts, gave birth approximately 1 week earlier ($P = .002$), primarily because 12% of the nurse-visited older nonsmokers delivered prematurely, in contrast to 3% of their comparison-group counterparts ($P = .03$); this was accompanied by nearly an 11% difference in low birth weight ($P = .001$).

By covarying social support and age in the analysis of birth weight and length of gestation, we examined the extent to which these unexpected treatment differences among the older nonsmokers were due to the preintervention treatment differences for this subgroup. We found that the social support and age variables were related to length of gestation for the nurse-visited older nonsmoking group but not for their counterparts in the comparison group (the regressions were nonhomogeneous). Evaluation of the plotted relationships (not shown) indicated that the treatment difference for this subgroup in length of gestation was concentrated in those nurse-visited cases in which the women were older and in which there was little social support.

To determine the extent to which the treatment differences for birth weight were produced by longer (or shorter) gestations, birth weight was analyzed again, after adding length of gestation as a covariate to the basic model (Table 9). After adjustment for length of gestation, among the young adolescents the treatment effect on birth weight was reduced from 395 to 324 g, an effect that remained significant ($P = .02$). Among smokers, the treatment contrast was reduced from 96 to 39 g, and among the older nonsmokers the treatment contrast shifted from 161 g in favor of the control group to 26 g in favor of the nurse-visited women, both

TABLE 8. Treatment Effects on Birth Weight and Length of Gestation Adjusted for Prepregnancy Height, Prepregnancy Weight, and Intake Smoking Habit for the Whole Sample, Adolescents, Smokers, and Older Nonsmokers*

Sample	Treatment Group	n	Dependent Variables			
			Birth Wt (g)	% Low Birth Wt (≤2,500 g)	Length of Gestation (wk)	% Preterm Delivery (<37 wk)
Whole	Nurse-visited	166	3,285	5.78	39.57	6.90
	Comparison	142	3,262	2.61	39.71	7.27
Difference			23 ± 134	3.17 ± 4.01	−0.14 ± 0.45	−0.37 ± 2.30
Adolescents (14–16 yr)	Nurse-visited	28	3,423	0.00	40.41	0.00
	Comparison	17	3,028	11.76	39.71	11.76
Difference			395 ± 343	−11.76†	0.70 ± 1.49	−11.76†
Smokers (≥5 cigarettes/d)	Nurse-visited	78	3,331	1.46	40.10	2.08
	Comparison	64	3,235	3.79	39.46	9.81
Difference			96 ± 177	−2.33 ± 4.12	0.64 ± 0.76	7.73 ± 7.05‡
Older nonsmokers	Nurse-visited	71	3,210	10.57	38.86	11.83
	Comparison	72	3,370	0.00	40.03	3.13
Difference			−160 ± 172	10.57 ± 5.20§	−1.17 ± 0.75§	8.70 ± 7.68‡

* Interval estimates of mean differences are calculated with 95% confidence. The fetal outcomes (in particular, the dichotomized and continuous versions of the same variable) are not independent of one another. They both are provided to give a more complete portrayal of the impact of the program on different aspects of fetal growth.
† For young adolescents, estimates for percentage of low-birth-weight infants and preterm delivery are not adjusted for covariates because of instability in the solution of the logistic linear model. The means are shown for the model without covariates, which converges. Because the subclass sizes were small and there were only two cases of low-birth-weight infants and preterm delivery in the control group and none in the nurse-visited group, the confidence intervals and probabilities, although formally significant, are not shown.
‡ $P \leq .05$; § $P \leq .01$.

TABLE 9. Treatment Effects on Birth Weight Adjusted for Prepregnancy Height, Prepregnancy Weight, Intake Smoking Habit, and Length of Gestation for the Adolescents, Smokers, and Older Nonsmokers*

Sample	Treatment Group	n	Birth Wt (g)
Adolescents (14–16 yr)	Nurse-visited	28	3,335
	Comparison	17	3,011
Difference			324 ± 259†
Smokers (≥5 cigarettes/d)	Nurse-visited	78	3,282
	Comparison	64	3,243
Difference			39 ± 184
Older nonsmokers	Nurse-visited	78	3,337
	Comparison	72	3,311
Difference			26 ± 130

* Interval estimates of mean difference are calculated with 95% confidence.
† $P \leq .05$.

nonsignificant differences after adjustment. This series of analyses indicated that the treatment effect on birth weight among smokers and older nonsmokers was explained largely by differences in length of gestation, whereas among the young adolescents it was not.

Differences in Program Effectiveness as a Function of Exposure to the Program

Birth weight and length of gestation were tested in a model in which gestational age at enrollment (categorized as before or after midgestation, or 140 days) was included as an indicator of the women's opportunities to be visited by the nurse (Table 10). The results of these analyses for the smokers and older nonsmokers showed no intensification of treatment effects for those who enrolled early. Among the young adolescents, on the other hand, the positive effect of the program on birth weight (adjusted for length of gestation) was concentrated exclusively on those young women who enrolled before midgestation, for whom a 515-g mean difference distinguished those assigned a nurse and those assigned to the comparison group ($P = .0002$).

TABLE 10. Treatment Effects on Birth Weight Adjusted for Prepregnancy Height, Prepregnancy Weight, Intake Smoking Habit, and Length of Gestation for the Babies Born to Young Adolescents Who Enrolled Before and After Midgestation*

Treatment Group	Enrolled			
	Before Midgestation		After Midgestation	
	n	Birth Wt (g)	n	Birth Wt (g)
Nurse-visited	21	3,437	7	3,038
Comparison	11	2,922	6	3,287
Difference		515 ± 243†		−249 ± 377

* Interval estimates of mean difference are calculated with 95% confidence.
† $P \leq .001$.

DISCUSSION

This study is the first randomized trial of comprehensive prenatal services to show that the social and health contexts for child bearing among socially disadvantaged families can be improved. The results suggest that nurse home-visitors are capable of improving women's use of community services, informal social support, and health habits. Although these results may be explained by the nurse-visited women simply giving more socially desirable answers to questions about these topics, the available evidence does not support this interpretation. Our attempt to validate reported level of smoking suggests that the nurse-visited smokers were more rather than less accurate at the end of pregnancy than women in the comparison group. Moreover, the increased accompaniment by support persons to the hospital during labor on the part of nurse-visited women was determined by the observations of hospital maternity nurses. Thus, the general picture of improved social support and health habits is corroborated, in part, by data from sources other than the women themselves.

We have hypothesized that the observed reduction in kidney infections among nurse-visited women can be explained by two interrelated processes. First, nurse-visited women were encouraged to contact their physician at the first sign of pregnancy complication; therefore, we suspect that bladder infections were treated more promptly in the nurse-visited group. The relatively low incidence of treated bladder infections in the comparison group may reflect their underutilization of the physician for this condition which, untreated, developed into the higher rate of kidney infection. Second, the reduction in kidney infections is consistent with a theoretical model linking maternal

health habits, social support, and stress as influences on maternal host resistance to infection and, ultimately, preterm delivery.[41,42] Hence, the reduction in kidney infections in the nurse-visited women may be one reflection of the salutary interaction between improved maternal health habits and social support.

Although no overall treatment effects on either birth weight or length of gestation were found, positive program effects were present for the offspring of young adolescents and women who smoked—two groups at special risk for preterm delivery and low-birth-weight infants.[43-52] It should be emphasized that the results for the smokers and young adolescents were examined thoroughly for possible biasing background conditions (none was found) and that the treatment effect among the young adolescents was concentrated exclusively on those who enrolled early in pregnancy and thus had greater exposure to the program. These results for young adolescents are consistent with a recent epidemiologic study of the effects of early prenatal care on the birth weight of offspring born to women in this age range[53] and with three other prenatal intervention studies.[6,10,12]

The interpretation of the birth weight finding for the young adolescents, however, should be tempered by two observations: (1) the sample size for this group was quite small, and (2) the treatment effect size was larger than we would have predicted, given known influences on fetal growth.

Among the smokers, there was more than a 75% reduction in the incidence of preterm delivery. This finding is strengthened by the corresponding reduction in number of cigarettes smoked and improvement in diet for nurse-visited smokers.

Why did the nurse-visited older nonsmokers give birth to infants of shorter gestations than their counterparts in the comparison group? Because the nurse-visited older nonsmokers reported less family support and were older at registration than their comparison-group counterparts, and because there were no intervening behavioral outcomes, health habits, or obstetrical conditions identified that might explain their poorer performance, we have concluded that the apparent negative effect was attributable to a greater number of women in this nurse-visited subsample who were predisposed to deliver early.

During the past two decades, many efforts have been mounted to address the needs of disadvantaged pregnant women and their children, usually through traditional office- and clinic-based care systems. Although office-based care is an important ingredient in an overall strategy to improve the outcomes of pregnancy, the results of this study suggest that it is not enough. The high incidence of low-birth-weight infants and preterm delivery among disadvantaged pregnant women is, in large part, the result of poor maternal health habits and behaviors which, in turn, are strongly affected by the stressful environmental conditions with which these women and their families must contend. A sensitively and comprehensively designed program of nurse home visitation appears to be a promising method of improving these behaviors and environmental conditions simultaneously.

In 1981, the Select Panel for the Promotion of Child Health[54] concluded that federal, state, and local governments should increase substantially their funding of home visitation services for pregnant women and high-risk infants, with the eventual goal of providing such services for all pregnant women and young children. The results of the present study provide the first evidence to support the position that standard office- and clinic-based prenatal care for socially disadvantaged women can be enhanced with home visitation. The positive effects for the newborn appear to be greatest for those born to women with specific risks for low birth weight infants, such as smoking and young age. The postnatal phase of the program has produced additional beneficial results.[55]

ACKNOWLEDGMENTS

This research was supported by grants from the Bureau of Community Health Services (HHS-MCR-360403-06), the Robert Wood Johnson Foundation (grant 5263), and the W. T. Grant Foundation (grant 0723-80). The serum cotinine assays were carried out in the laboratories of Dr Helen Van Vunakis at Brandeis University and were partially supported by grant DA 2407 from the Department of Health and Human Services.

We wish to thank Karen Hughes and Jean Thom for preparation of the manuscript; Janice Sheppard, Greg Jurkowski, and Ling Wu for their help with data processing; Christine Olson for help with nutritional issues; Moncrieff Cochran, Solan Chao, Robert Cole, Gilbert Forbes, Harriet Kitzman, Zorika Petic Henderson, Robert Hoekelman, Randy Lagier, Gregory Liptak, Elizabeth McAnarney, Joannie Pinhas, Henry Ricciuti, David Rush, and Cassie Stevens for helpful comments on design, analysis, and the manuscript; John Shannon for his administrative support of the project; and Elizabeth Chilson, Diane Farr, Georgianna McGrady, Jacqueline Roberts, and Lyn Scazafabo for their work with the families enrolled in the program.

REFERENCES

1. Lee KS, Paneth N, Lawrence M, et al: Neonatal mortality: An analysis of the recent improvement in the United States. *Am J Public Health* 1980;70:15–21
2. Kessel SS, Villar J, Berendes H, et al: The changing pattern of low birth weight in the United States. *JAMA* 1984;251:15
3. Healthy people. The Surgeon General's report on health

promotion and disease prevention. US Department of Health, Education, and Welfare. Government Printing Office, 1979
4. Lee K, Paneth N, Gartner L, et al: The very low birth weight rate: Principal predictor of neonatal mortality in industrialized populations. *J Pediatr* 1980;97:759–764
5. Miller H, Merritt T: Fetal growth in humans. Chicago, Year Book Medical Publishers, Inc, 1979
6. Felice M, Granados J, Ances I, et al: The young pregnant teenager: Impact of comprehensive prenatal care. *J Adolesc Health Care* 1981;1:193–197
7. Osofsky HJ, Osofsky J, Kendall N, et al: Adolescents as mothers: An interdisciplinary approach to a complex problem. *J Youth Adolesc* 1973;2:528–535
8. Klerman LV, Jekel JF: *School-Age Mothers: Problems, Programs, and Policy.* Hamden, CT, Shoe String Press, Inc, 1973
9. McAnarney ER, Roghmann KJ, Adams BN, et al: Obstetric, neonatal, and psychosocial outcomes of pregnant adolescents. *Pediatrics* 1978;61:199–205
10. Stine O, Kelley E: Evaluation of a school for young mothers: The frequency of prematurity among infants born to mothers under 17 years of age, according to the mothers' attendance of a special school during pregnancy. *Pediatrics* 1970;46:581–587
11. Elder HA, Santamarina BAG, Smith S, et al: The natural history of asymptomatic bacteriuria during pregnancy: The effect of tetracycline on the clinical course and the outcome of pregnancy. *Am J Obstet Gynecol* 1971;3:442
12. Paige D, Cordano A, Mellits ED, et al: Nutritional supplementation of pregnant adolescents. *J Adolesc Health Care* 1981;1:261–267
13. Rush D, Stein Z, Susser M: A randomized controlled trial of prenatal nutritional supplementation in New York City. *Pediatrics* 1980;65:683–697
14. Mora JO, de Paredes B, Wagner M, et al: Nutritional supplementation and the outcome of pregnancy: I. Birthweight. *Am J Clin Nutr* 1979;32:455–462
15. Lechtig AJ, Habicht JR, Yarbrough C, et al: Relation of maternal supplementary feeding during pregnancy to birth weight and other sociobiological factors, in Winick M (ed): *Proceedings of the Symposium on Nutrition and Fetal Development.* New York, John Wiley & Sons, 1972, pp 127–145
16. McDonald E, Pollitt E, Mueller W, et al: The Bacon Chow study: Maternal nutritional supplementation and birth weight of offspring. *Am J Clin Nutr* 1981;34:2133–2144
17. Johnson JWC, Austin KL, Jones GS, et al: Efficacy of 17 hydroxyprogesterone caprovate in the prevention of preterm labor. *N Engl J Med* 1975;293:675
18. Donovan JW: Randomized controlled trial of anti-smoking advice in pregnancy. *Br J Prev Soc Med* 1977;31:6–12
19. Sexton MS, Hebel JR: A clinical trial of change in maternal smoking and its effects on birthweight. *JAMA* 1984;251:911–915
20. Silver G: *Child Health, America's Future.* Germantown, MD, Aspen Systems, 1978
21. Wynn M, Wynn A: Some developments in child health care in Europe. *R Soc Health J* 1979;99:259–264
22. Larson CP: Efficacy of prenatal and postpartum home visits on child health and development. *Pediatrics* 1980;66:191–197
23. Siegel E, Bauman KE, Schaefer ES, et al: Hospital and home support during infancy: Impact on maternal attachment, child abuse and neglect, and health care utilization. *Pediatrics* 1980;66:183–190
24. Barkauskas V: Effectiveness of public health nurse home visits to primiparous mothers and their infants. *Am J Public Health* 1983;73:573–580
25. Olds D: Improving formal services for mothers and children, in Garbarino J, Stocking SH (eds): *Protecting Children from Abuse and Neglect: Developing and Maintaining Effective Support Systems for Families.* San Francisco, Jossey-Bass Publishers, 1981, pp 173–197
26. Olds D: An intervention program for high-risk families, in Hoekelman R (ed): *Minimizing High-Risk Parenting.* Media, PA, Harwal Publishing Company, 1983, pp 249–268
27. Olds D: The prenatal/early infancy project: An ecological approach to prevention of developmental disabilities, in Belsky J (ed): *In the Beginning.* New York, Columbia University Press, 1982, pp 270–285
28. Vital Statistics of New York State. Albany, New York State Department of Health, 1973–1977
29. New York State Department of Social Services. Annual Report of Child Protective Services in New York State. Albany, New York State Department of Social Services, 1973–1982
30. Boyer R, Savageau D: *Places Rated Almanac.* New York, Rand McNally, 1981
31. Hollingshead AB: Four-factor index of social status. Working paper. New Haven, CT, Yale University, 1976
32. Olds D, Henderson C, Birmingham M, et al: Final report to the Maternal and Child Health and Crippled Children's Services Research Grants Program, Bureau of Community Health Services, Health Services Administration, Public Health Service, Department of Health and Human Services, grant MCJ-36040307, November 1983
33. Efron B: Forcing a sequential experiment to be balanced. *Biometrika* 1971;58:403–417
34. Johnson N, Nitzke S, Vandeberg D: A reporting system for nutrient adequacy. *Home Econ Res J* 1974;2:210–221
35. Langone JJ, VanVunakis H, Hill P: Quantitation of cotinine in sera of smokers. *Res Commun Chem Pathol Pharmacol* 1975;10:21–28
36. Langone JJ, Sjika H, VanVunakis H: Nicotine and its metabolites: I. Radioimmunoassay for nicotine and cotinine. *Biochemistry* 1973;12:5025–5030
37. Henderson C: Analysis of covariance in the mixed model: Higher level, nonhomogeneous, and random regressions. *Biometrics* 1982;38:623–640
38. Horon IL, Strobino D, MacDonald H: Birthweights among infants born to adolescents and young adult women. *Am J Obstet Gynecol* 1983;146:444–449
39. Baker RJ, Nelder JA: *The GLIM system—Release three: Generalized Liner Interactive Modeling.* Oxford, England, Numerical Algorithms Group, 1978
40. Rotter JB: Generalized expectancies for internal versus external control of reinforcement. *Psychol Monogr* (Gen Appl) 1966;80:1
41. Hobel CJ: Prevention of prematurity, in Nathaniels PW, Beard R (eds): *Fetal Physiology and Medicine.* New York, Marcel Dekker, Inc, 1984, pp 757–778
42. Bragonier JR, Cushner IM, Hobel CJ: Social and personal factors in the etiology of preterm birth, in Fuchs F, Stubblefield PG (eds): *Preterm Birth: Causes, Prevention, and Management.* New York, MacMillan Publishing Co, 1984, pp 64–85
43. Naeye RL: Teenaged and pre-teenaged pregnancies: Consequences of the fetal-maternal competition for nutrients. *Pediatrics* 1981;67:146–150
44. Meyer MB: Effects of maternal smoking and altitude on birthweight and gestation, in Reed DM, Stanley FJ (eds): *The Epidemiology of Prematurity.* Baltimore, Urban and Schwarzenberg, 1977, pp 81–104
45. Fielding J: Adolescent pregnancy revisited. *N Engl J Med* 1977;299:893–896
46. Garn SM, Petzold AS. Characteristics of the mother and child in teen-age pregnancy. *Am J Dis Child* 1983;37:365–368
47. Zukerman B, Alpert JJ, Dooling E, et al: Neonatal outcome: Is adolescent pregnancy a risk factor? *Pediatrics* 1983; 71:489–493
48. Dwyer JF: Teenage pregnancy. *Am J Obstet Gynecol* 1974;118:373
49. Kreutner K, Hollingsworth D (eds): *Adolescent Obstetrics and Gynecology.* Chicago, Yearbook Medical Publishers, 1978
50. Rush D: Cigarette smoking, nutrition, social status, and perinatal loss: Their interactive relationships, in Porter IH, Hook EB (eds): *Human Embryonic and Fetal Death.* New

York, Academic Press, 1980, pp 207–219
51. Luke B, Hawkins M, Petrie R: Influence of smoking, weight gain, and pregravid weight for height on intrauterine growth. *Am J Clin Nutr* 1981;34:1410–1417
52. Meyer MB: How does maternal smoking affect birth weight and maternal weight gain? *Am J Obstet Gynecol* 1978; 131:888–893
53. Elster A: The effect of maternal age, parity, and prenatal care on perinatal outcomes of adolescent mothers. *Am J Obstet Gynecol* 1984;149:845–847
54. *Better Health for Our Children: A National Strategy.* The report of the Select Panel for the Promotion of Child Health, vol 1: *Major Findings and Recommendations.* US Department of Health and Human Services (PHS) publication no. 79-55071, 1981
55. Olds D, Henderson C, Chamberlin R, et al: Preventing child abuse and neglect: A randomized trial of nurse home visitation. *Pediatrics*, in press, 1985

AMERICAN ACADEMY OF PEDIATRICS RESIDENCY FELLOWSHIPS STIPULATIONS

To enable young physicians to complete their pediatric training, the American Academy of Pediatrics will grant a small number of fellowships of $1,000 and $3,000 each to pediatric interns and residents for the year beginning July 1. Candidates must meet the following requirements:

1. Be legal residents of the United States or Canada;
2. Have completed, or will have completed by July 1, a qualifying approved internship (PI-0) or have completed a PI-1 program, and have made a definite commitment for a first year pediatric residency (PI-1 or PI-2) acceptable to the American Board of Pediatrics; or
3. Be pediatric residents (PI-1, PI-2, or PI-3) in a training program and have made a definite commitment for another year of residency in a program acceptable to the American Board of Pediatrics;
4. Have real need of financial assistance; and
5. Support their application with a letter from the Chief of Service substantiating the above requirements; if a change in residency training program is contemplated (ie, moving to another institution), a letter from the chief of this service certifying acceptance to this program will also be necessary.

The fellowships have been provided through grants to the American Academy of Pediatrics by Mead Johnson Nutritional Division, Gerber Products Company, and the McNeil Consumer Products Company.

Although the fellowship awards are intended primarily for the support of first and second year pediatric residents, it is also recognized that some physicians may desire a third or fourth year of pediatric residency. Up to 25% of the fellowships may be awarded to persons in this category. Consideration will be given to geographic spread of awards, and preference will be exhibited for well-qualified but smaller training centers which perhaps have fewer resources for residents in training than do some of the larger centers.

The Committee on Residency Fellowships of the American Academy of Pediatrics will make final decision on the granting of the Awards. Those interested in applying may write to Jean D. Lockhart, MD, Department of Maternal, Child and Adolescent Health, American Academy of Pediatrics, 141 Northwest Point Rd, Elk Grove Village, IL 60007, for application forms.

The envelope must be postmarked no later than March 1, 1986 in order to be eligible.

Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation

David L. Olds, Charles R. Henderson, Jr, Robert Tatelbaum and Robert Chamberlin

Pediatrics 1986;77;16-28

12. Ellerstein NS, Canavan JW: Sexual abuse of boys. *Am J Dis Child* 1980;134:255–257
13. Rimza ME, Niggeman MS: Medical evaluation of sexually abused children: A review of 311 cases. *Pediatrics* 1982;69:8–14
14. Paul DM: The medical examination in sexual offences against children. *Med Sci Law* 1977;4:251–258
15. Herjanic B, Wilbois RP: Sexual abuse of children. *JAMA* 1978;239:331–333
16. Orr DP, Prietto SV: Emergency management of sexually abused children. *Am J Dis Child* 1979;133:628–631
17. Rogers CM, Thomas JN: Sexual victimization of children in the USA: Patterns and trends. *Clin Proc* 1984;40:211–221
18. Neinstein LS, Goldenring J: Nonsexual transmission of sexually transmitted diseases: An infrequent occurrence. *Pediatrics* 1984;74:67–76

ERRATA

In the article "Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation" by Olds et al (*Pediatrics* 1986;77:16–28), Dr Van Vunakis' grant number was incorrectly reported. It should have been DA 2507.

In the commentary "Children and Car Seats" by Shelness and Charles (*Pediatrics* 1986;77:256–258), there is an error on page 257, paragraph 2. The children's weights should have been 20 kg (44 lb) and 18 kg (39.6 lb).

In the article "Early Indicators of Self-Destruction in Childhood and Adolescence: A Survey of Pediatricians and Psychiatrists," by Fine et al (*Pediatrics* 1986;77:557–568), Figs 1 and 2 were transposed. The legend to Fig. 1 (p 562) refers to the figure above the legend to Fig 5 (p 565) and vice versa.

To the article, "Schilder's Myelinoclastic Diffuse Sclerosis" by Poser et al (*Pediatrics* 1986; 77:107–112), the authors would like to add the following acknowledgment. The biopsy diagnosis of diffuse sclerosis was made by Dr Jacqueline Mikol, neuropathologist at the Hopital Necker-Enfants Malades, Paris.

Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing. A Randomized Controlled Trial

Article *in* JAMA The Journal of the American Medical Association · September 1997

DOI: 10.1001/jama.278.8.644 · Source: PubMed

CITATIONS
453

READS
722

13 authors, including:

Harriet Kitzman
University of Rochester
139 PUBLICATIONS **9,473** CITATIONS
SEE PROFILE

David Olds
University of Colorado
148 PUBLICATIONS **12,681** CITATIONS
SEE PROFILE

Carole Hanks
Baylor University
16 PUBLICATIONS **1,995** CITATIONS
SEE PROFILE

Kenneth Muir Mcconnochie
University of Rochester
86 PUBLICATIONS **3,601** CITATIONS
SEE PROFILE

Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing

A Randomized Controlled Trial

Harriet Kitzman, RN, PhD; David L. Olds, PhD; Charles R. Henderson, Jr; Carole Hanks, RN, DrPH; Robert Cole, PhD; Robert Tatelbaum, MD; Kenneth M. McConnochie, MD, MPH; Kimberly Sidora, MPH; Dennis W. Luckey, PhD; David Shaver, MD; Kay Engelhardt, RN, PhD; David James, MD; Kathryn Barnard, RN, PhD

Context.—Interest in home-visitation services as a way of improving maternal and child outcomes has grown out of the favorable results of a trial in semirural New York. The findings have not been replicated in other populations.

Objective.—To test the effect of prenatal and infancy home visits by nurses on pregnancy-induced hypertension, preterm delivery, and low birth weight; on children's injuries, immunizations, mental development, and behavioral problems; and on maternal life course.

Design.—Randomized controlled trial.

Setting.—Public system of obstetric care in Memphis, Tenn.

Participants.—A total of 1139 primarily African-American women at less than 29 weeks' gestation, with no previous live births, and with at least 2 sociodemographic risk characteristics (unmarried, <12 years of education, unemployed).

Intervention.—Nurses made an average of 7 (range, 0-18) home visits during pregnancy and 26 (range, 0-71) visits from birth to the children's second birthdays.

Main Outcome Measures.—Pregnancy-induced hypertension, preterm delivery, low birth weight, children's injuries, ingestions, and immunizations abstracted from medical records; mothers' reports of children's behavioral problems; tests of children's mental development; mothers' reports of subsequent pregnancy, educational achievement, and labor-force participation; and use of welfare derived from state records.

Main Results.—In contrast to counterparts assigned to the comparison condition, fewer women visited by nurses during pregnancy had pregnancy-induced hypertension (13% vs 20%; P=.009). During the first 2 years after delivery, women visited by nurses during pregnancy and the first 2 years of the child's life had fewer health care encounters for children in which injuries or ingestions were detected (0.43 vs 0.55; P=.05); days that children were hospitalized with injuries or ingestions (0.03 vs 0.16; P<.001); and second pregnancies (36% vs 47%; P=.006). There were no program effects on preterm delivery or low birth weight; children's immunization rates, mental development, or behavioral problems; or mothers' education and employment.

Conclusion.—This program of home visitation by nurses can reduce pregnancy-induced hypertension, childhood injuries, and subsequent pregnancies among low-income women with no previous live births.

JAMA. 1997;278:644-652

From the School of Nursing (Dr Kitzman) and Departments of Psychiatry (Dr Cole), Obstetrics and Gynecology (Dr Tatelbaum), and Pediatrics (Dr McConnochie and Ms Sidora), University of Rochester, Rochester, NY; Departments of Pediatrics (Dr Olds) and Preventive Medicine and Biostatistics (Dr Luckey), University of Colorado Health Sciences Center, Denver; Department of Human Development, Cornell University, Ithaca, NY (Mr Henderson); School of Nursing, Baylor University, Houston, Tex (Dr Hanks); Presbyterian Health Services, Charlotte, NC (Dr Shaver); College of Nursing (Dr Engelhardt) and Department of Pediatrics (Dr James), University of Tennessee, Memphis; and School of Nursing, University of Washington, Seattle (Dr Barnard).

Reprints: David L. Olds, PhD, University of Colorado Health Sciences Center, 303 E 17th Ave, Suite 200, Denver, CO 80203 (e-mail: David.Olds@UCHSC.edu).

WITHIN the past 8 years, home-visitation services have been promoted as a way to improve the outcomes of pregnancy,[1] to reduce the rates of child abuse and neglect,[2] and, now that welfare has been given to the states in the form of block grants, to help families become economically self-sufficient. While some home-visitation programs have produced some positive effects,[3,4] most have failed to affect important aspects of maternal and child health and family functioning.[5,6]

See also pp 637 and 680.

Some of this recent interest in home visitation has grown out of the results of a trial of nurse home visitation with white women who had no previous live births and who lived in a semirural area in and around Elmira, NY.[7-10] Women visited by nurses during pregnancy reduced the number of cigarettes smoked, improved the quality of their diets during the course of pregnancy, and exhibited lower rates of pyelonephritis. In contrast to a comparison group, nurse-visited women who smoked cigarettes at the beginning of pregnancy had 75% fewer preterm deliveries, and nurse-visited young adolescents delivered newborns with higher birth weights.[7] Three percent of the nurse-visited women exhibited pregnancy-induced hypertension (PIH) compared with 9% in the comparison group, a nonsignificant difference.[7]

Home visitation during pregnancy and the first 2 years of the child's life in the Elmira program reduced the rates of state-verified cases of child abuse and neglect among children born to unmarried adolescents from low socioeconomic-status households through age 2 years.[8] While the program's effect on child abuse and neglect was attenuated during the

2-year period after the program ended,[11] this was probably because of increased surveillance for child abuse and neglect among the nurse-visited families.[12] Children's health care encounters in which injuries were detected were reduced from 1 through 4 years of age, ie, for up to 2 years after the program ended.[8,11] Moreover, during the first 4 years after delivery of their first child, the nurse-visited mothers who were unmarried and from low socioeconomic-status households at registration had fewer subsequent pregnancies and greater participation in the labor force than did their counterparts randomly assigned to comparison services.[9] This produced substantial savings to government.[10]

Despite limited similarity with the program tested, many different types of home-visitation programs for pregnant women and parents of young children have been promoted on the basis of results from the Elmira trial.[1,2] We have maintained, however, that the program model studied in Elmira should not be disseminated until its findings are replicated in a major urban area with a minority population.[13]

The current trial was undertaken to determine the extent to which findings from the Elmira study would be replicated with an African-American sample of primarily low-income, unmarried women living in a major urban area (Memphis, Tenn), and when the program was administered through a public health department.

We hypothesized that the program would produce outcomes similar to those in the original trial. Pilot work and preliminary analyses disclosed, however, that some outcomes from the original study occurred too infrequently to be viable outcomes or moderating variables in the Memphis trial, including pyelonephritis (1%), prenatal cigarette smoking (9%), and state-verified reports of child abuse and neglect (3%-4%). The beneficial effects of the Elmira program on child maltreatment and injuries in the original trial were concentrated on children born to mothers with little sense of control over their life circumstances.[8] We hypothesized in the current trial that effects of the program on maternal caregiving and childhood injuries would be greater for women with few psychological resources, where psychological resources were defined in terms of women's intellectual functioning and mental health, in addition to their sense of control.

SUBJECTS AND METHODS

The numbers of eligible subjects invited to participate, randomized, and assessed at various stages of the research are summarized in Table 1. As this table indicates, we achieved high rates of participation and retention. Office-based assessments were completed at 24 months post partum, for example, on 96% of the cases in which there was no fetal or child death.

Table 1.—Profile of the Trial: Sample Composition Over Time by Treatment*

	Treatment Group				
	1	2	3	4	Total
No. allocated to treatment	166	515	230	228	**1139**
No. of postrandomization drops†	1	4	4	4	**13**
No. of completed prenatal home visits (range)	...	...	7 (0-18)	7 (0-18)	...
No. of completed postnatal home visits (range)	...	...	...	26 (0-71)	...
No. of miscarriages	6	19	6	8	**39**
No. of stillbirths	0	5	3	2	**10**
No. of infant deaths‡	2	7	2	1	**12**
No. of preterm deliveries <28 wk	1	0	2	1	**4**
No. of completed 28-wk interviews	157	485	210	211	**1063**
No. of preterm deliveries <36 wk	7	42	20	11	**80**
No. of completed 36-wk interviews	137	411	179	189	**916**
No. of obstetrical records abstracted	163	511	228	228	**1130**
No. of labor and delivery records abstracted	162	509	228	227	**1126**
No. of newborn records abstracted	157	486	220	219	**1082**
No. of UT perinatal database records abstracted	140	427	191	191	**949**
No. of completed 6-mo assessments	Not followed up	469	Not followed up	203	**672**
12-mo assessments	Not followed up		Not followed up		
No. of home assessments completed		471		211	**682**
No. of office assessments completed		470		211	**681**
24-mo assessments	Not followed up		Not followed up		
No. of home assessments completed		467		208	**675**
No. of office assessments completed		465		206	**671**
Pediatric records completed	Not followed up		Not followed up		
No. of well-child and illness records		467		204	**671**
No. of immunization records		470		210	**680**
No. of ED and hospitalization records		481		216	**697**
No. of AFDC records reviewed	Not followed up	455	Not followed up	201	**656**

*A total of 1290 eligible subjects were invited to participate; 151 refused, and 1139 were randomized. Unless otherwise specified, the difference between the number of cases randomized and assessed is the result of missed assessments. UT indicates University of Tennessee; ED, emergency department; and AFDC, Aid to Families With Dependent Children.

†Ten of the 12 drops consisted of cases where the mother refused further participation after randomization. One woman (assigned to treatment 2) was dropped from the study when it was learned that she was registered and randomized a second time after an earlier registration and miscarriage; a second woman (assigned to treatment 1) was not followed up because of clerical error after a staff member identified her as not meeting the inclusion criteria.

‡One infant death occurred between 6 and 12 months of age.

Participants

From June 1, 1990, through August 31, 1991, 1290 consecutive women from the obstetrical clinic at the Regional Medical Center in Memphis were invited to participate in the study. Women less than 29 weeks pregnant were recruited if they had no previous live births, no specific chronic illnesses thought to contribute to fetal growth retardation or preterm delivery (eg, chronic hypertensive disorders requiring medical treatment, severe cardiac disease, large uterine fibroids), and at least 2 of the following sociodemographic risk conditions: unmarried, less than 12 years of education, and unemployed. Eighty-eight percent (1139/1290) of the women completed informed consent and were randomized to 1 of 4 treatment conditions described below. Ninety-two percent of the women enrolled were African American, 98% were unmarried, 64% were aged 18 years or younger at registration, and 85% came from households with incomes at or below the federal poverty guidelines. Compared with women who refused, those who agreed to participate were more likely to be African American than non–African American (89% vs 74%; $P<.001$); younger (average age, 18 vs 19 years; $P=.001$); and non–high school graduates (89% vs 84%; $P=.01$).

Statistical Power and Assignment Ratios

Sample size was established from a series of power calculations. For all calculations, we set $\alpha=.05$ and $\beta=.20$ and specified 2-tailed tests. We established sample size so that it would be sufficiently large (after attrition) to detect program effects that were limited to one half of the total sample defined as being at higher risk according to characteristics such as mothers' having few psychological resources. These calculations led to a sample of 1468 for the prenatal phase and 734 for the postnatal phase of the study. It was possible to enroll fewer women in the postnatal phase because, in the Elmira study, treatment effects (in SD units) were larger for postnatal outcomes than for prenatal outcomes. These analyses also indicated that we could assign women disproportionately

to the relatively expensive nurse-visited condition, with fewer in the comparison condition, with minimal loss of statistical power. Competition for subjects with other studies limited the final sample size for the prenatal phase of the study.

Given the sample actually enrolled, we show herein the estimate of smallest detectable treatment main effect for key outcomes: (1) mean increase in birth weight, 96 g, where SD=596 g; (2) mean reduction in children's health care encounters in which injuries were detected, 0.58 to 0.36, where SD=1.06; and (3) reduction in proportion of second pregnancies, 45% to 32%.

Slightly different assignment ratios and treatment allocation schemes were used during 3 time frames during the 15-month period of sample recruitment. This procedure was used to accommodate shifting expectations about completed sample size (because of the competition with other studies that sampled the same population), and to manage a relatively large number of women enrolled during the first 2 months of the study when only 10 of the 12 project nurses had been hired. Consequently, treatment 1 was added to the design during the second and third allocation periods to reduce the number of families assigned to the nurse-visited conditions (treatments 3 and 4) and to reduce workload stress among the nurses.

Randomization

After completion of baseline interviews, identifying information on the participants was sent to the University of Rochester, Rochester, NY, where it was entered into a computer program that randomized individual women to treatment conditions by methods that are extensions of ones given by Soares and Wu.[14] This procedure concealed the randomization from individuals directly involved with the participants in Memphis. The randomization was conducted within strata from a model with 5 classification factors: maternal race (African American vs non–African American), maternal age (<17, 17-18, and ≥19 years), gestational age at enrollment (<20 vs ≥20 weeks), employment status of head of household (employed vs unemployed), and geographic region of residence (4 regions). Women assigned to the home-visitation groups subsequently were assigned at random to a nurse home visitor.

Treatment Conditions

Women in treatment 1 (n=166) were provided free round-trip taxicab transportation for scheduled prenatal care appointments; they did not receive any postpartum services or assessments. Women in treatment 2 (n=515) were provided the free transportation for scheduled prenatal care plus developmental screening and referral services for the child at 6, 12, and 24 months of age. Those in treatment 3 (n=230) were provided the free transportation and screening offered in treatment 2 plus intensive nurse home-visitation services during pregnancy, 1 postpartum visit in the hospital before discharge, and 1 postpartum visit in the home. Women in treatment 4 (n=228) were provided the same services as those in treatment 3; in addition, they continued to be visited by nurses through the child's second birthday.

For the evaluation of the prenatal phase of the program, treatments 1 and 2 were combined to form a single comparison group and then contrasted with treatments 3 and 4, a group that was visited by nurses during pregnancy. For the postnatal phase of the study, treatment 2 was contrasted with treatment 4.

Program Plan and Implementation

The experimental home-visitation program was carried out by the Memphis/Shelby County Health Department. The nurses completed an average of 7 home visits (range, 0-18) during pregnancy and 26 home visits (range, 0-71) during the first 2 years post partum. They followed a detailed visit-by-visit protocol to guide their efforts to help women improve their health-related behaviors; care of their children; and life-course development (pregnancy planning, educational achievement, and participation in the workforce).

To improve the outcomes of pregnancy, the nurses helped women complete 24-hour diet histories on a regular basis and plot weight gains at every visit; they assessed the women's cigarette smoking and use of alcohol and illegal drugs and facilitated a reduction in the use of these substances through behavioral analysis.[15] They also taught women to identify the signs and symptoms of pregnancy complications, encouraged women to inform the office-based staff about those conditions, and facilitated compliance with treatment. They gave particular attention to urinary tract infections, sexually transmitted diseases, and hypertensive disorders. They coordinated care with office-based staff and measured blood pressure when needed.

After delivery, the nurses helped mothers and other caregivers improve the physical and emotional care of their children. The nurses taught parents to observe the signs of illness, to take temperatures, and to communicate with office staff about their children's illnesses before seeking care for an illness or injury. Specific curricula were integrated into the program to promote parent-child interaction by facilitating parents' understanding of their infants' and toddlers' communicative signals,[16,17] enhancing interest in playing with their children in ways that promote emotional and cognitive development,[18] and creating households that are safer for children.[19]

The nurses also helped women clarify their goals and solve problems that may have interfered with completing their educations, finding work, and planning future pregnancies. The program promoted work, education, and family planning, but it did so in the context of helping women set goals for themselves at a crucial stage in their own personal development.

The program protocols were based on theories of human ecology, human attachment, and self-efficacy.[20] The nurses helped families make use of needed health and human services and attempted to involve other family members and friends in the pregnancy, birth, and early care of the child. They established trusting relationships with parents and helped mothers set small, achievable behavioral objectives between visits that, when met, would increase mothers' confidence in their ability to manage greater challenges.

Masking

Interviews and abstractions of medical and social service records were conducted by staff members who were unaware of the women's treatment assignment, except for a few cases in which the participants inadvertently revealed their treatment status to the interviewers. Clinical assessments recorded in the medical records were made by health care providers who had access to the women's treatment assignment. Although the principal investigators and statisticians also had access to the subjects' treatment assignments, all decisions about the coding of interview responses and conditions in the medical record and about the construction of variables were made explicitly without this information.

Assessments and Definitions of Variables

Participating women were interviewed by research staff members at the time of registration (before their assignment to treatments), at the 28th and 36th weeks of pregnancy, and at the sixth, 12th, and 24th months of the child's life. Medical and social service records were abstracted.

At registration, women were interviewed to determine standard socioeconomic conditions, their mental health,[21] personality characteristics,[22] obstetrical histories, health-related behaviors (cigarette smoking, alcohol and illegal drug use), and social support. Women also completed brief tests to estimate their levels of intellectual functioning.[23] Women's prepregnancy weights and heights were also determined by self-report. The

last weights recorded in the prenatal record before delivery were used to calculate pregnancy weight gains.

Household per annum discretionary income was calculated by means of subsistence standards for determining Medicaid eligibility in Tennessee, the number of individuals in the household, and reported household income. In addition, each participant was assigned a value that represented the percentage of poverty households in the census tract in which she resided.[24]

A variable was created to index women's psychological resources measured at registration. It was based on the summed z scores of their intelligence,[23] mental health,[21] and sense of mastery/self-efficacy.[15,22] Self-efficacy was assessed with a measure developed for the current study to determine mothers' confidence in their ability to behave in accordance with the major behavioral objectives of the program. Each of the 3 dimensions was standardized to a mean of 100 and SD of 10, summed, and then restandardized to a mean of 100 and SD of 10. The psychological resource variable was dichotomized at values less than 100 vs 100 or more.

Women were interviewed at 28 weeks' gestation by telephone to assess their health-related behaviors, social support, use of community services, and participation in school and work. Identical interviews were conducted again at 36 weeks. At 36 weeks' gestation, women also were assessed to ascertain their mental health symptoms (with a focus on anxiety and depression)[21] and their sense of mastery.[22]

Obstetrical and newborn records were abstracted directly and verified against an on-line perinatal database from the University of Tennessee. Discrepancies between the perinatal database and our independent abstraction were resolved on a case-by-case basis. In addition, a subset of 41 records (every 25th record) was abstracted by 2 different coders. The reliability of abstraction was good, with correlations of 1.00 for birth weight and 5-minute Apgar score and 0.98 for gestational age.

Urine screens for marijuana and cocaine were performed on 511 women who registered for prenatal care at the Regional Medical Center as part of their clinical assessment during the time that this trial was conducted. The results of these screens (conducted before randomization) were abstracted from the perinatal database.

Urinary tract infections were recorded if a culture produced a colony count of more than 100 000/mL of clean-catch voided urine for a single uropathogen. Diagnoses of pyelonephritis were recorded from the medical record. (Urinary tract infections and pyelonephritis occurred too infrequently [5% and 1%, respectively] to serve as viable outcomes and so are not reported herein.) Cultures for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* were obtained at the first prenatal visit and were coded from the prenatal record; *Trichomonas vaginalis* was ascertained by diagnoses from the record. A sexually transmitted disease variable was created that consisted of the number of any 1 of these 3 types of infections. Syphilis was coded separately because of the severity of its effects on the fetus. Diagnoses of *Gardnerella vaginalis* and yeast infections were abstracted from the prenatal record. Infections separated by more than 21 days were treated as separate infections. Diagnoses were separated according to whether they occurred before or after randomization. Pregnancy-induced hypertension was coded when preeclampsia, eclampsia, toxemia, or PIH was coded in the intrapartum or postpartum record.[25]

Birth weight (in grams) was recorded from the hospital record. Intrauterine growth restriction was defined as birth weight less than the 10th percentile for gestational age.[26] Gestational age (in days) was estimated from reported last menstrual period (LMP) and ultrasound scans obtained before 26 weeks' gestation. (Ultrasound was performed on all subjects at registration for prenatal care.) If LMP and ultrasound converged within 14 days, then LMP was used for estimating gestational age. When LMP and ultrasound differed by more than 14 days, ultrasound was used as the estimate. When ultrasound was not done before 26 weeks' gestation, or LMP was unknown, the record was reviewed by 2 clinicians, independently and unaware of treatment condition, to determine the most reliable estimate of gestational age. Preterm birth was divided into 2 categories: (1) spontaneous preterm birth after preterm labor, with or without premature rupture of the membranes, or (2) indicated preterm birth performed for maternal or fetal complications.

At 6 months post partum, mothers and children were assessed in the study offices. Mothers completed interviews that assessed whether or not they attempted to breast-feed, their duration of breast-feeding, and their beliefs about children associated with child abuse and neglect (belief in physical punishment, unrealistic expectations, lack of empathy, and role reversal).[27] Mothers and children were observed while the mothers taught their children a developmentally challenging task by means of the Nursing Child Assessment Satellite Training procedure.[28] The mothers' behaviors were coded and summarized to characterize their sensitivity, responsiveness, and quality of teaching. The infants' behaviors were coded and aggregated to characterize their responsiveness and clarity of communication toward their mothers.

At 12 and 24 months post partum, in their homes and in the office, the mothers completed the standardized interviews given at 6 months. The interviews included information on the number and outcomes of subsequent pregnancies, mothers' educational achievements, and number of months mothers participated in the workforce. They and their children were observed again by means of the teaching-interaction procedure. During the home visits, the educational and socioemotional properties of the home environment were assessed, by means of the Home Observation for Measurement of the Environment.[29] At the 24-month office visit, the children were tested with the Bayley scales of infant development, and their mothers completed the Achenbach Child Behavior Checklist.[30]

The children's medical records were reviewed with a focus on hospitalizations, emergency department visits, and outpatient encounters in which injuries and ingestions were detected. A summary variable was created to count the total number of health care encounters of all types (outpatient, emergency, and hospital admissions) in which injuries or ingestions were detected. We calculated the number of days that children were hospitalized and in which injuries or ingestions were noted.

The dates and types of children's immunizations were recorded. Whether children were completely immunized by their 24th month of life was determined. Children needed to have 4 or more diphtheria, pertussis, and tetanus vaccines, 3 or more oral poliovirus vaccines, and 1 or more *Haemophilus influenzae* type b and measles, mumps, and rubella vaccines to be considered completely immunized.

Data also were abstracted from Tennessee Department of Human Services records to ascertain women's and their firstborn children's use of Aid to Families With Dependent Children (AFDC) during the period from the child's birth through second birthday. Cases were matched on mother's name, Social Security number, and birthday. A variable was constructed to reflect whether mother and/or child received AFDC for each month of the child's life from birth through 24 months. Summary variables were constructed to indicate the total number of months that either mother or child used welfare (AFDC) for the 1- to 12-month and 13- to 24-month periods.

Statistical Models and Methods of Analysis

Data analyses were conducted and reported on all cases with an "intention-to-treat" approach.

Table 2.—Background Characteristics of Sample at Randomization by Treatment Condition

Dependent Variables	Treatment Group 1	2	3	4
	%	%	%	%
White	4	8	7	11
Married	1	2	3	1
Head of household employed	58	57	57	50
Consumed alcohol (last 2 wk)	4	4	4	5
Smoked cigarettes (last 3 d)	10	10	7	11
Used marijuana (last 2 wk)	1	1	2	1
Used cocaine (last 2 wk)	1	0	0	0
Positive drug screen	3	5	2	4
Sexually transmitted diseases*	36	32	31	37
Syphilis (prerandomization)	7	4	7	6
Gardnerella infection	7	8	11	11
Urinary tract infection	7	10	14	11
Yeast infection	6	9	8	6
Previous abortion	17	18	17	18
Low body mass index	28	30	32	22
	Mean±SD	**Mean±SD**	**Mean±SD**	**Mean±SD**
Age, y	18.0±3.3†	18.1±3.2	17.9±2.8	18.1±3.3
Education, y	10.1±2.0	10.3±1.9	10.3±2.0	10.1±2.0
Income, $‡	1089.6±6677.0	1671.1±6890.5	2324.6±7340.7	98.8±6611.4
% Census tract below poverty	39.2±20.6	34.5±21.3	36.1±21.3	35.8±20.5
Housing density	0.9±0.5	0.9±0.5	1.0±0.5	1.0±0.6
IQ	97.3±10.0	96.3±10.1	95.7±10.8	96.5±10.5
Mental health§	100.3±9.4	100.2±10.1	100.2±9.6	99.2±10.5
Maternal self-efficacy§	99.5±10.0	100.1±9.9	100.4±10.0	99.7±10.2
Mastery§	100.6±9.6	100.1±10.3	99.9±9.7	99.4±9.9
Maternal psychological resources§	100.6±9.6	100.1±10.0	100.0±9.6	99.3±10.7
Grandmother support§‖	99.9±10.1	99.9±9.8	99.3±10.9	101.0±9.3
Husband/boyfriend support§‖	99.2±9.8	100.2±10.0	99.8±10.0	100.3±10.1
Child abuse beliefs§	99.5±10.1	99.7±9.6	100.2±10.0	100.9±10.7
Height, cm	164.2±6.7	164.7±7.3	164.1±7.0	164.0±6.5
Prepregnant weight, kg	62.3±15.1	62.1±14.7	61.0±12.9	62.7±13.9
Gestational age, wk	16.4±6.0	16.4±5.8	16.3±5.5	16.5±5.6

*Diagnosis of *Chlamydia trachomatis, Trichomonas vaginalis,* or *Neisseria gonorrhoeae* in current pregnancy before randomization.
†Mean±SD.
‡Annual household discretionary income based on income subsistence standards for Medicaid eligibility, reported household income, and number of individuals in household at registration.
§Standardized to sample mean=100, SD=10.
‖Locally developed scale that assesses degree to which individual provides emotional and material support to mother.

Dependent variables for which a normal distribution was assumed were analyzed in the general linear model; dichotomous outcomes, such as PIH, in the logistic-linear model (assuming a binomial distribution); and low-frequency count data, such as the number of health care encounters in which injuries were detected, in the log-linear model (assuming a Poisson distribution). Estimates and tests were adjusted for all covariates, classification factors, and interactions. Homogeneity of regressions was tested for all covariates on the contrasts of interest.[31] In the generalized case, the analysis was carried out and estimates obtained in terms of the linearized form of the model—the logits (or log of the odds) in the logistic models, and logs of the incidence in the log-linear models. We use the term *incidence* in referring to the actual count or mean of counts over specific periods of measurement.

For both prenatal and postnatal outcomes, to rule out the potential interaction of treatments with the 3 periods that had different treatment allocation schemes, analyses also were carried out in models that included a 3-level factor for allocation period and its interaction with other effects in the model. No significant differences for time or its interaction with treatments were found, so it was possible to drop this variable from further consideration.

The final models derived for the reported results differed, depending on whether the outcomes were from the prenatal or the postnatal phase of the study because outcomes in each phase had different sets of predictors and different hypothesized moderators of treatment effects. In both phases, we tested hypotheses regarding the moderating influence of specific variables found to condition program effects in the Elmira trial.

Pregnancy Models.—The models analyzed in the evaluation of program effects for birth weight and gestational age outcomes focused on the classification effect for treatments (groups 1 and 2 vs 3 and 4), maternal age (<17 vs ≥17 years at registration), and sex of the child. Covariates included women's prepregnancy weight, height, and number of cigarettes smoked at registration. The models for social and behavioral intervening outcomes (such as social support, psychological distress, and use of services) included treatments, a classification factor specifying whether the woman was in school at registration, and covariates for the intake measurement of the behavior or condition under examination (when these intake variables were available). The model for PIH and end-of-pregnancy blood pressures included treatments and a covariate for mean arterial blood pressure derived from the mothers' initial prenatal visit. The model for rates of genitourinary tract infections included treatments and a covariate for the number of corresponding types of infections diagnosed before randomization. A repeated-measures model was used for the analysis of maternal weight gain; the focus of the analysis was on testing the treatment difference in change between the prepregnancy and end-of-pregnancy time points.

Models for Postnatal Outcomes.—The primary statistical model for postnatal outcomes focused on classification effects for treatments (2 vs 4) and maternal psychological resources (high vs low), plus 2 covariates (household income and census-tract poverty level). For outcomes measured at more than 1 point in time or under more than 1 situation (eg, home and office), we carried out repeated-measures analyses, adding to the basic model fixed factors for time and measurement location and a random factor for individuals. The focus of interpretation was on those levels of functioning assessed at the end of the program, 24 months post partum.

RESULTS

Preintervention Equivalence of Treatment Conditions

As shown in Table 2, the treatment groups were equivalent on background characteristics, with a few exceptions: Women in treatment 4 lived in households in which the head of the household was more likely to be unemployed, and in which there was less discretionary income than did women in treatment 2. There were no additional intervention-comparison differences for subgroups defined on the basis of the women's age, psychological resources, gestational age at enrollment, or randomization period. Similarly, there were no additional

treatment differences on prerandomization background characteristics after removing those cases for which follow-up data were not available.

Birth Outcomes

Table 3 shows that there were no treatment main effects for birth weight, length of gestation, low birth weight, spontaneous preterm delivery, indicated preterm delivery, or Apgar scores.

Prenatal Intervening Variables

Table 4 shows that by the 36th week of pregnancy, nurse-visited women were more likely to use other community services than were women in the control group ($P=.01$). They also were more likely to be working ($P=.06$), an effect that was particularly strong among women who were not in school when they were randomized (14% vs 8% [$P=.05$] and 8% vs 2% [$P=.01$] for the 28th and 36th weeks, respectively; data not shown).

There were no program effects on women's use of standard prenatal care or obstetrical emergency services after registration in the study, but nurse-visited women who were in school at registration had twice as many predelivery hospitalizations as did their counterparts in the comparison condition (0.18 vs 0.09; $P=.003$; data not shown). These differences were not explained by any coherent pattern of diagnoses associated with those hospitalizations.

Table 4 also shows that, in contrast to women in the comparison group, nurse-visited women had fewer yeast infections after randomization and fewer instances of PIH ($P=.05$ and $P=.009$, respectively). Among women with PIH, in contrast to those in the comparison group, those who received a nurse home visitor had mean arterial blood pressures during labor that were 4.6 points lower ($P=.006$), although there were no treatment differences in birth weight, length of gestation, or Apgar scores for those with PIH (data not shown).

Childhood Injuries and Ingestions

During the first 2 years of their lives, nurse-visited children had fewer health care encounters in which injuries and ingestions were detected than did children in the comparison condition ($P=.05$), an effect that was accounted for primarily by a reduction in outpatient encounters ($P=.02$) (Table 5). Nurse-visited children also were hospitalized for fewer days with injuries and/or ingestions than were children in the comparison condition ($P<.001$). These program effects on both total health care encounters and number of days hospitalized with injuries and ingestions were greater for children born to women with few psychological resources (0.41 vs 0.67 [$P=.003$] and 0.02 vs 0.26 [$P<.001$], respectively).

Table 6 shows that the nurse-visited children were hospitalized at older ages and for substantially less serious reasons. The 3 nurse-visited children who were hospitalized with injuries and ingestions were admitted when they were more than 12 months of age (and thus mobile), while 6 (46%) of the 13 comparison children were hospitalized when they were less than 6 months of age (and thus immobile). Seven (54%) of the comparison-group children were hospitalized with either fractures and/or head trauma, while none of the nurse-visited children were. Two of the 3 nurse-visited children were hospitalized with ingestions.

Qualities of Caregiving, Immunization Rates, Mental Development, and Behavioral Problems

As indicated in Table 7, nurse-visited mothers reported that they attempted breast-feeding more frequently than did women in the comparison group ($P=.006$), although there were no differences in duration of breast-feeding (duration data not shown). By the 24th

Table 3.—Adjusted Birth Weight, Length of Gestation, and Apgar Outcomes by Treatment Condition*

Dependent Variables	Comparison Groups, Mean	Nurse-Visited Groups, Mean	Mean Difference†	95% Confidence Interval
Birth weight, g	3050.4	3032.2	18.2	−62.4 to 98.7
Gestational age, wk	39.0	39.0	0.0	−0.4 to 0.4
5-min Apgar	8.7	8.6	0.1	−0.1 to 0.3
			Odds Ratio‡	95% Confidence Interval
Low birth weight (<2500 g), %	14	15	1.1	0.8 to 1.6
IUGR,§ %	9	9	1.0	0.6 to 1.5
Preterm (<37 wk), %	13	11	0.8	0.6 to 1.2
Indicated preterm delivery, %	3	3	1.0	0.5 to 2.4
Spontaneous preterm delivery, %	9	8	0.8	0.5 to 1.3

*Estimates adjusted for maternal age, number of cigarettes smoked, sex of child, maternal prepregnancy weight, and maternal height. Comparison groups were treatment groups 1 and 2; nurse-visited groups, treatment groups 3 and 4.
†Difference = (comparison mean) − (nurse-visited mean).
‡Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
§Intrauterine growth restriction; cases with birth weights less than 10th percentile for gestational age.

Table 4.—Adjusted Variables for Use of Health and Community Services, School, Work, and Obstetric Problems Identified After Randomization by Treatment Condition*

Dependent Variables	Comparison Groups, Mean	Nurse-Visited Groups, Mean	Mean Difference†	95% Confidence Interval
Gestational weight gain, kg	14.9	14.6	0.3	−0.6 to 1.3
Systolic blood pressure (labor admission), mm Hg	112.6	111.7	0.9	−0.7 to 2.5
Diastolic blood pressure (labor admission), mm Hg	67.5	66.8	0.6	−0.8 to 2.1
No. of prenatal visits (total)	6.5	6.2	0.3	−0.1 to 0.7
No. of visits for obstetrical evaluation (total)	2.8	2.8	−0.1	−0.3 to 0.2
	Incidence‡ (Log-Incidence)	Incidence‡ (Log-Incidence)	Log-Incidence Difference§	95% Confidence Interval
No. of hospitalizations during pregnancy	0.13 (−2.11)	0.15 (−1.93)	−0.19	−0.52 to 0.14
No. of *Gardnerella* infections	0.07 (−2.63)	0.06 (−2.75)	0.12	−0.34 to 0.58
No. of yeast infections	0.19 (−1.65)	0.14 (−1.94)	0.29‖	−0.00 to 0.58
No. of sexually transmitted diseases	0.21 (−1.58)	0.22 (−1.51)	−0.07	−0.32 to 0.18
	%	%	Odds Ratio¶	95% Confidence Interval
Used other community services	20	29	1.8#	1.2 to 2.7
In school	41	44	1.2	0.8 to 1.8
Employed	3	6	2.0**	1.0 to 4.0
Pregnancy-induced hypertension	20	13	0.6#	0.5 to 0.9

*Use of health and community services and school and work estimates adjusted for whether women were in school at registration. Infections adjusted for number of prerandomization infections that correspond to those counted after randomization. Pregnancy-induced hypertension adjusted for mean arterial blood pressure measured at first antepartum visit. Comparison groups were treatment groups 1 and 2; nurse-visited groups, treatment groups 3 and 4.
†Difference = (comparison mean) − (nurse-visited mean).
‡Incidence = mean number of infrequently occurring events within stated time period. Individual cases may have values greater than 1, although the range is small.
§Difference = (comparison log-incidence) − (nurse-visited log-incidence).
‖$P\leq.05$.
¶Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
#$P\leq.01$.
**$P<.10$.

Table 5.—Adjusted Incidence of Child Health Care Encounters in Which Injuries and Ingestions Were Detected During Children's First 2 Years of Life, by Treatment Condition*

Dependent Variables	Comparison Group, Incidence† (Log-Incidence)	Nurse-Visited Group, Incidence† (Log-Incidence)	Log-Incidence Difference‡	95% Confidence Interval
Total No. of health care encounters—injuries/ingestions	0.56 (−0.59)	0.43 (−0.84)	0.25§	−0.00 to 0.50
No. of outpatient visits—injuries/ingestions	0.20 (−1.62)	0.11 (−2.19)	0.57§	0.10 to 1.04
No. of emergency department visits—injuries/ingestions	0.34 (−1.10)	0.33 (−1.12)	0.02	−0.27 to 0.31
No. of hospitalizations—injuries/ingestions	0.03 (−3.63)	0.01 (−4.31)	0.68	−0.66 to 2.02
No. of days hospitalized—injuries/ingestions	0.18 (−1.84)	0.04 (−3.47)	1.64‖	0.78 to 2.50

*Estimates adjusted for maternal psychological resources, discretionary household income, and poverty level of census tract. Comparison group was treatment group 2; nurse-visited group, treatment group 4.
†Incidence = mean number of infrequently occurring events within stated time period. Individual cases may have values greater than 1, although the range is small.
‡Difference = (comparison log-incidence)−(nurse-visited log-incidence).
§$P \leq .05$.
‖$P < .01$.

Table 6.—Diagnoses for Hospitalizations in Which Injuries and Ingestions Were Detected, by Treatment Condition

Diagnosis	Age, mo	Sex	Length of Stay, d
Nurse-Visited (Treatment Group 4)			
Burns (1st and 2nd degree to face)	12.0	M	2
Coin ingestion	12.1	M	1
Ingestion of iron medication	20.4	F	4
Comparison (Treatment Group 2)			
Head trauma	2.4	M	1
Fractured fibula/congenital syphilis	2.4	M	12
Strangulated hernia with delay in seeking care/burns (1st degree to lips)	3.5	M	15
Bilateral subdural hematoma*	4.9	F	19
Fractured skull	5.2	F	5
Bilateral subdural hematoma (unresolved)/aseptic meningitis—2nd hospitalization*	5.3	F	4
Fractured skull	7.8	F	3
Coin ingestion	10.9	M	2
Child abuse/neglect suspected	14.6	M	2
Fractured tibia	14.8	M	2
Burns (2nd degree to face/neck)	15.1	M	5
Burns (2nd and 3rd degree to bilateral leg)†	19.6	M	4
Gastroenteritis/head trauma	20.0	F	3
Burns (splinting/grafting)—2nd hospitalization†	20.1	M	6
Finger injury/osteomyelitis	23.0	M	6

*One child was hospitalized twice with a single bilateral subdural hematoma.
†One child was hospitalized twice for burns resulting from a single incident.

month of the child's life, in contrast to comparison-group counterparts, nurse-visited women held fewer beliefs about child-rearing associated with child abuse and neglect—lack of empathy, belief in physical punishment, unrealistic expectations for infants ($P=.003$). Moreover, the homes of nurse-visited women were rated as more conducive to children's development by means of the Home Observation for Measurement of the Environment scale ($P=.003$). There was no program effect on maternal teaching behavior, but children born to nurse-visited mothers with low psychological resources were observed to be more communicative and responsive toward their mothers than were children born to low-resource mothers in the comparison group (17.9 vs 17.2; $P=.03$; data not shown). There were no program effects on the children's use of well-child care, immunization status, mental development, or reported behavioral problems.

Maternal Life Course

By the 24th month post partum (Table 8), nurse-visited women reported having fewer second pregnancies and fewer subsequent live births than did women in the comparison group ($P=.006$ and $P=.01$, respectively). The program-control difference in subsequent live births was limited to women with high levels of psychological resources, for whom the rates were 14% vs 31%, respectively ($P<.001$). Although there was some indication that nurse-visited women may have used AFDC slightly less during the second year of the child's life ($P=.07$), there were no program effects on reported educational achievement or length of employment. By the 24th month, nurse-visited women reported higher levels of perceived mastery ($P=.005$).

COMMENT

For the prenatal phase of the trial, there were no treatment differences in length of gestation or birth weight, but there were differences in PIH. For the postnatal phase of the trial, children born to women visited by nurses during pregnancy and infancy had fewer health care encounters in which injuries and ingestions were detected and fewer hospitalization days in which injuries and ingestions were detected than did children in the comparison group (a difference accounted for by more severe and complex diagnoses for comparison children). In addition, nurse-visited women had fewer subsequent pregnancies and live births than did comparison group women.

The pattern of results for the prenatal phase of the study is different from that obtained in the Elmira trial and may be accounted for by different types of risks exhibited by African-American and white women enrolled in the 2 trials. Only 9% of the participants in the current trial smoked 1 or more cigarettes per day at registration, in contrast to 55% in the Elmira trial. Moreover, even in the current study, 6% of the African Americans vs 53% of the whites reported smoking cigarettes. The rates of sexually transmitted diseases, on the other hand, were higher in the current trial among African Americans (47%) than whites (16%). These differences in putative risks for adverse pregnancy outcome may help explain the difference in impact of the prenatal phase of the program in Elmira vs Memphis.

Although a reduction in PIH was hypothesized on the basis of results from the Elmira trial,[7] the information in the medical record did not allow us to make a reliable distinction between preeclampsia or gestational hypertension (nonproteinuric hypertension). Given the nurses' heightened awareness of hypertensive disorders, their monitoring of blood pressure, and their urging the women to communicate with office staff when problems were emerging, it is reasonable to assume that less serious manifestations of PIH were detected in the nurse-visited group. This may help to explain the lower mean arterial blood pressure measured at admission for labor and delivery in the nurse-visited women with PIH. The nurses' promotion of women's eating well-balanced diets, rest, and exercise may explain the reduction in PIH, given that calcium has been shown to reduce the rates of preeclampsia[32,33] and that exercise has been associated with a reduction in both preeclampsia and gestational hypertension.[34]

Additional findings from the current trial are consistent with other studies designed to reduce preterm delivery by increasing the monitoring of pregnant women.[35] We found a higher rate of predelivery hospitalization among the nurse-visited women who were in school at registration. The combination of nurses' attention to obstetric complications and a corresponding heightened awareness of these pregnant adolescents' health problems by school officials may have led to greater detection of emerging obstetrical complications and created increased pressure to hospitalize. The lower rate of yeast infections diagnosed after randomization in the nurse-visited groups is probably a reflection of the highly detectable symptoms of yeast infections and the nurses' urging women to comply with treatment.

Findings from the postnatal phase of the current trial, including the reduction in injuries and ingestions noted in the medical record, are more consistent with the Elmira study.[8,11] It is likely that some portion of the reduction in health care encounters in which injuries and ingestions were detected resulted from the nurses having taught women to observe their children's behavior for signs of illness, to take temperatures, and to call the office staff for guidance when problems arose. In theory, this should have led to a reduction in unnecessary health care encounters and an increase in problems that required more thorough evaluation. The reduction in outpatient encounters where injuries and ingestions were detected may be explained, at least in part, by this feature of the program.

A review of the diagnoses associated with children's hospitalizations, on the other hand, suggests that some portion of the treatment difference in number of days that children were hospitalized with injuries and ingestions resulted from the prevention of deficient caregiving and, in some cases, the prevention of child abuse and neglect. Our interpretation that these treatment differences are indicative of a reduction in deficient caregiving is supported by independent measures of the mothers' childrearing behaviors.

Nurse-visited women attempted breast-feeding more frequently; they provided home environments that were more conducive to children's intellectual and socioemotional development; and they expressed greater empathy, fewer unrealistic expectations, and diminished belief in the value of physical punishment for infants than did comparison-group mothers. While we cannot rule out the possibility that nurse-visited women simply provided more socially desirable responses, some of the beneficial effects of the program are based on data derived from reviews of medical records.

Many of the effects of the program on health care encounters in which injuries and ingestions were detected and on qualities of childrearing were greater for mothers with low psychological resources. For example, in contrast to counterparts in the comparison group, the children of nurse-visited mothers who had few psychological resources were observed to be more responsive and communicative toward their mothers. Infant-attachment research suggests that toddlers' behavior toward their mothers reveals the extent to which their mothers are sensitive and responsive rather than hostile, intrusive, or neglectful toward them, with toddlers' behavior being a better indication of the quality of the parent-child relationship over time than currently observed behaviors of parents.[36,37]

It is important to note, in this regard, that the program was designed to decrease risks posed by limited intellectual functioning, mental health, and mastery on the part of caregivers.[20] The program provided a detailed educational protocol designed to help parents understand and respond appropriately to their children's unique temperament and communicative style by means of educational materials adapted to the intellectual levels of the mothers. Given that limited knowledge and capacity to anticipate children's needs can compromise parents' ability to care for their children, it is reasonable that this program would reduce risks imparted by limited intellectual functioning, even in the absence of an effect on maternal intellectual functioning.

Table 7.—Adjusted Outcomes on Qualities of Caregiving and Children's Use of Well-Child Care, Immunization Rates, Mental Development, and Behavioral Problems, by Treatment Condition*

Dependent Variables	Comparison Group, %	Nurse-Visited Group, %	Odds Ratio†	95% Confidence Interval
Breastfeeding (attempted)	16	26	1.9‡	1.2 to 2.9
Immunizations up to date at 2 y	68	70	1.1	0.7 to 1.5
	Mean	**Mean**	**Mean Difference§**	**95% Confidence Interval**
No. of well-child visits (0-24 mo)	4.8	4.6	0.2	−0.1 to 0.6
Beliefs associated with child abuse, Bavolek total score	100.5	98.7	1.9‡	0.6 to 3.1
Emotional/cognitive stimulation, HOME total score	30.9	32.3	−1.3‡	−2.2 to −0.4
Maternal teaching, NCAST maternal total score	36.5	36.7	−0.2	−0.9 to 0.5
Child responsiveness, NCAST child total score	17.4	17.7	−0.3	−0.7 to 0.1
Bayley mental development score	94.3	94.5	−0.2	−2.4 to 2.0
Behavior problems total score	49.2	46.0	3.2	−0.6 to 7.0

*Estimates adjusted for maternal psychological resources, discretionary household income, and poverty level of census tract. Comparison group was treatment group 2; nurse-visited group, treatment group 4. HOME indicates Home Observation for Measurement of the Environment; NCAST, Nursing Child Assessment Satellite Training.
†Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
‡$P<.01$.
§Difference = (comparison mean)−(nurse-visited mean).

Table 8.—Adjusted Maternal Life Course Outcomes During First 2 Years Post Partum, by Treatment Condition*

Dependent Variables	Comparison Group, %	Nurse-Visited Group, %	Odds Ratio†	95% Confidence Interval
Subsequent pregnancy, 0-24 mo	47	36	0.6‡	0.4 to 0.9
Spontaneous abortion, 0-24 mo	3	5	1.5	0.7 to 3.4
Therapeutic abortion, 0-24 mo	4	2	0.5	0.2 to 1.4
Subsequent live birth, 0-24 mo	31	22	0.6‡	0.4 to 0.9
	Mean	**Mean**	**Mean Difference**	**95% Confidence Interval**
No. of months worked, 0-12 mo	1.7	2.2	−0.5	−1.0 to 0.0
No. of months worked, 13-24 mo	3.4	3.4	0.0	−0.7 to 0.7
No. of months on AFDC, 0-12 mo	7.6	7.3	0.3	−0.4 to 1.1
No. of months on AFDC, 13-24 mo	8.4	7.8	0.7‖	−0.0 to 1.4
Anxiety, 24 mo¶	100.3	99.1	1.2	−0.4 to 2.7
Depression, 24 mo¶	100.1	99.5	0.6	−1.0 to 2.2
Mastery, 24 mo¶	99.4	101.6	−2.2‡	−3.8 to −0.7

*Estimates adjusted for psychological resources, discretionary household income, and poverty level of census tract. Comparison group was treatment group 2; nurse-visited group, treatment group 4. AFDC indicates Aid to Families With Dependent Children.
†Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
‡$P<.01$.
§Difference = comparison mean−nurse-visited mean.
‖$P<.10$.
¶Standardized to sample mean=100; SD=10.

While the program produced no effect on mothers' mental health, it may have reduced psychological distress related to parents' care of their children, which is affected by parents' depression and sense of competence.[38,39] Moreover, by the end of the program at the children's second birthday, there were significant treatment effects on women's sense of mastery. Mastery is a general psychological attribute that affects parents' ability to cope effectively with a wide range of challenges, and a deficit in mastery has been associated with child abuse and neglect.[40] Thus, the program diminished risks posed by limited intellectual functioning, psychological distress, and impaired sense of mastery.

Although there also was a trend for the nurse-visited women to use AFDC about 0.7 month less during the child's second year of life than did women in the comparison group, there were no treatment-comparison differences in educational achievement or labor-force participation after delivery, despite nurse-visited women being in the labor force to a greater degree at the end of pregnancy. The discrepancy between the findings for these 2 phases of the study will be examined in future reports. In the Elmira trial, the influence of the program on workforce participation did not emerge until the 2-year period after the program ended, and the influence of the program on promoting women's economic self-sufficiency was preceded by a reduction in the rate of subsequent pregnancy.[9] A 15-year follow-up of the Elmira sample now indicates that these early alterations of maternal life course portend substantial improvements in major maternal life outcomes.[41] It will be important to determine whether a corresponding pattern of results emerges in Memphis after the program ends.

Although one might consider dropping the prenatal phase of the program from the intervention in light of its failure to produce substantial prenatal and newborn effects in the current trial, this would be injudicious. We have only limited insight into the extent to which the salutary postnatal effects are dependent on the prenatal initiation of the service. This issue deserves careful examination as the program is studied with new populations and in new contexts.

This research was supported with funding from 5 federal agencies: the National Institute of Nursing Research (grant NR01-01691-05); the Bureau of Maternal and Child Health (grant MCJ 360579); the Administration for Children and Families (grant 90PJ0003); the Office of the Assistant Secretary for Planning and Evaluation; and the National Center for Child Abuse and Neglect, through a transfer of funds to the National Institute of Nursing Research. This research was also supported by 4 private foundations: the Robert Wood Johnson Foundation, Princeton, NJ (grants 017934 and 11084); the Carnegie Corporation of New York, New York, NY (grant B 5492); the Pew Charitable Trusts, Philadelphia, Pa (grants 88-0211-000 and 93-02363-000); and the William T. Grant Foundation, New York, NY (grants 88-1246-88 and 91-1246-88), including a William T. Grant Faculty Scholars Award (86108086) and a Senior Research Scientist Award (1-K05-MH01382-01) to Dr Olds.

We thank Barb Suter, MPH, and Diana Strickland, MBA, for assistance in data processing; Laura Murphy, EdD, for overseeing the developmental assessments; Geraldine Smith, RN, CS, MSN, MS, BSN, for her supervision of the nurses; Jann Belton, RN, and Carol Ballard, RN, MSN, for integrating the program into the Memphis/Shelby County Health Department; the home-visiting nurses for their work with families; and Vincent Fulginiti, MD, Zorika Henderson, Peggy Hill, MS, M. Douglas Jones, MD, Richard Krugman, MD, Raymond Lorion, PhD, and James McGregor, MD, for their comments on the manuscript.

References

1. National Commission to Prevent Infant Mortality. *Home Visiting: Opening Doors for America's Pregnant Women and Children.* Washington, DC: National Commission to Prevent Infant Mortality; 1989.
2. US Advisory Board on Child Abuse and Neglect. *Child Abuse and Neglect: Critical First Steps in Response to a National Emergency.* Washington, DC: US Government Printing Office; June 1990.
3. Gutelius MF, Kirsch AD, MacDonald S, et al. Controlled study of child health supervision: behavioral results. *Pediatrics.* 1977;60:294-304.
4. Black MM, Nair P, Kight C, Wachtel R, Roby P, Schuler M. Parenting and early development among children of drug-abusing women: effects of home intervention. *Pediatrics.* 1994;94:440-448.
5. Olds DL, Kitzman H. Can home-visitation improve the health of women and children at environmental risk? *Pediatrics.* 1990;86:108-116.
6. Olds DL, Kitzman H. Review of research on home visiting for pregnant women and parents of young children. *Future Child.* 1993;3:53-92.
7. Olds DL, Henderson CR, Tatelbaum R, Chamberlin R. Improving the delivery of prenatal care and outcomes of pregnancy: a randomized trial of nurse home visitation. *Pediatrics.* 1986;77:16-28.
8. Olds DL, Henderson CR, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics.* 1986;78:65-78.
9. Olds DL, Henderson CR, Tatelbaum R, Chamberlin R. Improving the life-course development of socially disadvantaged mothers: a randomized trial of nurse home visitation. *Am J Public Health.* 1988; 78:1436-1445.
10. Olds DL, Henderson CR, Phelps C, Kitzman H, Hanks C. Effect of prenatal and infancy nurse home visitation on government spending. *Med Care.* 1993; 3:1-20.
11. Olds DL, Henderson CR, Kitzman H. Does prenatal and infancy nurse home visitation have enduring effects on qualities of parental caregiving and child health at 25 to 50 months of life? *Pediatrics.* 1994;93:89-98.
12. Olds DL, Henderson CR, Kitzman H, Cole R. Effects of prenatal and infancy nurse home visitation on surveillance of child maltreatment. *Pediatrics.* 1995;95:365-372.
13. Olds DL. Home visitation for pregnant women and parents of young children. *AJDC.* 1992;146:704-708.
14. Soares JF, Wu CF. Some restricted randomization rules in sequential designs. *Commun Stat Theory Methods.* 1983;12:2017-2034.
15. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev.* 1977;84: 191-215.
16. *NCAST Caregiver/Parent-Child Interaction Feeding Manual.* Seattle: NCAST Publications, University of Washington, School of Nursing; 1994.
17. Sumner GA, Barnard KE, Johnson-Crowley N, Spietz A. *NCAST Keys to Caregiving.* Seattle: NCAST Publications, University of Washington, School of Nursing; 1990.
18. Sparling J, Lewis I. *Partners for Learning.* Lewisville, NC: Kaplan Press; 1984.
19. *Safestate, Safehome: Inspector's Notes.* Boston: Massachusetts Dept of Public Health; 1986.
20. Olds DL, Kitzman H, Cole R, Robinson J. Theoretical foundations of a program of home visitation for pregnant women and parents of young children. *J Community Psychol.* 1997;25:9-25.
21. Ware JE, Veit CT, Donald CA. *Refinements in the Measurement of Mental Health for Adults in the Health Insurance Study.* Santa Monica, Calif: RAND Corp; 1985.
22. Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav.* 1967;19:2-21.
23. Shipley W. A self-administered scale for measuring intellectual impairment and deterioration. *J Psychol.* 1940;9:371-377.
24. US Dept of Commerce, Bureau of the Census. *Summary Tape File 3A: 1990 Census of Population and Housing* [database on CD-ROM]. Suitland, Md: US Dept of Commerce, Bureau of the Census; November 1992. Item CE90-3A-53. Available from: Data Users Services Division, Washington, DC.
25. American College of Obstetricians and Gynecologists. Hypertension in pregnancy. *Tech Bull.* January 1996;219:1-8.
26. Brenner WE, Edelman DA, Hendricks CH. A standard of fetal growth for the United States of America. *Am J Obstet Gynecol.* 1976;56:52-64.
27. Bavolek SJ. *Handbook for the AAPI: Adult-Adolescent Parenting Inventory.* Eau Claire, Wis: Family Development Resources Inc; 1984.
28. *NCAST Caregiver/Parent-Child Interaction Teaching Manual.* Seattle: NCAST Publications, University of Washington, School of Nursing; 1994.
29. Caldwell B, Bradley R. *Home Observation for Measurement of the Environment.* Little Rock: University of Arkansas; 1979.
30. Achenbach TM. *Child Behavior Checklist for Ages 2-3.* Burlington: University of Vermont; 1988.
31. Henderson C. Analysis of covariance in the mixed model: higher level, nonhomogeneous, and random regressions. *Biometrics.* 1982;38:623-640.
32. Belizan J, Villar J, Gonzalez L, Campodonico J, Bergel E. Calcium supplementation to prevent hypertensive disorders of pregnancy. *N Engl J Med.* 1991;325:1399-1405.
33. Carroli G, Belizan J. Calcium supplementation during pregnancy: a systematic review of randomized controlled trials. *Br J Obstet Gynaecol.* 1994;101:753-758.
34. Marcoux S, Brisson J, Fabia J. The effect of leisure time physical activity on the risk of pre-eclampsia and gestational hypertension. *J Epidemiol Community Health.* 1989;43:147-152.
35. Collaborative Group on Preterm Birth Prevention. Multicenter randomized controlled trial of a preterm birth prevention program. *Am J Obstet Gynecol.* 1993;169:352-366.
36. Sroufe A, Carlson EA. Contribution of attachment theory to developmental psychopathology. In: Cicchetti D, Cohen D, eds. *Developmental Psychopathology, Vol 1: Theory and Methods.* New York, NY: John Wiley & Sons Inc; 1995:581-617.
37. Ainsworth MDS, Blehar M. Waters E, Wall S. *Patterns of Attachment.* Hillsdale, NJ: Lawrence Erlbaum Assoc; 1978.
38. Loyd B, Abidin R. Revision of the parenting stress index. *J Pediatr Psychol.* 1985;53:169-177.
39. Zuckerman B, Beardslee W. Maternal depression: a concern for pediatricians. *Pediatrics.* 1987; 79:110-117.
40. Ellis R, Milner J. Child abuse and locus of control. *Psychol Rep.* 1981;48:507-510.
41. Olds D, Eckenrode J, Henderson C Jr, et al. Long-term effects of home visitation on maternal life course and child abuse and neglect: a fifteen-year follow-up of a randomized trial. *JAMA.* 1997; 278:637-643.

Printed and Published in the United States of America

Differences in Program Implementation Between Nurses and Paraprofessionals Providing Home Visits During Pregnancy and Infancy: A Randomized Trial

Jon Korfmacher, PhD, Ruth O'Brien, PhD, RN, Susan Hiatt, PhD, and David Olds, PhD

ABSTRACT

Objectives. This study examined differences between nurses and paraprofessionals in implementation of a home visiting program for low-income, first-time parents during pregnancy and the first 2 years of the child's life.

Methods. Mothers were randomly assigned to either a nurse-visited (n = 236) or a paraprofessional-visited (n = 244) condition. Nurse- and paraprofessional-visited families were compared on number and length of visits, topics covered, number of program dropouts, and relationship with home visitor.

Results. On average, nurses completed more visits than paraprofessionals (28 vs 23; $P < .001$) and spent a greater proportion of time on physical health issues during pregnancy (38% vs 27%; $P < .001$) and on parenting issues during infancy (46% vs 32%; $P < .001$). Paraprofessionals conducted visits that lasted longer and spent a greater proportion of time on environmental health and safety issues (15% vs 7% pregnancy; 15% vs 8% infancy; $P < .001$). While home visitors were viewed equally positively by mothers, nurses had fewer dropouts than did paraprofessionals (38% vs 48%; $P = .04$). More paraprofessional-visited families than nurse-visited families experienced staff turnover.

Conclusions. Nurses and paraprofessionals, even when using the same model, provide home visiting services in different ways. (*Am J Public Health.* 1999;89:1847–1851)

Home visitation as a strategy for reducing maltreatment of children and for improving maternal and child health has received heightened attention in recent years. Recommendations to increase home visitation services for vulnerable pregnant women and parents of young children[1,2] relied heavily on the results of a randomized trial of prenatal and infancy home visitation by nurses.[3–5] Policy advisory groups, however, have promoted paraprofessional program models on the basis of very limited evidence from randomized trials. Although some literature reviews have concluded that paraprofessionals achieve outcomes equal to or better than those of professionals across different clinical settings, few of the examined studies were randomized trials[6,7] and most focused on interventions with adult clients,[8] weakening their applicability to the early intervention literature.

The Home Visitation 2000 program was designed to examine differences between nurses and paraprofessionals using essentially the same program model of home visiting for first-time, low-income mothers during pregnancy and infancy. The program model, delivered by nurses, has been shown in previous trials to be effective in improving maternal and child health, parental caregiving practices, and maternal education, employment, and family planning choices.[3–5,9]

There are 2 important empirical foci of the Home Visitation 2000 trial. The first, the focus of a separate report in preparation, is an examination of program outcomes, to explain whether there are differences between nurses and paraprofessionals in their ability to affect maternal, child, and family functioning. The second, the focus of the present report, is an examination of the differences in the implementation of the program model between nurses and paraprofessionals. Program implementation is important because any subsequent child and parent outcomes are likely to be affected by the way the programs were actually delivered.

Methods

Subjects

Between March 29, 1994, and June 15, 1999, pregnant women who had had no previous live births and who either qualified for Medicaid or had no private insurance were recruited from 21 prenatal clinics in the Denver, Colo, metropolitan area. Of the 1178 women identified as eligible, 735 agreed to participate in the study. On average, participants were young (mean age = 19.76 years), were unmarried (84%), and had completed 11 years of education. Forty-five percent were Hispanic, 34% were non-Hispanic White, 16% were African American, 4% were American Indian, and 1% were Asian.

The subjects were randomized by computer program within strata from a model with 3 classification factors: race/ethnicity, gestational age at enrollment, and geographic region of residence. Women assigned to 1 of the 2 home visitation groups were subsequently assigned at random to home visitors within sets of visitors. Visitors were assigned to geographic regions to increase the likelihood that they would serve families of the same race/ethnicity, although there was no attempt to specifically match visitors and subjects by race or ethnicity.

At the time of the study, all of the authors were with the University of Colorado Health Sciences Center, Denver. Jon Korfmacher is now with the Erikson Institute, Chicago, Ill.

Requests for reprints should be sent to Jon Korfmacher, PhD, Erikson Institute, 420 N Wabash Ave, Chicago, IL 60611 (e-mail:jkorfmacher@erikson.edu).

This article was accepted June 4, 1999.

The subjects were assigned to 1 of 3 groups. Women in the comparison group (n = 255; excluded from current analyses) were given developmental screening and referral services for the child at 6, 12, 15, 21, and 24 months of age. Women in the second group (n = 244) were given the screening and referral services in addition to intensive paraprofessional home visitation services during pregnancy and the first 2 years of the child's life. Women in the third group (n = 236) were given the screening and referral services in addition to intensive nurse home visitation services during pregnancy and the first 2 years of the child's life.

Home Visitation Program Model

The program model[10] focused on 3 primary goals: improving pregnancy outcomes by promoting health-related behaviors; improving child health, development, and safety by promoting competent care of the child; and enhancing parent life-course development by promoting pregnancy planning, educational achievement, and employment. These goals were supported by 2 secondary goals: enhancing families' material support by linking families with needed health and social services and promoting supportive relationships with family members and friends. Home visitors followed a visit-by-visit protocol that provided guidance about content and timing of the content. Visitors used the protocols as a guide, adapting them to the individual needs of the mother. These protocols, developed in a previous trial,[9,10] were reviewed and updated jointly by the nurse and paraprofessional supervisors, ensuring that the protocols were similar across programs and that they were detailed enough to be implemented regardless of disciplinary background.

Each visitor carried a maximum caseload of 25 families. Visits followed an established schedule of every other week (except for weekly visits during the first 4 weeks after enrollment and the first 6 weeks after delivery) through the child's 21st month, followed by monthly visits during the final 3 months. The average cost of the nurse home visitor program for approximately 2.5 years of service was $7681 per family; the corresponding cost for the paraprofessional program was $5178. These cost estimates included staff salaries and fringe benefits, supplies, travel, rent, equipment, and training costs.

Home Visitors and Training

The team of 10 nurses was supported by 1 supervisor, who had a master's degree in nursing and experience in mental health, community development, and nursing administration. The team of 10 paraprofessionals was supervised by 2 licensed clinical social workers, who had backgrounds in mental health, family relations, and early child development.

The nurse visitors were required to have a BSN degree and experience in community or maternal and child health nursing. The paraprofessionals were expected to have a high school education, with no college degree in the helping professions. Preference in hiring was given to paraprofessional applicants with previous work experience in human services agencies. Both groups, nurses and paraprofessionals, were ethnically diverse, including Mexican Americans and others of Hispanic origin, African Americans, Native Americans, Asian Americans, and European Americans.

Both nurse and paraprofessional home visitors initially received 1 month of intensive training, during which they served 2 families in a pilot program to gain experience with the program model. Regular in-service training was also conducted to cover aspects of maternal and child health and development. While the 2 groups of home visitors experienced essentially the same training regimen, some modification was necessary because of their different educational backgrounds. For example, because nurses were expected to exercise more independent judgment in helping mothers deal with physical health concerns, the nurses were given more in-depth training on the physical health and development of the mother and child than were the paraprofessionals.

Program Implementation Variables

Program dropouts. When mothers ended their involvement with the program, visitors documented the time of and explanation for the termination. A mother was considered to have dropped out of the program prematurely if she ceased contact with her home visitor 6 months or more before her child's second birthday.

Encounter variables. The home visitors kept track of contacts with family members through encounter forms filled out after every visit. These encounter forms detailed length of the visit, family members who participated, and percentage of time devoted to the different program areas (personal health, parenting, mother's own life course development, environmental health and safety, and social support). The home visitors also recorded attempted visits that were not completed.

Within-program reliability estimates for program content were calculated on the basis of 165 encounters (90 nurse, 75 paraprofessional) during which a second visitor made her own ratings of the visit. Correlation coefficients for specific variables suggest acceptable reliability (average r for nurses = 0.79, average r for paraprofessionals = 0.77; range of r = 0.63–0.84).

Mother's rating of the helping relationship. At the end of pregnancy, at 15 months, and at 24 months, each mother rated her relationship with her home visitor, using the 27-item Helper–Client Relationship Inventory.[11] Average overall scores were calculated for each mother (Cronbach $\alpha = .92$).

Relationship continuity. The program model emphasized the development of a continuous relationship between home visitor and family through the course of the services to promote a strong working alliance.[10] Because of staff turnover and the fact that some visitors reduced their time commitment to the program over the course of the trial, some families experienced a disruption in this helping relationship. A dichotomous variable was created that categorized mothers as having had either a disrupted or an undisrupted relationship with their visitors.

Analysis

Variables characterizing program implementation were analyzed as dependent variables in a model with 2 levels of treatment (nurse and paraprofessional) and 2 covariates (maternal age and household density). General linear models were used to analyze continuous dependent variables and logistic regression was used to analyze dichotomous dependent variables. Data gathered from visitors' record-keeping forms were analyzed separately for pregnancy and infancy (0–24 months). For mothers' ratings of home visitors, a factor was added for time of assessment in repeated-measures analysis.

Results

Mothers in the 2 treatment conditions were compared on a large number of background characteristics. The groups demonstrated equivalence on these characteristics, with 2 exceptions: the group visited by paraprofessionals tended to be younger and to live in denser households than the nurse-visited group. Maternal age and household density were included in analytic models to control for their effects.

By the end of the intervention, 89 mothers (38%) in the nurse-visited group had dropped out of the intervention before their children turned 2 years of age, while the paraprofessional-visited group had 117 dropouts

(48%). The difference was significant ($P = .04$). Table 1 summarizes the mothers' reasons for dropping out and shows a greater dropout rate among paraprofessional-visited families because of a higher number of active and passive refusals.

Table 2 shows comparisons between families in the nurse and paraprofessional conditions in frequency of visitation and length of contact. Although the 2 groups did not differ on the number of visits during pregnancy, nurse-visited families, on average, received about 5 more visits during the child's infancy than did families visited by paraprofessionals ($P < .001$). This difference is due in part to the larger number of paraprofessional-visited families who dropped out of the program, although analyses limited to families who completed the program still show nurses completing more visits (least squares mean for nurses = 37.95, SE = 1.14; least squares mean for paraprofessionals = 35.05, SE = 1.22; $P = .09$). Paraprofessionals spent more time per visit ($P < .001$) and made more unsuccessful attempts at contact than did the nurses ($P = .02$ prenatal; $P < .001$ postnatal). Nurses completed more postnatal visits that included the mother's husband or boyfriend ($P = .01$).

As Table 2 shows, nurses spent a greater proportion of home visit time focused on issues of personal health (during pregnancy) and parenting (during infancy), while paraprofessionals spent a greater proportion of time on issues of environmental health and safety, social support, and mother's life course development ($P < .001$ for all comparisons except prenatal life course development, $P = .02$).

Across the intervention period, there were no statistically significant differences in the degree to which mothers provided positive ratings of their home visitors on the Helper–Client Relationship Inventory (least squares mean for nurses = 4.14, SE = .04; least squares mean for paraprofessionals = 4.06, SE = .04; NS).

Mothers in the paraprofessional condition had more relationship disruption than did mothers in the nurse condition ($P < .001$); 35% of mothers visited by paraprofessionals had more than one visitor, compared with only 11% of those visited by nurses.

TABLE 1—Mothers' Reasons for Dropping Out of a Home Visitation Program, by Type of Visitor: Denver, Colo, 1994–1997

	Type of Visitor			
	Nurse (n = 89)		Paraprofessional (n = 117)	
Reason	No.	%	No.	%
Death of child or fetus	10	11	8	7
Change in child custody	0	0	2	2
Moved out of program area	20	22	24	21
Refused services	27	30	33	28
Passive refusal[a]	32	36	50	43

[a]Subject did not specifically refuse services or state intention to leave program but was unresponsive to home visitor and/or could not be located by home visitor.

TABLE 2—Frequency, Type, and Length of Contact in a Home Visitation Program, by Time Period and Type of Visitor: Denver, Colo, 1994–1997

	Pregnancy		Infancy	
	Nurse Visitor (n = 236)	Paraprofessional Visitor (n = 244)	Nurse Visitor (n = 236)	Paraprofessional Visitor (n = 244)
Completed visits	6.51 (2.8)	6.32 (0.27)	21.34 (0.99)	16.49 (0.97)**
Attempted visits	1.33 (0.12)	1.73 (0.12)*	5.25 (0.44)	7.63 (0.43)**
Average visit length, min[a]	77.25 (1.27)	85.24 (1.30)**	71.82 (1.05)	78.49 (1.05)**
Total visit time, min	503 (25)	542 (25)	1498 (80)	1299 (78)
Visits with grandmother	0.45 (0.09)	0.69 (0.09)	1.99 (0.29)	1.82 (0.28)
Visits with partner	0.64 (0.09)	0.67 (0.09)	2.32 (0.24)	1.45 (0.24)*
Content areas, %[a]				
Personal health	38.11 (0.70)	26.56 (0.71)**	14.87 (0.47)	15.30 (0.47)
Environmental health	7.30 (0.38)	15.14 (0.39)**	7.93 (0.40)	15.16 (0.40)**
Life course development	13.97 (0.43)	15.43 (0.44)*	16.23 (0.48)	19.41 (0.48)**
Parental caregiving	25.03 (0.72)	23.70 (0.73)	46.09 (0.94)	31.51 (0.94)**
Friends and family	15.42 (0.39)	18.78 (0.40)**	14.76 (0.44)	18.39 (0.44)**

Note. Numbers in table are least squares means (SEs in parentheses), with maternal age and household density at intake controlled for. *P* values are for comparisons between nurses and paraprofessionals within the time period.
[a]These statistics could be calculated only for families with 1 or more visits. Sample sizes are as follows: pregnancy, n's = 222 (nurse visitor) and 210 (paraprofessional visitor); infancy, n's = 205 (nurse visitor) and 204 (paraprofessional visitor).
*$P < .05$; **$P < .001$.

Discussion

Differences Between Nurses and Paraprofessionals

Even when given the same program goals and detailed visit protocols delineating content relevant to attaining these goals, nurses and paraprofessionals provided services in substantially different ways. Many of these differences are reasonable, given the differences in backgrounds of the home visitors. Nurses, for example, have been educated to believe strongly in the influence of maternal health behaviors on the health of the developing fetus and the importance of parental caregiving behaviors in the behavioral and emotional development of young children. Professional beliefs about what factors have the most impact on birth outcomes and the health and development of very young children may have guided the nurses' interpretation of the home visit protocols and the apportioning of time to various content areas.

There were some differences between programs in the training and protocol content in the area of personal health; however, while nurses' knowledge of health issues enabled them to independently assess whether symptoms required medical attention, paraprofessionals received training in identifying health concerns that required consultation with the mother's primary care

provider. Thus, the goal of ensuring that mothers and children received appropriate preventive care or evaluation of symptoms of ill health was similar for both types of visitor, irrespective of the steps involved in procuring such care.

Paraprofessionals often commented that they were uncomfortable with the formal content-oriented protocols and that they viewed the home visitor's role as that of a more experienced, trusted peer who had struggled through similar issues in her own life.[12] Many of the paraprofessionals questioned the relevance for low-income families of the parental caregiving activities provided in the program model.[12] These data suggest that paraprofessionals most likely placed greater emphasis on environmental safety (adequate clothing, food, shelter for mother and child), work, and social support in their visits with clients because these were issues they had successfully managed in their own lives.

Did differences in supervisor background for the nurses and paraprofessionals contribute to the observed differences in home visit content? While the supervisors' backgrounds may explain the lowered emphasis on physical health for the paraprofessionals, this is not a likely explanation for the differences in time spent on parenting, because both of the paraprofessional supervisors had years of experience in working with families on parenting and child maltreatment issues. The paraprofessional supervisors emphasized parent–child interactions during case conferences, often dealing with the discomforts that paraprofessionals voiced about these aspects of the program content.[12]

It is also possible that the reported differences in program emphasis reflect not differences in orientation between the 2 types of visitor, but simply differences in how visitors recorded visit content. Although the interrater agreement between visitors within programs lends credence to the interpretation of an orientation difference, it was not possible in this study to examine how nurses and paraprofessionals would rate the same family. Such an examination is needed to further elucidate this issue.

Differences between visitors in the time spent on social support and life course development were small and may not have major clinical significance. Differences in time spent on caregiving in infancy and physical health during pregnancy, on the other hand, were large. Because previous trials of this program model have shown significant effects on caregiving and pregnancy outcomes,[3,5,9] these differences in implementation may take on increased relevance as program outcomes are studied.

Low Contact

The contact both types of visitor had with families was low compared with the amount expected by the program protocol. Nurses and paraprofessionals achieved only 51% and 40%, respectively, of the expected number of visits. These low numbers are partly a reflection of the dropout rates. Other early preventive intervention trials, including those using this program model, have also reported less than expected contact or large dropout rates.[13–16]

The number of families who left the program early suggests that committing to regular home visits at least twice a month may have been difficult for many families. The competing demands of family, work, school, and friends may have made finding time to focus intensely (and sometimes critically) on their life choices and circumstances a lower priority. A separate set of analyses showed that mothers in both programs who dropped out were less engaged in the intervention and viewed their visitor more negatively than those who stayed.[17] Most of these mothers, however, continued to participate in the outcome research assessment, which required less time and emotional commitment and included a small payment for participation.

Since families in both conditions received fewer average visits than the program protocol recommended, some may argue that the intervention is not appropriate for the families served and that the visitation schedule should be reduced. An important aspect of the program model, however, is that it allows home visitors flexibility to provide more visitation to families who need it[13] while respecting the wishes of families who want fewer visits. Reducing the number of home visits overall may encourage administrators to increase the number of clients served by each home visitor. This could reduce the visitors' ability to visit higher-need families more frequently and may be counterproductive to forming strong individual relationships with families. A randomized trial that varies the amount of contact prescribed to families is the best way to address this issue.[18]

Home Visitor–Family Relationship

Although the mothers' ratings of the helping relationship did not show differences between nurses and paraprofessionals, the behavior of the mothers suggests differences in their perceptions of the program's value. Mothers were visited by paraprofessionals significantly less often than by nurses, in spite of the fact that paraprofessionals made more attempted (unsuccessful) visits. Mothers visited by paraprofessionals were more likely to drop out of the intervention, a finding also seen in paraprofessional mental health programs.[19]

Anecdotal evidence suggests that the paraprofessional visitors had difficulty engaging many of the families.[12] They often dealt with issues that were very similar to past issues in their own lives, such as housing concerns, domestic violence, and substance abuse. Supervisors spent a significant amount of time dealing with these "countertransference" issues. Many paraprofessionals experienced difficulty in adapting to the professional environment in terms of time management, organization, and workplace social skills.[12] This factor may have both affected their ability to implement the intervention and contributed to the high rate of paraprofessional staff turnover. It is likely that this turnover also made it more difficult for families and paraprofessional visitors to form strong working alliances. Psychotherapy research has long shown a relationship between quality of the treatment alliance and the program outcome.[20] Future analyses will be devoted to explaining the effect of home visitor–family relationships on program use and outcomes.

Conclusion

Nurses and paraprofessionals conducted a program for parents and infants in unique ways, even when they were provided with a structured and common set of program protocols. The next step is understanding how these differences relate to differences in outcomes between families enrolled in the 2 types of program. Examinations of the inner workings of program models can help answer the question of what works best for whom under what circumstances and may provide guidance as to the best type of intervention for families in need of services. □

Contributors

J. Korfmacher planned and conducted the majority of the data management and analysis. D. Olds is the principal investigator and designer of the Home Visitation 2000 trial, from which the data were taken. R. O'Brien and S. Hiatt are coinvestigators of and contributed to the design of the Home Visitation 2000 trial. All authors contributed to the writing of the paper.

Acknowledgments

This research was made possible by a grant from the Colorado Trust (93059). J. Korfmacher's work was

funded in part by a grant from the National Institute of Mental Health (R03 MH57338).

The study was approved by the Colorado Multiple Institutional Review Board. Participants gave written consent for participation in research before they were enrolled in the study.

References

1. *Home Visiting: Opening Doors for America's Pregnant Women and Children*. Washington, DC: National Commission to Prevent Infant Mortality; 1989.
2. *Child Abuse and Neglect: Critical First Steps in Response to a National Emergency*. Washington, DC: US Advisory Board on Child Abuse and Neglect; June 1990.
3. Olds D, Henderson C, Tatelbaum R, Chamberlin R. Improving the delivery of prenatal care and outcomes of pregnancy: a randomized trial of nurse home visitation. *Pediatrics*. 1986;77: 16–28.
4. Olds D, Henderson C, Tatelbaum R, Chamberlin R. Improving the life-course development of socially disadvantaged mothers: a randomized trial of nurse home visitation. *Am J Public Health*. 1988;78:1436–1445.
5. Olds D, Henderson C, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics*. 1986;78:65–78.
6. Durlak JA. Comparative effectiveness of paraprofessional and professional helpers. *Psychol Bull*. 1979;86:80–92.
7. Hattie JA, Sharpley CF, Rogers HJ. Comparative effectiveness of professional and paraprofessional helpers. *Psychol Bull*. 1984;95: 534–541.
8. Nietzel MT, Fisher SG. Effectiveness of professional and paraprofessional helpers: a comment on Durlak. *Psychol Bull*. 1981;89:555–565.
9. Kitzman H, Olds DL, Henderson CR Jr, et al. Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing: a randomized controlled trial. *JAMA*. 1997;278:644–652.
10. Olds D, Kitzman H, Cole R, Robinson J. Theoretical and empirical foundations of a program of home visitation for pregnant women and parents of young children. *J Community Psychol*. 1997;25:9–25.
11. Barnard KE. Developing, implementing, and documenting interventions with parents and young children. *Zero to Three*. 1998;18(4): 23–29.
12. Hiatt SW, Sampson D, Baird D. Paraprofessional home visitation: conceptual and pragmatic considerations. *J Community Psychol*. 1997;25:77–92.
13. Olds D, Korfmacher J. Maternal psychological characteristics as influences on home visitation contact. *J Community Psychol*. 1998;26:23–36.
14. Korfmacher J, Kitzman H, Olds D. Intervention processes as predictors of outcomes in a preventive home visitation program. *J Community Psychol*. 1998;26:49–64.
15. St. Pierre RG, Layzer JI, Goodson BD, Bernstein LS. *National Impact Evaluation of the Comprehensive Child Development Program*. Cambridge, Mass: Abt Associates Inc; 1997. Final Report to the Administration for Children, Youth and Families, contract 105-90-1900.
16. Gross RT, Spiker D, Haynes CW, eds. *Helping Low Birth Weight, Premature Babies: The Infant Health and Development Program*. Stanford, Calif: Stanford University Press; 1997.
17. Korfmacher J, O'Brien R, Hiatt S. Home visitor and maternal perceptions: predicting program use and dropouts in a pregnancy and infancy intervention program. Paper presented at: Biennial Meeting of the Society for Research in Child Development; April 15–18, 1999; Albuquerque, NM.
18. Powell C, Grantham-McGregor S. Home visiting of varying frequency and child development. *Pediatrics*. 1989;84:157–164.
19. Roth A, Fonagy P. *What Works for Whom? A Critical Review of Psychotherapy Research*. New York, NY: Guilford Press; 1996.
20. Horvarth AO, Symonds BD. Relation between working alliance and outcome in psychotherapy: a meta-analysis. *J Consult Clin Psychol*. 1991;38:139–149.

IMPaCT Intervention

- CHWs provide tailored social support for high-risk patients
- Highly structured with recommended caseloads, supervision ratios, hiring algorithms, training courses, and software for documentation, reporting, and quality control
    - Important to note: insufficient investment in infrastructure or unrealistic caseloads can compromise program effectiveness (i.e. cheaper cost initially but wasteful long-term)
- Mangers supervise a team of six CHWs who each serve 55 patients
- Randomized controlled trial analysis
    - Different from typical pre-post evaluations that may be exaggerated because of regression to the mean
    - 302 total patients (150 intervention, 152 control)
        - Seen at the UPenn Health System July 2013 – October 2014
        - All patients insured by Medicaid or uninsured, lived in high-poverty neighborhoods, and were diagnosed with at least 2 chronic diseases (diabetes, obesity, tobacco dependence, or hypertension)
    - Annual return of $2.47 for every dollar invested, from perspective of Medicaid payer; 38% reduction in cost
        - This is also important to note, as ROI is dependent on who is MAKING the investment and who is RECEIVING the return
        - Medicaid payer bears all costs and receives all returns in this analysis, but there are other possible models
            - i.e. providers bear cost for CHW programs and see returns only if costs of prevented admissions exceed revenue
    - Intervention group also had fewer admissions and lower cost admissions, and more outpatient visits per year compared to control
        - Total inpatient cost was $2.3 mil for intervention compared with $3.8 mil for control
        - 149.6 hospital admissions per CHW team for intervention, 212.7 admissions per CHW team for control

Health Plan of Nevada

- CHWs working with managed care super-utilizer HPN members
- Pre- and post-CHW intervention evaluation of 1,437 for HPN members (90 day period)
- # of acute admissions visits, acute readmissions, emergency room visits, urgent care visits, and PCP visits overall decreased*
    - Greatest percent reduction for acute readmits, acute admits, and emergency room – more impactful on reduction of medical costs
- Overall medical and prescription costs analyzed per member per month, all lower pre-/post-intervention
    - Medical $1,200 → $1,140
    - Prescription $521 → $506
- Medical and prescription costs analyzed by chronic disease status
    - Coronary atherosclerosis $3,184 → $2,471
    - Diabetes $1,096 → $965

    - CHF, renal failure, COPD, asthma, cancer increased
- Total cost of CHW program for 14 months was $278,331, with avg. monthly cost of $19,881; $503,384 savings
    - $1.81 ROI for medical and pharmacy costs

Community Health Access Program (CHAP) for Low-Income Pregnant Women

- Matched case-control design comparing 115 CHAP clients to 115 pregnant women with similar risk factors
- CHWs conducted home visits to ID risk factors in and out of the home, provide social support
- One year cost savings of $3.36, long-term savings of $5.59
    - Cost estimates derived from Medicaid estimates

Family Navigator ROI Study

- CHWs used to improve diagnosis and treatment of children w/ need for services relating to autism, ADHD, trauma, or substance abuse
- ROI analysis include savings in spending on unnecessary services (e.g. misdiagnosis) and from improved behavioral health outcomes
- ROI of $4.20 on reduced medical expenses, $4.34 on social return from improved outcomes, and $8.54 overall
    - ROI can reflect variables aside from typical medical/prescription costs
    - Costs estimated over a five year period based on one year of referrals

Kentucky Homeplace Program

- 166,227 clients served from July 2001 to June 2019
- ROI is $11.34 for every $1 invested in CHW training

CHWs in Cancer Outreach

- Generation of lifetime benefits of $12,348 per person served by a CHW
    - Benefits include value of additional years of life saved because of early screenings, additional taxes paid during those additional years, and savings from reduction in urgent care use
- Cost of CHW doing cancer outreach is $5,359
- ROI $2.3, which is a return of more than 200%

CHW Models, by UMass in Connecticut

- Models based on existing models in other states
- Model 1: Diabetes management in Latino population of 158 Latinos with type II diabetes
    - Based on University of Texas Community Outreach intervention
        - CHWs employed by community-based organizations
    - Projected intervention cost is $388,000 over 3 years
    - Projected outcomes:
        - 60% achieve good glycemic control
        - 74% achieve overall glycemic control

        - Direct medical cost savings = $435k over 3 years
        - ROI of $1.12 for ever $1 invested over 3 years
- Model 2: Asthma control in children, population of 96 children w/ uncontrolled asthma
    - Based on intervention by Seattle-King County Medicaid Healthy Homes, Washington
        - CHWs employed by private group practice using a patient-centered medical home model
    - Projected intervention cost is $229,000 over 3 years
    - Projected outcomes:
        - Direct medical cost savings: $427k over 3 years
        - ROI of $1.86 for every $1 invested
- Model 3: Complex health needs individuals connecting to healthcare services, population of 72 adults w/ chronic conditions and behavioral health needs
    - Based on Molina Healthcare/CARE NM intervention
        - CHWs employed by hospital system in partnership w/ affiliated practitioners and clinics
    - Projected intervention cost is $394,000 over 3 years
    - Projected outcomes:
        - 81% reduction in hospitalizations
        - 69% reduction in ED visits
        - Direct medical cost savings: $944k over 3 years
        - ROI of $2.40 for every $1 invested
- Model 4: Preventing CVD complications in 148 adults with CV risk factors
    - Based on Community Outreach and CV Health in Maryland intervention
        - CHWs employed by community-based org working w/ health care providers
    - Projected intervention cost: $194,000 over 3 years
    - Projected outcomes:
        - 230% more individuals w/ controlled BP and 170% more individuals w/ controlled cholesterol levels than if no intervention
        - Direct medical cost savings: $388,000 over 3 years
        - ROI of $2 for every $1 invested

Several other ROI of CHW studies linked here, as well as general CHW implementation success studies.

- In general, ROI for CHWs is greater than $1 due to myriad of factors, including reduction in ED visits or hospital admissions and lower cost visits

HEALTHY MOMS. STRONG BABIES.

MARCH OF DIMES

2022 MATERNITY CARE DESERT STATE HIGHLIGHTS- OKLAHOMA

INTRODUCTION

Maternity care encompasses health care services for women during pregnancy, delivery and postpartum.

- There are nearly four million births in the United States each year.
- Access to quality maternity care is a critical component of maternal health and positive birth outcomes, especially considering the high rates of maternal mortality and severe maternal morbidity in the U.S.

WHAT IS A MATERNITY CARE DESERT?

Definitions	Maternity care deserts	Low access to maternity care	Moderate access to maternity care	Full access to maternity care
Hospitals and birth centers offering obstetric care	zero	<2	<2	>2
Obstetric Providers (obstetrician, CNM/CM) per 10,000 Births	zero	<60	<60	≥60
Proportion of women 18-64 without health insurance*	any	≥10%	<10%	any

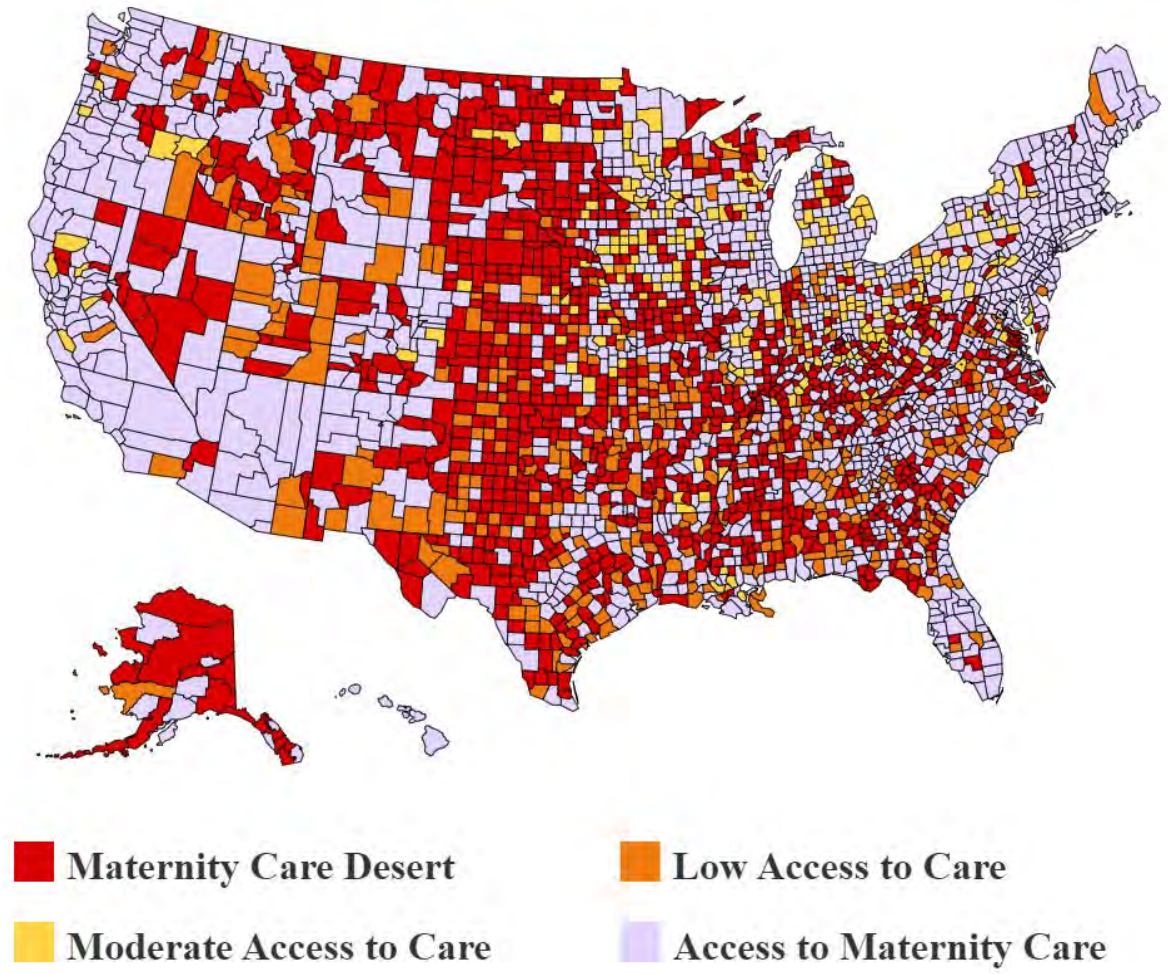
Notes: CNM/CM = certified nurse midwives/certified midwives.
***U.S. average is approximately 11%.**
Source: Kaiser Family Foundation. https://www.kff.org/womens-health-policy/fact-sheet/womens-health-insurance-coverage-fact-sheet/

Full Report Link: https://www.marchofdimes.org/maternitycaredesertsreport

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022;
Kaiser Family Foundation. Women's Health Insurance Coverage. https://www.kff.org/womens-health-policy/fact-sheet/womens-health-insurance-coverage/

ACCESS TO MATERNITY CARE

Maternity Care Deserts, 2020



Maternity Care Deserts

- 36% of all U.S. counties are designated as maternity care desert.
- More than 2.2 million women of childbearing age live in maternity care deserts.
- In 2020, more than 146,000 babies were born in maternity care deserts.

Limited Access to Care

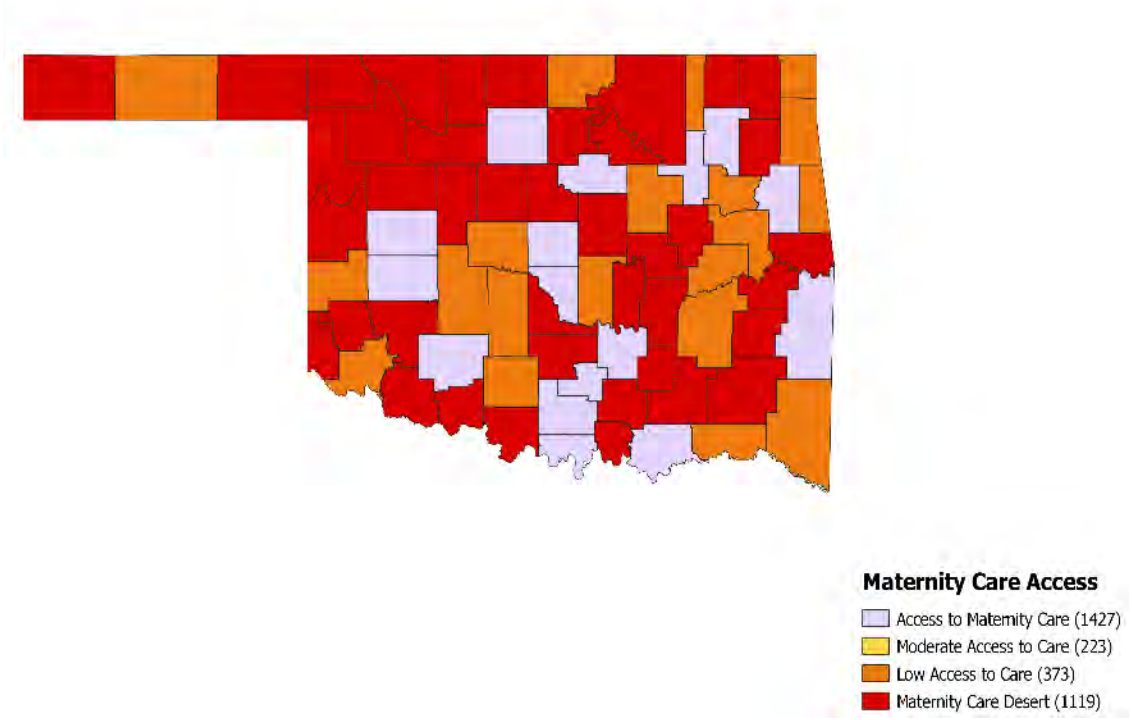
- Over 2.8 million women of childbearing age and nearly 160,000 babies were impacted by reduced access to maternity care.

HEALTHY MOMS. STRONG BABIES. | MARCH OF DIMES

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

ACCESS TO MATERNITY CARE IN OKLAHOMA

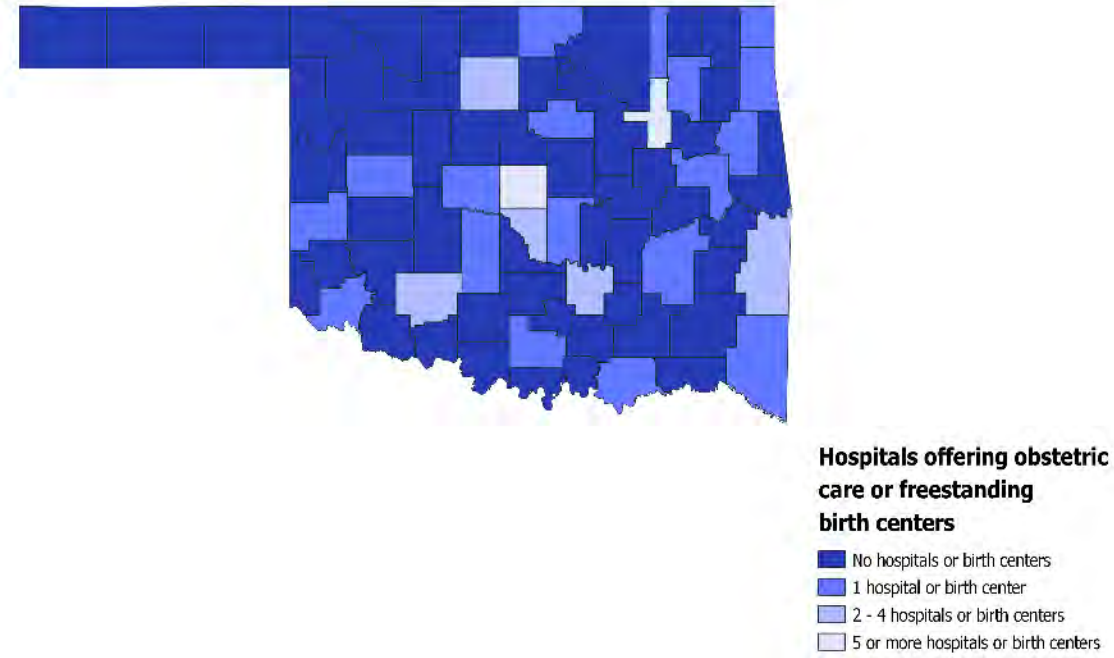
Maternity Care Deserts, 2020



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

HOSPITALS & BIRTH CENTERS

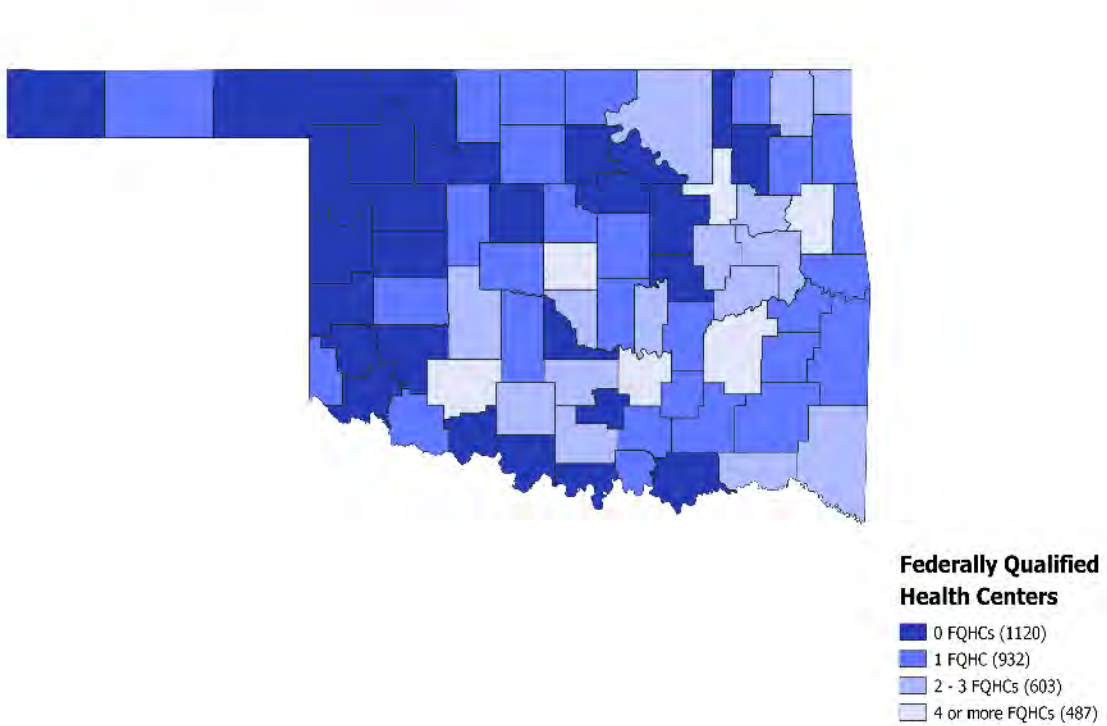
Hospitals and/or birth centers offering obstetric care by county, 2019



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

FEDERALLY QUALIFIED HEALTH CENTERS

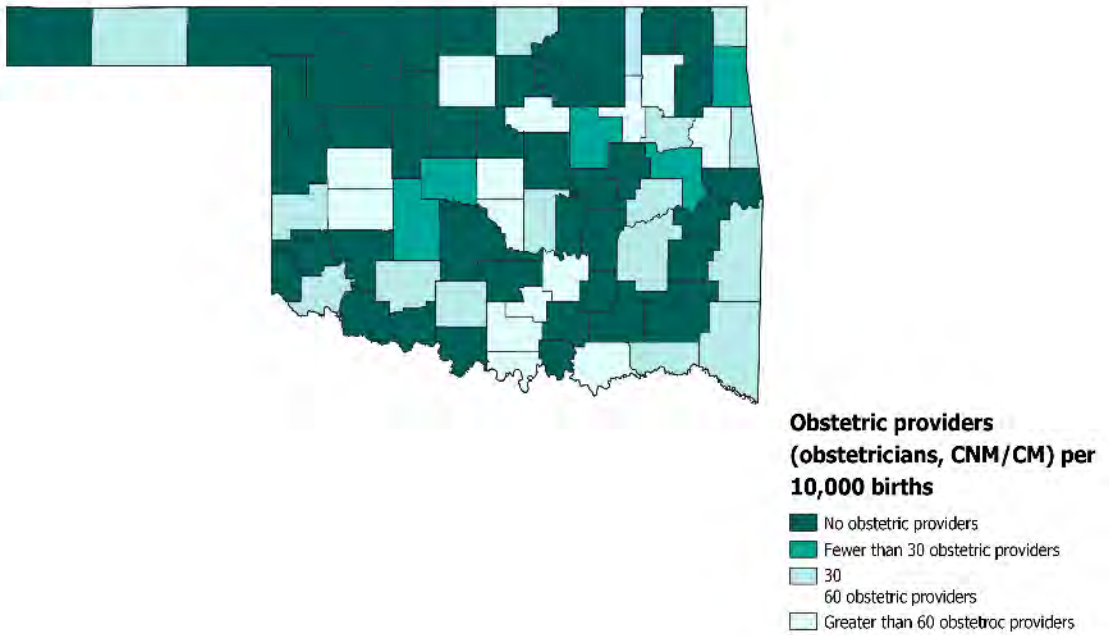
Federally Qualified Health Centers (FQHC) by county, 2021



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

PROVIDERS

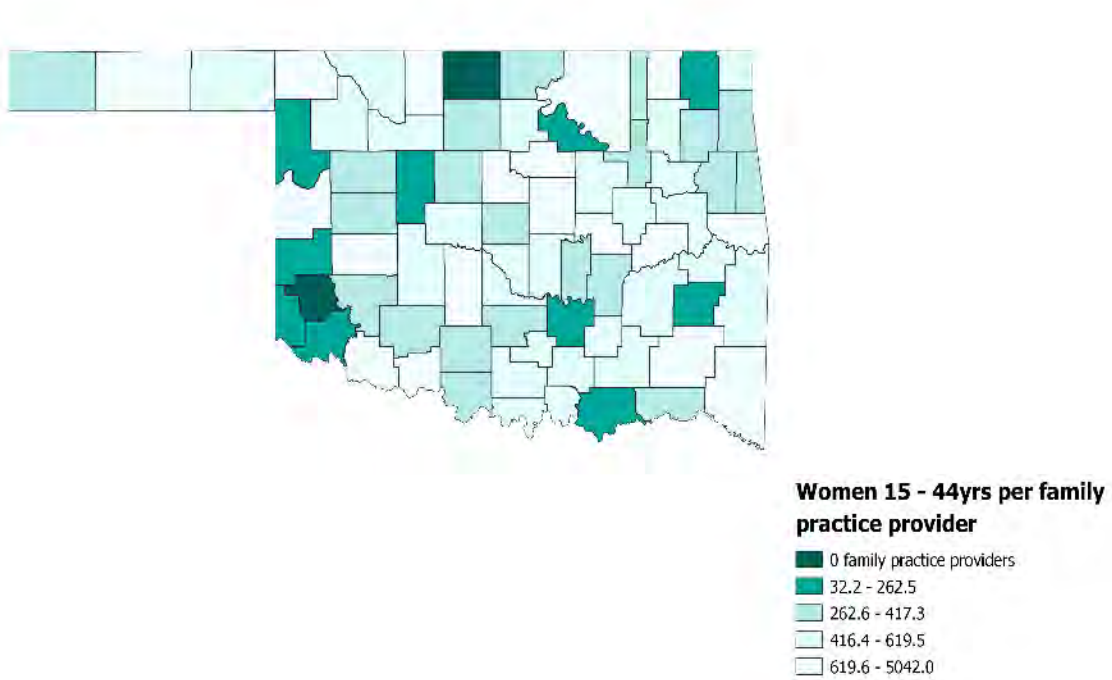
Distribution of obstetric providers by county, 2019*



*obstetric providers include obstetricians and certified nurse-midwives
Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

FAMILY PHYSICIANS

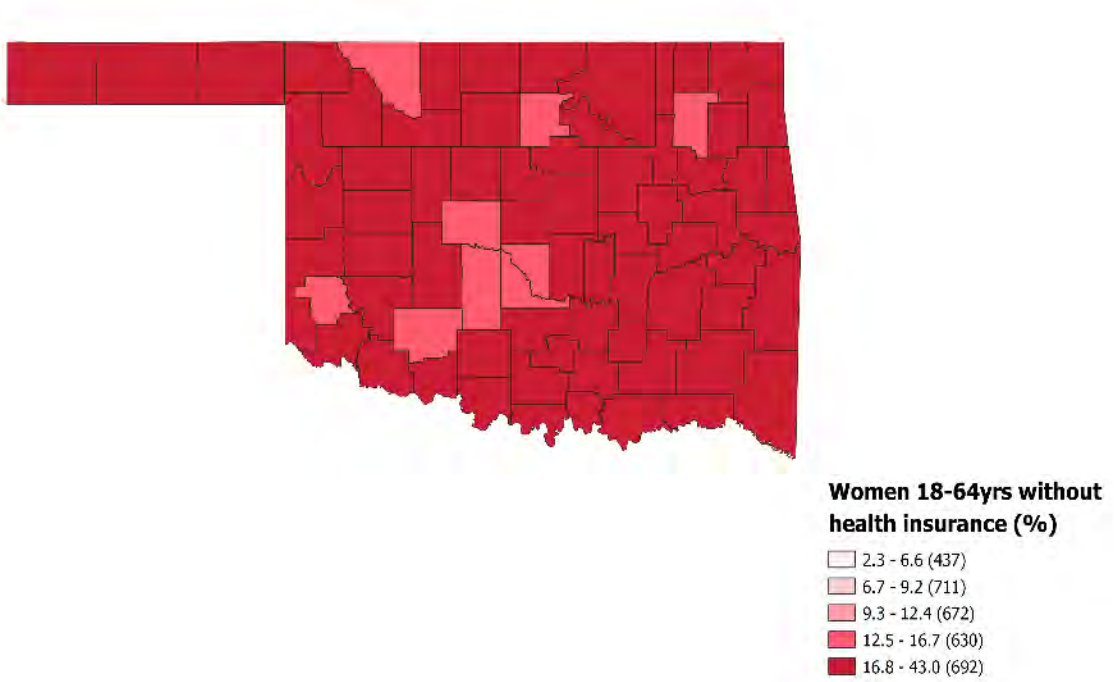
Distribution of family physicians by county, 2021



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

ACCESS TO HEALTH INSURANCE

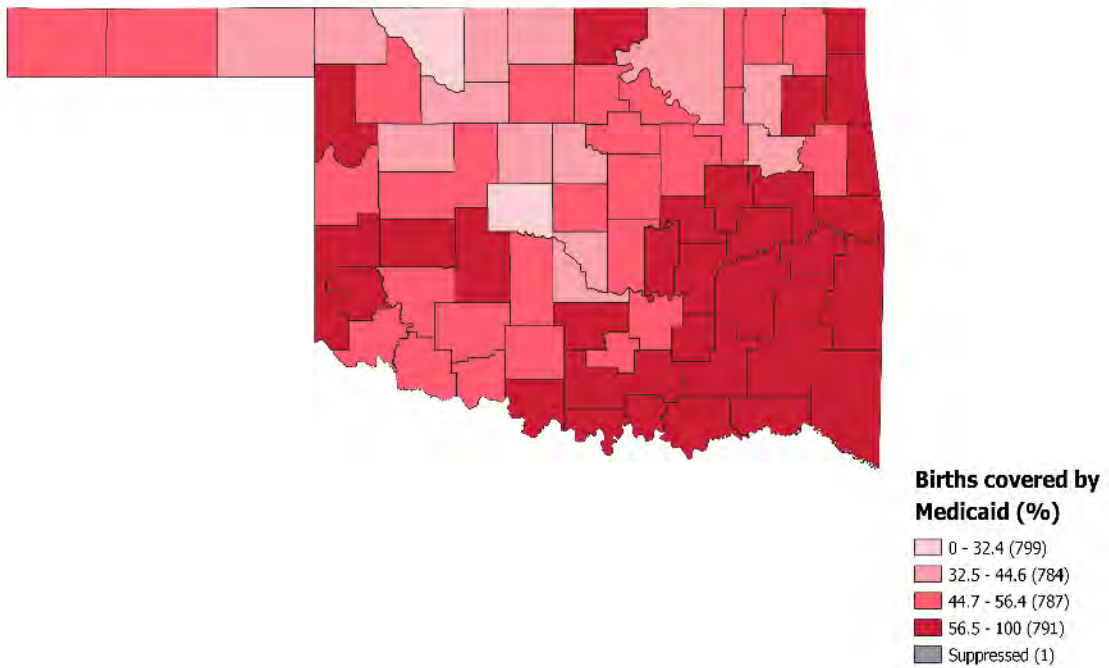
Percentage of women without health insurance by county, 2019



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

BIRTHS COVERED BY MEDICAID

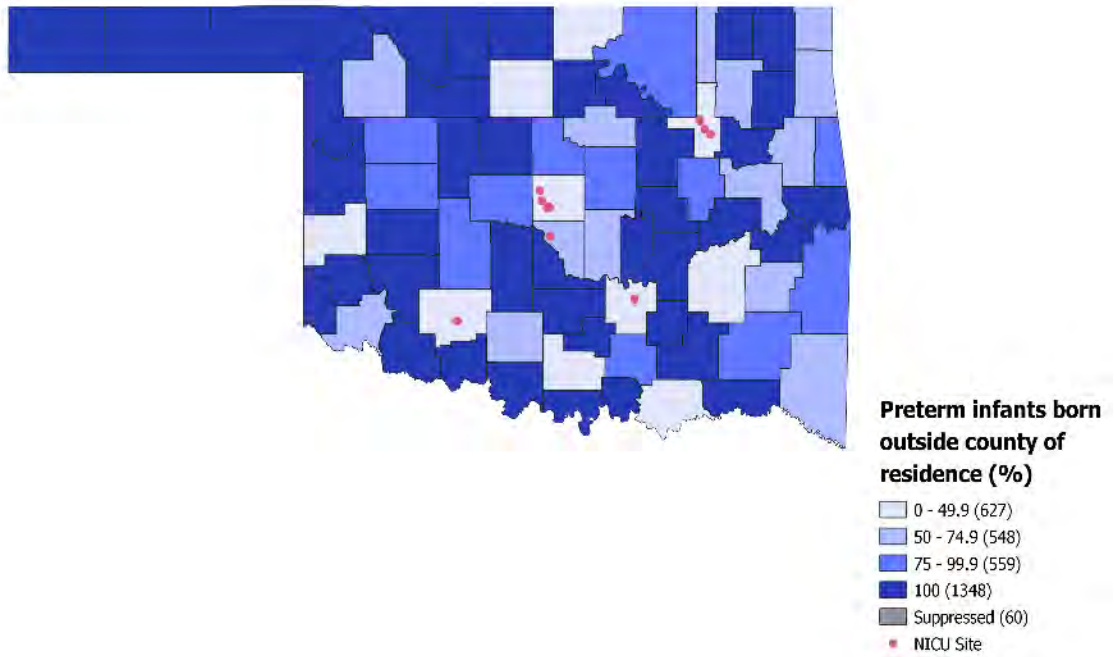
Percentage of births covered by Medicaid, by county, 2020



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

PERINATAL REGIONALIZATION

Percentage of preterm infants born outside county of residence and NICU* sites, 2020

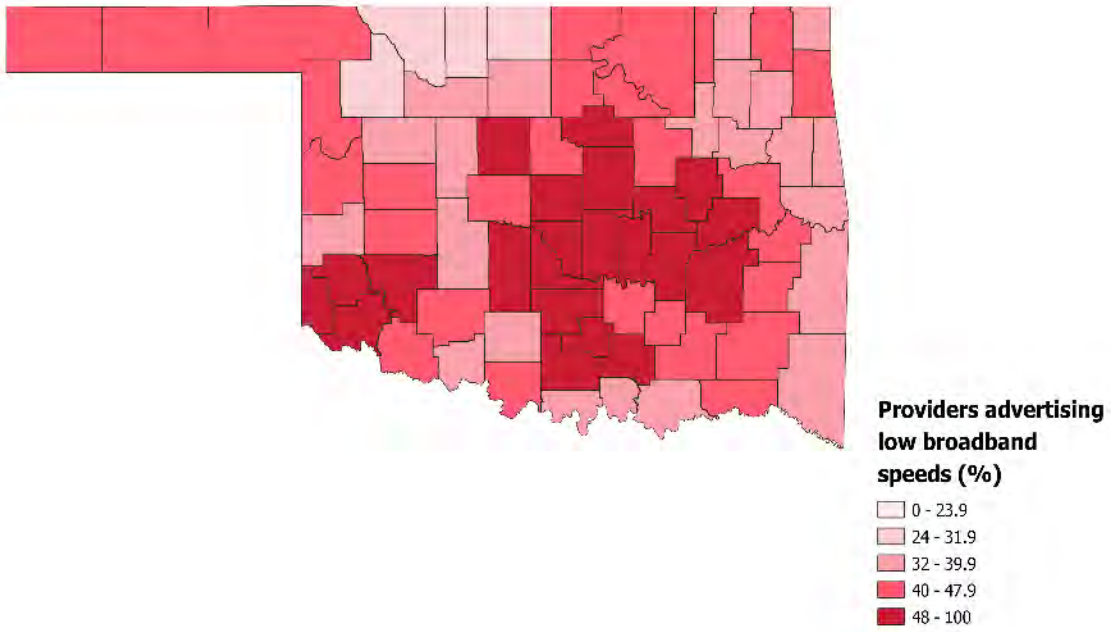


*NICU= Neonatal Intensive Care Unit

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

BROADBAND ACCESS

Percentage of fixed consumer broadband providers advertising low broadband speeds, by county, 2020



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

OKLAHOMA STATE STATS

Maternity Care Access	Counties (n)	Women 15-44 yrs. old (n)	Births (n)	Women (18-64 yrs.) Without Health Insurance (Mean)	Median Household Income (Mean)	Population Below Poverty (Mean)	Hospitals Providing OB Care (n)	OB Providers (n)	OB Providers per 10,000 births (n)
Maternity Care Desert	41	109,385	7,011	20.5%	$48,661	16.6%	0	0	0.0
Low Access to Maternity Care	20	173,911	11,141	20.8%	$50,294	17.7%	12	41	40.5
Moderate Access to Maternity Care	0	0	0	0%	$0	0%	0	0	0
Full Access to Maternity Care	16	497,744	30,881	20.1%	$52,298	16.5%	32	325	96.9

All data are from 2019-2020

HEALTHY MOMS. STRONG BABIES. | MARCH OF DIMES

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

POLICY AND ACTION

IMPROVE ACCESS TO QUALITY MATERNAL CARE

- **Expand Medicaid for individuals who fall at or below 138 percent of the Federal Poverty Level (FPL).** States that expand Medicaid may improve the health of women of childbearing age by reducing racial and ethnic disparities in birth outcomes such as rates of prenatal and postpartum visit attendance, maternal mortality, low birthweight and preterm birth.

- **Raise parental income eligibility levels under Medicaid.** Non-expansion states have another option to reduce postpartum coverage loss by raising income eligibility thresholds for parents.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

IMPROVE ACCESS TO QUALITY AND AFFORDABLE PRECONCEPTION, PRENATAL, INTRAPARTUM AND POSTPARTUM CARE

- **Expand Medicaid for individuals who fall at or below 138 percent of the Federal Poverty Level (FPL).** States that expand Medicaid may improve the health of people of childbearing age, infants and their children by reducing racial and ethnic disparities in birth outcomes such as rates of prenatal and postpartum visit attendance, maternal mortality, low birthweight and preterm birth.
- **Raise parental income eligibility levels under Medicaid.** Non-expansion states have another option to improve access to postpartum coverage by raising income eligibility thresholds for parents.
- **Extend the Medicaid postpartum coverage period to 12 months.** The *American Rescue Plan Act of 2021,* starting April 2022, gives states the option to extend postpartum coverage to pregnant people to one full year.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

IMPROVE ACCESS TO QUALITY AND AFFORDABLE PRECONCEPTION, PRENATAL, INTRAPARTUM AND POSTPARTUM CARE

- **Expand access to and improve integration of the midwifery model of care in all states.** This can help improve access to equitable and culturally informed maternity care in under-resourced areas, lower costs, reduce unnecessary medical interventions that contribute to risks of maternal mortality and morbidity in initial and subsequent pregnancies.
- **Provide coverage for evidence-based telehealth maternal health services and support alignment of telehealth reimbursement across payers.** A robust body of evidence shows largely positive outcomes associated with telehealth services in maternity care.

- **Enhance perinatal regionalization as a strategy to improve both maternal and neonatal outcomes.** March of Dimes supports the 2022 Maternal Levels of Care Verification program, which provides a standardized description of maternity facility capabilities and personnel.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

PREVENTION AND TREATMENT

- **Address social determinants of health to reduce disparities and improve health outcomes.** Expand the scope of research, engage in health system reform and improve social and economic conditions (poverty, employment, low wages, housing) that contribute to underlying health inequities.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

RESEARCH, SURVEILLANCE AND QUALITY IMPROVEMENT

- **Improve maternal mortality and morbidity data collection and surveillance and prioritize policy recommendations from Maternal Mortality Review Committees.**

- **Invest in and Strengthen Perinatal Quality Collaboratives (PQC) to provide infrastructure that supports *all* U.S. states and territories having a PQC.**

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

HELP Taskforce Recommendations

PREGNANCY RESOURCE NAVIGATORS

Supporting Research & Evidence: *see attachments for additional data*

- The experiences of the first two months of life have an important impact on long-term health and development. This has to do with the remarkably rapid growth of the brain early in life, and the organization of core regulatory networks that form our ability to cope.
- Studies highlight the importance of initial and ongoing CHW training, appropriate caseloads, effective communication, and community solutions to barriers.

- Successful CHW programs include recruitment of peers from the community, close proximity of services to households, provision of home-based services, and strengthened referral/follow up to resources. Oklahoma State Department of Health (OSDH) currently has 42 CHW's in a variety of settings.
- High-quality home visiting programs can improve outcomes for children and families, particularly those that face added challenges such as teen or single parenthood, maternal depression and lack of social and financial supports.

Current Programs & Resources:

Home visiting programs are a long-proven model for supporting the physical, cognitive and emotional development of children, and can improve family economic self-sufficiency and enhance parents' abilities to support their children's development. Oklahoma currently has 70 Children's First nurses available for home visits.

Community health workers are generally peers who provide tailored social support to those they serve, helping to navigate complex systems. This workforce is trained and supported by professionals to assess needs, connect to care and follow up on next steps.

Budget: $2.9M annually

- 25 Community Health Workers
- Target population served: 24,000 newborns and families (40% of annual births)
- See attached budget for details

Conclusion: Pregnancy Resource Navigators benefit Oklahoma families by integrating the proven home visiting and community health worker models for prosperous babies, mothers and families.

> **Proposed Recommendation**: Seek support for the Pregnancy Resource Navigator (PRN) program by the Oklahoma State Department of Health (OSDH) to expand home visiting and case management services to support and celebrate Oklahoma mothers, babies and families.

MATERNITY DESERTS

Supporting Research & Evidence:

- According to the March of Dimes, 41 of our 77 counties are in maternity care deserts (impacting ~ 109,385 women) and another 20 counties have low access to maternity care (impacting 173,911 more women) in our state
- Thus, 61 out of 77 counties affecting ~ 283,296 women annually in our state do not have adequate access to maternity care for our Oklahoma mothers
- 63% of deaths of mothers were determined to have been preventable.
    - The Maternal Mortality Review Committee decisions indicated that most women who died within one year of a pregnancy ending could possibly have had better outcomes had particular health-related issues been better managed prior to, during, or after the pregnancy.
    - Such health-related issues include receiving preconception health screenings, increased access to appropriate prenatal care, increased awareness of possible complications post-delivery and seeking medical intervention as soon as warning signs are identified.

Current Programs & Resources:

- OSDH is working to address maternity deserts through county health department mobile units throughout the sate
    - This is in various stages of implementation with plans to expand to all ten public health districts in collaboration with their communities in 2023.
    - Mobile units care to for mothers where they are and work with community partners to provide quality prenatal care needed for best outcomes for Oklahoma moms and babies.

Conclusion: Oklahoma has a number of maternity desert areas, causing access to care for mothers before, during and after pregnancy difficult.

Proposed Recommendation: Identify opportunities to expand health services to women in all areas of the state and address the social determinants of health including improved access to care and reliable transportation women.

PREGNANCY RESOURCE CENTER FUNDING

Supporting Research & Evidence:

- Legislation passed in 2018 to reimburse non-profit organizations to assist mothers in carrying their children to term and provide support to mothers and infants for an additional year following birth.
- Modeled after the Texas Pregnancy Care Network model.

Current Programs & Resources:

- OSDH is currently contracted with the Oklahoma Pregnancy Care Network (OPCN).
    - $3M per year in available funding for non-profit organizations in Oklahoma to reimburse for counseling, referrals, classes and materials assistance.
    - Currently $9M in carryover funding available
    - Service options include, but not limited to:
        - Provide medical attention for the duration of pregnancy;
        - Nutritional support services;
        - Housing assistance;
        - Education and employment assistance;
        - Parenting education and support services.
-

Conclusion: Oklahoma has available funds for supporting Oklahoma mothers, babies and families through pregnancy resource centers statewide.

Proposed Recommendation: Identify opportunities to expand ways in which available funding flows to pregnancy resource centers throughout the state.

Eliminate Unnecessary Barriers to Adoption and help make Oklahoma the most adoption friendly state in the United States

APPENDIX D

Adoption Code

Annual Adoption Month Training

OFFICE OF THE ATTORNEY GENERAL RECOMMENDATIONS

1. Amend the Oklahoma Adoption Code (10 O.S. § 7505-3.2(C)) to increase the initial amount authorized to be expended on birth mother living and transportation expenses from $1,000 to $3,500 without first obtaining court approval. (*See* Attachment A – Proposed Amendment)

2. Amend the Oklahoma Safe Haven Law (10A O.S. § 1-2-109) to increase the number of days to relinquish a child without prosecution for child abandonment or child neglect from 30 days of age or younger to 60 days of age or younger. (*See* Attachment B – Proposed Amendment)

    a. Amend corresponding criminal law (21 O.S. § 851) consistent with the same.

3. Attorney General to host and facilitate an annual Adoption CLE Seminar beginning November 2023 (National Adoption Awareness Month). (*See* Attachment C – CLE Seminar Proposal)

4. Create an Oklahoma pro-life brand with a website that compiles pro-life resources, initiatives, programs, assistance, and educational information to fulfill task force objectives, with request for funding from Legislature.

    a. Create a marketing campaign to promote the Oklahoma pro-life brand and website that could include advertising through billboards, social media, and television ads.

    b. Add the Oklahoma pro-life website to Attorney General's SAFELINE cards.

ATTACHMENT A

PROPOSED AMENDMENT TO OKLAHOMA SAFE HAVEN LAW – RAISING AGE OF CHILD FROM 30 DAYS TO 60 DAYS

Oklahoma Statutes – Title 10A. Children and Juvenile Code
Article 1 – Oklahoma Children's Code
Chapter 2 – Reporting and Investigations
Section 1-2-109 – Relinquishment of Child to Medical Services Provider or Child Rescuer

A. A parent subject to the provisions of this act shall not be prosecuted for child abandonment or child neglect under the provisions of any statute which makes child abandonment or child neglect a crime, when the allegations of child abandonment or child neglect are based solely on the relinquishment of a child ~~thirty (30)~~ sixty (60) days of age or younger to a medical services provider or a child rescuer as defined in this section.

B. The following entities shall, without a court order, take possession of a child ~~thirty (30)~~ sixty (60) days of age or younger if the child is voluntarily delivered to the entity by the parent of the child and the parent did not express an intent to return for the child:

1. A medical services provider; or

2. A child rescuer.

C. Delivery of the child may be effectuated by an in-person transfer of the child to the medical services provider or child rescuer or by leaving the child in a newborn safety device that is:

1. Voluntarily installed by the medical services provider or child rescuer;

2. Physically located inside a police station, fire station, child protective services agency, hospital or other medical facility; and

3. Located in an area that is conspicuous and visible to the employees of the police station, fire station, child protective services agency, hospital or other medical facility.

D. A medical services provider or child rescuer that installs a newborn safety device shall:

1. Be responsible for the cost of the installation; and

2. Install an adequate dual alarm system connected to the physical location of the newborn safety device that is:

a. tested at least one time per week to ensure the alarm system is in working order, and

b. visually checked at least two times per day to ensure the alarm system is in working order.

E. Any entity identified in subsection B of this section to which a parent seeks to relinquish a child pursuant to the provisions of this section may:

1. Request, but not demand, any information about the child that the parent is willing to share. The entity is encouraged to ask about, but not demand, the details of any relevant medical history relating to the child or the parents of the child. The entity shall respect the wish of the parent if the parent desires to remain anonymous; and

2. Provide the parent with printed information relating to the rights of the parents, including both parents, with respect to reunification with the child and sources of counseling for the parents, if desired.

F. Once a child has been relinquished to any entity identified in subsection B of this section, the entity receiving the child shall:

1. Perform or provide for the performance of any act necessary to protect the physical health or safety of the child; and

2. Notify the local office of the Department that a parent of a child ~~thirty (30)~~ sixty (60) days of age or younger, in the best judgment of the receiving entity, has relinquished such child and that the entity has taken possession of the child.

G. Upon being made aware that a medical services provider or child rescuer has possession of a child under the provisions of this section, the Department of Human Services shall immediately check with law enforcement authorities to determine if a child has been reported missing and whether the missing child could be the relinquished child.

H. The Department shall design and disseminate:

1. A simplified form for the recording of medical or other information that a relinquishing parent wishes to share with the entity to whom the child is being relinquished;

2. Easily understood printed materials that give information about parents' rights with regard to reunification with a child including, but not limited to, information on how a parent can contact the appropriate entity regarding reunification, and information on sources of counseling for relinquishing parents; and

3. Media information including printed material that creates public awareness about the provisions of this act.

I. For purposes of this section:

1. "Medical services provider" means a person authorized to practice the healing arts including a physician's assistant or nurse practitioner, a registered or practical nurse and a nurse aide; and

2. "Child rescuer" means any employee or other designated person on duty at a police station, fire station, child protective services agency, hospital or other medical facility.

J. A medical services provider or child rescuer with responsibility for performing duties pursuant to this section shall be immune from any criminal liability that might otherwise result from the actions of the entity, if acting in good faith in receiving a relinquished child. In addition, such medical provider or child rescuer shall be immune from any civil liability that might otherwise result from merely receiving a relinquished child.

Oklahoma Statutes – Title 21. Crimes and Punishments
Chapter 31 – Abandonment or Neglect of Wife or Children
Section 851 – Abandoning Child under Age Ten

A. Any parent of any child or children under the age of ten (10) years, and every person to whom such child or children have been confided for nurture or education, who deserts such child or children within this state, or takes such child or children without this state, with the intent wholly to abandon it shall be deemed guilty of a felony and upon conviction thereof shall be punished by imprisonment in the State Penitentiary for any period of time not less than one (1) year nor more than ten (10) years.

B. It is an affirmative defense to a prosecution under this section that a parent voluntarily delivered a child under the age of ~~thirty (30)~~ sixty (60) days to and left the child with, or voluntarily arranged for another person to deliver a child to and leave the child with, a medical services provider or child rescuer as provided in Section 1-2-109 of Title 10A of the Oklahoma Statutes.

ATTACHMENT B

PROPOSED AMENDMENT TO OKLAHOMA ADOPTION CODE – RAISING PRE-APPROVED BIRTH MOTHER EXPENSES FROM $1,000 TO $3,500

Oklahoma Statutes – Title 10. Children
Chapter 75 – Oklahoma Adoption Code
Chapter 2 – Reporting and Investigations
Section 7505-3.2 – Cost of Adoptive Family

A. 1. An affidavit shall be attached to the petition for adoption, or may be filed after the filing of the petition for adoption, but prior to the final decree of adoption, which discloses to the court all of the costs, funds, or monies expended by the adoptive family or expected to be expended in connection with the adoption of a minor.

2. No final decree of adoption shall be entered until the court is satisfied that all costs and expenses have been disclosed, are reasonable, and that the costs and expenses do not violate the provisions of subsection B of this section. Upon its review of the affidavit of monies expended, the court shall in writing disapprove any expenditure that the court deems unreasonable or in violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes and, to the extent necessary to comply with Oklahoma law, shall order reimbursement of any consideration given in violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes. Payments made pursuant to this section shall not be a violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes. Court approval of the affidavit of monies expended shall not exempt a person, attorney or licensed child-placing agency from prosecution if the information provided to the court is fraudulent or false.

B. 1. Except as otherwise specifically provided by law, the following list of adoption-related costs and expenses specified in this paragraph may be deemed proper items for a person to pay in connection with an adoption:

a. reasonable attorney fees and court costs,

b. reasonable medical expenses for birth mother and minor to be adopted,

c. reasonable adoption counseling expenses for birth parents before and after the birth of the minor, not to exceed six (6) months from placement of the minor,

d. reasonable fees of a licensed child-placing agency, including social services staff fees provided by agency employees that include:

(1) casework services,

(2) adoptive child and family studies,

(3) placement services,

(4) certification of agency facilities,

(5) admission assessments, and

(6) service planning,

e. (1) reasonable and necessary living expenses of the birth mother that are incurred during the adoption planning process or during the pregnancy, not to exceed two (2) months after the birth of the minor or after the consent or relinquishment of the birth mother. Reasonable and necessary living expenses include but are not limited to:

(a) housing expenses,

(b) utilities, such as electric, gas, water, or telephone bills,

(c) food for the birth mother and any minor child of the birth mother residing in the home of the birth mother,

(d) travel expenses for transportation to support the pregnancy, such as gasoline, bus fares, or providing for the temporary use of a vehicle during the pregnancy, and

(e) child care or foster care for any minor child of the birth mother associated with pregnancy-related medical care.

(2) Reasonable and necessary living expenses shall not include:

(a) any expenses met by existing resources of the birth mother,

(b) any expenses used for the support of family members who are not minor children of the mother,

(c) any expenses for recreational or leisure activities, and

(d) the purchase or gift of an automobile,

f. reasonable expenses for a home study,

g. reasonable and necessary costs associated with an international adoption,

h. reasonable expenses legally required by any governmental entity related to the adoption of a minor, and

i. a one-time gift to the birth mother from the prospective adoptive parents of no greater value than One Hundred Dollars ($100.00).

2. In addition, all expenses approved by the court should be commensurate with other customary fees for similar services by persons of equivalent experience and training where the services are performed. Any services provided outside this state shall be allowed in an amount as if the services had been performed within the State of Oklahoma.

3. The provisions of this subsection shall apply to living and transportation expenses incurred after the biological mother of the minor contacts the child-placing agency or attorney for adoption services.

4. The provisions of this subsection shall not prohibit a court from extending any time period, or including any additional costs and expenses in connection with an adoption other than those specified in this subsection based on unusual circumstances or need. If additional costs and expenses in connection with an adoption are approved by the court, the court shall specify in writing the unusual circumstances that justify the approval.

5. Except as otherwise ordered by the court except for good cause shown, all payments made pursuant to this section shall be paid directly to the third-party provider of services or goods. Any living expense paid on behalf of a birth mother in a domestic adoption which is not supported by an itemized receipt shall not be allowed for payment. If gift cards are issued to pay expenses, an itemized receipt verifying purchases shall be required for approval by the court. The accounting shall include vouchers for all monies expended, copies of all checks written and receipts for all cash payments attesting to the accuracy of the accounting.

6. No person, attorney or licensed child-placing agency shall have a financial interest in a third-party provider of services or goods, without disclosing in an affidavit the financial interest to the court and the other parties to the adoption.

C. Any person, attorney, or licensed child-placing agency desiring to pay living and transportation expenses on behalf of a birth mother is authorized to expend an initial amount not to exceed ~~One Thousand Dollars ($1,000.00)~~ Three Thousand Five Hundred Dollars ($3,500) plus deposits for housing and utilities for such costs and expenses without first obtaining court approval as required by paragraph 1 of subsection D of this section. Any such costs and expenses shall be disclosed as is otherwise required by the Oklahoma Adoption Code.

D. 1. Except for the amount authorized by subsection C of this section, the payment of any living or transportation expenses for benefit of the birth mother as authorized in subparagraph e of paragraph 1 of subsection B of this section shall be approved in advance by the court.

2. The person, attorney, or licensed child-placing agency desiring to pay living or transportation expenses on behalf of a birth mother which exceed the amount in subsection

C of this section shall file a petition for an order approving payment of adoption-related expenses.

3. The petition for an order approving payment of adoption-related expenses shall be filed in the district court where the adoption petition is to be filed, as provided in Section 7502-1.2 of this title.

4. The petition shall be captioned: "In the matter of Baby (name)." The petition shall include a listing of all anticipated living or transportation expenses to be paid on behalf of the birth mother for which court approval is being sought. If additional expenditures not previously authorized by the court are needed on behalf of the birth mother, an amended petition may be filed with the court.

5. The petition shall be heard by the court within ten (10) days of filing. The court clerk shall charge the same cost for a petition for payment of expenses as is charged for the filing of an adoption petition. In the event an adoption petition is later filed in the same county, the adoption petition shall be filed as an amended petition within the same case in which payment for expenses was approved and no additional court costs shall be required. In the event a petition for preadoption termination of parental rights is later filed in the same county, the court clerk shall not assess an additional filing fee and may use the same case number as for the petition for adoption.

6. Any order authorizing payment shall be attached to a petition for adoption. If no adoption petition is filed, the court shall retain jurisdiction to enter any orders deemed appropriate regarding the reimbursement of costs and expenses paid. If the child is placed for adoption outside the State of Oklahoma, any such order shall be submitted to the Interstate Compact of the Placement of Children and to the court in the other state where the petition for adoption is to be filed.

E. 1. In addition to the adoptive family affidavit requirement of subsection A of this section, a Disclosure Statement of Adoption-related Costs and Expenditures shall be prepared in writing by the person, attorney or child-placing agency in a direct-placement adoption. The Disclosure Statement of Adoption-related Costs and Expenditures shall include a declaration of all fees, expenses, and costs charged or expected to be charged for the adoption including, but not limited to, the following:

a. retainer fees, the hourly rate, and the number of hours billed for the adoption,

b. any fee charged for preplacement or other home studies of any prospective birth parents, regardless of whether the home study was performed by an outside agency,

c. any costs, fees or expenses or any other thing of value paid to or on behalf of the birth parents related to the adoption of a minor by any party other than the adoptive parents, and

d. any other fees and expenses related to the adoption not otherwise specifically listed in this section.

2. The Disclosure Statement of Adoption-related Costs and Expenditures containing true and accurate information shall be filed before or when the final decree of adoption is ordered in each adoption of a minor in this state. A statutory Disclosure Statement of Adoption-related Costs and Expenditures is provided in Section 2 of this act. A copy of the statement shall be a public record to be compiled and maintained by the court clerk and available for public inspection; provided, that any information identifying the person, attorney or child-placing agency in the direct adoption shall be redacted from the document prior to filing with the court clerk and shall not be made public. In addition, the identity of the child, the adoptive parents, and the birth parents shall be redacted from the document prior to filing with the court clerk and shall not be made public.

ATTACHMENT C

ATTORNEY GENERAL'S ANNUAL ADOPTION CLE SEMINAR PROPOSAL

- Full day seminar with six, 50-minute Continuing Legal Education (CLE) presentations (including one hour of ethics)
- Beginning November 2023 (National Adoption Awareness Month)
- Objectives:
    - Raise awareness for adoption in community and within the Oklahoma Bar
    - Create community enthusiasm for and interest in adoption
    - Build attorney competency for those practicing in adoption
    - Help lawyers stay up-to-date on current laws and trends in adoption
    - Give lawyers who practice in adoption an opportunity to connect
- Potential Topics:
    - Current laws and trends in adoption
    - Competency and candor in adoption practice (ethics)
    - Understanding the Oklahoma Adoption Code
    - Relative Adoptions
    - Private/infant Adoptions
    - DHS Adoptions
    - Contested adoptions
    - Indian Child Welfare Act (ICWA)
    - G.A.L., C.A.S.A., & Foster Care topics

Encourage and Provide Resources to our communities to support unplanned pregnancies

APPENDIX E

Maternity Desert Services Needed

Pregnancy Resource Navigator

From:	Jackie Shawnee
To:	"jmerciez@cottageforlife.org"
Cc:	Beverly Hicks
Subject:	taskforce recs
Date:	Thursday, October 20, 2022 10:54:19 AM
Attachments:	2 Elmira 1986_Improving the Delivery of Prenatal Care and Outcomes of Pregnancy_A Randomized Trial of Nurse Home Visitation.pdf 4 Denver_Differences in Program Implementation Between Nurses and Paraprofessionals Providing Home Visits During Pregnancy and Infancy.pdf 3 Memphis_Effect-of-Prenatal-and-Infancy-Home-Visitation-by-Nurses-on-Pregnancy-Outcomes-Childhood-Injuries-and-Repeated-Childbearing-A-Randomized-Controlled.pdf image001.png CHW ROI Summary.pdf Oklahoma_2022_Maternity Deserts.pdf Recommendation_PRN,Deserts,Preg Centers.pdf

---

Good morning Chairwoman Merciez,

As requested please find below and attached supporting information, current resources and a proposed recommendation for the pregnancy resource navigators program, maternity deserts, and pregnancy resource centers funding. Supporting docs are attached, but also the info below is in a 3 page document that is attached as well for easy distribution.

If you have any questions or need anything additional please let me know. Thank you and see you next Tuesday!

PREGNANCY RESOURCE NAVIGATORS

Supporting Research & Evidence: *see attachments for additional data*

- The experiences of the first two months of life have an important impact on long-term health and development. This has to do with the remarkably rapid growth of the brain early in life, and the organization of core regulatory networks that form our ability to cope.
- Studies highlight the importance of initial and ongoing CHW training, appropriate caseloads, effective communication, and community solutions to barriers.
- Successful CHW programs include recruitment of peers from the community, close proximity of services to households, provision of home-based services, and strengthened referral/follow up to resources. Oklahoma State Department of Health (OSDH) currently has 42 CHW's in a variety of settings.
- High-quality home visiting programs can improve outcomes for children and families, particularly those that face added challenges such as teen or single parenthood, maternal depression and lack of social and financial supports.

Current Programs & Resources:

Home visiting programs are a long-proven model for supporting the physical, cognitive and emotional development of children, and can improve family economic self-sufficiency and enhance parents' abilities to support their children's development. Oklahoma currently has 70 Children's First nurses available for home visits.

Community health workers are generally peers who provide tailored social support to those they serve, helping to navigate complex systems. This workforce is trained and supported by professionals to assess needs, connect to care and follow up on next steps.

Budget: $2.9M annually

- 25 Community Health Workers
- Target population served: 24,000 newborns and families (40% of annual births)
- See attached budget for details

Conclusion: Pregnancy Resource Navigators benefit Oklahoma families by integrating the proven home visiting and community health worker models for prosperous babies, mothers and families.

> **Proposed Recommendation**: Seek support for the Pregnancy Resource Navigator (PRN) program by the Oklahoma State Department of Health (OSDH) to expand home visiting and case management services to support and celebrate Oklahoma mothers, babies and families.

MATERNITY DESERTS

Supporting Research & Evidence:

- According to the March of Dimes, 41 of our 77 counties are in maternity care deserts (impacting ~ 109,385 women) and another 20 counties have low access to maternity care (impacting 173,911 more women) in our state
- Thus, 61 out of 77 counties affecting ~ 283,296 women annually in our state do not have adequate access to maternity care for our Oklahoma mothers
- 63% of deaths of mothers were determined to have been preventable.
    - The Maternal Mortality Review Committee decisions indicated that most women who died within one year of a pregnancy ending could possibly have had better outcomes had particular health-related issues been better managed prior to, during, or after the pregnancy.
    - Such health-related issues include receiving preconception health screenings, increased access to appropriate prenatal care, increased awareness of possible complications post-delivery and seeking medical intervention as soon as warning signs are identified.

Current Programs & Resources:

- OSDH is working to address maternity deserts through county health department mobile units throughout the sate

- This is in various stages of implementation with plans to expand to all ten public health districts in collaboration with their communities in 2023.
- Mobile units care to for mothers where they are and work with community partners to provide quality prenatal care needed for best outcomes for Oklahoma moms and babies.

Conclusion: Oklahoma has a number of maternity desert areas, causing access to care for mothers before, during and after pregnancy difficult.

Proposed Recommendation: Identify opportunities to expand health services to women in all areas of the state and address the social determinants of health including improved access to care and reliable transportation women.

PREGNANCY RESOURCE CENTER FUNDING

Supporting Research & Evidence:

- Legislation passed in 2018 to reimburse non-profit organizations to assist mothers in carrying their children to term and provide support to mothers and infants for an additional year following birth.
- Modeled after the Texas Pregnancy Care Network model.

Current Programs & Resources:

- OSDH is currently contracted with the Oklahoma Pregnancy Care Network (OPCN).
  - $3M per year in available funding for non-profit organizations in Oklahoma to reimburse for counseling, referrals, classes and materials assistance.
  - Currently $9M in carryover funding available
  - Service options include, but not limited to:
    - Provide medical attention for the duration of pregnancy;
    - Nutritional support services;
    - Housing assistance;
    - Education and employment assistance;
    - Parenting education and support services.
-

Conclusion: Oklahoma has available funds for supporting Oklahoma mothers, babies and families through pregnancy resource centers statewide.

Proposed Recommendation: Identify opportunities to expand ways in which available funding flows to pregnancy resource centers throughout the state.

Sincerely,

Jackie Shawnee | Chief of Staff
Office of the Commissioner | Oklahoma State Department of Health
Oklahoma.gov | health.ok.gov

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation

David L. Olds, Charles R. Henderson, Jr, Robert Tatelbaum and Robert Chamberlin

Pediatrics 1986;77;16-28

Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation

David L. Olds, PhD, Charles R. Henderson, Jr, Robert Tatelbaum, MD, and Robert Chamberlin, MD

From the Departments of Pediatrics and Obstetrics and Gynecology, University of Rochester, Rochester, New York; Comprehensive Interdisciplinary Developmental Services, Inc, Elmira, New York; Department of Human Development and Family Studies, Cornell University, New York; and New Hampshire State Department of Health and Welfare, Concord

ABSTRACT. We evaluated a comprehensive program of prenatal and postpartum nurse home visitation. The program was designed to prevent a wide range of health and developmental problems in children born to primiparous women who were either teenagers, unmarried, or of low socioeconomic status. During pregnancy, women who were visited by nurses, compared with women randomly assigned to comparison groups, became aware of more community services; attended childbirth classes more frequently; made more extensive use of the nutritional supplementation program for women, infants, and children; made greater dietary improvements; reported that their babies' fathers became more interested in their pregnancies; were accompanied to the hospital by a support person during labor more frequently; reported talking more frequently to family members, friends, and service providers about their pregnancies and personal problems; and had fewer kidney infections. Positive effects of the program on birth weight and length of gestation were present for the offspring of young adolescents (<17 years of age) and smokers. In contrast to their comparison-group counterparts, young adolescents who were visited by nurses gave birth to newborns who were an average of 395 g heavier, and women who smoked and were visited by nurses exhibited a 75% reduction in the incidence of preterm delivery. ($P \leq .05$ for all findings.) *Pediatrics* 1986;77:16–28; *prenatal care, pregnancy, nurse, home visitation, birth weight, health habit.*

Despite improvements in perinatal care and reductions in infant mortality, the incidence of low-birth-weight infants (≤2,500 g) has decreased only slightly during the past decade.[1,2] Low birth weight is still the greatest threat to the life and well-being of infants in the United States.[3,4] It is more prevalent in lower socioeconomic groups, a phenomenon that can be explained, in large part, by differences in maternal health habits (such as smoking and alcoholism) and behavioral choices (such as age at conception and use of prenatal care) but not by differences in medical complications.[5]

During the 1960s and early 1970s, in an effort to improve the outcomes of pregnancy and early child rearing among the poor, the federal government funded a number of health service demonstration programs for poor, young, pregnant women and their children.[6–10] Most of the programs provided a greater array of services (eg, medical, psychologic, social) than had been available previously, but they continued to be delivered from traditional clinic-based settings. Although this greater variety of services represents an improvement over what was previously available, office-based services often do not reach those in greatest need. Moreover, without an appreciation for the full set of stressful family and community influences on women's health habits and behaviors, office-based personnel are not in a strong position to foster change. This is especially true in the case of socially disadvantaged women, for whom there are many difficult life circumstances that interfere with appropriate health habits. The evaluations of clinic-based programs have been difficult to interpret because the control groups, when used at all, were not randomly assigned.

Randomized and other controlled trials of prematurity and low-birth-weight prevention strategies have been carried out, but they typically have tested single preventive agents[11–19]; thus, the greater

Received for publication March 4, 1985; accepted June 12, 1985.
Reprint requests to (D.L.O.) Department of Pediatrics, University of Rochester, Rochester, NY 14642.

rigor in design was offset by the futile search for a "magic bullet." The results of these single-agent interventions have been inconsistent. Because preterm delivery and low birth weight have multiple determinants, it was our judgment that the problem needed to be addressed with home visitation services that could moderate a range of risk factors simultaneously.

Home visitation has been given considerable attention as a possible means of improving child health.[20,21] Prior to this report, however, the effect of prenatal home visitation on pregnancy outcomes had not been studied in rigorous fashion, although a few studies had examined postnatal home visitation programs.[22-24] The prenatal phase of the home visitation program evaluated in the present study was based on the premise that comprehensive home visitation by nurses should be an effective means of (1) reaching women who are reluctant to use traditional health and human services, (2) responding flexibly to the stressful life circumstances with which socially disadvantaged women must contend, (3) improving their health habits and behaviors, and (4) ultimately, reducing the rates of preterm delivery and low-birth-weight infants. The prenatal and postpartum home visitation service was designed to prevent a wide range of childhood health and developmental problems. This report evaluates the effectiveness of the prenatal program as a means of enhancing the antepartum social support, health habits, and obstetrical health status of socially disadvantaged women and of improving the length of gestation and birth weight of their babies.

DESIGN AND METHODS

The study design consisted of a randomized, clinical trial. Participating families were assigned at random to one of the four treatment conditions outlined in Table 1.

Treatment Conditions

Treatment 1. Families in the first group served as a control. During pregnancy, no services were provided through the research project. When the babies were 1 and 2 years of age, an infant specialist hired by the research project screened them for sensory and developmental problems. Suspected problems were referred to other specialists for further evaluation and treatment.

Treatment 2. Families in the second group were provided free transportation for regular prenatal and well-child care at local clinics and physicians' offices through a contract with a local taxicab company. Sensory and developmental screening, as in treatment 1, was provided when the babies were 1 and 2 years of age.

Treatment 3. Families in the third group were provided a nurse home-visitor during pregnancy in addition to the screening and transportation services. The nurses visited families about once every 2 weeks and made an average of nine visits during pregnancy, each of which lasted approximately one hour and 15 minutes.

Treatment 4. Families assigned to the fourth group received the same services during pregnancy as those in treatment 3, but, in addition, the nurses continued to make visits until the babies were 2 years of age. For the first month after delivery, the nurses visited once a week; thereafter, they visited on a schedule of diminishing frequency until the infants were 18 to 24 months of age, when visits were made every 6 weeks.

Prenatal Home Visitation Program

During their visits, the nurses carried out three basic activities: parent education, the enhancement of the women's informal support systems, and the linkage of the parents with community services. A central aspect of the nurses' approach was to emphasize the strengths of the women and their families.

An average of 83% of the nurses' home-visiting time during the prenatal period was devoted to education. The prenatal education program provided information on fetal and infant development, with the ultimate objective of improving parental behavior that theoretically affects fetal growth and

TABLE 1. Services Provided (+) in Each of the Four Treatment Groups

Services Provided	Treatment Group			
	1 (n = 90)	2 (n = 94)	3 (n = 100)	4 (n = 116)
Health and developmental screening at the child's 12th and 24th month of life	+	+	+	+
Free transportation to regular prenatal and well-child visits		+	+	+
Nurse home visitation during pregnancy			+	+
Nurse home visitation during the child's first 2 years of life				+

well-being of the newborn. Specific objectives included improving women's diets; helping women monitor their weight gain and eliminate the use of cigarettes, alcohol, and drugs; teaching parents to identify the signs of pregnancy complication; encouraging regular rest, appropriate exercise, and good personal hygiene related to obstetrical health; and preparing parents for labor, delivery, and early care of the newborn. The nurses used a detailed curriculum to guide their educational activities but tailored the content of their visits to the family's individual needs.

The second major activity of the nurses was to enhance the informal support available to the women during pregnancy, birth, and subsequent early child rearing. The nurses encouraged the women's relatives (usually their husbands and own mothers) as well as their close friends (including boyfriends) to participate in the home visits, to accompany the women to childbirth classes, to help them with household responsibilities, and to act as coaches during labor and delivery.

The nurses also linked families with community-based health and human services. Parents were urged to keep prenatal care appointments, to enroll in childbirth education classes, and, when needed, to seek other community services, such as the nutritional supplementation program for women, infants, and children.

The nurses worked closely with the clinic personnel and private office staff members responsible for the women's primary prenatal care. The women themselves were encouraged to call the physician or clinic at the first sign of any complication of pregnancy. In addition, the nurses sent two formal reports to the private obstetricians and the clinic staff informing them of the nurses' observations of maternal medical, social, and emotional conditions. The nurses clarified and reinforced physicians' recommendations in the home.

Detailed record-keeping systems and regular case reviews were used to make sure that the home visit protocol was followed by each nurse. Detailed descriptions of both the prenatal and postpartum programs are provided elsewhere.[25-27]

Setting

The study was carried out in a small, semirural county of approximately 100,000 residents in the Appalachian region of New York State. The community was well served from the standpoint of health and human services. Prenatal care was available through nine obstetricians and a free antepartum clinic sponsored by the health department. Prior to 1974, the county had one of the highest rates of infant mortality in the state (an average of 21.8 deaths per 1,000 births for the years 1971 to 1973). After the recruitment of a full-time neonatologist at a local hospital in 1974, the rates of infant mortality declined. For the 3-year period immediately preceding the current study (1975 to 1977), the mortality rate was 15.2 deaths per 1,000 births.[28] Moreover, the community has consistently exhibited the highest rates of reported and confirmed cases of child abuse and neglect in the state.[29] In 1980, the community was rated the worst Standard Metropolitan Statistical Area in the United States in terms of its economic conditions.[30]

Sample

Pregnant women were actively recruited if they had no previous live births and had any one of the following characteristics that predispose to infant health and developmental problems: (1) young age (<19 years), (2) single-parent status, (3) low socioeconomic status. The study design, however, allowed any woman who asked to participate and who was bearing a first child to be enrolled. This avoided creating a program that was stigmatized as being exclusively for the poor, and it enabled us to determine whether the effects of the program were greater for families at greater risk by creating sample heterogeneity. Women more than 25 weeks pregnant were to be excluded, but because of the difficulty of estimating length of gestation at the time of registration, 30 women were enrolled between the 26th and 29th week of pregnancy.

Women were recruited through the health department antepartum clinic, the offices of private obstetricians, Planned Parenthood, the public schools, and a variety of other health and human service agencies. Approximately 10% of the target population was missed due to late registration for prenatal care. An additional 10% was missed because some eligible women from the offices of private obstetricians were not referred. Between April 1978 and September 1980, 500 women were interviewed, and 400 enrolled. Appropriate informed consent was obtained. There were no differences in age, marital status, or education between those women who participated and those who declined. Ninety-four percent of the nonwhite women (mostly black) enrolled as opposed to 80% of the white women ($P = .02$).

At enrollment, 47% of the participating women were younger than 19 years of age, 62% were unmarried, and 61% came from families in Hollingshead's[31] social classes IV and V (semiskilled and unskilled laborers). (Hollingshead's index was adapted slightly to accommodate the variety of household compositions found in our sample. Details of the procedure can be obtained from the

first author.) Fifteen percent of the women were not at risk according to either the age, marital status, or socioeconomic status criteria, and 23% possessed all three risk characteristics. Sixty-eight percent of the women obtained antepartum care at the health department clinic, whereas the remaining 32% received care from private obstetricians.

Forty-six nonwhite women were removed from the analyses reported here because the sample of nonwhite women was too small to cross-classify race with other variables of importance in the statistical analyses. Twenty cases with maternal or fetal conditions predisposing to preterm delivery and/or aberrations in fetal growth were removed from the analysis in order to minimize the number of cases unalterable by the home-visiting service. The design-matrix location of these nonwhite women and medically complicated cases is presented in Table 2; the results of analyses including these cases are presented elsewhere[32] but are virtually the same as those reported in this paper.

Treatment Assignment

Families enrolled in the program were stratified by marital status, race, and seven geographic regions within the county (based on census tract boundaries). These families were assigned at random to one of the four treatment conditions. At the end of the intake interview, the women drew their treatment assignments from a deck of cards. The stratification was executed by using separate decks for the groups defined by the women's race, marital status at intake, and, for white women, the geographic region in which they resided. To ensure reasonably balanced subclasses, the decks were reconstituted periodically to overrepresent those treatments with smaller numbers of subjects, a procedure similar to Efron's[33] biased-coin designs. Women in treatments 3 and 4 subsequently were assigned on a rotating basis, within their stratification blocks, to one of five home visitors.

There were two departures from the randomization procedure. First, in six cases, women who enrolled were living in the same household as other women already participating in the study. To avoid potential horizontal diffusion of the treatment in the case of different assignment within households, the six new enrollees were assigned to the same treatment as their housemates.

Second, during the last 6 months of the 30-month enrollment period, the number of cards representing treatment 4 was increased in each of the decks in order to enlarge the size of that group and to enhance the statistical power of the design to compare, during the postpartum phase of the research, the infancy home-visiting program with treatments 1 and 2. Analysis of selected dependent variables confirmed that this slight confounding of treatments with time did not affect the pattern of treatment differences reported below.

Data Collection

Interviews were carried out with participating women by project staff members at the time of registration in the project (prior to their assignment to treatments) and again at the 32nd week of pregnancy. Obstetrical, labor, delivery, and newborn records were abstracted by two registered nurses

TABLE 2. Distribution of Nonwhite Women and Serious Fetal or Maternal Medical Conditions Associated With Fetal Growth Retardation Removed From Analysis of Pregnancy Data

Condition	Treatment Group	Age 14–16 yr		Age 17–34 yr	
		Smokers	Nonsmokers	Smokers	Nonsmokers
Nonwhite	Nurse-visited	1	9	3	14
	Comparison	2	4	1	12
Fetal conditions					
Twins	Nurse-visited				1
	Comparison				1
Major malformations	Nurse-visited	1		3*	
	Comparison			1	1
Maternal conditions					
Diabetes	Nurse-visited				
	Comparison			1†	1
Hypertension	Nurse-visited			1*	2
	Comparison			4†	1
Uterine malformation	Nurse-visited				1
	Comparison				
Stillbirths	Nurse-visited			1	1
	Comparison			1	

* In one case, the newborn had major malformations and the mother had hypertension.
† One woman had both diabetes and hypertension.

who were trained to reliability by our obstetrical co-investigator (R.T.).[32] Diagnoses used for this study were those recorded in the medical record. Nurses in the labor and delivery room completed forms indicating whether the women were accompanied to labor and delivery by a support person. The interviewers and medical record reviewers hired by the research project did not know to which treatment the women had been assigned.

At intake, the women were interviewed to determine their family structure, socioeconomic background, psychologic characteristics, health conditions, health habits, the availability of informal support, and their child-rearing histories. At the 32nd week of pregnancy, they were interviewed regarding their use of other health and human services, the support provided to them by significant persons in their informal networks, and their health habits.

Dietary intake was measured at both assessment periods, using 24-hour diet records and 24-hour recalls. For 74% of the sample, dietary data were gathered for two consecutive 24-hour periods at each assessment period; for an additional 14% of the sample, data were available for a single 24-hour period. These data were aggregated into a nutrient-adequacy ratio (NAR index), which converted the intake of 12 nutrients into a summary of percentages of Recommended Dietary Allowances.[34] Using an extension of intraclass correlation techniques, we found the reliability of the dietary data to be acceptable.[32]

Serum cotinine assays were done to validate the women's reported level of smoking on a subsample of 116 patients who received their antepartum care at the health department clinic. Serum was derived from blood samples drawn routinely at the patients' registration in the clinic and at approximately the 36th week of pregnancy. Cotinine levels were determined by radioimmunoassay.[35,36]

Estimates of length of gestation gave priority to newborn physical and neurologic examinations (based on the Dubowitz procedure) and to ultrasound readings taken before the 28th week of pregnancy. Reported last menstrual periods (LMPs) and measurements of uterine size made before 20 weeks were used when newborn examination and ultrasound data were not available. The gestational age of all low-birth-weight babies was estimated from the newborn physical examination findings.

Statistical Models and Methods of Analysis

For all analyses, a core statistical model was derived that consisted of a $2 \times 2 \times 2 \times 2$ factorial structure (leading to 16 smallest subclasses): treatments (1 and 2 *v* 3 and 4) × maternal smoking status (zero to four *v* five or more cigarettes per day) × maternal age (<17 *v* ≥17 years) × sex of child. This model was extended to include a repeated-measures structure for dependent variables measured both early and late in pregnancy. Three covariates measured at registration (maternal prepregnant weight, prepregnant height, and number of cigarettes smoked per day at intake) were included in the model when birth weight and length of gestation were analyzed as dependent variables in order to reduce error variance and improve the precision of our estimates.

A thorough investigation was carried out for each covariate to determine whether its relationship with the dependent variable was the same for contrasting groups defined by levels of the classification factors; that is, whether the slopes were parallel. This was to ensure the correct interpretation of adjusted mean differences and to evaluate any substantive findings resulting from such interactions of the covariate with classification factors.[37] Separate regressions of birth weight on prepregnant height were specified for older and younger women, because we found a trend for height, even after adjustment for prepregnant weight, to be related to birth weight among the young adolescents but not among the older women. For certain analyses of birth weight, length of gestation was added to the model as a covariate; in these cases, the square root of length of gestation was used instead of a linear term, because the relationship between birth weight and length of gestation is steeper at earlier dates (eg, between 27 and 37 weeks) than later. This transformed length-of-gestation variable was specified separately for older and younger women because we found, as did Horon *et al*,[38] that the relationship between birth weight and length of gestation differed depending on age of the mother.

Treatments 1 and 2 were combined for purposes of analysis after it was determined that there were no differences between these two groups in their use of routine prenatal care, the primary means by which transportation was hypothesized to affect pregnancy outcomes. Treatments 3 and 4 also were combined for the prenatal analysis because they were identical during this phase of the research. In the remainder of this paper, we refer to the combination of treatments 3 and 4 as the nurse-visited group. Planned treatment comparisons focused on the smokers (five or more cigarettes per day) and young adolescents (<17 years).

Dependent variables for which a normal distribution was assumed were analyzed in the general linear model and dichotomous outcomes (eg, preterm delivery and low birth weight) in the logistic linear model (assuming a binomial distribution).

Estimates and tests were adjusted for all covariates, classification factors, and interactions. Analysis was by our own computer programs, except that in the logistic case the model-fitting algorithm of Generalized Linear Interactive Modeling (GLIM) program[39] was invoked as a subroutine.

Comparisons of means pooled across two or more model subclasses (as in main effects and lower order interactions) are averaged equally over levels of the cross-classified fixed factors, except for maternal age, for which a 6:1 weighting of older women to young adolescents was used, in accordance with their proportions in the general population. The means presented correspond directly to the tests: they are functions of the 16 smallest-subclass means that have been adjusted for any covariates in the model. In the logistic case, means are given in incidence form because this approach corresponds more closely to the presentation of general linear model results than would, for example, log odds ratios. Except where indicated, variations in n are attributable to missing data.

RESULTS

Preintervention Equivalence of Treatment Conditions

The treatment conditions were evaluated carefully to determine their equivalence at registration. Before assignment to treatment conditions, the nurse-visited and comparison-group women were equivalent on all standard sociodemographic and health characteristics (Table 3). In the area of social support, however, in contrast to the comparison-group women, there were trends for the women assigned a nurse to have fewer family members in their helping network ($P = .08$) and less confidence that someone would accompany them to labor and delivery ($P = .07$). Moreover, the nurse-visited nonsmokers in the older than 16-year age group were

TABLE 3. Preintervention Background Characteristics of Sample

Variable	Range	Comparison Group (n ≃ 165)	Nurse-Visited Group (n ≃ 189)	Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
Sociodemographics				
Age of mother (yr)	14–34	19.57	19.53	0.04 ± 0.66
No. of weeks pregnant (at registration in research)	7–29	17.12	17.44	−0.32 ± 1.01
Education of mother (yr completed)	7–17	11.21	11.34	−0.13 ± 0.32
Proportion of households in socioeconomic classes IV and V (semi-skilled and unskilled workers)[31]	0–1	0.61	0.61	0.00 ± 0.10
Proportion married	0–1	0.43	0.41	0.02 ± 0.10
Proportion nonrisk (older, married, not poor)	0–1	0.17	0.14	0.03 ± 0.08
Maternal health status/behavior				
Prepregnant wt (lb)	80–308	129.98	131.22	−1.24 ± 6.20
Prepregnant ht (cm)	140–180	162.15	162.23	−0.08 ± 1.40
Diastolic blood pressure (mm Hg) at first antepartum visit	30–98	64.43	62.83	1.60 ± 2.16
No. of drinks during previous week	0–15	0.23	0.25	−0.02 ± 2.03
No. of cigarettes/d	0–55	6.94	7.65	−0.71 ± 1.97
Adequacy of diet (average % Recommended Dietary Allowances of 12 nutrients)	14–100	72.46	69.34	3.12 ± 3.77
Maternal personality and social support				
Personal control (items)†	7–14	12.19	12.43	−0.24 ± 0.30
No. of people/helping network	0–10	5.24	4.95	0.29 ± 0.49
No. of intimates/helping network	0–10	1.85	1.69	0.16 ± 0.32
No. of kin/helping network	0–10	3.22	2.86	0.36 ± 0.41*
Expected accompaniment to hospital for labor and delivery‡	2–16	9.61	9.08	0.53 ± 0.56*
Husband/boyfriend support§	−13–12	−0.19	0.42	−0.61 ± 1.63
Mother support‖	−7–16	0.12	−0.46	0.58 ± 1.18

* $P \leq .10$.
† Personal control summarized the extent to which the women felt control over their life circumstances using a short-form variant of Rotter's Locus of Control scale.[40]
‡ Scale based on addition of ratings of confidence in being accompanied to labor and delivery.
§ Scale characterizing availability, contact, and anticipated help from the women's husbands or boyfriends.
‖ Scale characterizing availability, contact, and anticipated help from the women's mothers.

less securely embedded in a helpful kin network (P = .007), had less confidence that someone would accompany them to labor and delivery (P = .06), and were older (P = .04) than their counterparts in the comparison group.

Attrition

The rates of attrition were distributed equally across the treatment conditions: 12 comparison and 14 nurse-visited women dropped out. The women who discontinued the nurse-visited condition, however, had a greater sense of personal control (P = .009), a higher level of education (P = .002), and enrolled in the project earlier in their pregnancies (P = .02) than those who discontinued the comparison group. An examination of the reasons for these women's discontinuation showed that they had either moved or miscarried. Even though more advantaged women dropped out of the nurse-visited group than from the comparison group, the women who remained in the comparison and nurse-visited groups at the time of delivery were essentially equivalent.

Formal and Informal Support Systems

In contrast to their counterparts assigned to the comparison group, by the end of pregnancy, nurse-visited women were aware of more of the community services available to them (P = .01), attended childbirth education classes more frequently (P = .01), received more WIC vouchers (P = .03), reported that they talked more frequently with service providers and members of their informal networks about the stresses of pregnancy and family life (P = .02), indicated that their babies' fathers showed a greater interest in their pregnancies (P = .02), and were accompanied by someone to the labor room more frequently (P = .01) (Table 4).

Maternal Obstetrical Conditions and Health Habits

The nurse-visited women had fewer kidney infections after enrollment (P = .005) (Table 5).

Nurse-visited women made greater improvements in the quality of their diets from registration to the 32nd week of pregnancy than women in the comparison group (Table 6), an effect that was especially strong among the smokers (P = .04 for both contrasts). During the course of pregnancy, nurse-visited smokers made greater reductions in the number of cigarettes smoked than smokers assigned to the comparison group, leading to a four cigarette-per-day difference at the end of pregnancy (P = .0001).

The relationship between the reported number of cigarettes smoked and serum cotinine was analyzed at intake and at 32 weeks of pregnancy. Highly significant regressions for both nurse-visited and comparison-group women are shown in Table 7. Among smokers, the relationship between

TABLE 4. Women's Use of Services and Support Person Behavior Reported at the 32nd Week of Pregnancy and Observed at Hospital Admission for Labor and Delivery

Variable	Range	Comparison Group		Nurse-Visited Group		Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
		$\bar{x}$	n	$\bar{x}$	n	
Use of services						
No. of services known	0–10	4.91	137	5.47	157	−0.56 ± 0.45*
Childbirth education (proportion)	0–1	0.54	120	0.70	129	−0.16 ± 0.13*
No. of nutritional supplementation vouchers	0–8	1.56	136	2.18	152	−0.62 ± 0.55†
No. of antepartum visits	0–19	10.50	136	10.49	156	0.01 ± 0.67
No. of calls to physician or clinic	0–10	1.72	136	1.43	156	0.29 ± 0.40
Support person behavior						
Talk about problems‡	20–74	36.19	138	38.39	158	−2.20 ± 1.87†
Father interest pregnancy	1–5	3.72	132	4.07	146	−0.35 ± 0.29†
Accompany to labor (proportion)	0–1	0.87	127	0.95	142	−0.08 ± 0.07*
Accompany to delivery (proportion)	0–1	0.39	125	0.45	139	−0.06 ± 0.12
Help with household§	5–35	16.57	138	15.39	158	1.18 ± 1.68

* $P \leq .01$; † $P \leq .05$.
‡ Scale based on addition of number of times that women spoke with specific family members, friends, and professional service providers about the women's problems.
§ Scales based on addition of maternal ratings regarding amount of help the women had for house cleaning, shopping, etc.

TABLE 5. Obstetrical Complications After Enrollment

Variable	Range	Comparison Group		Nurse-Visited Group		Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
		$\bar{x}$	n	$\bar{x}$	n	
Kidney infection (proportion)	0–1	0.03	141	0.00	165	0.03 ± 0.02*
Bladder infection (proportion)†	0–1	0.06	141	0.10	165	−0.04 ± 0.06
Hematocrit (%) (last before delivery)	22–46	36.67	142	36.76	166	−0.09 ± 0.74
Proteinuria (≥2+) (proportion)‡	0–1	0.03	142	0.05	166	−0.02 ± 0.04
Edema (proportion)	0–1	0.58	142	0.62	166	−0.04 ± 0.08
Hypertensive disorder of pregnancy (proportion)	0–1	0.07	142	0.04	166	0.03 ± 0.05

* $P \leq .01$.
† Includes diagnosed bladder infections as well as urinary tract infections not identified specifically as kidney infections.
‡ Protein is measured on a 6-point scale with a range of values from 0 to 4+.

TABLE 6. Obstetrical Conditions and Health Habits Measured Early and Late in Pregnancy*

Variable	Range	Assessment Period	Comparison Group		Nurse-Visited Group		Comparison Group-Nurse-Visited Group Difference and 95% Confidence Interval
			$\bar{x}$	n	$\bar{x}$	n	
Bleeding (proportion)	0–1	Trimester 1	0.01	137	0.06	158	
	0–1	Trimester 3	0.06	137	0.06	158	
Δ			0.05		0.00		0.05 ± 0.07
Spotting (proportion)	0–1	Trimester 1	0.09	142	0.10	166	
	0–1	Trimester 3	0.03	142	0.07	166	
Δ			−0.06		−0.03		−0.03 ± 0.09
Blood pressure (diastolic mm Hg)	30–98	First visit	63.97	137	62.63	158	
	40–118	Last visit	71.10	137	70.23	158	
Δ			7.13		7.60		−0.47 ± 2.96
No. of alcoholic drinks/wk	0–15	Intake	0.18	136	0.22	157	
	0–15	32nd wk	0.12	136	0.18	157	
Δ			−0.06		−0.04		−0.02 ± 0.15
Weight gain (lb)	80–308	Prepregnant	127.58	136	128.69	153	
	99–313	Last visit	160.36	136	164.40	153	
Δ			32.78		35.71		−2.93 ± 3.13
Adequacy of diet (avg % Recommended Daily Allowances)	14–100	Intake	72.08	115	69.72	138	
	12–100	32nd wk	71.75	115	73.86	138	
Δ			−0.33		4.14		−4.47 ± 4.38†
No. of cigarettes/d	5–55	Intake	14.37	64	15.83	77	
	5–70	32nd wk	16.00	64	13.29	77	
Δ			1.63		−2.54		4.17 ± 1.01‡

* Δ, Early to late pregnancy change.
† $P \leq .05$; ‡ $P \leq .001$.

TABLE 7. Estimated Regression of Number of Cigarettes Smoked per Day on Serum Cotinine Value at Intake and the 32nd Week of Pregnancy for Nurse-Visited and Comparison Women

Sample	Treatment Group	Data Collection Period			
		Intake		32nd wk	
		$\hat{\beta}$ Value*	n	$\hat{\beta}$ Value*	n
Whole	Comparison	0.050†	18	0.060‡	17
	Nurse-visited	0.051†	20	0.086‡	29
Smokers (≥5 cigarettes/d)	Comparison	0.011	11	0.012	9
	Nurse-visited	−0.021	10	0.083‡	15

* Estimated regression coefficient.
† $P \leq .01$; ‡ $P \leq .001$.

reported cigarettes smoked and serum cotinine at the 32nd week of pregnancy was significantly greater for the nurse-visited women than for those in the comparison group ($P = .05$), suggesting that the nurse-visited smokers were more accurate in the recollection of their smoking habits at the end of pregnancy than smokers in the comparison group. Thus, the treatment difference in the reported number of cigarettes smoked did not derive from the nurse-visited women exaggerating their reduction.

Birth Weight and Length of Gestation

Although there were no overall treatment main effects for birth weight or length of gestation (Table 8), the nurse-visited young adolescents gave birth to babies who were an average of 395 g heavier than babies of young adolescents in the comparison group ($P = .02$). For the nurse-visited smokers, there was a 2% incidence of preterm delivery in contrast to 10% for smokers in the comparison group ($P = .04$). The nurse-visited older nonsmokers, in contrast to their comparison-group counterparts, gave birth approximately 1 week earlier ($P = .002$), primarily because 12% of the nurse-visited older nonsmokers delivered prematurely, in contrast to 3% of their comparison-group counterparts ($P = .03$); this was accompanied by nearly an 11% difference in low birth weight ($P = .001$).

By covarying social support and age in the analysis of birth weight and length of gestation, we examined the extent to which these unexpected treatment differences among the older nonsmokers were due to the preintervention treatment differences for this subgroup. We found that the social support and age variables were related to length of gestation for the nurse-visited older nonsmoking group but not for their counterparts in the comparison group (the regressions were nonhomogeneous). Evaluation of the plotted relationships (not shown) indicated that the treatment difference for this subgroup in length of gestation was concentrated in those nurse-visited cases in which the women were older and in which there was little social support.

To determine the extent to which the treatment differences for birth weight were produced by longer (or shorter) gestations, birth weight was analyzed again, after adding length of gestation as a covariate to the basic model (Table 9). After adjustment for length of gestation, among the young adolescents the treatment effect on birth weight was reduced from 395 to 324 g, an effect that remained significant ($P = .02$). Among smokers, the treatment contrast was reduced from 96 to 39 g, and among the older nonsmokers the treatment contrast shifted from 161 g in favor of the control group to 26 g in favor of the nurse-visited women, both

TABLE 8. Treatment Effects on Birth Weight and Length of Gestation Adjusted for Prepregnancy Height, Prepregnancy Weight, and Intake Smoking Habit for the Whole Sample, Adolescents, Smokers, and Older Nonsmokers*

Sample	Treatment Group	n	Dependent Variables			
			Birth Wt (g)	% Low Birth Wt (≤2,500 g)	Length of Gestation (wk)	% Preterm Delivery (<37 wk)
Whole	Nurse-visited	166	3,285	5.78	39.57	6.90
	Comparison	142	3,262	2.61	39.71	7.27
Difference			23 ± 134	3.17 ± 4.01	−0.14 ± 0.45	−0.37 ± 2.30
Adolescents (14–16 yr)	Nurse-visited	28	3,423	0.00	40.41	0.00
	Comparison	17	3,028	11.76	39.71	11.76
Difference			395 ± 343	−11.76†	0.70 ± 1.49	−11.76†
Smokers (≥5 cigarettes/d)	Nurse-visited	78	3,331	1.46	40.10	2.08
	Comparison	64	3,235	3.79	39.46	9.81
Difference			96 ± 177	−2.33 ± 4.12	0.64 ± 0.76	7.73 ± 7.05‡
Older nonsmokers	Nurse-visited	71	3,210	10.57	38.86	11.83
	Comparison	72	3,370	0.00	40.03	3.13
Difference			−160 ± 172	10.57 ± 5.20§	−1.17 ± 0.75§	8.70 ± 7.68‡

* Interval estimates of mean differences are calculated with 95% confidence. The fetal outcomes (in particular, the dichotomized and continuous versions of the same variable) are not independent of one another. They both are provided to give a more complete portrayal of the impact of the program on different aspects of fetal growth.
† For young adolescents, estimates for percentage of low-birth-weight infants and preterm delivery are not adjusted for covariates because of instability in the solution of the logistic linear model. The means are shown for the model without covariates, which converges. Because the subclass sizes were small and there were only two cases of low-birth-weight infants and preterm delivery in the control group and none in the nurse-visited group, the confidence intervals and probabilities, although formally significant, are not shown.
‡ $P \leq .05$; § $P \leq .01$.

TABLE 9. Treatment Effects on Birth Weight Adjusted for Prepregnancy Height, Prepregnancy Weight, Intake Smoking Habit, and Length of Gestation for the Adolescents, Smokers, and Older Nonsmokers*

Sample	Treatment Group	n	Birth Wt (g)
Adolescents (14–16 yr)	Nurse-visited	28	3,335
	Comparison	17	3,011
Difference			324 ± 259†
Smokers (≥5 cigarettes/d)	Nurse-visited	78	3,282
	Comparison	64	3,243
Difference			39 ± 184
Older nonsmokers	Nurse-visited	78	3,337
	Comparison	72	3,311
Difference			26 ± 130

* Interval estimates of mean difference are calculated with 95% confidence.
† $P \leq .05$.

nonsignificant differences after adjustment. This series of analyses indicated that the treatment effect on birth weight among smokers and older nonsmokers was explained largely by differences in length of gestation, whereas among the young adolescents it was not.

Differences in Program Effectiveness as a Function of Exposure to the Program

Birth weight and length of gestation were tested in a model in which gestational age at enrollment (categorized as before or after midgestation, or 140 days) was included as an indicator of the women's opportunities to be visited by the nurse (Table 10). The results of these analyses for the smokers and older nonsmokers showed no intensification of treatment effects for those who enrolled early. Among the young adolescents, on the other hand, the positive effect of the program on birth weight (adjusted for length of gestation) was concentrated exclusively on those young women who enrolled before midgestation, for whom a 515-g mean difference distinguished those assigned a nurse and those assigned to the comparison group ($P = .0002$).

TABLE 10. Treatment Effects on Birth Weight Adjusted for Prepregnancy Height, Prepregnancy Weight, Intake Smoking Habit, and Length of Gestation for the Babies Born to Young Adolescents Who Enrolled Before and After Midgestation*

Treatment Group	Enrolled			
	Before Midgestation		After Midgestation	
	n	Birth Wt (g)	n	Birth Wt (g)
Nurse-visited	21	3,437	7	3,038
Comparison	11	2,922	6	3,287
Difference		515 ± 243†		−249 ± 377

* Interval estimates of mean difference are calculated with 95% confidence.
† $P \leq .001$.

DISCUSSION

This study is the first randomized trial of comprehensive prenatal services to show that the social and health contexts for child bearing among socially disadvantaged families can be improved. The results suggest that nurse home-visitors are capable of improving women's use of community services, informal social support, and health habits. Although these results may be explained by the nurse-visited women simply giving more socially desirable answers to questions about these topics, the available evidence does not support this interpretation. Our attempt to validate reported level of smoking suggests that the nurse-visited smokers were more rather than less accurate at the end of pregnancy than women in the comparison group. Moreover, the increased accompaniment by support persons to the hospital during labor on the part of nurse-visited women was determined by the observations of hospital maternity nurses. Thus, the general picture of improved social support and health habits is corroborated, in part, by data from sources other than the women themselves.

We have hypothesized that the observed reduction in kidney infections among nurse-visited women can be explained by two interrelated processes. First, nurse-visited women were encouraged to contact their physician at the first sign of pregnancy complication; therefore, we suspect that bladder infections were treated more promptly in the nurse-visited group. The relatively low incidence of treated bladder infections in the comparison group may reflect their underutilization of the physician for this condition which, untreated, developed into the higher rate of kidney infection. Second, the reduction in kidney infections is consistent with a theoretical model linking maternal

health habits, social support, and stress as influences on maternal host resistance to infection and, ultimately, preterm delivery.[41,42] Hence, the reduction in kidney infections in the nurse-visited women may be one reflection of the salutary interaction between improved maternal health habits and social support.

Although no overall treatment effects on either birth weight or length of gestation were found, positive program effects were present for the offspring of young adolescents and women who smoked—two groups at special risk for preterm delivery and low-birth-weight infants.[43-52] It should be emphasized that the results for the smokers and young adolescents were examined thoroughly for possible biasing background conditions (none was found) and that the treatment effect among the young adolescents was concentrated exclusively on those who enrolled early in pregnancy and thus had greater exposure to the program. These results for young adolescents are consistent with a recent epidemiologic study of the effects of early prenatal care on the birth weight of offspring born to women in this age range[53] and with three other prenatal intervention studies.[6,10,12]

The interpretation of the birth weight finding for the young adolescents, however, should be tempered by two observations: (1) the sample size for this group was quite small, and (2) the treatment effect size was larger than we would have predicted, given known influences on fetal growth.

Among the smokers, there was more than a 75% reduction in the incidence of preterm delivery. This finding is strengthened by the corresponding reduction in number of cigarettes smoked and improvement in diet for nurse-visited smokers.

Why did the nurse-visited older nonsmokers give birth to infants of shorter gestations than their counterparts in the comparison group? Because the nurse-visited older nonsmokers reported less family support and were older at registration than their comparison-group counterparts, and because there were no intervening behavioral outcomes, health habits, or obstetrical conditions identified that might explain their poorer performance, we have concluded that the apparent negative effect was attributable to a greater number of women in this nurse-visited subsample who were predisposed to deliver early.

During the past two decades, many efforts have been mounted to address the needs of disadvantaged pregnant women and their children, usually through traditional office- and clinic-based care systems. Although office-based care is an important ingredient in an overall strategy to improve the outcomes of pregnancy, the results of this study suggest that it is not enough. The high incidence of low-birth-weight infants and preterm delivery among disadvantaged pregnant women is, in large part, the result of poor maternal health habits and behaviors which, in turn, are strongly affected by the stressful environmental conditions with which these women and their families must contend. A sensitively and comprehensively designed program of nurse home visitation appears to be a promising method of improving these behaviors and environmental conditions simultaneously.

In 1981, the Select Panel for the Promotion of Child Health[54] concluded that federal, state, and local governments should increase substantially their funding of home visitation services for pregnant women and high-risk infants, with the eventual goal of providing such services for all pregnant women and young children. The results of the present study provide the first evidence to support the position that standard office- and clinic-based prenatal care for socially disadvantaged women can be enhanced with home visitation. The positive effects for the newborn appear to be greatest for those born to women with specific risks for low birth weight infants, such as smoking and young age. The postnatal phase of the program has produced additional beneficial results.[55]

ACKNOWLEDGMENTS

This research was supported by grants from the Bureau of Community Health Services (HHS-MCR-360403-06), the Robert Wood Johnson Foundation (grant 5263), and the W. T. Grant Foundation (grant 0723-80). The serum cotinine assays were carried out in the laboratories of Dr Helen Van Vunakis at Brandeis University and were partially supported by grant DA 2407 from the Department of Health and Human Services.

We wish to thank Karen Hughes and Jean Thom for preparation of the manuscript; Janice Sheppard, Greg Jurkowski, and Ling Wu for their help with data processing; Christine Olson for help with nutritional issues; Moncrieff Cochran, Solan Chao, Robert Cole, Gilbert Forbes, Harriet Kitzman, Zorika Petic Henderson, Robert Hoekelman, Randy Lagier, Gregory Liptak, Elizabeth McAnarney, Joannie Pinhas, Henry Ricciuti, David Rush, and Cassie Stevens for helpful comments on design, analysis, and the manuscript; John Shannon for his administrative support of the project; and Elizabeth Chilson, Diane Farr, Georgianna McGrady, Jacqueline Roberts, and Lyn Scazafabo for their work with the families enrolled in the program.

REFERENCES

1. Lee KS, Paneth N, Lawrence M, et al: Neonatal mortality: An analysis of the recent improvement in the United States. *Am J Public Health* 1980;70:15–21
2. Kessel SS, Villar J, Berendes H, et al: The changing pattern of low birth weight in the United States. *JAMA* 1984;251:15
3. Healthy people. The Surgeon General's report on health

promotion and disease prevention. US Department of Health, Education, and Welfare. Government Printing Office, 1979
4. Lee K, Paneth N, Gartner L, et al: The very low birth weight rate: Principal predictor of neonatal mortality in industrialized populations. *J Pediatr* 1980;97:759–764
5. Miller H, Merritt T: Fetal growth in humans. Chicago, Year Book Medical Publishers, Inc, 1979
6. Felice M, Granados J, Ances I, et al: The young pregnant teenager: Impact of comprehensive prenatal care. *J Adolesc Health Care* 1981;1:193–197
7. Osofsky HJ, Osofsky J, Kendall N, et al: Adolescents as mothers: An interdisciplinary approach to a complex problem. *J Youth Adolesc* 1973;2:528–535
8. Klerman LV, Jekel JF: *School-Age Mothers: Problems, Programs, and Policy.* Hamden, CT, Shoe String Press, Inc, 1973
9. McAnarney ER, Roghmann KJ, Adams BN, et al: Obstetric, neonatal, and psychosocial outcomes of pregnant adolescents. *Pediatrics* 1978;61:199–205
10. Stine O, Kelley E: Evaluation of a school for young mothers: The frequency of prematurity among infants born to mothers under 17 years of age, according to the mothers' attendance of a special school during pregnancy. *Pediatrics* 1970;46:581–587
11. Elder HA, Santamarina BAG, Smith S, et al: The natural history of asymptomatic bacteriuria during pregnancy: The effect of tetracycline on the clinical course and the outcome of pregnancy. *Am J Obstet Gynecol* 1971;3:442
12. Paige D, Cordano A, Mellits ED, et al: Nutritional supplementation of pregnant adolescents. *J Adolesc Health Care* 1981;1:261–267
13. Rush D, Stein Z, Susser M: A randomized controlled trial of prenatal nutritional supplementation in New York City. *Pediatrics* 1980;65:683–697
14. Mora JO, de Paredes B, Wagner M, et al: Nutritional supplementation and the outcome of pregnancy: I. Birthweight. *Am J Clin Nutr* 1979;32:455–462
15. Lechtig AJ, Habicht JR, Yarbrough C, et al: Relation of maternal supplementary feeding during pregnancy to birth weight and other sociobiological factors, in Winick M (ed): *Proceedings of the Symposium on Nutrition and Fetal Development.* New York, John Wiley & Sons, 1972, pp 127–145
16. McDonald E, Pollitt E, Mueller W, et al: The Bacon Chow study: Maternal nutritional supplementation and birth weight of offspring. *Am J Clin Nutr* 1981;34:2133–2144
17. Johnson JWC, Austin KL, Jones GS, et al: Efficacy of 17 hydroxyprogesterone caprovate in the prevention of preterm labor. *N Engl J Med* 1975;293:675
18. Donovan JW: Randomized controlled trial of anti-smoking advice in pregnancy. *Br J Prev Soc Med* 1977;31:6–12
19. Sexton MS, Hebel JR: A clinical trial of change in maternal smoking and its effects on birthweight. *JAMA* 1984;251:911–915
20. Silver G: *Child Health, America's Future.* Germantown, MD, Aspen Systems, 1978
21. Wynn M, Wynn A: Some developments in child health care in Europe. *R Soc Health J* 1979;99:259–264
22. Larson CP: Efficacy of prenatal and postpartum home visits on child health and development. *Pediatrics* 1980;66:191–197
23. Siegel E, Bauman KE, Schaefer ES, et al: Hospital and home support during infancy: Impact on maternal attachment, child abuse and neglect, and health care utilization. *Pediatrics* 1980;66:183–190
24. Barkauskas V: Effectiveness of public health nurse home visits to primiparous mothers and their infants. *Am J Public Health* 1983;73:573–580
25. Olds D: Improving formal services for mothers and children, in Garbarino J, Stocking SH (eds): *Protecting Children from Abuse and Neglect: Developing and Maintaining Effective Support Systems for Families.* San Francisco, Jossey-Bass Publishers, 1981, pp 173–197
26. Olds D: An intervention program for high-risk families, in Hoekelman R (ed): *Minimizing High-Risk Parenting.* Media, PA, Harwal Publishing Company, 1983, pp 249–268
27. Olds D: The prenatal/early infancy project: An ecological approach to prevention of developmental disabilities, in Belsky J (ed): *In the Beginning.* New York, Columbia University Press, 1982, pp 270–285
28. Vital Statistics of New York State. Albany, New York State Department of Health, 1973–1977
29. New York State Department of Social Services. Annual Report of Child Protective Services in New York State. Albany, New York State Department of Social Services, 1973–1982
30. Boyer R, Savageau D: *Places Rated Almanac.* New York, Rand McNally, 1981
31. Hollingshead AB: Four-factor index of social status. Working paper. New Haven, CT, Yale University, 1976
32. Olds D, Henderson C, Birmingham M, et al: Final report to the Maternal and Child Health and Crippled Children's Services Research Grants Program, Bureau of Community Health Services, Health Services Administration, Public Health Service, Department of Health and Human Services, grant MCJ-36040307, November 1983
33. Efron B: Forcing a sequential experiment to be balanced. *Biometrika* 1971;58:403–417
34. Johnson N, Nitzke S, Vandeberg D: A reporting system for nutrient adequacy. *Home Econ Res J* 1974;2:210–221
35. Langone JJ, VanVunakis H, Hill P: Quantitation of cotinine in sera of smokers. *Res Commun Chem Pathol Pharmacol* 1975;10:21–28
36. Langone JJ, Sjika H, VanVunakis H: Nicotine and its metabolites: I. Radioimmunoassay for nicotine and cotinine. *Biochemistry* 1973;12:5025–5030
37. Henderson C: Analysis of covariance in the mixed model: Higher level, nonhomogeneous, and random regressions. *Biometrics* 1982;38:623–640
38. Horon IL, Strobino D, MacDonald H: Birthweights among infants born to adolescents and young adult women. *Am J Obstet Gynecol* 1983;146:444–449
39. Baker RJ, Nelder JA: *The GLIM system—Release three: Generalized Liner Interactive Modeling.* Oxford, England, Numerical Algorithms Group, 1978
40. Rotter JB: Generalized expectancies for internal versus external control of reinforcement. *Psychol Monogr* (Gen Appl) 1966;80:1
41. Hobel CJ: Prevention of prematurity, in Nathaniels PW, Beard R (eds): *Fetal Physiology and Medicine.* New York, Marcel Dekker, Inc, 1984, pp 757–778
42. Bragonier JR, Cushner IM, Hobel CJ: Social and personal factors in the etiology of preterm birth, in Fuchs F, Stubblefield PG (eds): *Preterm Birth: Causes, Prevention, and Management.* New York, MacMillan Publishing Co, 1984, pp 64–85
43. Naeye RL: Teenaged and pre-teenaged pregnancies: Consequences of the fetal-maternal competition for nutrients. *Pediatrics* 1981;67:146–150
44. Meyer MB: Effects of maternal smoking and altitude on birthweight and gestation, in Reed DM, Stanley FJ (eds): *The Epidemiology of Prematurity.* Baltimore, Urban and Schwarzenberg, 1977, pp 81–104
45. Fielding J: Adolescent pregnancy revisited. *N Engl J Med* 1977;299:893–896
46. Garn SM, Petzold AS. Characteristics of the mother and child in teen-age pregnancy. *Am J Dis Child* 1983;37:365–368
47. Zukerman B, Alpert JJ, Dooling E, et al: Neonatal outcome: Is adolescent pregnancy a risk factor? *Pediatrics* 1983; 71:489–493
48. Dwyer JF: Teenage pregnancy. *Am J Obstet Gynecol* 1974;118:373
49. Kreutner K, Hollingsworth D (eds): *Adolescent Obstetrics and Gynecology.* Chicago, Yearbook Medical Publishers, 1978
50. Rush D: Cigarette smoking, nutrition, social status, and perinatal loss: Their interactive relationships, in Porter IH, Hook EB (eds): *Human Embryonic and Fetal Death.* New

York, Academic Press, 1980, pp 207–219
51. Luke B, Hawkins M, Petrie R: Influence of smoking, weight gain, and pregravid weight for height on intrauterine growth. *Am J Clin Nutr* 1981;34:1410–1417
52. Meyer MB: How does maternal smoking affect birth weight and maternal weight gain? *Am J Obstet Gynecol* 1978; 131:888–893
53. Elster A: The effect of maternal age, parity, and prenatal care on perinatal outcomes of adolescent mothers. *Am J Obstet Gynecol* 1984;149:845–847
54. *Better Health for Our Children: A National Strategy.* The report of the Select Panel for the Promotion of Child Health, vol 1: *Major Findings and Recommendations.* US Department of Health and Human Services (PHS) publication no. 79-55071, 1981
55. Olds D, Henderson C, Chamberlin R, et al: Preventing child abuse and neglect: A randomized trial of nurse home visitation. *Pediatrics*, in press, 1985

AMERICAN ACADEMY OF PEDIATRICS RESIDENCY FELLOWSHIPS STIPULATIONS

To enable young physicians to complete their pediatric training, the American Academy of Pediatrics will grant a small number of fellowships of $1,000 and $3,000 each to pediatric interns and residents for the year beginning July 1. Candidates must meet the following requirements:

1. Be legal residents of the United States or Canada;
2. Have completed, or will have completed by July 1, a qualifying approved internship (PI-0) or have completed a PI-1 program, and have made a definite commitment for a first year pediatric residency (PI-1 or PI-2) acceptable to the American Board of Pediatrics; or
3. Be pediatric residents (PI-1, PI-2, or PI-3) in a training program and have made a definite commitment for another year of residency in a program acceptable to the American Board of Pediatrics;
4. Have real need of financial assistance; and
5. Support their application with a letter from the Chief of Service substantiating the above requirements; if a change in residency training program is contemplated (ie, moving to another institution), a letter from the chief of this service certifying acceptance to this program will also be necessary.

The fellowships have been provided through grants to the American Academy of Pediatrics by Mead Johnson Nutritional Division, Gerber Products Company, and the McNeil Consumer Products Company.

Although the fellowship awards are intended primarily for the support of first and second year pediatric residents, it is also recognized that some physicians may desire a third or fourth year of pediatric residency. Up to 25% of the fellowships may be awarded to persons in this category. Consideration will be given to geographic spread of awards, and preference will be exhibited for well-qualified but smaller training centers which perhaps have fewer resources for residents in training than do some of the larger centers.

The Committee on Residency Fellowships of the American Academy of Pediatrics will make final decision on the granting of the Awards. Those interested in applying may write to Jean D. Lockhart, MD, Department of Maternal, Child and Adolescent Health, American Academy of Pediatrics, 141 Northwest Point Rd, Elk Grove Village, IL 60007, for application forms.

The envelope must be postmarked no later than March 1, 1986 in order to be eligible.

Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation

David L. Olds, Charles R. Henderson, Jr, Robert Tatelbaum and Robert Chamberlin

Pediatrics 1986;77;16-28

12. Ellerstein NS, Canavan JW: Sexual abuse of boys. *Am J Dis Child* 1980;134:255–257
13. Rimza ME, Niggeman MS: Medical evaluation of sexually abused children: A review of 311 cases. *Pediatrics* 1982;69:8–14
14. Paul DM: The medical examination in sexual offences against children. *Med Sci Law* 1977;4:251–258
15. Herjanic B, Wilbois RP: Sexual abuse of children. *JAMA* 1978;239:331–333
16. Orr DP, Prietto SV: Emergency management of sexually abused children. *Am J Dis Child* 1979;133:628–631
17. Rogers CM, Thomas JN: Sexual victimization of children in the USA: Patterns and trends. *Clin Proc* 1984;40:211–221
18. Neinstein LS, Goldenring J: Nonsexual transmission of sexually transmitted diseases: An infrequent occurrence. *Pediatrics* 1984;74:67–76

ERRATA

In the article "Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation" by Olds et al (*Pediatrics* 1986;77:16–28), Dr Van Vunakis' grant number was incorrectly reported. It should have been DA 2507.

In the commentary "Children and Car Seats" by Shelness and Charles (*Pediatrics* 1986;77:256–258), there is an error on page 257, paragraph 2. The children's weights should have been 20 kg (44 lb) and 18 kg (39.6 lb).

In the article "Early Indicators of Self-Destruction in Childhood and Adolescence: A Survey of Pediatricians and Psychiatrists," by Fine et al (*Pediatrics* 1986;77:557–568), Figs 1 and 2 were transposed. The legend to Fig. 1 (p 562) refers to the figure above the legend to Fig 5 (p 565) and vice versa.

To the article, "Schilder's Myelinoclastic Diffuse Sclerosis" by Poser et al (*Pediatrics* 1986; 77:107–112), the authors would like to add the following acknowledgment. The biopsy diagnosis of diffuse sclerosis was made by Dr Jacqueline Mikol, neuropathologist at the Hopital Necker-Enfants Malades, Paris.

Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing. A Randomized Controlled Trial

Article *in* JAMA The Journal of the American Medical Association · September 1997

DOI: 10.1001/jama.278.8.644 · Source: PubMed

CITATIONS
453

READS
722

13 authors, including:

Harriet Kitzman
University of Rochester
139 PUBLICATIONS **9,473** CITATIONS
SEE PROFILE

David Olds
University of Colorado
148 PUBLICATIONS **12,681** CITATIONS
SEE PROFILE

Carole Hanks
Baylor University
16 PUBLICATIONS **1,995** CITATIONS
SEE PROFILE

Kenneth Muir Mcconnochie
University of Rochester
86 PUBLICATIONS **3,601** CITATIONS
SEE PROFILE

Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing

A Randomized Controlled Trial

Harriet Kitzman, RN, PhD; David L. Olds, PhD; Charles R. Henderson, Jr; Carole Hanks, RN, DrPH; Robert Cole, PhD; Robert Tatelbaum, MD; Kenneth M. McConnochie, MD, MPH; Kimberly Sidora, MPH; Dennis W. Luckey, PhD; David Shaver, MD; Kay Engelhardt, RN, PhD; David James, MD; Kathryn Barnard, RN, PhD

Context.—Interest in home-visitation services as a way of improving maternal and child outcomes has grown out of the favorable results of a trial in semirural New York. The findings have not been replicated in other populations.

Objective.—To test the effect of prenatal and infancy home visits by nurses on pregnancy-induced hypertension, preterm delivery, and low birth weight; on children's injuries, immunizations, mental development, and behavioral problems; and on maternal life course.

Design.—Randomized controlled trial.

Setting.—Public system of obstetric care in Memphis, Tenn.

Participants.—A total of 1139 primarily African-American women at less than 29 weeks' gestation, with no previous live births, and with at least 2 sociodemographic risk characteristics (unmarried, <12 years of education, unemployed).

Intervention.—Nurses made an average of 7 (range, 0-18) home visits during pregnancy and 26 (range, 0-71) visits from birth to the children's second birthdays.

Main Outcome Measures.—Pregnancy-induced hypertension, preterm delivery, low birth weight, children's injuries, ingestions, and immunizations abstracted from medical records; mothers' reports of children's behavioral problems; tests of children's mental development; mothers' reports of subsequent pregnancy, educational achievement, and labor-force participation; and use of welfare derived from state records.

Main Results.—In contrast to counterparts assigned to the comparison condition, fewer women visited by nurses during pregnancy had pregnancy-induced hypertension (13% vs 20%; P=.009). During the first 2 years after delivery, women visited by nurses during pregnancy and the first 2 years of the child's life had fewer health care encounters for children in which injuries or ingestions were detected (0.43 vs 0.55; P=.05); days that children were hospitalized with injuries or ingestions (0.03 vs 0.16; P<.001); and second pregnancies (36% vs 47%; P=.006). There were no program effects on preterm delivery or low birth weight; children's immunization rates, mental development, or behavioral problems; or mothers' education and employment.

Conclusion.—This program of home visitation by nurses can reduce pregnancy-induced hypertension, childhood injuries, and subsequent pregnancies among low-income women with no previous live births.

JAMA. 1997;278:644-652

WITHIN the past 8 years, home-visitation services have been promoted as a way to improve the outcomes of pregnancy,[1] to reduce the rates of child abuse and neglect,[2] and, now that welfare has been given to the states in the form of block grants, to help families become economically self-sufficient. While some home-visitation programs have produced some positive effects,[3,4] most have failed to affect important aspects of maternal and child health and family functioning.[5,6]

See also pp 637 and 680.

Some of this recent interest in home visitation has grown out of the results of a trial of nurse home visitation with white women who had no previous live births and who lived in a semirural area in and around Elmira, NY.[7-10] Women visited by nurses during pregnancy reduced the number of cigarettes smoked, improved the quality of their diets during the course of pregnancy, and exhibited lower rates of pyelonephritis. In contrast to a comparison group, nurse-visited women who smoked cigarettes at the beginning of pregnancy had 75% fewer preterm deliveries, and nurse-visited young adolescents delivered newborns with higher birth weights.[7] Three percent of the nurse-visited women exhibited pregnancy-induced hypertension (PIH) compared with 9% in the comparison group, a nonsignificant difference.[7]

Home visitation during pregnancy and the first 2 years of the child's life in the Elmira program reduced the rates of state-verified cases of child abuse and neglect among children born to unmarried adolescents from low socioeconomic-status households through age 2 years.[8] While the program's effect on child abuse and neglect was attenuated during the

From the School of Nursing (Dr Kitzman) and Departments of Psychiatry (Dr Cole), Obstetrics and Gynecology (Dr Tatelbaum), and Pediatrics (Dr McConnochie and Ms Sidora), University of Rochester, Rochester, NY; Departments of Pediatrics (Dr Olds) and Preventive Medicine and Biostatistics (Dr Luckey), University of Colorado Health Sciences Center, Denver; Department of Human Development, Cornell University, Ithaca, NY (Mr Henderson); School of Nursing, Baylor University, Houston, Tex (Dr Hanks); Presbyterian Health Services, Charlotte, NC (Dr Shaver); College of Nursing (Dr Engelhardt) and Department of Pediatrics (Dr James), University of Tennessee, Memphis; and School of Nursing, University of Washington, Seattle (Dr Barnard).

Reprints: David L. Olds, PhD, University of Colorado Health Sciences Center, 303 E 17th Ave, Suite 200, Denver, CO 80203 (e-mail: David.Olds@UCHSC.edu).

2-year period after the program ended,[11] this was probably because of increased surveillance for child abuse and neglect among the nurse-visited families.[12] Children's health care encounters in which injuries were detected were reduced from 1 through 4 years of age, ie, for up to 2 years after the program ended.[8,11] Moreover, during the first 4 years after delivery of their first child, the nurse-visited mothers who were unmarried and from low socioeconomic-status households at registration had fewer subsequent pregnancies and greater participation in the labor force than did their counterparts randomly assigned to comparison services.[9] This produced substantial savings to government.[10]

Despite limited similarity with the program tested, many different types of home-visitation programs for pregnant women and parents of young children have been promoted on the basis of results from the Elmira trial.[1,2] We have maintained, however, that the program model studied in Elmira should not be disseminated until its findings are replicated in a major urban area with a minority population.[13]

The current trial was undertaken to determine the extent to which findings from the Elmira study would be replicated with an African-American sample of primarily low-income, unmarried women living in a major urban area (Memphis, Tenn), and when the program was administered through a public health department.

We hypothesized that the program would produce outcomes similar to those in the original trial. Pilot work and preliminary analyses disclosed, however, that some outcomes from the original study occurred too infrequently to be viable outcomes or moderating variables in the Memphis trial, including pyelonephritis (1%), prenatal cigarette smoking (9%), and state-verified reports of child abuse and neglect (3%-4%). The beneficial effects of the Elmira program on child maltreatment and injuries in the original trial were concentrated on children born to mothers with little sense of control over their life circumstances.[8] We hypothesized in the current trial that effects of the program on maternal caregiving and childhood injuries would be greater for women with few psychological resources, where psychological resources were defined in terms of women's intellectual functioning and mental health, in addition to their sense of control.

SUBJECTS AND METHODS

The numbers of eligible subjects invited to participate, randomized, and assessed at various stages of the research are summarized in Table 1. As this table indicates, we achieved high rates of participation and retention. Office-based assessments were completed at 24 months post partum, for example, on 96% of the cases in which there was no fetal or child death.

Table 1.—Profile of the Trial: Sample Composition Over Time by Treatment*

	Treatment Group				
	1	2	3	4	Total
No. allocated to treatment	166	515	230	228	**1139**
No. of postrandomization drops†	1	4	4	4	**13**
No. of completed prenatal home visits (range)	...	...	7 (0-18)	7 (0-18)	...
No. of completed postnatal home visits (range)	...	...	...	26 (0-71)	...
No. of miscarriages	6	19	6	8	**39**
No. of stillbirths	0	5	3	2	**10**
No. of infant deaths‡	2	7	2	1	**12**
No. of preterm deliveries <28 wk	1	0	2	1	**4**
No. of completed 28-wk interviews	157	485	210	211	**1063**
No. of preterm deliveries <36 wk	7	42	20	11	**80**
No. of completed 36-wk interviews	137	411	179	189	**916**
No. of obstetrical records abstracted	163	511	228	228	**1130**
No. of labor and delivery records abstracted	162	509	228	227	**1126**
No. of newborn records abstracted	157	486	220	219	**1082**
No. of UT perinatal database records abstracted	140	427	191	191	**949**
No. of completed 6-mo assessments	Not followed up	469	Not followed up	203	**672**
12-mo assessments	Not followed up		Not followed up		
No. of home assessments completed		471		211	**682**
No. of office assessments completed		470		211	**681**
24-mo assessments	Not followed up		Not followed up		
No. of home assessments completed		467		208	**675**
No. of office assessments completed		465		206	**671**
Pediatric records completed	Not followed up		Not followed up		
No. of well-child and illness records		467		204	**671**
No. of immunization records		470		210	**680**
No. of ED and hospitalization records		481		216	**697**
No. of AFDC records reviewed	Not followed up	455	Not followed up	201	**656**

*A total of 1290 eligible subjects were invited to participate; 151 refused, and 1139 were randomized. Unless otherwise specified, the difference between the number of cases randomized and assessed is the result of missed assessments. UT indicates University of Tennessee; ED, emergency department; and AFDC, Aid to Families With Dependent Children.

†Ten of the 12 drops consisted of cases where the mother refused further participation after randomization. One woman (assigned to treatment 2) was dropped from the study when it was learned that she was registered and randomized a second time after an earlier registration and miscarriage; a second woman (assigned to treatment 1) was not followed up because of clerical error after a staff member identified her as not meeting the inclusion criteria.

‡One infant death occurred between 6 and 12 months of age.

Participants

From June 1, 1990, through August 31, 1991, 1290 consecutive women from the obstetrical clinic at the Regional Medical Center in Memphis were invited to participate in the study. Women less than 29 weeks pregnant were recruited if they had no previous live births, no specific chronic illnesses thought to contribute to fetal growth retardation or preterm delivery (eg, chronic hypertensive disorders requiring medical treatment, severe cardiac disease, large uterine fibroids), and at least 2 of the following sociodemographic risk conditions: unmarried, less than 12 years of education, and unemployed. Eighty-eight percent (1139/1290) of the women completed informed consent and were randomized to 1 of 4 treatment conditions described below. Ninety-two percent of the women enrolled were African American, 98% were unmarried, 64% were aged 18 years or younger at registration, and 85% came from households with incomes at or below the federal poverty guidelines. Compared with women who refused, those who agreed to participate were more likely to be African American than non–African American (89% vs 74%; $P<.001$); younger (average age, 18 vs 19 years; $P=.001$); and non–high school graduates (89% vs 84%; $P=.01$).

Statistical Power and Assignment Ratios

Sample size was established from a series of power calculations. For all calculations, we set $\alpha=.05$ and $\beta=.20$ and specified 2-tailed tests. We established sample size so that it would be sufficiently large (after attrition) to detect program effects that were limited to one half of the total sample defined as being at higher risk according to characteristics such as mothers' having few psychological resources. These calculations led to a sample of 1468 for the prenatal phase and 734 for the postnatal phase of the study. It was possible to enroll fewer women in the postnatal phase because, in the Elmira study, treatment effects (in SD units) were larger for postnatal outcomes than for prenatal outcomes. These analyses also indicated that we could assign women disproportionately

to the relatively expensive nurse-visited condition, with fewer in the comparison condition, with minimal loss of statistical power. Competition for subjects with other studies limited the final sample size for the prenatal phase of the study.

Given the sample actually enrolled, we show herein the estimate of smallest detectable treatment main effect for key outcomes: (1) mean increase in birth weight, 96 g, where SD=596 g; (2) mean reduction in children's health care encounters in which injuries were detected, 0.58 to 0.36, where SD=1.06; and (3) reduction in proportion of second pregnancies, 45% to 32%.

Slightly different assignment ratios and treatment allocation schemes were used during 3 time frames during the 15-month period of sample recruitment. This procedure was used to accommodate shifting expectations about completed sample size (because of the competition with other studies that sampled the same population), and to manage a relatively large number of women enrolled during the first 2 months of the study when only 10 of the 12 project nurses had been hired. Consequently, treatment 1 was added to the design during the second and third allocation periods to reduce the number of families assigned to the nurse-visited conditions (treatments 3 and 4) and to reduce workload stress among the nurses.

Randomization

After completion of baseline interviews, identifying information on the participants was sent to the University of Rochester, Rochester, NY, where it was entered into a computer program that randomized individual women to treatment conditions by methods that are extensions of ones given by Soares and Wu.[14] This procedure concealed the randomization from individuals directly involved with the participants in Memphis. The randomization was conducted within strata from a model with 5 classification factors: maternal race (African American vs non–African American), maternal age (<17, 17-18, and ≥19 years), gestational age at enrollment (<20 vs ≥20 weeks), employment status of head of household (employed vs unemployed), and geographic region of residence (4 regions). Women assigned to the home-visitation groups subsequently were assigned at random to a nurse home visitor.

Treatment Conditions

Women in treatment 1 (n=166) were provided free round-trip taxicab transportation for scheduled prenatal care appointments; they did not receive any postpartum services or assessments. Women in treatment 2 (n=515) were provided the free transportation for scheduled prenatal care plus developmental screening and referral services for the child at 6, 12, and 24 months of age. Those in treatment 3 (n=230) were provided the free transportation and screening offered in treatment 2 plus intensive nurse home-visitation services during pregnancy, 1 postpartum visit in the hospital before discharge, and 1 postpartum visit in the home. Women in treatment 4 (n=228) were provided the same services as those in treatment 3; in addition, they continued to be visited by nurses through the child's second birthday.

For the evaluation of the prenatal phase of the program, treatments 1 and 2 were combined to form a single comparison group and then contrasted with treatments 3 and 4, a group that was visited by nurses during pregnancy. For the postnatal phase of the study, treatment 2 was contrasted with treatment 4.

Program Plan and Implementation

The experimental home-visitation program was carried out by the Memphis/Shelby County Health Department. The nurses completed an average of 7 home visits (range, 0-18) during pregnancy and 26 home visits (range, 0-71) during the first 2 years post partum. They followed a detailed visit-by-visit protocol to guide their efforts to help women improve their health-related behaviors; care of their children; and life-course development (pregnancy planning, educational achievement, and participation in the workforce).

To improve the outcomes of pregnancy, the nurses helped women complete 24-hour diet histories on a regular basis and plot weight gains at every visit; they assessed the women's cigarette smoking and use of alcohol and illegal drugs and facilitated a reduction in the use of these substances through behavioral analysis.[15] They also taught women to identify the signs and symptoms of pregnancy complications, encouraged women to inform the office-based staff about those conditions, and facilitated compliance with treatment. They gave particular attention to urinary tract infections, sexually transmitted diseases, and hypertensive disorders. They coordinated care with office-based staff and measured blood pressure when needed.

After delivery, the nurses helped mothers and other caregivers improve the physical and emotional care of their children. The nurses taught parents to observe the signs of illness, to take temperatures, and to communicate with office staff about their children's illnesses before seeking care for an illness or injury. Specific curricula were integrated into the program to promote parent-child interaction by facilitating parents' understanding of their infants' and toddlers' communicative signals,[16,17] enhancing interest in playing with their children in ways that promote emotional and cognitive development,[18] and creating households that are safer for children.[19]

The nurses also helped women clarify their goals and solve problems that may have interfered with completing their educations, finding work, and planning future pregnancies. The program promoted work, education, and family planning, but it did so in the context of helping women set goals for themselves at a crucial stage in their own personal development.

The program protocols were based on theories of human ecology, human attachment, and self-efficacy.[20] The nurses helped families make use of needed health and human services and attempted to involve other family members and friends in the pregnancy, birth, and early care of the child. They established trusting relationships with parents and helped mothers set small, achievable behavioral objectives between visits that, when met, would increase mothers' confidence in their ability to manage greater challenges.

Masking

Interviews and abstractions of medical and social service records were conducted by staff members who were unaware of the women's treatment assignment, except for a few cases in which the participants inadvertently revealed their treatment status to the interviewers. Clinical assessments recorded in the medical records were made by health care providers who had access to the women's treatment assignment. Although the principal investigators and statisticians also had access to the subjects' treatment assignments, all decisions about the coding of interview responses and conditions in the medical record and about the construction of variables were made explicitly without this information.

Assessments and Definitions of Variables

Participating women were interviewed by research staff members at the time of registration (before their assignment to treatments), at the 28th and 36th weeks of pregnancy, and at the sixth, 12th, and 24th months of the child's life. Medical and social service records were abstracted.

At registration, women were interviewed to determine standard socioeconomic conditions, their mental health,[21] personality characteristics,[22] obstetrical histories, health-related behaviors (cigarette smoking, alcohol and illegal drug use), and social support. Women also completed brief tests to estimate their levels of intellectual functioning.[23] Women's prepregnancy weights and heights were also determined by self-report. The

last weights recorded in the prenatal record before delivery were used to calculate pregnancy weight gains.

Household per annum discretionary income was calculated by means of subsistence standards for determining Medicaid eligibility in Tennessee, the number of individuals in the household, and reported household income. In addition, each participant was assigned a value that represented the percentage of poverty households in the census tract in which she resided.[24]

A variable was created to index women's psychological resources measured at registration. It was based on the summed z scores of their intelligence,[23] mental health,[21] and sense of mastery/self-efficacy.[15,22] Self-efficacy was assessed with a measure developed for the current study to determine mothers' confidence in their ability to behave in accordance with the major behavioral objectives of the program. Each of the 3 dimensions was standardized to a mean of 100 and SD of 10, summed, and then restandardized to a mean of 100 and SD of 10. The psychological resource variable was dichotomized at values less than 100 vs 100 or more.

Women were interviewed at 28 weeks' gestation by telephone to assess their health-related behaviors, social support, use of community services, and participation in school and work. Identical interviews were conducted again at 36 weeks. At 36 weeks' gestation, women also were assessed to ascertain their mental health symptoms (with a focus on anxiety and depression)[21] and their sense of mastery.[22]

Obstetrical and newborn records were abstracted directly and verified against an on-line perinatal database from the University of Tennessee. Discrepancies between the perinatal database and our independent abstraction were resolved on a case-by-case basis. In addition, a subset of 41 records (every 25th record) was abstracted by 2 different coders. The reliability of abstraction was good, with correlations of 1.00 for birth weight and 5-minute Apgar score and 0.98 for gestational age.

Urine screens for marijuana and cocaine were performed on 511 women who registered for prenatal care at the Regional Medical Center as part of their clinical assessment during the time that this trial was conducted. The results of these screens (conducted before randomization) were abstracted from the perinatal database.

Urinary tract infections were recorded if a culture produced a colony count of more than 100 000/mL of clean-catch voided urine for a single uropathogen. Diagnoses of pyelonephritis were recorded from the medical record. (Urinary tract infections and pyelonephritis occurred too infrequently [5% and 1%, respectively] to serve as viable outcomes and so are not reported herein.) Cultures for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* were obtained at the first prenatal visit and were coded from the prenatal record; *Trichomonas vaginalis* was ascertained by diagnoses from the record. A sexually transmitted disease variable was created that consisted of the number of any 1 of these 3 types of infections. Syphilis was coded separately because of the severity of its effects on the fetus. Diagnoses of *Gardnerella vaginalis* and yeast infections were abstracted from the prenatal record. Infections separated by more than 21 days were treated as separate infections. Diagnoses were separated according to whether they occurred before or after randomization. Pregnancy-induced hypertension was coded when preeclampsia, eclampsia, toxemia, or PIH was coded in the intrapartum or postpartum record.[25]

Birth weight (in grams) was recorded from the hospital record. Intrauterine growth restriction was defined as birth weight less than the 10th percentile for gestational age.[26] Gestational age (in days) was estimated from reported last menstrual period (LMP) and ultrasound scans obtained before 26 weeks' gestation. (Ultrasound was performed on all subjects at registration for prenatal care.) If LMP and ultrasound converged within 14 days, then LMP was used for estimating gestational age. When LMP and ultrasound differed by more than 14 days, ultrasound was used as the estimate. When ultrasound was not done before 26 weeks' gestation, or LMP was unknown, the record was reviewed by 2 clinicians, independently and unaware of treatment condition, to determine the most reliable estimate of gestational age. Preterm birth was divided into 2 categories: (1) spontaneous preterm birth after preterm labor, with or without premature rupture of the membranes, or (2) indicated preterm birth performed for maternal or fetal complications.

At 6 months post partum, mothers and children were assessed in the study offices. Mothers completed interviews that assessed whether or not they attempted to breast-feed, their duration of breast-feeding, and their beliefs about children associated with child abuse and neglect (belief in physical punishment, unrealistic expectations, lack of empathy, and role reversal).[27] Mothers and children were observed while the mothers taught their children a developmentally challenging task by means of the Nursing Child Assessment Satellite Training procedure.[28] The mothers' behaviors were coded and summarized to characterize their sensitivity, responsiveness, and quality of teaching. The infants' behaviors were coded and aggregated to characterize their responsiveness and clarity of communication toward their mothers.

At 12 and 24 months post partum, in their homes and in the office, the mothers completed the standardized interviews given at 6 months. The interviews included information on the number and outcomes of subsequent pregnancies, mothers' educational achievements, and number of months mothers participated in the workforce. They and their children were observed again by means of the teaching-interaction procedure. During the home visits, the educational and socioemotional properties of the home environment were assessed, by means of the Home Observation for Measurement of the Environment.[29] At the 24-month office visit, the children were tested with the Bayley scales of infant development, and their mothers completed the Achenbach Child Behavior Checklist.[30]

The children's medical records were reviewed with a focus on hospitalizations, emergency department visits, and outpatient encounters in which injuries and ingestions were detected. A summary variable was created to count the total number of health care encounters of all types (outpatient, emergency, and hospital admissions) in which injuries or ingestions were detected. We calculated the number of days that children were hospitalized and in which injuries or ingestions were noted.

The dates and types of children's immunizations were recorded. Whether children were completely immunized by their 24th month of life was determined. Children needed to have 4 or more diphtheria, pertussis, and tetanus vaccines, 3 or more oral poliovirus vaccines, and 1 or more *Haemophilus influenzae* type b and measles, mumps, and rubella vaccines to be considered completely immunized.

Data also were abstracted from Tennessee Department of Human Services records to ascertain women's and their firstborn children's use of Aid to Families With Dependent Children (AFDC) during the period from the child's birth through second birthday. Cases were matched on mother's name, Social Security number, and birthday. A variable was constructed to reflect whether mother and/or child received AFDC for each month of the child's life from birth through 24 months. Summary variables were constructed to indicate the total number of months that either mother or child used welfare (AFDC) for the 1- to 12-month and 13- to 24-month periods.

Statistical Models and Methods of Analysis

Data analyses were conducted and reported on all cases with an "intention-to-treat" approach.

Table 2.—Background Characteristics of Sample at Randomization by Treatment Condition

Dependent Variables	Treatment Group 1	2	3	4
	%	%	%	%
White	4	8	7	11
Married	1	2	3	1
Head of household employed	58	57	57	50
Consumed alcohol (last 2 wk)	4	4	4	5
Smoked cigarettes (last 3 d)	10	10	7	11
Used marijuana (last 2 wk)	1	1	2	1
Used cocaine (last 2 wk)	1	0	0	0
Positive drug screen	3	5	2	4
Sexually transmitted diseases*	36	32	31	37
Syphilis (prerandomization)	7	4	7	6
Gardnerella infection	7	8	11	11
Urinary tract infection	7	10	14	11
Yeast infection	6	9	8	6
Previous abortion	17	18	17	18
Low body mass index	28	30	32	22
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Age, y	18.0±3.3†	18.1±3.2	17.9±2.8	18.1±3.3
Education, y	10.1±2.0	10.3±1.9	10.3±2.0	10.1±2.0
Income, $‡	1089.6±6677.0	1671.1±6890.5	2324.6±7340.7	98.8±6611.4
% Census tract below poverty	39.2±20.6	34.5±21.3	36.1±21.3	35.8±20.5
Housing density	0.9±0.5	0.9±0.5	1.0±0.5	1.0±0.6
IQ	97.3±10.0	96.3±10.1	95.7±10.8	96.5±10.5
Mental health§	100.3±9.4	100.2±10.1	100.2±9.6	99.2±10.5
Maternal self-efficacy§	99.5±10.0	100.1±9.9	100.4±10.0	99.7±10.2
Mastery§	100.6±9.6	100.1±10.3	99.9±9.7	99.4±9.9
Maternal psychological resources§	100.6±9.6	100.1±10.0	100.0±9.6	99.3±10.7
Grandmother support§‖	99.9±10.1	99.9±9.8	99.3±10.9	101.0±9.3
Husband/boyfriend support§‖	99.2±9.8	100.2±10.0	99.8±10.0	100.3±10.1
Child abuse beliefs§	99.5±10.1	99.7±9.6	100.2±10.0	100.9±10.7
Height, cm	164.2±6.7	164.7±7.3	164.1±7.0	164.0±6.5
Prepregnant weight, kg	62.3±15.1	62.1±14.7	61.0±12.9	62.7±13.9
Gestational age, wk	16.4±6.0	16.4±5.8	16.3±5.5	16.5±5.6

*Diagnosis of *Chlamydia trachomatis, Trichomonas vaginalis,* or *Neisseria gonorrhoeae* in current pregnancy before randomization.
†Mean±SD.
‡Annual household discretionary income based on income subsistence standards for Medicaid eligibility, reported household income, and number of individuals in household at registration.
§Standardized to sample mean=100, SD=10.
‖Locally developed scale that assesses degree to which individual provides emotional and material support to mother.

Dependent variables for which a normal distribution was assumed were analyzed in the general linear model; dichotomous outcomes, such as PIH, in the logistic-linear model (assuming a binomial distribution); and low-frequency count data, such as the number of health care encounters in which injuries were detected, in the log-linear model (assuming a Poisson distribution). Estimates and tests were adjusted for all covariates, classification factors, and interactions. Homogeneity of regressions was tested for all covariates on the contrasts of interest.[31] In the generalized case, the analysis was carried out and estimates obtained in terms of the linearized form of the model—the logits (or log of the odds) in the logistic models, and logs of the incidence in the log-linear models. We use the term *incidence* in referring to the actual count or mean of counts over specific periods of measurement.

For both prenatal and postnatal outcomes, to rule out the potential interaction of treatments with the 3 periods that had different treatment allocation schemes, analyses also were carried out in models that included a 3-level factor for allocation period and its interaction with other effects in the model. No significant differences for time or its interaction with treatments were found, so it was possible to drop this variable from further consideration.

The final models derived for the reported results differed, depending on whether the outcomes were from the prenatal or the postnatal phase of the study because outcomes in each phase had different sets of predictors and different hypothesized moderators of treatment effects. In both phases, we tested hypotheses regarding the moderating influence of specific variables found to condition program effects in the Elmira trial.

Pregnancy Models.—The models analyzed in the evaluation of program effects for birth weight and gestational age outcomes focused on the classification effect for treatments (groups 1 and 2 vs 3 and 4), maternal age (<17 vs ≥17 years at registration), and sex of the child. Covariates included women's prepregnancy weight, height, and number of cigarettes smoked at registration. The models for social and behavioral intervening outcomes (such as social support, psychological distress, and use of services) included treatments, a classification factor specifying whether the woman was in school at registration, and covariates for the intake measurement of the behavior or condition under examination (when these intake variables were available). The model for PIH and end-of-pregnancy blood pressures included treatments and a covariate for mean arterial blood pressure derived from the mothers' initial prenatal visit. The model for rates of genitourinary tract infections included treatments and a covariate for the number of corresponding types of infections diagnosed before randomization. A repeated-measures model was used for the analysis of maternal weight gain; the focus of the analysis was on testing the treatment difference in change between the prepregnancy and end-of-pregnancy time points.

Models for Postnatal Outcomes.—The primary statistical model for postnatal outcomes focused on classification effects for treatments (2 vs 4) and maternal psychological resources (high vs low), plus 2 covariates (household income and census-tract poverty level). For outcomes measured at more than 1 point in time or under more than 1 situation (eg, home and office), we carried out repeated-measures analyses, adding to the basic model fixed factors for time and measurement location and a random factor for individuals. The focus of interpretation was on those levels of functioning assessed at the end of the program, 24 months post partum.

RESULTS

Preintervention Equivalence of Treatment Conditions

As shown in Table 2, the treatment groups were equivalent on background characteristics, with a few exceptions: Women in treatment 4 lived in households in which the head of the household was more likely to be unemployed, and in which there was less discretionary income than did women in treatment 2. There were no additional intervention-comparison differences for subgroups defined on the basis of the women's age, psychological resources, gestational age at enrollment, or randomization period. Similarly, there were no additional

treatment differences on prerandomization background characteristics after removing those cases for which follow-up data were not available.

Birth Outcomes

Table 3 shows that there were no treatment main effects for birth weight, length of gestation, low birth weight, spontaneous preterm delivery, indicated preterm delivery, or Apgar scores.

Prenatal Intervening Variables

Table 4 shows that by the 36th week of pregnancy, nurse-visited women were more likely to use other community services than were women in the control group ($P=.01$). They also were more likely to be working ($P=.06$), an effect that was particularly strong among women who were not in school when they were randomized (14% vs 8% [$P=.05$] and 8% vs 2% [$P=.01$] for the 28th and 36th weeks, respectively; data not shown).

There were no program effects on women's use of standard prenatal care or obstetrical emergency services after registration in the study, but nurse-visited women who were in school at registration had twice as many predelivery hospitalizations as did their counterparts in the comparison condition (0.18 vs 0.09; $P=.003$; data not shown). These differences were not explained by any coherent pattern of diagnoses associated with those hospitalizations.

Table 4 also shows that, in contrast to women in the comparison group, nurse-visited women had fewer yeast infections after randomization and fewer instances of PIH ($P=.05$ and $P=.009$, respectively). Among women with PIH, in contrast to those in the comparison group, those who received a nurse home visitor had mean arterial blood pressures during labor that were 4.6 points lower ($P=.006$), although there were no treatment differences in birth weight, length of gestation, or Apgar scores for those with PIH (data not shown).

Childhood Injuries and Ingestions

During the first 2 years of their lives, nurse-visited children had fewer health care encounters in which injuries and ingestions were detected than did children in the comparison condition ($P=.05$), an effect that was accounted for primarily by a reduction in outpatient encounters ($P=.02$) (Table 5). Nurse-visited children also were hospitalized for fewer days with injuries and/or ingestions than were children in the comparison condition ($P<.001$). These program effects on both total health care encounters and number of days hospitalized with injuries and ingestions were greater for children born to women with few psychological resources (0.41 vs 0.67 [$P=.003$] and 0.02 vs 0.26 [$P<.001$], respectively).

Table 6 shows that the nurse-visited children were hospitalized at older ages and for substantially less serious reasons. The 3 nurse-visited children who were hospitalized with injuries and ingestions were admitted when they were more than 12 months of age (and thus mobile), while 6 (46%) of the 13 comparison children were hospitalized when they were less than 6 months of age (and thus immobile). Seven (54%) of the comparison-group children were hospitalized with either fractures and/or head trauma, while none of the nurse-visited children were. Two of the 3 nurse-visited children were hospitalized with ingestions.

Qualities of Caregiving, Immunization Rates, Mental Development, and Behavioral Problems

As indicated in Table 7, nurse-visited mothers reported that they attempted breast-feeding more frequently than did women in the comparison group ($P=.006$), although there were no differences in duration of breast-feeding (duration data not shown). By the 24th

Table 3.—Adjusted Birth Weight, Length of Gestation, and Apgar Outcomes by Treatment Condition*

Dependent Variables	Comparison Groups, Mean	Nurse-Visited Groups, Mean	Mean Difference†	95% Confidence Interval
Birth weight, g	3050.4	3032.2	18.2	−62.4 to 98.7
Gestational age, wk	39.0	39.0	0.0	−0.4 to 0.4
5-min Apgar	8.7	8.6	0.1	−0.1 to 0.3
			Odds Ratio‡	95% Confidence Interval
Low birth weight (<2500 g), %	14	15	1.1	0.8 to 1.6
IUGR,§ %	9	9	1.0	0.6 to 1.5
Preterm (<37 wk), %	13	11	0.8	0.6 to 1.2
Indicated preterm delivery, %	3	3	1.0	0.5 to 2.4
Spontaneous preterm delivery, %	9	8	0.8	0.5 to 1.3

*Estimates adjusted for maternal age, number of cigarettes smoked, sex of child, maternal prepregnancy weight, and maternal height. Comparison groups were treatment groups 1 and 2; nurse-visited groups, treatment groups 3 and 4.
†Difference = (comparison mean) − (nurse-visited mean).
‡Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
§Intrauterine growth restriction; cases with birth weights less than 10th percentile for gestational age.

Table 4.—Adjusted Variables for Use of Health and Community Services, School, Work, and Obstetric Problems Identified After Randomization by Treatment Condition*

Dependent Variables	Comparison Groups, Mean	Nurse-Visited Groups, Mean	Mean Difference†	95% Confidence Interval
Gestational weight gain, kg	14.9	14.6	0.3	−0.6 to 1.3
Systolic blood pressure (labor admission), mm Hg	112.6	111.7	0.9	−0.7 to 2.5
Diastolic blood pressure (labor admission), mm Hg	67.5	66.8	0.6	−0.8 to 2.1
No. of prenatal visits (total)	6.5	6.2	0.3	−0.1 to 0.7
No. of visits for obstetrical evaluation (total)	2.8	2.8	−0.1	−0.3 to 0.2
	Incidence‡ (Log-Incidence)	Incidence‡ (Log-Incidence)	Log-Incidence Difference§	95% Confidence Interval
No. of hospitalizations during pregnancy	0.13 (−2.11)	0.15 (−1.93)	−0.19	−0.52 to 0.14
No. of *Gardnerella* infections	0.07 (−2.63)	0.06 (−2.75)	0.12	−0.34 to 0.58
No. of yeast infections	0.19 (−1.65)	0.14 (−1.94)	0.29‖	−0.00 to 0.58
No. of sexually transmitted diseases	0.21 (−1.58)	0.22 (−1.51)	−0.07	−0.32 to 0.18
	%	%	Odds Ratio¶	95% Confidence Interval
Used other community services	20	29	1.8#	1.2 to 2.7
In school	41	44	1.2	0.8 to 1.8
Employed	3	6	2.0**	1.0 to 4.0
Pregnancy-induced hypertension	20	13	0.6#	0.5 to 0.9

*Use of health and community services and school and work estimates adjusted for whether women were in school at registration. Infections adjusted for number of prerandomization infections that correspond to those counted after randomization. Pregnancy-induced hypertension adjusted for mean arterial blood pressure measured at first antepartum visit. Comparison groups were treatment groups 1 and 2; nurse-visited groups, treatment groups 3 and 4.
†Difference = (comparison mean) − (nurse-visited mean).
‡Incidence = mean number of infrequently occurring events within stated time period. Individual cases may have values greater than 1, although the range is small.
§Difference = (comparison log-incidence) − (nurse-visited log-incidence).
‖$P \leq .05$.
¶Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
#$P \leq .01$.
**$P < .10$.

Table 5.—Adjusted Incidence of Child Health Care Encounters in Which Injuries and Ingestions Were Detected During Children's First 2 Years of Life, by Treatment Condition*

Dependent Variables	Comparison Group, Incidence† (Log-Incidence)	Nurse-Visited Group, Incidence† (Log-Incidence)	Log-Incidence Difference‡	95% Confidence Interval
Total No. of health care encounters—injuries/ingestions	0.56 (−0.59)	0.43 (−0.84)	0.25§	−0.00 to 0.50
No. of outpatient visits—injuries/ingestions	0.20 (−1.62)	0.11 (−2.19)	0.57§	0.10 to 1.04
No. of emergency department visits—injuries/ingestions	0.34 (−1.10)	0.33 (−1.12)	0.02	−0.27 to 0.31
No. of hospitalizations—injuries/ingestions	0.03 (−3.63)	0.01 (−4.31)	0.68	−0.66 to 2.02
No. of days hospitalized—injuries/ingestions	0.18 (−1.84)	0.04 (−3.47)	1.64‖	0.78 to 2.50

*Estimates adjusted for maternal psychological resources, discretionary household income, and poverty level of census tract. Comparison group was treatment group 2; nurse-visited group, treatment group 4.
†Incidence = mean number of infrequently occurring events within stated time period. Individual cases may have values greater than 1, although the range is small.
‡Difference = (comparison log-incidence)−(nurse-visited log-incidence).
§$P \leq .05$.
‖$P < .01$.

Table 6.—Diagnoses for Hospitalizations in Which Injuries and Ingestions Were Detected, by Treatment Condition

Diagnosis	Age, mo	Sex	Length of Stay, d
Nurse-Visited (Treatment Group 4)			
Burns (1st and 2nd degree to face)	12.0	M	2
Coin ingestion	12.1	M	1
Ingestion of iron medication	20.4	F	4
Comparison (Treatment Group 2)			
Head trauma	2.4	M	1
Fractured fibula/congenital syphilis	2.4	M	12
Strangulated hernia with delay in seeking care/burns (1st degree to lips)	3.5	M	15
Bilateral subdural hematoma*	4.9	F	19
Fractured skull	5.2	F	5
Bilateral subdural hematoma (unresolved)/aseptic meningitis—2nd hospitalization*	5.3	F	4
Fractured skull	7.8	F	3
Coin ingestion	10.9	M	2
Child abuse/neglect suspected	14.6	M	2
Fractured tibia	14.8	M	2
Burns (2nd degree to face/neck)	15.1	M	5
Burns (2nd and 3rd degree to bilateral leg)†	19.6	M	4
Gastroenteritis/head trauma	20.0	F	3
Burns (splinting/grafting)—2nd hospitalization†	20.1	M	6
Finger injury/osteomyelitis	23.0	M	6

*One child was hospitalized twice with a single bilateral subdural hematoma.
†One child was hospitalized twice for burns resulting from a single incident.

month of the child's life, in contrast to comparison-group counterparts, nurse-visited women held fewer beliefs about child-rearing associated with child abuse and neglect—lack of empathy, belief in physical punishment, unrealistic expectations for infants ($P=.003$). Moreover, the homes of nurse-visited women were rated as more conducive to children's development by means of the Home Observation for Measurement of the Environment scale ($P=.003$). There was no program effect on maternal teaching behavior, but children born to nurse-visited mothers with low psychological resources were observed to be more communicative and responsive toward their mothers than were children born to low-resource mothers in the comparison group (17.9 vs 17.2; $P=.03$; data not shown). There were no program effects on the children's use of well-child care, immunization status, mental development, or reported behavioral problems.

Maternal Life Course

By the 24th month post partum (Table 8), nurse-visited women reported having fewer second pregnancies and fewer subsequent live births than did women in the comparison group ($P=.006$ and $P=.01$, respectively). The program-control difference in subsequent live births was limited to women with high levels of psychological resources, for whom the rates were 14% vs 31%, respectively ($P<.001$). Although there was some indication that nurse-visited women may have used AFDC slightly less during the second year of the child's life ($P=.07$), there were no program effects on reported educational achievement or length of employment. By the 24th month, nurse-visited women reported higher levels of perceived mastery ($P=.005$).

COMMENT

For the prenatal phase of the trial, there were no treatment differences in length of gestation or birth weight, but there were differences in PIH. For the postnatal phase of the trial, children born to women visited by nurses during pregnancy and infancy had fewer health care encounters in which injuries and ingestions were detected and fewer hospitalization days in which injuries and ingestions were detected than did children in the comparison group (a difference accounted for by more severe and complex diagnoses for comparison children). In addition, nurse-visited women had fewer subsequent pregnancies and live births than did comparison group women.

The pattern of results for the prenatal phase of the study is different from that obtained in the Elmira trial and may be accounted for by different types of risks exhibited by African-American and white women enrolled in the 2 trials. Only 9% of the participants in the current trial smoked 1 or more cigarettes per day at registration, in contrast to 55% in the Elmira trial. Moreover, even in the current study, 6% of the African Americans vs 53% of the whites reported smoking cigarettes. The rates of sexually transmitted diseases, on the other hand, were higher in the current trial among African Americans (47%) than whites (16%). These differences in putative risks for adverse pregnancy outcome may help explain the difference in impact of the prenatal phase of the program in Elmira vs Memphis.

Although a reduction in PIH was hypothesized on the basis of results from the Elmira trial,[7] the information in the medical record did not allow us to make a reliable distinction between preeclampsia or gestational hypertension (nonproteinuric hypertension). Given the nurses' heightened awareness of hypertensive disorders, their monitoring of blood pressure, and their urging the women to communicate with office staff when problems were emerging, it is reasonable to assume that less serious manifestations of PIH were detected in the nurse-visited group. This may help to explain the lower mean arterial blood pressure measured at admission for labor and delivery in the nurse-visited women with PIH. The nurses' promotion of women's eating well-balanced diets, rest, and exercise may explain the reduction in PIH, given that calcium has been shown to reduce the rates of preeclampsia[32,33] and that exercise has been associated with a reduction in both preeclampsia and gestational hypertension.[34]

Additional findings from the current trial are consistent with other studies designed to reduce preterm delivery by increasing the monitoring of pregnant women.[35] We found a higher rate of predelivery hospitalization among the nurse-visited women who were in school at registration. The combination of nurses' attention to obstetric complications and a corresponding heightened awareness of these pregnant adolescents' health problems by school officials may have led to greater detection of emerging obstetrical complications and created increased pressure to hospitalize. The lower rate of yeast infections diagnosed after randomization in the nurse-visited groups is probably a reflection of the highly detectable symptoms of yeast infections and the nurses' urging women to comply with treatment.

Findings from the postnatal phase of the current trial, including the reduction in injuries and ingestions noted in the medical record, are more consistent with the Elmira study.[8,11] It is likely that some portion of the reduction in health care encounters in which injuries and ingestions were detected resulted from the nurses having taught women to observe their children's behavior for signs of illness, to take temperatures, and to call the office staff for guidance when problems arose. In theory, this should have led to a reduction in unnecessary health care encounters and an increase in problems that required more thorough evaluation. The reduction in outpatient encounters where injuries and ingestions were detected may be explained, at least in part, by this feature of the program.

A review of the diagnoses associated with children's hospitalizations, on the other hand, suggests that some portion of the treatment difference in number of days that children were hospitalized with injuries and ingestions resulted from the prevention of deficient caregiving and, in some cases, the prevention of child abuse and neglect. Our interpretation that these treatment differences are indicative of a reduction in deficient caregiving is supported by independent measures of the mothers' childrearing behaviors.

Nurse-visited women attempted breast-feeding more frequently; they provided home environments that were more conducive to children's intellectual and socioemotional development; and they expressed greater empathy, fewer unrealistic expectations, and diminished belief in the value of physical punishment for infants than did comparison-group mothers. While we cannot rule out the possibility that nurse-visited women simply provided more socially desirable responses, some of the beneficial effects of the program are based on data derived from reviews of medical records.

Table 7.—Adjusted Outcomes on Qualities of Caregiving and Children's Use of Well-Child Care, Immunization Rates, Mental Development, and Behavioral Problems, by Treatment Condition*

Dependent Variables	Comparison Group, %	Nurse-Visited Group, %	Odds Ratio†	95% Confidence Interval
Breastfeeding (attempted)	16	26	1.9‡	1.2 to 2.9
Immunizations up to date at 2 y	68	70	1.1	0.7 to 1.5
	Mean	**Mean**	**Mean Difference§**	**95% Confidence Interval**
No. of well-child visits (0-24 mo)	4.8	4.6	0.2	−0.1 to 0.6
Beliefs associated with child abuse, Bavolek total score	100.5	98.7	1.9‡	0.6 to 3.1
Emotional/cognitive stimulation, HOME total score	30.9	32.3	−1.3‡	−2.2 to −0.4
Maternal teaching, NCAST maternal total score	36.5	36.7	−0.2	−0.9 to 0.5
Child responsiveness, NCAST child total score	17.4	17.7	−0.3	−0.7 to 0.1
Bayley mental development score	94.3	94.5	−0.2	−2.4 to 2.0
Behavior problems total score	49.2	46.0	3.2	−0.6 to 7.0

*Estimates adjusted for maternal psychological resources, discretionary household income, and poverty level of census tract. Comparison group was treatment group 2; nurse-visited group, treatment group 4. HOME indicates Home Observation for Measurement of the Environment; NCAST, Nursing Child Assessment Satellite Training.
†Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
‡$P<.01$.
§Difference = (comparison mean)−(nurse-visited mean).

Table 8.—Adjusted Maternal Life Course Outcomes During First 2 Years Post Partum, by Treatment Condition*

Dependent Variables	Comparison Group, %	Nurse-Visited Group, %	Odds Ratio†	95% Confidence Interval
Subsequent pregnancy, 0-24 mo	47	36	0.6‡	0.4 to 0.9
Spontaneous abortion, 0-24 mo	3	5	1.5	0.7 to 3.4
Therapeutic abortion, 0-24 mo	4	2	0.5	0.2 to 1.4
Subsequent live birth, 0-24 mo	31	22	0.6‡	0.4 to 0.9
	Mean	**Mean**	**Mean Difference**	**95% Confidence Interval**
No. of months worked, 0-12 mo	1.7	2.2	−0.5	−1.0 to 0.0
No. of months worked, 13-24 mo	3.4	3.4	0.0	−0.7 to 0.7
No. of months on AFDC, 0-12 mo	7.6	7.3	0.3	−0.4 to 1.1
No. of months on AFDC, 13-24 mo	8.4	7.8	0.7‖	−0.0 to 1.4
Anxiety, 24 mo¶	100.3	99.1	1.2	−0.4 to 2.7
Depression, 24 mo¶	100.1	99.5	0.6	−1.0 to 2.2
Mastery, 24 mo¶	99.4	101.6	−2.2‡	−3.8 to −0.7

*Estimates adjusted for psychological resources, discretionary household income, and poverty level of census tract. Comparison group was treatment group 2; nurse-visited group, treatment group 4. AFDC indicates Aid to Families With Dependent Children.
†Odds = p/(1−p); odds ratio = nurse-visited odds/comparison odds.
‡$P<.01$.
§Difference = comparison mean−nurse-visited mean.
‖$P<.10$.
¶Standardized to sample mean=100; SD=10.

Many of the effects of the program on health care encounters in which injuries and ingestions were detected and on qualities of childrearing were greater for mothers with low psychological resources. For example, in contrast to counterparts in the comparison group, the children of nurse-visited mothers who had few psychological resources were observed to be more responsive and communicative toward their mothers. Infant-attachment research suggests that toddlers' behavior toward their mothers reveals the extent to which their mothers are sensitive and responsive rather than hostile, intrusive, or neglectful toward them, with toddlers' behavior being a better indication of the quality of the parent-child relationship over time than currently observed behaviors of parents.[36,37]

It is important to note, in this regard, that the program was designed to decrease risks posed by limited intellectual functioning, mental health, and mastery on the part of caregivers.[20] The program provided a detailed educational protocol designed to help parents understand and respond appropriately to their children's unique temperament and communicative style by means of educational materials adapted to the intellectual levels of the mothers. Given that limited knowledge and capacity to anticipate children's needs can compromise parents' ability to care for their children, it is reasonable that this program would reduce risks imparted by limited intellectual functioning, even in the absence of an effect on maternal intellectual functioning.

While the program produced no effect on mothers' mental health, it may have reduced psychological distress related to parents' care of their children, which is affected by parents' depression and sense of competence.[38,39] Moreover, by the end of the program at the children's second birthday, there were significant treatment effects on women's sense of mastery. Mastery is a general psychological attribute that affects parents' ability to cope effectively with a wide range of challenges, and a deficit in mastery has been associated with child abuse and neglect.[40] Thus, the program diminished risks posed by limited intellectual functioning, psychological distress, and impaired sense of mastery.

Although there also was a trend for the nurse-visited women to use AFDC about 0.7 month less during the child's second year of life than did women in the comparison group, there were no treatment-comparison differences in educational achievement or labor-force participation after delivery, despite nurse-visited women being in the labor force to a greater degree at the end of pregnancy. The discrepancy between the findings for these 2 phases of the study will be examined in future reports. In the Elmira trial, the influence of the program on workforce participation did not emerge until the 2-year period after the program ended, and the influence of the program on promoting women's economic self-sufficiency was preceded by a reduction in the rate of subsequent pregnancy.[9] A 15-year follow-up of the Elmira sample now indicates that these early alterations of maternal life course portend substantial improvements in major maternal life outcomes.[41] It will be important to determine whether a corresponding pattern of results emerges in Memphis after the program ends.

Although one might consider dropping the prenatal phase of the program from the intervention in light of its failure to produce substantial prenatal and newborn effects in the current trial, this would be injudicious. We have only limited insight into the extent to which the salutary postnatal effects are dependent on the prenatal initiation of the service. This issue deserves careful examination as the program is studied with new populations and in new contexts.

This research was supported with funding from 5 federal agencies: the National Institute of Nursing Research (grant NR01-01691-05); the Bureau of Maternal and Child Health (grant MCJ 360579); the Administration for Children and Families (grant 90PJ0003); the Office of the Assistant Secretary for Planning and Evaluation; and the National Center for Child Abuse and Neglect, through a transfer of funds to the National Institute of Nursing Research. This research was also supported by 4 private foundations: the Robert Wood Johnson Foundation, Princeton, NJ (grants 017934 and 11084); the Carnegie Corporation of New York, New York, NY (grant B 5492); the Pew Charitable Trusts, Philadelphia, Pa (grants 88-0211-000 and 93-02363-000); and the William T. Grant Foundation, New York, NY (grants 88-1246-88 and 91-1246-88), including a William T. Grant Faculty Scholars Award (86108086) and a Senior Research Scientist Award (1-K05-MH01382-01) to Dr Olds.

We thank Barb Suter, MPH, and Diana Strickland, MBA, for assistance in data processing; Laura Murphy, EdD, for overseeing the developmental assessments; Geraldine Smith, RN, CS, MSN, MS, BSN, for her supervision of the nurses; Jann Belton, RN, and Carol Ballard, RN, MSN, for integrating the program into the Memphis/Shelby County Health Department; the home-visiting nurses for their work with families; and Vincent Fulginiti, MD, Zorika Henderson, Peggy Hill, MS, M. Douglas Jones, MD, Richard Krugman, MD, Raymond Lorion, PhD, and James McGregor, MD, for their comments on the manuscript.

References

1. National Commission to Prevent Infant Mortality. *Home Visiting: Opening Doors for America's Pregnant Women and Children.* Washington, DC: National Commission to Prevent Infant Mortality; 1989.
2. US Advisory Board on Child Abuse and Neglect. *Child Abuse and Neglect: Critical First Steps in Response to a National Emergency.* Washington, DC: US Government Printing Office; June 1990.
3. Gutelius MF, Kirsch AD, MacDonald S, et al. Controlled study of child health supervision: behavioral results. *Pediatrics.* 1977;60:294-304.
4. Black MM, Nair P, Kight C, Wachtel R, Roby P, Schuler M. Parenting and early development among children of drug-abusing women: effects of home intervention. *Pediatrics.* 1994;94:440-448.
5. Olds DL, Kitzman H. Can home-visitation improve the health of women and children at environmental risk? *Pediatrics.* 1990;86:108-116.
6. Olds DL, Kitzman H. Review of research on home visiting for pregnant women and parents of young children. *Future Child.* 1993;3:53-92.
7. Olds DL, Henderson CR, Tatelbaum R, Chamberlin R. Improving the delivery of prenatal care and outcomes of pregnancy: a randomized trial of nurse home visitation. *Pediatrics.* 1986;77:16-28.
8. Olds DL, Henderson CR, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics.* 1986;78:65-78.
9. Olds DL, Henderson CR, Tatelbaum R, Chamberlin R. Improving the life-course development of socially disadvantaged mothers: a randomized trial of nurse home visitation. *Am J Public Health.* 1988; 78:1436-1445.
10. Olds DL, Henderson CR, Phelps C, Kitzman H, Hanks C. Effect of prenatal and infancy nurse home visitation on government spending. *Med Care.* 1993; 3:1-20.
11. Olds DL, Henderson CR, Kitzman H. Does prenatal and infancy nurse home visitation have enduring effects on qualities of parental caregiving and child health at 25 to 50 months of life? *Pediatrics.* 1994;93:89-98.
12. Olds DL, Henderson CR, Kitzman H, Cole R. Effects of prenatal and infancy nurse home visitation on surveillance of child maltreatment. *Pediatrics.* 1995;95:365-372.
13. Olds DL. Home visitation for pregnant women and parents of young children. *AJDC.* 1992;146:704-708.
14. Soares JF, Wu CF. Some restricted randomization rules in sequential designs. *Commun Stat Theory Methods.* 1983;12:2017-2034.
15. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev.* 1977;84: 191-215.
16. *NCAST Caregiver/Parent-Child Interaction Feeding Manual.* Seattle: NCAST Publications, University of Washington, School of Nursing; 1994.
17. Sumner GA, Barnard KE, Johnson-Crowley N, Spietz A. *NCAST Keys to Caregiving.* Seattle: NCAST Publications, University of Washington, School of Nursing; 1990.
18. Sparling J, Lewis I. *Partners for Learning.* Lewisville, NC: Kaplan Press; 1984.
19. *Safestate, Safehome: Inspector's Notes.* Boston: Massachusetts Dept of Public Health; 1986.
20. Olds DL, Kitzman H, Cole R, Robinson J. Theoretical foundations of a program of home visitation for pregnant women and parents of young children. *J Community Psychol.* 1997;25:9-25.
21. Ware JE, Veit CT, Donald CA. *Refinements in the Measurement of Mental Health for Adults in the Health Insurance Study.* Santa Monica, Calif: RAND Corp; 1985.
22. Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav.* 1967;19:2-21.
23. Shipley W. A self-administered scale for measuring intellectual impairment and deterioration. *J Psychol.* 1940;9:371-377.
24. US Dept of Commerce, Bureau of the Census. *Summary Tape File 3A: 1990 Census of Population and Housing* [database on CD-ROM]. Suitland, Md: US Dept of Commerce, Bureau of the Census; November 1992. Item CE90-3A-53. Available from: Data Users Services Division, Washington, DC.
25. American College of Obstetricians and Gynecologists. Hypertension in pregnancy. *Tech Bull.* January 1996;219:1-8.
26. Brenner WE, Edelman DA, Hendricks CH. A standard of fetal growth for the United States of America. *Am J Obstet Gynecol.* 1976;56:52-64.
27. Bavolek SJ. *Handbook for the AAPI: Adult-Adolescent Parenting Inventory.* Eau Claire, Wis: Family Development Resources Inc; 1984.
28. *NCAST Caregiver/Parent-Child Interaction Teaching Manual.* Seattle: NCAST Publications, University of Washington, School of Nursing; 1994.
29. Caldwell B, Bradley R. *Home Observation for Measurement of the Environment.* Little Rock: University of Arkansas; 1979.
30. Achenbach TM. *Child Behavior Checklist for Ages 2-3.* Burlington: University of Vermont; 1988.
31. Henderson C. Analysis of covariance in the mixed model: higher level, nonhomogeneous, and random regressions. *Biometrics.* 1982;38:623-640.
32. Belizan J, Villar J, Gonzalez L, Campodonico J, Bergel E. Calcium supplementation to prevent hypertensive disorders of pregnancy. *N Engl J Med.* 1991;325:1399-1405.
33. Carroli G, Belizan J. Calcium supplementation during pregnancy: a systematic review of randomized controlled trials. *Br J Obstet Gynaecol.* 1994;101:753-758.
34. Marcoux S, Brisson J, Fabia J. The effect of leisure time physical activity on the risk of pre-eclampsia and gestational hypertension. *J Epidemiol Community Health.* 1989;43:147-152.
35. Collaborative Group on Preterm Birth Prevention. Multicenter randomized controlled trial of a preterm birth prevention program. *Am J Obstet Gynecol.* 1993;169:352-366.
36. Sroufe A, Carlson EA. Contribution of attachment theory to developmental psychopathology. In: Cicchetti D, Cohen D, eds. *Developmental Psychopathology, Vol 1: Theory and Methods.* New York, NY: John Wiley & Sons Inc; 1995:581-617.
37. Ainsworth MDS, Blehar M. Waters E, Wall S. *Patterns of Attachment.* Hillsdale, NJ: Lawrence Erlbaum Assoc; 1978.
38. Loyd B, Abidin R. Revision of the parenting stress index. *J Pediatr Psychol.* 1985;53:169-177.
39. Zuckerman B, Beardslee W. Maternal depression: a concern for pediatricians. *Pediatrics.* 1987; 79:110-117.
40. Ellis R, Milner J. Child abuse and locus of control. *Psychol Rep.* 1981;48:507-510.
41. Olds D, Eckenrode J, Henderson C Jr, et al. Long-term effects of home visitation on maternal life course and child abuse and neglect: a fifteen-year follow-up of a randomized trial. *JAMA.* 1997; 278:637-643.

Printed and Published in the United States of America

Differences in Program Implementation Between Nurses and Paraprofessionals Providing Home Visits During Pregnancy and Infancy: A Randomized Trial

Jon Korfmacher, PhD, Ruth O'Brien, PhD, RN, Susan Hiatt, PhD, and David Olds, PhD

ABSTRACT

Objectives. This study examined differences between nurses and paraprofessionals in implementation of a home visiting program for low-income, first-time parents during pregnancy and the first 2 years of the child's life.

Methods. Mothers were randomly assigned to either a nurse-visited ($n = 236$) or a paraprofessional-visited ($n = 244$) condition. Nurse- and paraprofessional-visited families were compared on number and length of visits, topics covered, number of program dropouts, and relationship with home visitor.

Results. On average, nurses completed more visits than paraprofessionals (28 vs 23; $P < .001$) and spent a greater proportion of time on physical health issues during pregnancy (38% vs 27%; $P < .001$) and on parenting issues during infancy (46% vs 32%; $P < .001$). Paraprofessionals conducted visits that lasted longer and spent a greater proportion of time on environmental health and safety issues (15% vs 7% pregnancy; 15% vs 8% infancy; $P < .001$). While home visitors were viewed equally positively by mothers, nurses had fewer dropouts than did paraprofessionals (38% vs 48%; $P = .04$). More paraprofessional-visited families than nurse-visited families experienced staff turnover.

Conclusions. Nurses and paraprofessionals, even when using the same model, provide home visiting services in different ways. (*Am J Public Health* 1999;89:1847–1851)

Home visitation as a strategy for reducing maltreatment of children and for improving maternal and child health has received heightened attention in recent years. Recommendations to increase home visitation services for vulnerable pregnant women and parents of young children[1,2] relied heavily on the results of a randomized trial of prenatal and infancy home visitation by nurses.[3–5] Policy advisory groups, however, have promoted paraprofessional program models on the basis of very limited evidence from randomized trials. Although some literature reviews have concluded that paraprofessionals achieve outcomes equal to or better than those of professionals across different clinical settings, few of the examined studies were randomized trials[6,7] and most focused on interventions with adult clients,[8] weakening their applicability to the early intervention literature.

The Home Visitation 2000 program was designed to examine differences between nurses and paraprofessionals using essentially the same program model of home visiting for first-time, low-income mothers during pregnancy and infancy. The program model, delivered by nurses, has been shown in previous trials to be effective in improving maternal and child health, parental caregiving practices, and maternal education, employment, and family planning choices.[3–5,9]

There are 2 important empirical foci of the Home Visitation 2000 trial. The first, the focus of a separate report in preparation, is an examination of program outcomes, to explain whether there are differences between nurses and paraprofessionals in their ability to affect maternal, child, and family functioning. The second, the focus of the present report, is an examination of the differences in the implementation of the program model between nurses and paraprofessionals. Program implementation is important because any subsequent child and parent outcomes are likely to be affected by the way the programs were actually delivered.

Methods

Subjects

Between March 29, 1994, and June 15, 1999, pregnant women who had had no previous live births and who either qualified for Medicaid or had no private insurance were recruited from 21 prenatal clinics in the Denver, Colo, metropolitan area. Of the 1178 women identified as eligible, 735 agreed to participate in the study. On average, participants were young (mean age = 19.76 years), were unmarried (84%), and had completed 11 years of education. Forty-five percent were Hispanic, 34% were non-Hispanic White, 16% were African American, 4% were American Indian, and 1% were Asian.

The subjects were randomized by computer program within strata from a model with 3 classification factors: race/ethnicity, gestational age at enrollment, and geographic region of residence. Women assigned to 1 of the 2 home visitation groups were subsequently assigned at random to home visitors within sets of visitors. Visitors were assigned to geographic regions to increase the likelihood that they would serve families of the same race/ethnicity, although there was no attempt to specifically match visitors and subjects by race or ethnicity.

At the time of the study, all of the authors were with the University of Colorado Health Sciences Center, Denver. Jon Korfmacher is now with the Erikson Institute, Chicago, Ill.

Requests for reprints should be sent to Jon Korfmacher, PhD, Erikson Institute, 420 N Wabash Ave, Chicago, IL 60611 (e-mail:jkorfmacher@erikson.edu).

This article was accepted June 4, 1999.

The subjects were assigned to 1 of 3 groups. Women in the comparison group (n = 255; excluded from current analyses) were given developmental screening and referral services for the child at 6, 12, 15, 21, and 24 months of age. Women in the second group (n = 244) were given the screening and referral services in addition to intensive paraprofessional home visitation services during pregnancy and the first 2 years of the child's life. Women in the third group (n = 236) were given the screening and referral services in addition to intensive nurse home visitation services during pregnancy and the first 2 years of the child's life.

Home Visitation Program Model

The program model[10] focused on 3 primary goals: improving pregnancy outcomes by promoting health-related behaviors; improving child health, development, and safety by promoting competent care of the child; and enhancing parent life-course development by promoting pregnancy planning, educational achievement, and employment. These goals were supported by 2 secondary goals: enhancing families' material support by linking families with needed health and social services and promoting supportive relationships with family members and friends. Home visitors followed a visit-by-visit protocol that provided guidance about content and timing of the content. Visitors used the protocols as a guide, adapting them to the individual needs of the mother. These protocols, developed in a previous trial,[9,10] were reviewed and updated jointly by the nurse and paraprofessional supervisors, ensuring that the protocols were similar across programs and that they were detailed enough to be implemented regardless of disciplinary background.

Each visitor carried a maximum caseload of 25 families. Visits followed an established schedule of every other week (except for weekly visits during the first 4 weeks after enrollment and the first 6 weeks after delivery) through the child's 21st month, followed by monthly visits during the final 3 months. The average cost of the nurse home visitor program for approximately 2.5 years of service was $7681 per family; the corresponding cost for the paraprofessional program was $5178. These cost estimates included staff salaries and fringe benefits, supplies, travel, rent, equipment, and training costs.

Home Visitors and Training

The team of 10 nurses was supported by 1 supervisor, who had a master's degree in nursing and experience in mental health, community development, and nursing administration. The team of 10 paraprofessionals was supervised by 2 licensed clinical social workers, who had backgrounds in mental health, family relations, and early child development.

The nurse visitors were required to have a BSN degree and experience in community or maternal and child health nursing. The paraprofessionals were expected to have a high school education, with no college degree in the helping professions. Preference in hiring was given to paraprofessional applicants with previous work experience in human services agencies. Both groups, nurses and paraprofessionals, were ethnically diverse, including Mexican Americans and others of Hispanic origin, African Americans, Native Americans, Asian Americans, and European Americans.

Both nurse and paraprofessional home visitors initially received 1 month of intensive training, during which they served 2 families in a pilot program to gain experience with the program model. Regular in-service training was also conducted to cover aspects of maternal and child health and development. While the 2 groups of home visitors experienced essentially the same training regimen, some modification was necessary because of their different educational backgrounds. For example, because nurses were expected to exercise more independent judgment in helping mothers deal with physical health concerns, the nurses were given more in-depth training on the physical health and development of the mother and child than were the paraprofessionals.

Program Implementation Variables

Program dropouts. When mothers ended their involvement with the program, visitors documented the time of and explanation for the termination. A mother was considered to have dropped out of the program prematurely if she ceased contact with her home visitor 6 months or more before her child's second birthday.

Encounter variables. The home visitors kept track of contacts with family members through encounter forms filled out after every visit. These encounter forms detailed length of the visit, family members who participated, and percentage of time devoted to the different program areas (personal health, parenting, mother's own life course development, environmental health and safety, and social support). The home visitors also recorded attempted visits that were not completed.

Within-program reliability estimates for program content were calculated on the basis of 165 encounters (90 nurse, 75 paraprofessional) during which a second visitor made her own ratings of the visit. Correlation coefficients for specific variables suggest acceptable reliability (average r for nurses = 0.79, average r for paraprofessionals = 0.77; range of r = 0.63–0.84).

Mother's rating of the helping relationship. At the end of pregnancy, at 15 months, and at 24 months, each mother rated her relationship with her home visitor, using the 27-item Helper–Client Relationship Inventory.[11] Average overall scores were calculated for each mother (Cronbach α = .92).

Relationship continuity. The program model emphasized the development of a continuous relationship between home visitor and family through the course of the services to promote a strong working alliance.[10] Because of staff turnover and the fact that some visitors reduced their time commitment to the program over the course of the trial, some families experienced a disruption in this helping relationship. A dichotomous variable was created that categorized mothers as having had either a disrupted or an undisrupted relationship with their visitors.

Analysis

Variables characterizing program implementation were analyzed as dependent variables in a model with 2 levels of treatment (nurse and paraprofessional) and 2 covariates (maternal age and household density). General linear models were used to analyze continuous dependent variables and logistic regression was used to analyze dichotomous dependent variables. Data gathered from visitors' record-keeping forms were analyzed separately for pregnancy and infancy (0–24 months). For mothers' ratings of home visitors, a factor was added for time of assessment in repeated-measures analysis.

Results

Mothers in the 2 treatment conditions were compared on a large number of background characteristics. The groups demonstrated equivalence on these characteristics, with 2 exceptions: the group visited by paraprofessionals tended to be younger and to live in denser households than the nurse-visited group. Maternal age and household density were included in analytic models to control for their effects.

By the end of the intervention, 89 mothers (38%) in the nurse-visited group had dropped out of the intervention before their children turned 2 years of age, while the paraprofessional-visited group had 117 dropouts

(48%). The difference was significant ($P = .04$). Table 1 summarizes the mothers' reasons for dropping out and shows a greater dropout rate among paraprofessional-visited families because of a higher number of active and passive refusals.

Table 2 shows comparisons between families in the nurse and paraprofessional conditions in frequency of visitation and length of contact. Although the 2 groups did not differ on the number of visits during pregnancy, nurse-visited families, on average, received about 5 more visits during the child's infancy than did families visited by paraprofessionals ($P < .001$). This difference is due in part to the larger number of paraprofessional-visited families who dropped out of the program, although analyses limited to families who completed the program still show nurses completing more visits (least squares mean for nurses = 37.95, SE = 1.14; least squares mean for paraprofessionals = 35.05, SE = 1.22; $P = .09$). Paraprofessionals spent more time per visit ($P < .001$) and made more unsuccessful attempts at contact than did the nurses ($P = .02$ prenatal; $P < .001$ postnatal). Nurses completed more postnatal visits that included the mother's husband or boyfriend ($P = .01$).

As Table 2 shows, nurses spent a greater proportion of home visit time focused on issues of personal health (during pregnancy) and parenting (during infancy), while paraprofessionals spent a greater proportion of time on issues of environmental health and safety, social support, and mother's life course development ($P < .001$ for all comparisons except prenatal life course development, $P = .02$).

Across the intervention period, there were no statistically significant differences in the degree to which mothers provided positive ratings of their home visitors on the Helper–Client Relationship Inventory (least squares mean for nurses = 4.14, SE = .04; least squares mean for paraprofessionals = 4.06, SE = .04; NS).

Mothers in the paraprofessional condition had more relationship disruption than did mothers in the nurse condition ($P < .001$); 35% of mothers visited by paraprofessionals had more than one visitor, compared with only 11% of those visited by nurses.

TABLE 1—Mothers' Reasons for Dropping Out of a Home Visitation Program, by Type of Visitor: Denver, Colo, 1994–1997

	Type of Visitor			
	Nurse (n = 89)		Paraprofessional (n = 117)	
Reason	No.	%	No.	%
Death of child or fetus	10	11	8	7
Change in child custody	0	0	2	2
Moved out of program area	20	22	24	21
Refused services	27	30	33	28
Passive refusal[a]	32	36	50	43

[a]Subject did not specifically refuse services or state intention to leave program but was unresponsive to home visitor and/or could not be located by home visitor.

TABLE 2—Frequency, Type, and Length of Contact in a Home Visitation Program, by Time Period and Type of Visitor: Denver, Colo, 1994–1997

	Pregnancy		Infancy	
	Nurse Visitor (n = 236)	Paraprofessional Visitor (n = 244)	Nurse Visitor (n = 236)	Paraprofessional Visitor (n = 244)
Completed visits	6.51 (2.8)	6.32 (0.27)	21.34 (0.99)	16.49 (0.97)**
Attempted visits	1.33 (0.12)	1.73 (0.12)*	5.25 (0.44)	7.63 (0.43)**
Average visit length, min[a]	77.25 (1.27)	85.24 (1.30)**	71.82 (1.05)	78.49 (1.05)**
Total visit time, min	503 (25)	542 (25)	1498 (80)	1299 (78)
Visits with grandmother	0.45 (0.09)	0.69 (0.09)	1.99 (0.29)	1.82 (0.28)
Visits with partner	0.64 (0.09)	0.67 (0.09)	2.32 (0.24)	1.45 (0.24)*
Content areas, %[a]				
Personal health	38.11 (0.70)	26.56 (0.71)**	14.87 (0.47)	15.30 (0.47)
Environmental health	7.30 (0.38)	15.14 (0.39)**	7.93 (0.40)	15.16 (0.40)**
Life course development	13.97 (0.43)	15.43 (0.44)*	16.23 (0.48)	19.41 (0.48)**
Parental caregiving	25.03 (0.72)	23.70 (0.73)	46.09 (0.94)	31.51 (0.94)**
Friends and family	15.42 (0.39)	18.78 (0.40)**	14.76 (0.44)	18.39 (0.44)**

Note. Numbers in table are least squares means (SEs in parentheses), with maternal age and household density at intake controlled for. *P* values are for comparisons between nurses and paraprofessionals within the time period.
[a]These statistics could be calculated only for families with 1 or more visits. Sample sizes are as follows: pregnancy, n's = 222 (nurse visitor) and 210 (paraprofessional visitor); infancy, n's = 205 (nurse visitor) and 204 (paraprofessional visitor).
*$P < .05$; **$P < .001$.

Discussion

Differences Between Nurses and Paraprofessionals

Even when given the same program goals and detailed visit protocols delineating content relevant to attaining these goals, nurses and paraprofessionals provided services in substantially different ways. Many of these differences are reasonable, given the differences in backgrounds of the home visitors. Nurses, for example, have been educated to believe strongly in the influence of maternal health behaviors on the health of the developing fetus and the importance of parental caregiving behaviors in the behavioral and emotional development of young children. Professional beliefs about what factors have the most impact on birth outcomes and the health and development of very young children may have guided the nurses' interpretation of the home visit protocols and the apportioning of time to various content areas.

There were some differences between programs in the training and protocol content in the area of personal health; however, while nurses' knowledge of health issues enabled them to independently assess whether symptoms required medical attention, paraprofessionals received training in identifying health concerns that required consultation with the mother's primary care

provider. Thus, the goal of ensuring that mothers and children received appropriate preventive care or evaluation of symptoms of ill health was similar for both types of visitor, irrespective of the steps involved in procuring such care.

Paraprofessionals often commented that they were uncomfortable with the formal content-oriented protocols and that they viewed the home visitor's role as that of a more experienced, trusted peer who had struggled through similar issues in her own life.[12] Many of the paraprofessionals questioned the relevance for low-income families of the parental caregiving activities provided in the program model.[12] These data suggest that paraprofessionals most likely placed greater emphasis on environmental safety (adequate clothing, food, shelter for mother and child), work, and social support in their visits with clients because these were issues they had successfully managed in their own lives.

Did differences in supervisor background for the nurses and paraprofessionals contribute to the observed differences in home visit content? While the supervisors' backgrounds may explain the lowered emphasis on physical health for the paraprofessionals, this is not a likely explanation for the differences in time spent on parenting, because both of the paraprofessional supervisors had years of experience in working with families on parenting and child maltreatment issues. The paraprofessional supervisors emphasized parent–child interactions during case conferences, often dealing with the discomforts that paraprofessionals voiced about these aspects of the program content.[12]

It is also possible that the reported differences in program emphasis reflect not differences in orientation between the 2 types of visitor, but simply differences in how visitors recorded visit content. Although the interrater agreement between visitors within programs lends credence to the interpretation of an orientation difference, it was not possible in this study to examine how nurses and paraprofessionals would rate the same family. Such an examination is needed to further elucidate this issue.

Differences between visitors in the time spent on social support and life course development were small and may not have major clinical significance. Differences in time spent on caregiving in infancy and physical health during pregnancy, on the other hand, were large. Because previous trials of this program model have shown significant effects on caregiving and pregnancy outcomes,[3,5,9] these differences in implementation may take on increased relevance as program outcomes are studied.

Low Contact

The contact both types of visitor had with families was low compared with the amount expected by the program protocol. Nurses and paraprofessionals achieved only 51% and 40%, respectively, of the expected number of visits. These low numbers are partly a reflection of the dropout rates. Other early preventive intervention trials, including those using this program model, have also reported less than expected contact or large dropout rates.[13–16]

The number of families who left the program early suggests that committing to regular home visits at least twice a month may have been difficult for many families. The competing demands of family, work, school, and friends may have made finding time to focus intensely (and sometimes critically) on their life choices and circumstances a lower priority. A separate set of analyses showed that mothers in both programs who dropped out were less engaged in the intervention and viewed their visitor more negatively than those who stayed.[17] Most of these mothers, however, continued to participate in the outcome research assessment, which required less time and emotional commitment and included a small payment for participation.

Since families in both conditions received fewer average visits than the program protocol recommended, some may argue that the intervention is not appropriate for the families served and that the visitation schedule should be reduced. An important aspect of the program model, however, is that it allows home visitors flexibility to provide more visitation to families who need it[13] while respecting the wishes of families who want fewer visits. Reducing the number of home visits overall may encourage administrators to increase the number of clients served by each home visitor. This could reduce the visitors' ability to visit higher-need families more frequently and may be counterproductive to forming strong individual relationships with families. A randomized trial that varies the amount of contact prescribed to families is the best way to address this issue.[18]

Home Visitor–Family Relationship

Although the mothers' ratings of the helping relationship did not show differences between nurses and paraprofessionals, the behavior of the mothers suggests differences in their perceptions of the program's value. Mothers were visited by paraprofessionals significantly less often than by nurses, in spite of the fact that paraprofessionals made more attempted (unsuccessful) visits. Mothers visited by paraprofessionals were more likely to drop out of the intervention, a finding also seen in paraprofessional mental health programs.[19]

Anecdotal evidence suggests that the paraprofessional visitors had difficulty engaging many of the families.[12] They often dealt with issues that were very similar to past issues in their own lives, such as housing concerns, domestic violence, and substance abuse. Supervisors spent a significant amount of time dealing with these "countertransference" issues. Many paraprofessionals experienced difficulty in adapting to the professional environment in terms of time management, organization, and workplace social skills.[12] This factor may have both affected their ability to implement the intervention and contributed to the high rate of paraprofessional staff turnover. It is likely that this turnover also made it more difficult for families and paraprofessional visitors to form strong working alliances. Psychotherapy research has long shown a relationship between quality of the treatment alliance and the program outcome.[20] Future analyses will be devoted to explaining the effect of home visitor–family relationships on program use and outcomes.

Conclusion

Nurses and paraprofessionals conducted a program for parents and infants in unique ways, even when they were provided with a structured and common set of program protocols. The next step is understanding how these differences relate to differences in outcomes between families enrolled in the 2 types of program. Examinations of the inner workings of program models can help answer the question of what works best for whom under what circumstances and may provide guidance as to the best type of intervention for families in need of services. □

Contributors

J. Korfmacher planned and conducted the majority of the data management and analysis. D. Olds is the principal investigator and designer of the Home Visitation 2000 trial, from which the data were taken. R. O'Brien and S. Hiatt are coinvestigators of and contributed to the design of the Home Visitation 2000 trial. All authors contributed to the writing of the paper.

Acknowledgments

This research was made possible by a grant from the Colorado Trust (93059). J. Korfmacher's work was

funded in part by a grant from the National Institute of Mental Health (R03 MH57338).

The study was approved by the Colorado Multiple Institutional Review Board. Participants gave written consent for participation in research before they were enrolled in the study.

References

1. *Home Visiting: Opening Doors for America's Pregnant Women and Children*. Washington, DC: National Commission to Prevent Infant Mortality; 1989.
2. *Child Abuse and Neglect: Critical First Steps in Response to a National Emergency*. Washington, DC: US Advisory Board on Child Abuse and Neglect; June 1990.
3. Olds D, Henderson C, Tatelbaum R, Chamberlin R. Improving the delivery of prenatal care and outcomes of pregnancy: a randomized trial of nurse home visitation. *Pediatrics*. 1986;77: 16–28.
4. Olds D, Henderson C, Tatelbaum R, Chamberlin R. Improving the life-course development of socially disadvantaged mothers: a randomized trial of nurse home visitation. *Am J Public Health*. 1988;78:1436–1445.
5. Olds D, Henderson C, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics*. 1986;78:65–78.
6. Durlak JA. Comparative effectiveness of paraprofessional and professional helpers. *Psychol Bull*. 1979;86:80–92.
7. Hattie JA, Sharpley CF, Rogers HJ. Comparative effectiveness of professional and paraprofessional helpers. *Psychol Bull*. 1984;95: 534–541.
8. Nietzel MT, Fisher SG. Effectiveness of professional and paraprofessional helpers: a comment on Durlak. *Psychol Bull*. 1981;89:555–565.
9. Kitzman H, Olds DL, Henderson CR Jr, et al. Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing: a randomized controlled trial. *JAMA*. 1997;278:644–652.
10. Olds D, Kitzman H, Cole R, Robinson J. Theoretical and empirical foundations of a program of home visitation for pregnant women and parents of young children. *J Community Psychol*. 1997;25:9–25.
11. Barnard KE. Developing, implementing, and documenting interventions with parents and young children. *Zero to Three*. 1998;18(4): 23–29.
12. Hiatt SW, Sampson D, Baird D. Paraprofessional home visitation: conceptual and pragmatic considerations. *J Community Psychol*. 1997;25:77–92.
13. Olds D, Korfmacher J. Maternal psychological characteristics as influences on home visitation contact. *J Community Psychol*. 1998;26:23–36.
14. Korfmacher J, Kitzman H, Olds D. Intervention processes as predictors of outcomes in a preventive home visitation program. *J Community Psychol*. 1998;26:49–64.
15. St. Pierre RG, Layzer JI, Goodson BD, Bernstein LS. *National Impact Evaluation of the Comprehensive Child Development Program*. Cambridge, Mass: Abt Associates Inc; 1997. Final Report to the Administration for Children, Youth and Families, contract 105-90-1900.
16. Gross RT, Spiker D, Haynes CW, eds. *Helping Low Birth Weight, Premature Babies: The Infant Health and Development Program*. Stanford, Calif: Stanford University Press; 1997.
17. Korfmacher J, O'Brien R, Hiatt S. Home visitor and maternal perceptions: predicting program use and dropouts in a pregnancy and infancy intervention program. Paper presented at: Biennial Meeting of the Society for Research in Child Development; April 15–18, 1999; Albuquerque, NM.
18. Powell C, Grantham-McGregor S. Home visiting of varying frequency and child development. *Pediatrics*. 1989;84:157–164.
19. Roth A, Fonagy P. *What Works for Whom? A Critical Review of Psychotherapy Research*. New York, NY: Guilford Press; 1996.
20. Horvarth AO, Symonds BD. Relation between working alliance and outcome in psychotherapy: a meta-analysis. *J Consult Clin Psychol*. 1991;38:139–149.

IMPaCT Intervention

- CHWs provide tailored social support for high-risk patients
- Highly structured with recommended caseloads, supervision ratios, hiring algorithms, training courses, and software for documentation, reporting, and quality control
    - Important to note: insufficient investment in infrastructure or unrealistic caseloads can compromise program effectiveness (i.e. cheaper cost initially but wasteful long-term)
- Mangers supervise a team of six CHWs who each serve 55 patients
- Randomized controlled trial analysis
    - Different from typical pre-post evaluations that may be exaggerated because of regression to the mean
    - 302 total patients (150 intervention, 152 control)
        - Seen at the UPenn Health System July 2013 – October 2014
        - All patients insured by Medicaid or uninsured, lived in high-poverty neighborhoods, and were diagnosed with at least 2 chronic diseases (diabetes, obesity, tobacco dependence, or hypertension)
    - Annual return of $2.47 for every dollar invested, from perspective of Medicaid payer; 38% reduction in cost
        - This is also important to note, as ROI is dependent on who is MAKING the investment and who is RECEIVING the return
        - Medicaid payer bears all costs and receives all returns in this analysis, but there are other possible models
            - i.e. providers bear cost for CHW programs and see returns only if costs of prevented admissions exceed revenue
    - Intervention group also had fewer admissions and lower cost admissions, and more outpatient visits per year compared to control
        - Total inpatient cost was $2.3 mil for intervention compared with $3.8 mil for control
        - 149.6 hospital admissions per CHW team for intervention, 212.7 admissions per CHW team for control

Health Plan of Nevada

- CHWs working with managed care super-utilizer HPN members
- Pre- and post-CHW intervention evaluation of 1,437 for HPN members (90 day period)
- # of acute admissions visits, acute readmissions, emergency room visits, urgent care visits, and PCP visits overall decreased*
    - Greatest percent reduction for acute readmits, acute admits, and emergency room – more impactful on reduction of medical costs
- Overall medical and prescription costs analyzed per member per month, all lower pre-/post-intervention
    - Medical $1,200 → $1,140
    - Prescription $521 → $506
- Medical and prescription costs analyzed by chronic disease status
    - Coronary atherosclerosis $3,184 → $2,471
    - Diabetes $1,096 → $965

    - CHF, renal failure, COPD, asthma, cancer increased
- Total cost of CHW program for 14 months was $278,331, with avg. monthly cost of $19,881; $503,384 savings
    - $1.81 ROI for medical and pharmacy costs

Community Health Access Program (CHAP) for Low-Income Pregnant Women

- Matched case-control design comparing 115 CHAP clients to 115 pregnant women with similar risk factors
- CHWs conducted home visits to ID risk factors in and out of the home, provide social support
- One year cost savings of $3.36, long-term savings of $5.59
    - Cost estimates derived from Medicaid estimates

Family Navigator ROI Study

- CHWs used to improve diagnosis and treatment of children w/ need for services relating to autism, ADHD, trauma, or substance abuse
- ROI analysis include savings in spending on unnecessary services (e.g. misdiagnosis) and from improved behavioral health outcomes
- ROI of $4.20 on reduced medical expenses, $4.34 on social return from improved outcomes, and $8.54 overall
    - ROI can reflect variables aside from typical medical/prescription costs
    - Costs estimated over a five year period based on one year of referrals

Kentucky Homeplace Program

- 166,227 clients served from July 2001 to June 2019
- ROI is $11.34 for every $1 invested in CHW training

CHWs in Cancer Outreach

- Generation of lifetime benefits of $12,348 per person served by a CHW
    - Benefits include value of additional years of life saved because of early screenings, additional taxes paid during those additional years, and savings from reduction in urgent care use
- Cost of CHW doing cancer outreach is $5,359
- ROI $2.3, which is a return of more than 200%

CHW Models, by UMass in Connecticut

- Models based on existing models in other states
- Model 1: Diabetes management in Latino population of 158 Latinos with type II diabetes
    - Based on University of Texas Community Outreach intervention
        - CHWs employed by community-based organizations
    - Projected intervention cost is $388,000 over 3 years
    - Projected outcomes:
        - 60% achieve good glycemic control
        - 74% achieve overall glycemic control

        - Direct medical cost savings = $435k over 3 years
        - ROI of $1.12 for ever $1 invested over 3 years
- Model 2: Asthma control in children, population of 96 children w/ uncontrolled asthma
    - Based on intervention by Seattle-King County Medicaid Healthy Homes, Washington
        - CHWs employed by private group practice using a patient-centered medical home model
    - Projected intervention cost is $229,000 over 3 years
    - Projected outcomes:
        - Direct medical cost savings: $427k over 3 years
        - ROI of $1.86 for every $1 invested
- Model 3: Complex health needs individuals connecting to healthcare services, population of 72 adults w/ chronic conditions and behavioral health needs
    - Based on Molina Healthcare/CARE NM intervention
        - CHWs employed by hospital system in partnership w/ affiliated practitioners and clinics
    - Projected intervention cost is $394,000 over 3 years
    - Projected outcomes:
        - 81% reduction in hospitalizations
        - 69% reduction in ED visits
        - Direct medical cost savings: $944k over 3 years
        - ROI of $2.40 for every $1 invested
- Model 4: Preventing CVD complications in 148 adults with CV risk factors
    - Based on Community Outreach and CV Health in Maryland intervention
        - CHWs employed by community-based org working w/ health care providers
    - Projected intervention cost: $194,000 over 3 years
    - Projected outcomes:
        - 230% more individuals w/ controlled BP and 170% more individuals w/ controlled cholesterol levels than if no intervention
        - Direct medical cost savings: $388,000 over 3 years
        - ROI of $2 for every $1 invested

Several other ROI of CHW studies linked here, as well as general CHW implementation success studies.

- In general, ROI for CHWs is greater than $1 due to myriad of factors, including reduction in ED visits or hospital admissions and lower cost visits

HEALTHY MOMS. STRONG BABIES.

MARCH OF DIMES

2022 MATERNITY CARE DESERT STATE HIGHLIGHTS- OKLAHOMA

INTRODUCTION

Maternity care encompasses health care services for women during pregnancy, delivery and postpartum.

- There are nearly four million births in the United States each year.
- Access to quality maternity care is a critical component of maternal health and positive birth outcomes, especially considering the high rates of maternal mortality and severe maternal morbidity in the U.S.

WHAT IS A MATERNITY CARE DESERT?

Definitions	Maternity care deserts	Low access to maternity care	Moderate access to maternity care	Full access to maternity care
Hospitals and birth centers offering obstetric care	zero	<2	<2	>2
Obstetric Providers (obstetrician, CNM/CM) per 10,000 Births	zero	<60	<60	≥60
Proportion of women 18-64 without health insurance*	any	≥10%	<10%	any

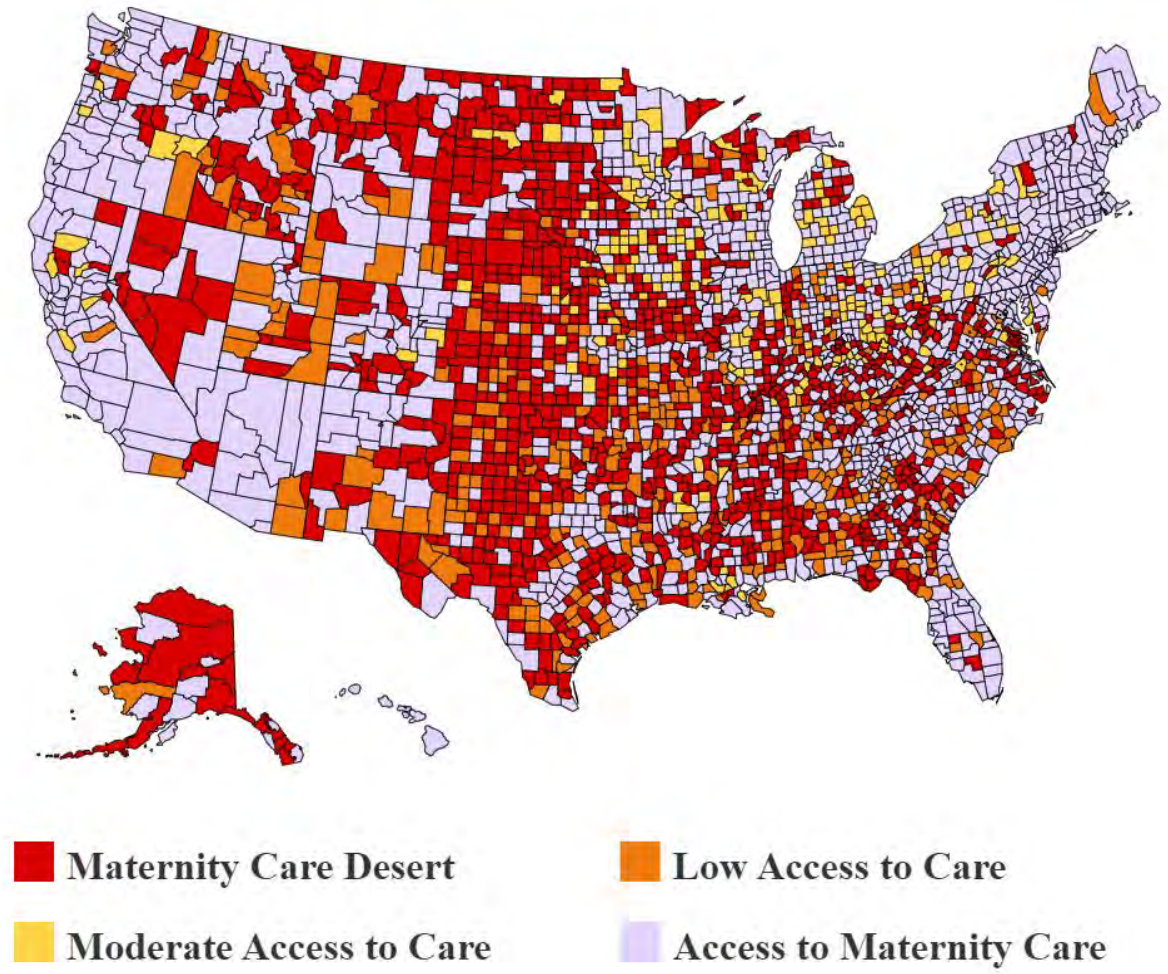
Notes: CNM/CM = certified nurse midwives/certified midwives.
***U.S. average is approximately 11%.**
Source: Kaiser Family Foundation. https://www.kff.org/womens-health-policy/fact-sheet/womens-health-insurance-coverage-fact-sheet/

Full Report Link: https://www.marchofdimes.org/maternitycaredesertsreport

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022;
Kaiser Family Foundation. Women's Health Insurance Coverage. https://www.kff.org/womens-health-policy/fact-sheet/womens-health-insurance-coverage/

ACCESS TO MATERNITY CARE

Maternity Care Deserts, 2020



Maternity Care Deserts

- 36% of all U.S. counties are designated as maternity care desert.
- More than 2.2 million women of childbearing age live in maternity care deserts.
- In 2020, more than 146,000 babies were born in maternity care deserts.

Limited Access to Care

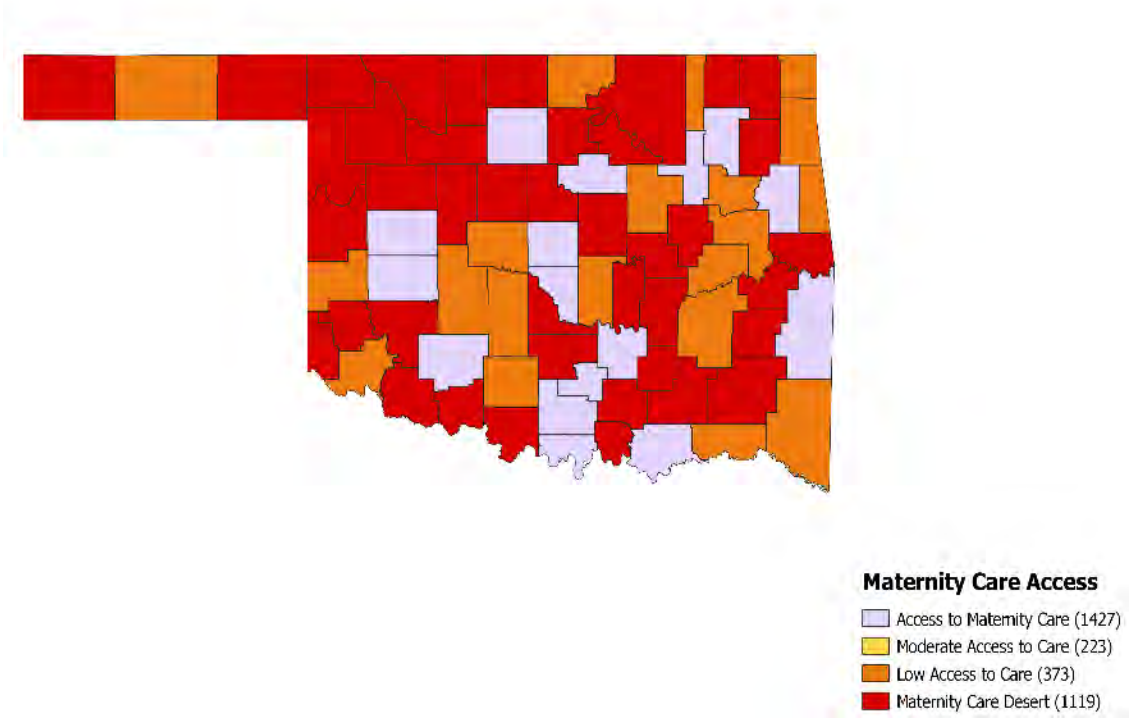
- Over 2.8 million women of childbearing age and nearly 160,000 babies were impacted by reduced access to maternity care.

HEALTHY MOMS. STRONG BABIES. | MARCH OF DIMES

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

ACCESS TO MATERNITY CARE IN OKLAHOMA

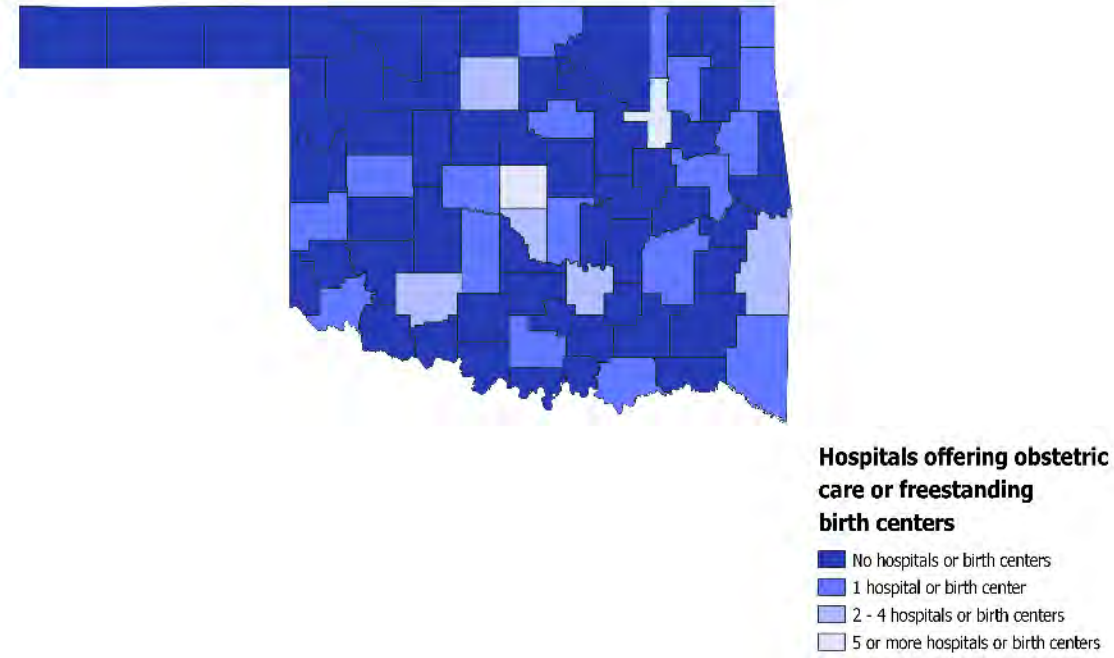
Maternity Care Deserts, 2020



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

HOSPITALS & BIRTH CENTERS

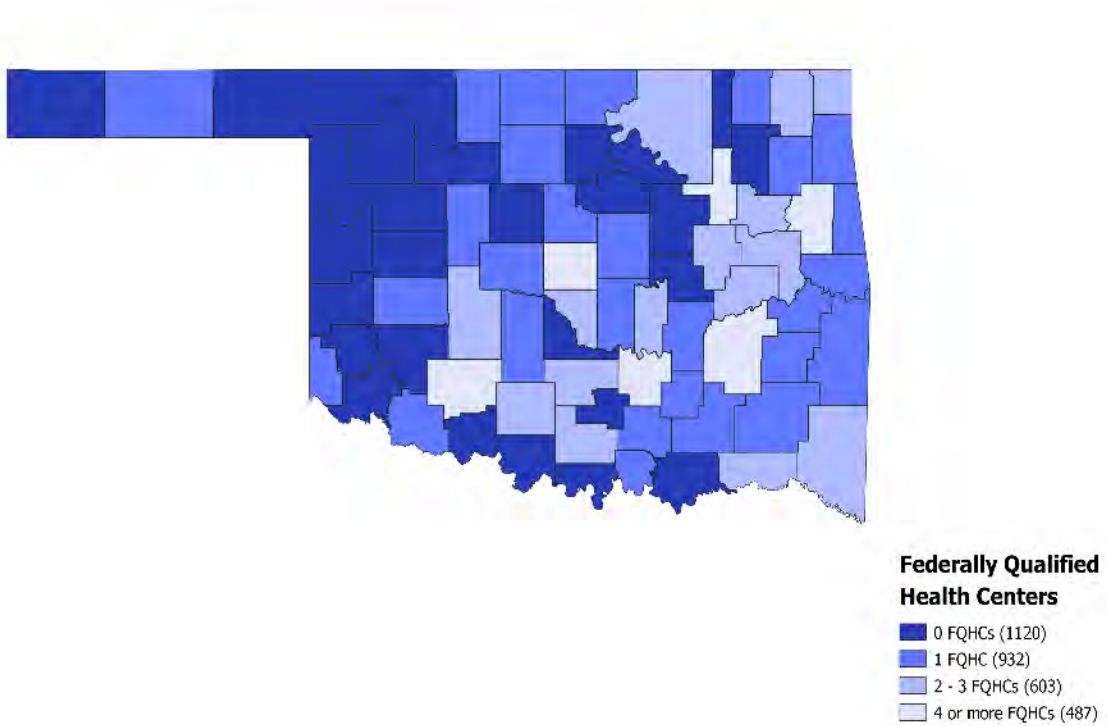
Hospitals and/or birth centers offering obstetric care by county, 2019



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

FEDERALLY QUALIFIED HEALTH CENTERS

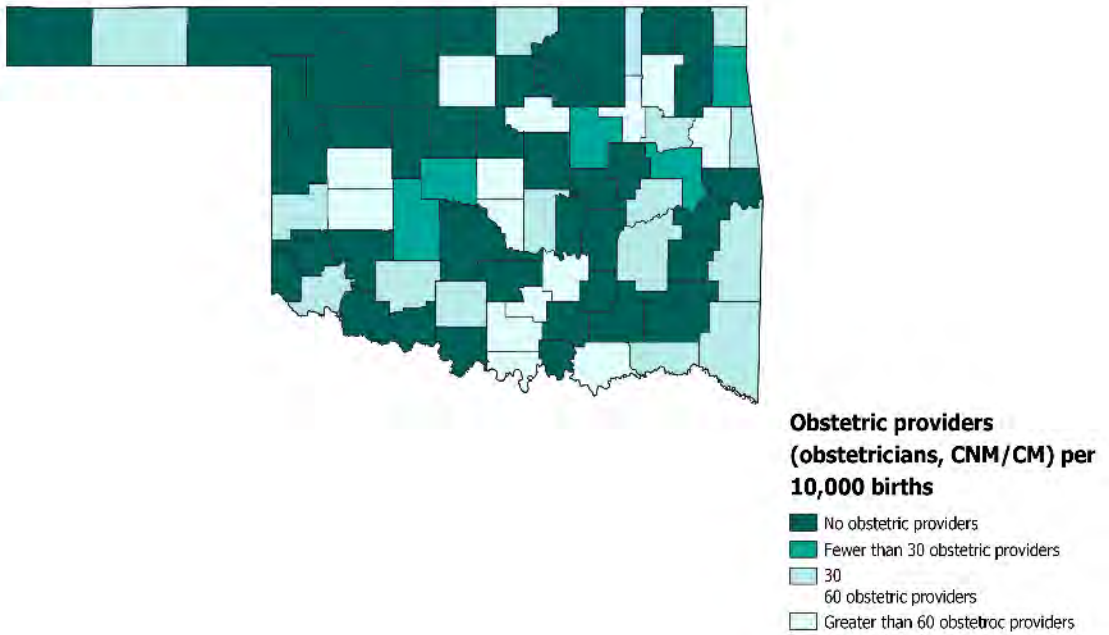
Federally Qualified Health Centers (FQHC) by county, 2021



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

PROVIDERS

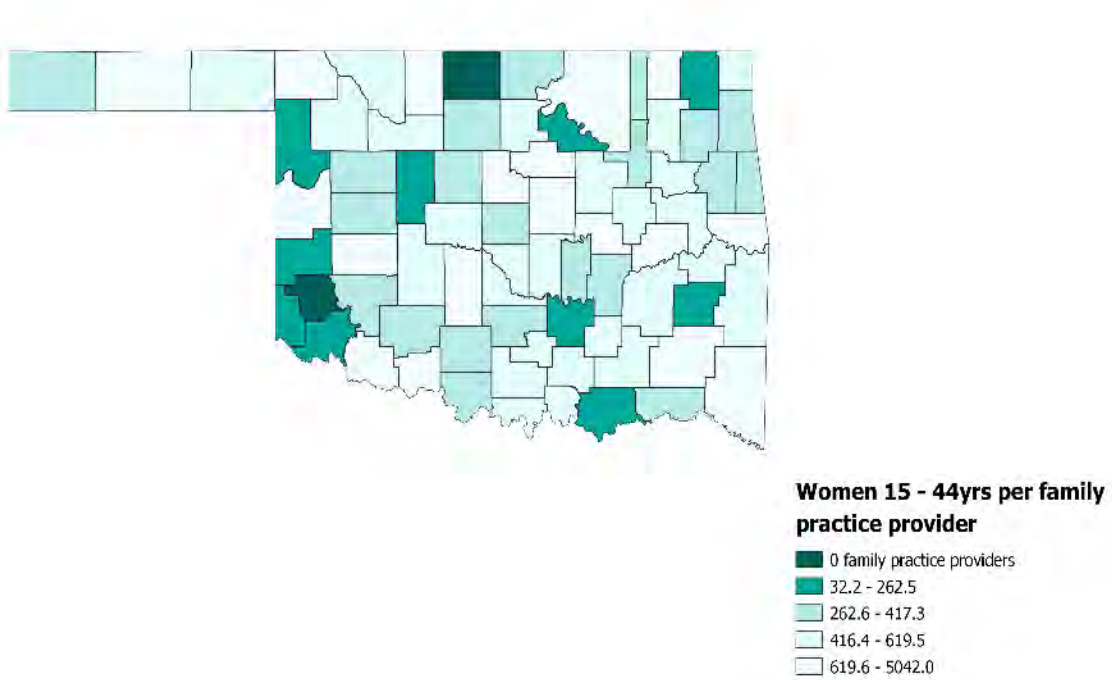
Distribution of obstetric providers by county, 2019*



*obstetric providers include obstetricians and certified nurse-midwives
Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

FAMILY PHYSICIANS

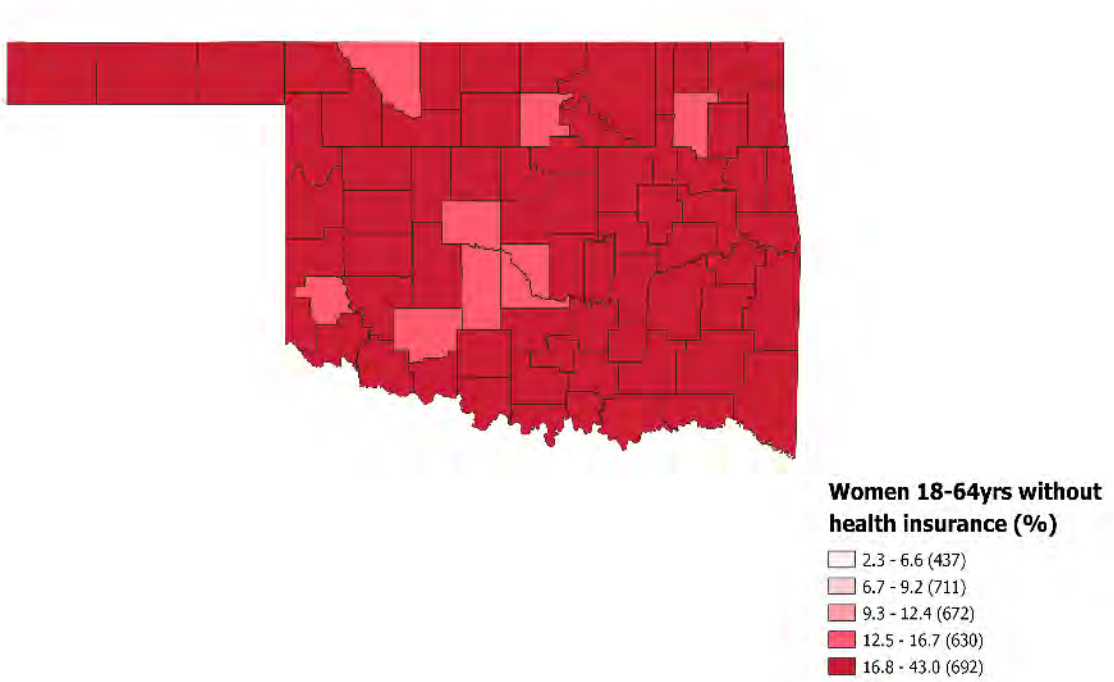
Distribution of family physicians by county, 2021



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

ACCESS TO HEALTH INSURANCE

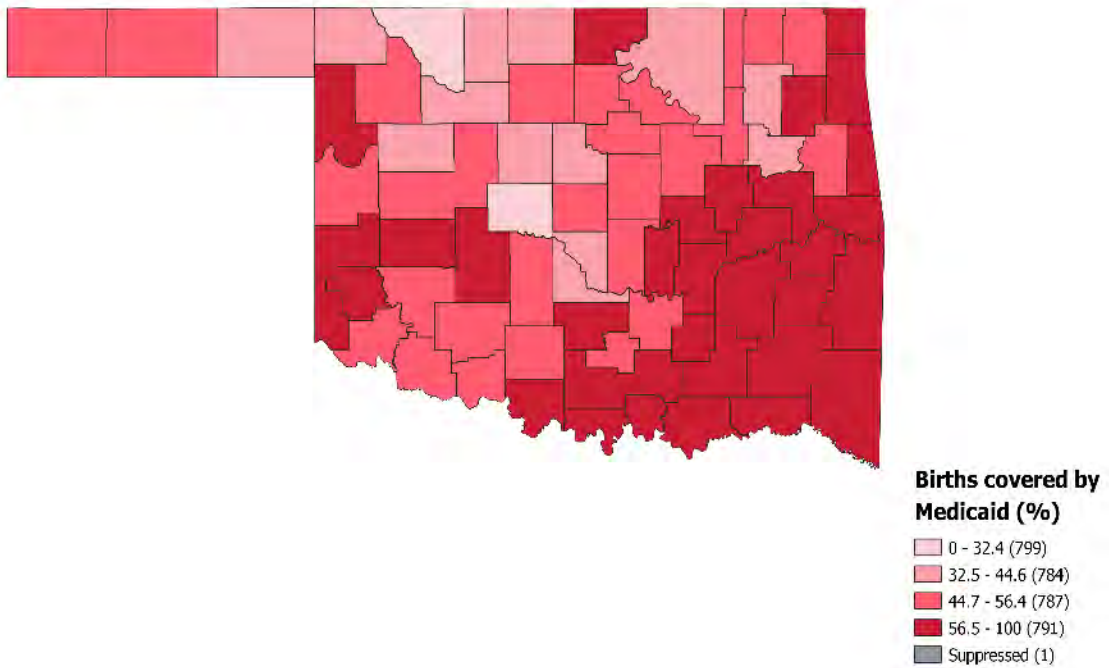
Percentage of women without health insurance by county, 2019



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

BIRTHS COVERED BY MEDICAID

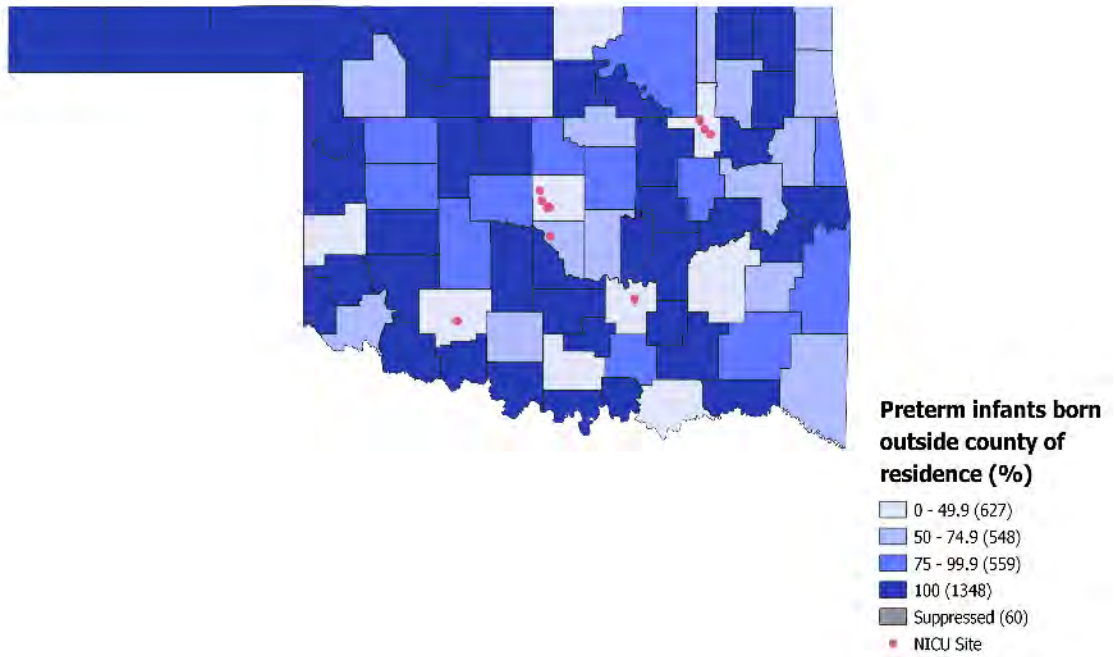
Percentage of births covered by Medicaid, by county, 2020



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

PERINATAL REGIONALIZATION

Percentage of preterm infants born outside county of residence and NICU* sites, 2020

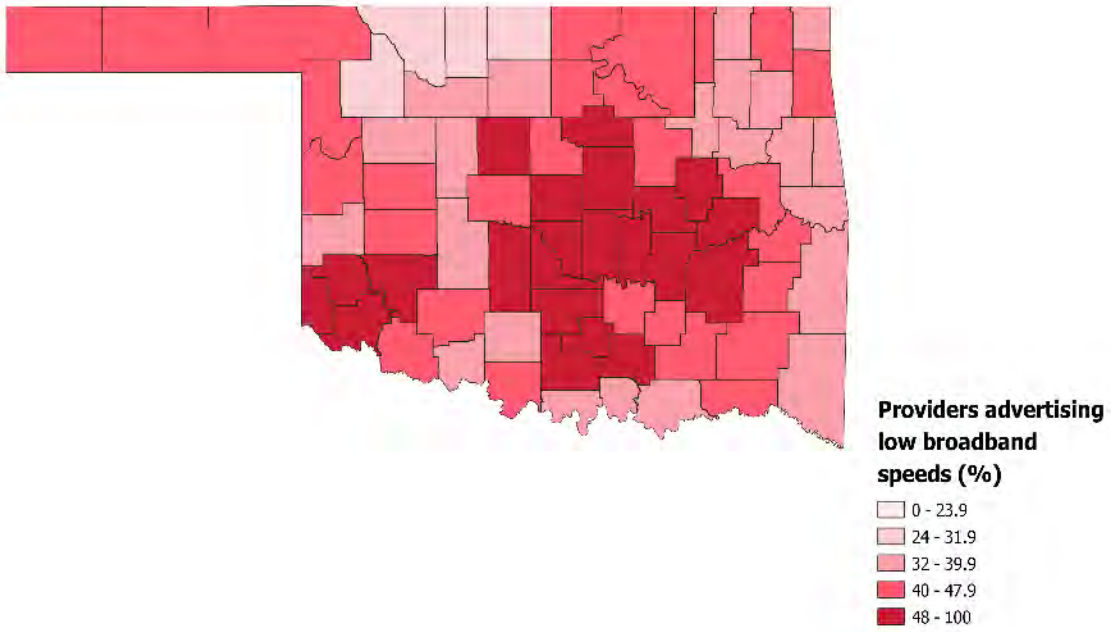


*NICU= Neonatal Intensive Care Unit

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

BROADBAND ACCESS

Percentage of fixed consumer broadband providers advertising low broadband speeds, by county, 2020



Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

OKLAHOMA STATE STATS

Maternity Care Access	Counties (n)	Women 15-44 yrs. old (n)	Births (n)	Women (18-64 yrs.) Without Health Insurance (Mean)	Median Household Income (Mean)	Population Below Poverty (Mean)	Hospitals Providing OB Care (n)	OB Providers (n)	OB Providers per 10,000 births (n)
Maternity Care Desert	41	109,385	7,011	20.5%	$48,661	16.6%	0	0	0.0
Low Access to Maternity Care	20	173,911	11,141	20.8%	$50,294	17.7%	12	41	40.5
Moderate Access to Maternity Care	0	0	0	0%	$0	0%	0	0	0
Full Access to Maternity Care	16	497,744	30,881	20.1%	$52,298	16.5%	32	325	96.9

All data are from 2019-2020

HEALTHY MOMS. STRONG BABIES. | MARCH OF DIMES

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022

POLICY AND ACTION

IMPROVE ACCESS TO QUALITY MATERNAL CARE

- **Expand Medicaid for individuals who fall at or below 138 percent of the Federal Poverty Level (FPL).** States that expand Medicaid may improve the health of women of childbearing age by reducing racial and ethnic disparities in birth outcomes such as rates of prenatal and postpartum visit attendance, maternal mortality, low birthweight and preterm birth.

- **Raise parental income eligibility levels under Medicaid.** Non-expansion states have another option to reduce postpartum coverage loss by raising income eligibility thresholds for parents.

HEALTHY MOMS. STRONG BABIES. | MARCH OF DIMES

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

IMPROVE ACCESS TO QUALITY AND AFFORDABLE PRECONCEPTION, PRENATAL, INTRAPARTUM AND POSTPARTUM CARE

- **Expand Medicaid for individuals who fall at or below 138 percent of the Federal Poverty Level (FPL).** States that expand Medicaid may improve the health of people of childbearing age, infants and their children by reducing racial and ethnic disparities in birth outcomes such as rates of prenatal and postpartum visit attendance, maternal mortality, low birthweight and preterm birth.
- **Raise parental income eligibility levels under Medicaid.** Non-expansion states have another option to improve access to postpartum coverage by raising income eligibility thresholds for parents.
- **Extend the Medicaid postpartum coverage period to 12 months.** The *American Rescue Plan Act of 2021,* starting April 2022, gives states the option to extend postpartum coverage to pregnant people to one full year.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

IMPROVE ACCESS TO QUALITY AND AFFORDABLE PRECONCEPTION, PRENATAL, INTRAPARTUM AND POSTPARTUM CARE

- **Expand access to and improve integration of the midwifery model of care in all states.** This can help improve access to equitable and culturally informed maternity care in under-resourced areas, lower costs, reduce unnecessary medical interventions that contribute to risks of maternal mortality and morbidity in initial and subsequent pregnancies.
- **Provide coverage for evidence-based telehealth maternal health services and support alignment of telehealth reimbursement across payers.** A robust body of evidence shows largely positive outcomes associated with telehealth services in maternity care.

- **Enhance perinatal regionalization as a strategy to improve both maternal and neonatal outcomes.** March of Dimes supports the 2022 Maternal Levels of Care Verification program, which provides a standardized description of maternity facility capabilities and personnel.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

PREVENTION AND TREATMENT

- **Address social determinants of health to reduce disparities and improve health outcomes.** Expand the scope of research, engage in health system reform and improve social and economic conditions (poverty, employment, low wages, housing) that contribute to underlying health inequities.

HEALTHY MOMS. STRONG BABIES. | MARCH OF DIMES

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

RESEARCH, SURVEILLANCE AND QUALITY IMPROVEMENT

- **Improve maternal mortality and morbidity data collection and surveillance and prioritize policy recommendations from Maternal Mortality Review Committees.**

- **Invest in and Strengthen Perinatal Quality Collaboratives (PQC) to provide infrastructure that supports *all* U.S. states and territories having a PQC.**

HEALTHY MOMS. STRONG BABIES.

Source: Nowhere to go: Maternity Care Deserts across the U.S. March of Dimes, September 2022.

HELP Taskforce Recommendations

PREGNANCY RESOURCE NAVIGATORS

Supporting Research & Evidence: *see attachments for additional data*

- The experiences of the first two months of life have an important impact on long-term health and development. This has to do with the remarkably rapid growth of the brain early in life, and the organization of core regulatory networks that form our ability to cope.
- Studies highlight the importance of initial and ongoing CHW training, appropriate caseloads, effective communication, and community solutions to barriers.

- Successful CHW programs include recruitment of peers from the community, close proximity of services to households, provision of home-based services, and strengthened referral/follow up to resources. Oklahoma State Department of Health (OSDH) currently has 42 CHW's in a variety of settings.
- High-quality home visiting programs can improve outcomes for children and families, particularly those that face added challenges such as teen or single parenthood, maternal depression and lack of social and financial supports.

Current Programs & Resources:

Home visiting programs are a long-proven model for supporting the physical, cognitive and emotional development of children, and can improve family economic self-sufficiency and enhance parents' abilities to support their children's development. Oklahoma currently has 70 Children's First nurses available for home visits.

Community health workers are generally peers who provide tailored social support to those they serve, helping to navigate complex systems. This workforce is trained and supported by professionals to assess needs, connect to care and follow up on next steps.

Budget: $2.9M annually

- 25 Community Health Workers
- Target population served: 24,000 newborns and families (40% of annual births)
- See attached budget for details

Conclusion: Pregnancy Resource Navigators benefit Oklahoma families by integrating the proven home visiting and community health worker models for prosperous babies, mothers and families.

> **Proposed Recommendation**: Seek support for the Pregnancy Resource Navigator (PRN) program by the Oklahoma State Department of Health (OSDH) to expand home visiting and case management services to support and celebrate Oklahoma mothers, babies and families.

MATERNITY DESERTS

Supporting Research & Evidence:

- According to the March of Dimes, 41 of our 77 counties are in maternity care deserts (impacting ~ 109,385 women) and another 20 counties have low access to maternity care (impacting 173,911 more women) in our state
- Thus, 61 out of 77 counties affecting ~ 283,296 women annually in our state do not have adequate access to maternity care for our Oklahoma mothers
- 63% of deaths of mothers were determined to have been preventable.
    - The Maternal Mortality Review Committee decisions indicated that most women who died within one year of a pregnancy ending could possibly have had better outcomes had particular health-related issues been better managed prior to, during, or after the pregnancy.
    - Such health-related issues include receiving preconception health screenings, increased access to appropriate prenatal care, increased awareness of possible complications post-delivery and seeking medical intervention as soon as warning signs are identified.

Current Programs & Resources:

- OSDH is working to address maternity deserts through county health department mobile units throughout the sate
    - This is in various stages of implementation with plans to expand to all ten public health districts in collaboration with their communities in 2023.
    - Mobile units care to for mothers where they are and work with community partners to provide quality prenatal care needed for best outcomes for Oklahoma moms and babies.

Conclusion: Oklahoma has a number of maternity desert areas, causing access to care for mothers before, during and after pregnancy difficult.

Proposed Recommendation: Identify opportunities to expand health services to women in all areas of the state and address the social determinants of health including improved access to care and reliable transportation women.

PREGNANCY RESOURCE CENTER FUNDING

Supporting Research & Evidence:

- Legislation passed in 2018 to reimburse non-profit organizations to assist mothers in carrying their children to term and provide support to mothers and infants for an additional year following birth.
- Modeled after the Texas Pregnancy Care Network model.

Current Programs & Resources:

- OSDH is currently contracted with the Oklahoma Pregnancy Care Network (OPCN).
    - $3M per year in available funding for non-profit organizations in Oklahoma to reimburse for counseling, referrals, classes and materials assistance.
    - Currently $9M in carryover funding available
    - Service options include, but not limited to:
        - Provide medical attention for the duration of pregnancy;
        - Nutritional support services;
        - Housing assistance;
        - Education and employment assistance;
        - Parenting education and support services.
-

Conclusion: Oklahoma has available funds for supporting Oklahoma mothers, babies and families through pregnancy resource centers statewide.

Proposed Recommendation: Identify opportunities to expand ways in which available funding flows to pregnancy resource centers throughout the state.

Encourage and Provide Resources to our communities to support unplanned pregnancies

APPENDIX F

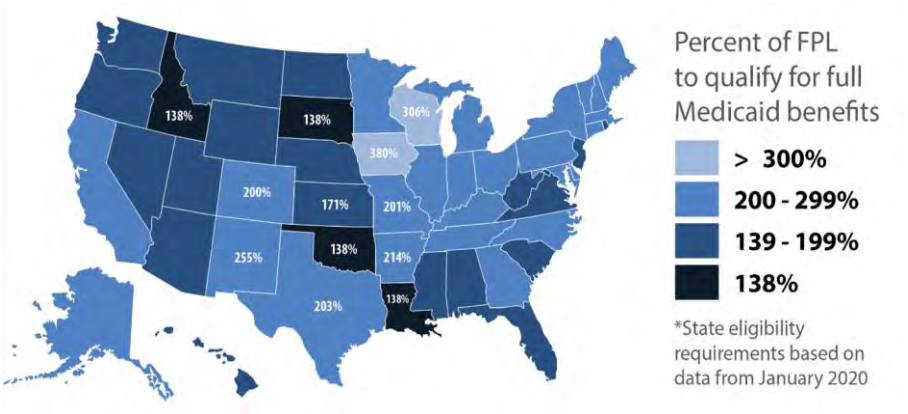
Expansion of Sooner Care

SOONERCARE INCOME ELIGIBILITY FOR PREGNANCY & POSTPARTUM COVERAGE

Comparison of income thresholds and coverage to other states

Oklahoma's income threshold for Medicaid pregnancy coverage is the lowest in the nation, along with three other states. SoonerCare currently provides full-scope health benefits, including 60 days of postpartum coverage, for pregnant women with incomes up to 138% of the federal poverty level (FPL) ($18,769 annually for an individual and $38,304 for a family of four).

SoonerCare also offers limited, pregnancy related benefits for women with incomes above 138% FPL up to 205% FPL ($28,560 annually for an individual and $58,296 for a family of four). Benefits to the mother end upon birth; however, the child maintains 12 months of continuous eligibility after birth and remains eligible for full scope SoonerCare benefits provided the household income remains at or below 205% of the FPL.



Opportunities to improve health outcomes

Raising the Income Threshold from 138% FPL to 205% FPL

Women who regularly attend prenatal visits can more effectively manage chronic health conditions during pregnancy, which lowers the risk of pregnancy-related complications such as premature births and unplanned cesarian sections. Access to mental health care and other wellness activities are also critical to the overall wellbeing of the mother, creating opportunities for improved energy levels, and alleviating pain and discomfort.

By raising the income threshold for full scope SoonerCare benefits from 138% FPL to 205% FPL, approximately 2500 additional women would have access to services that will reduce risk and create opportunities for better health outcomes for both mother and child. These services include postpartum care, prescription drugs, genetic testing, vision and hearing services to treat disease, physical, occupational, and speech therapies, preventive primary care, and more robust dental benefits during and after their pregnancy.

Extending postpartum coverage from 60 days to 12 months

One-third of maternal deaths occur up to one year after childbirth, and almost 12% occur after the six-week postpartum visit.[1] These deaths are often related to chronic conditions such as diabetes and hypertension, mental illness, and substance abuse/misuse. Without postpartum care, mothers lack continuity of care of services received while pregnant which could have negative impacts on the baby.

Postpartum depression affects 1 in 9 new mothers and is particularly common in low-income mothers: 40%-60% of low-income new mothers reported depressive symptoms.[2] In addition to the potential health risks to the mother, women with postpartum depression are at two times greater risk of not regularly attending well-child visits to ensure the health and wellness of the baby. One out of every 10 women in the postpartum period may report suicidal ideation, suggesting increased risk for suicide attempt, and suicide mortality in this population. Specific interventions targeting suicidal risk in the postpartum period are warranted.[3]

The current postpartum coverage period is 60 days; however, a new opportunity through the Centers for Medicare and Medicaid Services allows states to provide new mothers with up to 12 months of continuous postpartum coverage. By expanding postpartum coverage, mothers will have access to an array of services including care coordination, tobacco cessation/counseling, behavioral health care and substance use disorder treatment.

Estimated cost to raise the income threshold and provide 12 months of continuous postpartum coverage

Extending full-scope benefits to women between 138% FPL and 205% FPL at the regular federal financial participation (FMAP) rate for federal fiscal year 2023 (67.36%) would carry an estimated annual cost impact of $4.5 million ($1.47 million state share and $3.03 million federal share).

To add 12 months of continuous postpartum coverage for new mothers between 138% and 205% would cost approximately $7.8 million annually ($2.54 million state share and $5.25 million federal share). The cost of 12 months of postpartum coverage for new mothers under 138% FPL is accounted for in expansion cost estimates and would not add additional cost to the state.

Since Oklahoma is an expansion state, if the state adopts the optional 12-month extension of postpartum coverage, CMS would provide an enhanced 90% FMAP rate for postpartum women with incomes up to 138% FPL who would otherwise be eligible for Medicaid expansion. This provision ensures states do not lose the enhanced expansion match for these postpartum women. The total cost to increase the income threshold for full-scope benefits to 205% and provide 12 months of continuous postpartum coverage is estimated to be $12.3 million ($4.01 million state share and $8.28 million federal share).

[1] https://www.cdc.gov/vitalsigns/maternal-deaths/index.html
[2] Infants of Depressed Mothers Living in Poverty: Opportunities to Identify and Serve | Urban Institute
[3] https://www.tandfonline.com/doi/abs/10.1080/00207411.2021.1959814

Encourage and Provide Resources to our communities to support unplanned pregnancies

APPENDIX G

Scope of Practice for Advanced Nurses

IMPROVING PREGNANCY AND MATERNITY OUTCOMES VIA INCREASED ACCESS TO MIDWIFERY SERVICES

Presentation to the
Governor's Task Force on Helping Every Life and Parent

About Nurse-Midwives in Oklahoma

- Nurse-midwives have been practicing in Oklahoma since 1980. The first nurse-midwifery practice was at an Indian Health Services Hospital.
- There are currently 78 Certified Nurse-Midwives in Oklahoma. The ones who are practicing are providing full-scope care, which means:
  - Prenatal Care
  - Intrapartum Care
  - Postpartum Care
  - Sexual and Reproductive Health Care throughout the lifespan.

About Nurse-Midwives in Oklahoma

- Nurse-Midwifery in Oklahoma is regulated by the Board of Nursing as a category of Advanced Practice Registered Nurses.
- Specific statutory recognition was first granted in 1980.
- Medicaid reimbursement was approved in 1988. Reimbursement is at 100% of the Physician Rate.

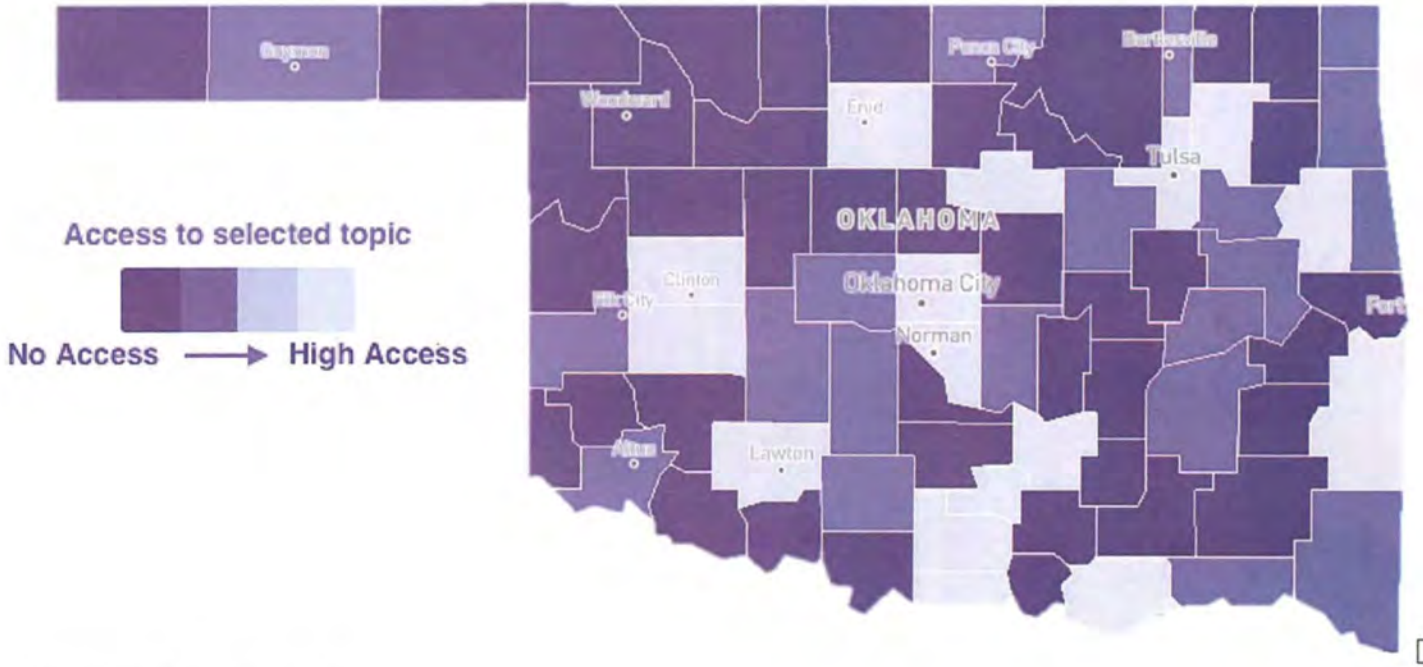
About Nurse-Midwives in Oklahoma

- Oklahoma Governor Henry Bellmon recommended in his 1989 report entitled "A Brighter Future" that educational resources support the training of Certified Nurse-Midwives and that barriers to practice be investigated and removed.
- Certified Nurse-Midwives in Oklahoma have prescriptive authority as do all Advanced Practice Nurses in the state.

Maternity Deserts

- March of Dimes has released its 2022 report on maternity care deserts across the United States—counties where there's a lack of maternity care resources.
- Maternity Deserts are defined as:
  - No hospital providing obstetric care;
  - No birth centers;
  - No obstetrician/gynecologist; and
  - No Certified Nurse-Midwife

Current Maternity Deserts in Oklahoma



Source: March of Dimes – Maternity Care Deserts Across the United States (2022 Report)

Key Takeaways From MoD 2022 Report

- 41 out of 77 Oklahoma Counties are classified as 'Maternity Deserts'
- 20 Counties have 'Low Access'
- Only 16 Counties have 'Full Access'
- 101,711 Oklahoma women live in maternity care deserts.

The Problem

"Many people don't know that we are in a maternal and infant health crisis in our country. Our country is currently the least safe to give birth and be born in among industrialized countries, and ... part of that problem is not having access to high-quality maternity care. We have failed moms and babies too long in our country, and we need to act now to improve this crisis.

. . .

many of the countries with better pregnancy outcomes have a large midwifery workforce, whereas only about 10% of pregnancies are managed by midwives in the U.S."

" - Dr. Zsakeba Henderson, March of Dimes

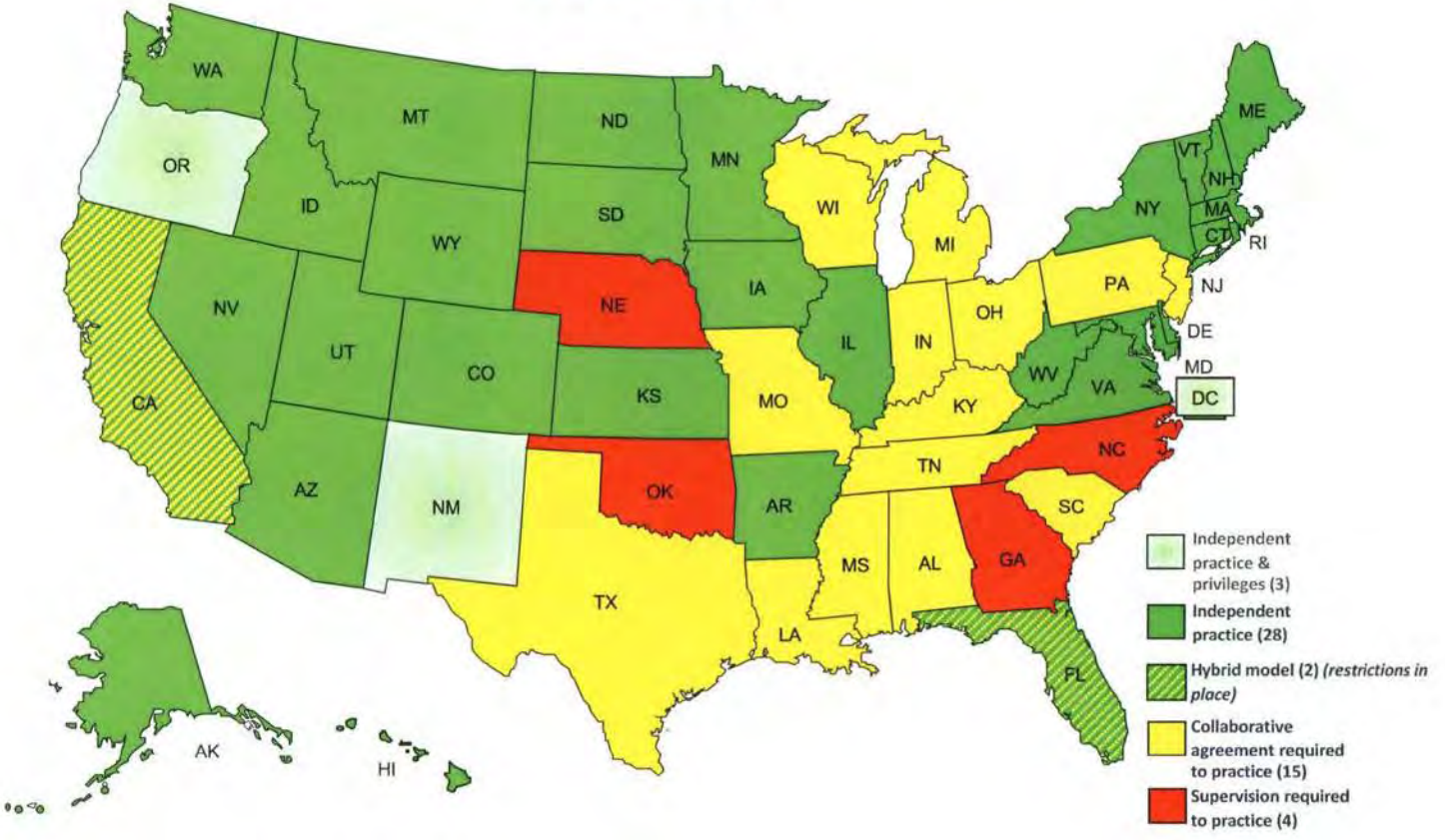
Previous Legislative Considerations

In 2020 Oklahoma took steps to regulate previously unregulated forms of midwifery care with the passage of *Shepard's Law*. The legislature understood that safe and regulated midwifery care was key to providing positive birth outcomes for thousands of Oklahoma Women.

In 2021 the authors of *Shepard's Law* proposed Senate Bill 1220 which would transition Oklahoma Nurse-Midwives from the current supervision of prescriptive authority to granting CNMs ***full practice authority.***

Oklahoma's neighboring states have recently passed legislation removing the antiquated supervision requirements and have adopted the recommendations of the two National Associations.

Practice Environments for Certified Nurse-Midwives
October 2022



What do the National Associations Say?

In 2011 the American College of Obstetricians and Gynecologists and the American College of Nurse-Midwives adopted a joint statement of practice relations between OBGYNs and Nurse-Midwives. This statement has been reaffirmed three times with the most recent revision and reaffirmation happening in April of 2018.

Included in this statement is declaration that:

"ACOG and ACNM advocate for health care policies that ensure access to appropriate levels of care for all women. Quality of care is enhanced by collegial relationships characterized by mutual respect and trust; professional responsibility and accountability; ***and national uniformity in full practice authority and licensure across all states.***"

Why Legislative Is Action Needed

1. Increased access to midwifery care as provided by Certified Nurse-Midwives;
2. Improved maternal and infant health outcomes;
3. Increased recruitment and retention of existing Nurse-Midwife workforce due to unrestricted practice.
4. Develop a more robust and diverse workforce across the State of Oklahoma.

The Recommendation

- We believe that this Task Force should recommend that the Legislature adopt national best practices and allow Certified Nurse-Midwives to practice to the top of their education and training, including removal of overly burdensome regulations requiring physician supervision for the prescription of medication.

Questions / Answers

College Statement of Policy

As issued by the College Executive Board

AMERICAN COLLEGE of NURSE-MIDWIVES
With women, for a lifetime®

This document was developed jointly by the American College of Nurse-Midwives and the American College of Obstetricians and Gynecologists.

JOINT STATEMENT OF PRACTICE RELATIONS BETWEEN OBSTETRICIAN-GYNECOLOGISTS AND CERTIFIED NURSE-MIDWIVES/CERTIFIED MIDWIVES[1]

The American College of Obstetricians and Gynecologists (ACOG) and the American College of Nurse-Midwives (ACNM) affirm our shared goal of safe women's health care in the United States through the promotion of evidence-based models provided by obstetricians-gynecologists (ob-gyns), certified nurse-midwives (CNMs), and certified midwives (CMs). ACOG and ACNM believe health care is most effective when it occurs in a system that facilitates communication across care settings and among clinicians. Ob-gyns and CNMs/CMs are experts in their respective fields of practice and are educated, trained, and licensed independent clinicians who collaborate depending on the needs of their patients[2].

These clinicians practice to the full extent of their education, training, experience, and licensure and support team-based care[2, 3]. ACOG and ACNM advocate for health care policies that ensure access to appropriate levels of care for all women[4]. Quality of care is enhanced by collegial relationships characterized by mutual respect and trust; professional responsibility and accountability; and national uniformity in full practice authority and licensure across all states.

---

[1] Certified Nurse-Midwives (CNMs) are registered nurses who have graduated from a midwifery education program accredited by the Accreditation Commission for Midwifery Education (ACME) and have passed a national certification examination administered by the American Midwifery Certification Board, Inc. (AMCB), formerly the American College of Nurse-Midwives Certification Council, Inc. (ACC). Certified Midwives (CMs) are graduates of a midwifery education program accredited by ACME and have successfully completed the AMBC certification examination and adhere to the same professional standards as certified nurse-midwives. Obstetricians-gynecologists (OB-GYNs) pass a national certification exam administered by the American Board of Obstetrics and Gynecology or Osteopathic Board and enter ongoing Maintenance of Certification.

[2] American College of Obstetricians and Gynecologists. Collaboration in practice: implementing team-based care. Washington, DC: ACOG; 2016. Available at: (https://www.acog.org/Clinical-Guidance-and-Publications/Task-Force-and-Work-Group-Reports/Collaboration-in-Practice-Implementing-Team-Based-Care).

[3] American College of Nurse-Midwives. ACNM position statement: collaborative management in midwifery practice for medical, gynecologic and obstetric conditions. Silver Spring (MD): ACNM; 2014. Available at: http://www.midwife.org/ACNM/files/ACNMLibraryData/UPLOADFILENAME/000000000058/Collaborative-Mgmt-in-Midwifery-Practice-Sept-2014.pdf

[4] Levels of maternal care. Obstetric Care Consensus No. 2. American College of Obstetricians and Gynecologists. Obstet Gynecol 2015;125:502-15. Available at: http://journals.lww.com/greenjournal/Abstract/2015/02000/Obstetric_Care_Consensus_No__2__Levels_of.46.aspx.

Shortages and maldistribution of maternity care clinicians cause serious public health concerns for women, children, and families[5]. Ob-gyns and CNMs/CMs working together optimize women's health care. ACOG and ACNM recommend increasing the number of ob-gyns and CNMs/CMs, utilizing inter-professional education to promote collaboration and team-based care.

Recognizing the high level of responsibility that ob-gyns and CNMs/CMs assume when providing care to women, ACOG and ACNM affirm their commitment to promote the highest standards for education, national professional certification, and recertification of their respective members and to support evidence-based practice. Accredited education and professional certification preceding licensure are essential to ensure skilled providers at all levels of care across the United States.

ACOG and ACNM recognize the importance of options and preferences of women in their health care. Ob-gyns and CNMs/CMs work in a variety of settings including private practice, community health facilities, clinics, hospitals, and accredited birth centers.[6] ACOG and ACNM hold different positions on home birth.[7] Establishing and sustaining viable practices that can provide broad services to women requires that ob-gyns and CNM/CMs have access to affordable professional liability insurance coverage, hospital privileges, equivalent reimbursement from private payers and under government programs, and support services including, but not limited to laboratory, obstetrical imaging, and anesthesia. To provide highest quality and seamless care, ob-gyns and CNMs/CMs should have access to a system of care that fosters collaboration among licensed, independent providers.

---

[5] Ollove M. A shortage in the nation's maternal health care. Washington, DC: Pew Charitable Trusts; 2016. Available at: http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2016/08/15/a-shortage-in-the-nations-maternal-health-care.

[6] A birthing center within a hospital complex, or a freestanding birthing center that meets the standards of the Accreditation Association for Ambulatory Health Care, the Joint Commission, or the American Association of Birth Centers [From American Academy of Pediatrics, American College of Obstetricians and Gynecologists. Guidelines for Perinatal Care. 8th ed. Elk Grove Village (IL): AAP; Washington, DC: American College of Obstetricians and Gynecologists; 2017.], or is accredited by the Commission for the Accreditation of Birth Centers (CABC).

[7] American College of Nurse-Midwives. ACNM position statement: planned home birth. Silver Spring (MD): ACNM; 2016. Available at: http://www.midwife.org/ACNM/files/ACNMLibraryData/UPLOADFILENAME/000000000251/Planned-Home-Birth-Dec-2016.pdf.; Planned home birth. Committee Opinion No. 697. American College of Obstetricians and Gynecologists. Obstet Gynecol 2017;129:e117-22. Available at: http://journals.lww.com/greenjournal/fulltext/2017/04000/Committee_Opinion_No__697___Planned_Home_Birth.52.aspx.

Approved by Executive Board of the American College of Obstetricians and Gynecologists
Approved by Board of Directors of the American College of Nurse-Midwives
February 2011
Reaffirmed July 2014
Reaffirmed July 2017
Revised and Reaffirmed April 2018

MARCH OF DIMES

OFFICE OF GOVERNMENT AFFAIRS

T (202) 659-1800
E advocacy@marchofdimes.org
MARCHOFDIMES.ORG

October 11, 2022

Juli Merciez, BSN, RN MPC
307 South Seneca Avenue
Bartlesville, OK 74003

RE: SB 1220 – To Grant Full Practice Authority to Certified Nurse Midwives - Support

Dear Ms. Merciez:

On behalf of March of Dimes, which leads the fight for the health of all moms and babies, I write today to express our support for Senate Bill 1220.

Access to quality maternity care is a critical component of maternal health and positive birth outcomes, especially in light of the high rates of maternal mortality and severe maternal morbidity in the U.S. in recent years. However, a 2020 March of Dimes report found that across the country more than 2.2 million women of childbearing age live in maternity care deserts (1,095 counties) that have no hospital offering obstetric care, no birth center, and no obstetric provider. In Oklahoma, more than 101,711 women (15-44 yrs. old) live in maternity care deserts, with 40 of Oklahoma's 77 counties having very limited or no access to obstetric services at all.[1]

Even higher rates of maternal mortality and morbidity and other adverse birth outcomes among Black women in the U.S. has prompted interest in models of care that can improve outcomes, including midwifery and specific evidence-based supportive and preventive care programs developed and led by midwives.[2] Studies have documented negative experiences of Black women in traditional hospital births,[3] the occurrence of provider implicit bias, and poorer quality and differential care experienced by women of color.[4] Moreover, even as the nation struggles to address one of the most severe pandemics in U.S. history, Oklahoma's requirement for signed collaborative practice agreements "restricts CNMs from exercising their full scope of practice or from receiving hospital credentials, clinical privileges, or third-party reimbursement for services that fall within the

[1] March of Dimes. (2020). Nowhere to Go: Maternity Care Deserts Across the U.S.
[2] Black Mamas Matter Alliance. April, 2018. Black Paper: Setting the Standard for Holistic Care of and for Black Women.
[3] Black Women Birthing Justice. (2016). Battling over Birth.
[4] Jain JA, Temming LA, D'Alton ME, et al. SMFM Special Report: Putting the "M" back in MFM: Reducing racial and ethnic disparities in maternal morbidity and mortality: A call to action. Am J Obstet Gynecol 2018;218(2):B9-B17.

MARCH OF DIMES

OFFICE OF GOVERNMENT AFFAIRS

T (202) 659-1800
E advocacy@marchofdimes.org
MARCHOFDIMES.ORG

scope of their trainings and licensure"[5] – barriers that restrict the supply of midwives and can prevent women from accessing midwifery care.[6]

March of Dimes believes that the approach and philosophy of midwifery, as described by the International Confederation of Midwives (ICM), should be widely available for women of childbearing age, and endorses ICM minimum education and training standards for all midwives whose education and licensure meets the ICM Global Standards for Midwifery Education. Further, March of Dimes welcomes efforts to increase the number of midwives of color and diversify the maternity care workforce with individuals who represent the lived and cultural experiences of the patients they serve.[7]

March of Dimes supports SB 1220 as it would allow Certified Nurse Midwives (CNMs) to practice to the full extent of their education and training. SB 1220 would also allow for low-and moderate-risk women to access midwifery care as part of an integrated system of care that further integrates midwives and their model of care into maternity care. Studies have revealed the importance of integrated care and collaboration, and suggest, "When professionals collaborate on decision-making and when coordination of care is seamless, fewer intrapartum neonatal and maternal deaths occur during critical obstetric events."[8]

March of Dimes further endorses SB 1220 as we believe the bill can improve access to maternity care providers in under-resourced areas, reduce interventions that contribute to risk of maternal mortality and morbidity in initial and subsequent pregnancies, lower costs, and potentially improve birth outcomes. We thank you for the state's continued efforts to improve the health of *all* moms and babies in Oklahoma, and urge your support of SB 1220.

Respectfully,

Erin Coppenbarger

Erin Coppenbarger, MS, RD/LC, CLC, CLS
Manager, Maternal & Infant Health Initiatives

[5] ACNM Board of Directors. (Reviewed and approved by the ACNM Board of Directors, Dec. 2011) Position Statement: Collaborative Agreement between Physicians and Certified Nurse-Midwives and Certified Midwives.
[6] Vedam S, Stoll K, MacDorman M, et al. Mapping integration of midwives across the United States: Impact on access, equity, and outcomes. PLoS One 2018;13(2):e0192523)
[7] ACOG ACNM. (revised and reaffirmed April 2018). Joint Statement of Practice Relations between Obstetrician-Gynecologists and Certified Nurse-Midwives/Certified Midwives.
[8] Vedam S, Stoll K, MacDorman M, et al. Mapping integration of midwives across the United States:Impact on access, equity, and outcomes. PLoS One 2018;13(2):e0192523).

HEALTHY MOMS. STRONG BABIES.

2021 MARCH OF DIMES REPORT CARD

The 2021 Report Card highlights the latest key indicators to describe and improve maternal and infant health in the U.S. It features grades for preterm birth and measures on infant mortality in addition to social drivers of health, low-risk Cesarean births and inadequate prenatal care. Our Supplemental Report Card highlights the stark disparities across race and ethnicity within these factors.

With the onset of the COVID-19 pandemic, pre-existing health disparities have been magnified. Comprehensive data collection and analysis of these measures, and the resulting disparities, inform the development of policies and programs that move us closer to health equity. The Report Card looks at policies like Medicaid expansion and programs like Maternal Mortality Review Committees, that can help improve equitable maternal and infant health for families across the country.

OKLAHOMA

Scan here for more data on your state.

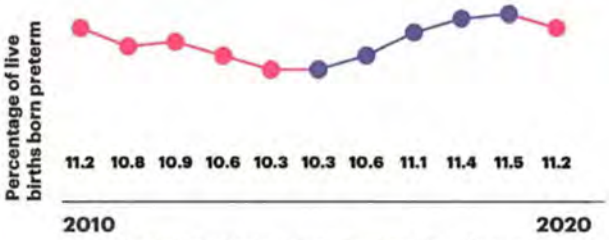
INFANT HEALTH

PRETERM BIRTH GRADE

D-

PRETERM BIRTH RATE

11.2%



Purple (darker) color shows a significant trend (p <= .05)

INFANT MORTALITY

5.6

Infant mortality rates are an indication of overall health. Leading causes of infant death include birth defects, prematurity, low birth weight, maternal complications and sudden infant death syndrome.

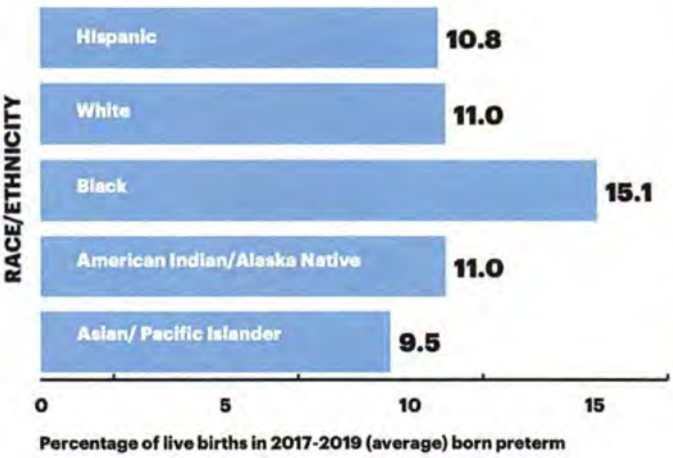
INFANT MORTALITY RATE

7.1

Purple (darker) color shows a significant trend (p <= .05)

PRETERM BIRTH RATE BY RACE AND ETHNICITY

The March of Dimes disparity ratio measures and tracks progress towards the elimination of racial/ethnic disparities in preterm birth. It's based on Healthy People 2020 methodology and compares the group with the lowest preterm birth rate to the average for all other groups. Progress is evaluated by comparing the current disparity ratio to a baseline disparity ratio. A lower disparity ratio is better, with a disparity ratio of 1 indicating no disparity.



In Oklahoma, the preterm birth rate among Black women is 39% higher than the rate among all other women.

DISPARITY RATIO:

1.26

CHANGE FROM BASELINE:

No Improvement

PRETERM BIRTH RATE BY CITY

CITY	GRADE	PRETERM BIRTH RATE	CHANGE IN RATE FROM LAST YEAR
Oklahoma City	F	13.3%	Worsened

A TIME FOR PARTNERSHIP AND ACTION:
EXAMINING THE U.S. MATERNAL AND INFANT HEALTH CRISIS AND POLICIES NEEDED FOR CHANGE

March of Dimes recommends state policy actions that are rooted in addressing disparities in maternal and infant health outcomes, see **www.marchofdimes.org/reportcard**

For details on data sources and calculations, see Technical Notes. Scan the QR code to the right to access the full U.S. Report Card.

OKLAHOMA

MATERNAL HEALTH

There is a critical connection between infant health, maternal health and the health of a family. All are dependent on their lived social context, the quality and accessibility of healthcare and the policies within a state. Each factor can provide insight into how a state serves its population.

SOCIAL VULNERABILITY INDEX

Where you live matters.

March of Dimes is offering the opportunity to examine social determinants of health at the county level using the Social Vulnerability Index (SVI). Socially vulnerable populations are at greater risk of experiencing poor health outcomes during a public health emergency. The same factors used in the index also contribute to poor maternal and infant health outcomes, including poor access to maternity care. The differences in counties are measured using 15 social factors, grouped into four areas including: socioeconomic status; household composition and disability; minority status and language; housing type and transportation. Each aspect of the index uses physical or social factors that help to estimate where poor health outcomes may be more prevalent.

The overall SVI for each county represents the amount of vulnerability relative to other counties in the state. The SVI measure is always a number between 0 and 1. A lower SVI indicates lesser vulnerability and a higher SVI indicates greater vulnerability.

Lesser vulnerability — Greater vulnerability

0.0-0.29 | 0.30-0.59 | 0.60-1.0

CLINICAL MEASURES

Your healthcare matters.

Access to and quality of healthcare before, during and after pregnancy can affect health outcomes in the future. An unnecessary Cesarean birth can lead to medical complications and inadequate prenatal care can miss important milestones in pregnancy.

24.5 PERCENT (25.6)

LOW-RISK CESAREAN BIRTH

This shows Cesarean births for first-time moms, carrying a single baby, positioned head first and at least 37 weeks pregnant.

15.2 PERCENT (14.9)

INADEQUATE PRENATAL CARE

Percent of women who received care beginning in the fifth month or later or less than 50% of the appropriate number of visits for the infant's gestational age.

POLICY MEASURES

The policies in your state matter. Adoption of the following policies and organizations can help improve maternal and infant health care.

MEDICAID EXPANSION

States who have adopted this policy allow women greater access to preventative care during pregnancy.

MEDICAID EXTENSION

States have recent action to extend coverage for women beyond 60 days postpartum.

MIDWIFERY POLICY

Allows the practice of direct entry midwives and certified nurse midwives.

MATERNAL MORTALITY REVIEW COMMITTEE

These committees are essential to understanding and addressing the causes of maternal death.

PERINATAL QUALITY COLLABORATIVE

These teams work to identify and improve quality care issues in maternal and infant healthcare.

DOULA POLICY OR LEGISLATION

Passage of Medicaid coverage for doula care.

Legend

- ✓ State has the indicated organization/policy
- ✗ State does not have the indicated organization/policy
- ✳ Waiver pending or planning is occurring
- ✳ Has an MMRC but does not review deaths up to a year after pregnancy ends

A TIME FOR PARTNERSHIP AND ACTION:
EXAMINING THE U.S. MATERNAL AND INFANT HEALTH CRISIS AND POLICIES NEEDED FOR CHANGE

March of Dimes recommends state policy actions that are rooted in addressing disparities in maternal and infant health outcomes, see www.marchofdimes.org/reportcard

For details on data sources and calculations, see Technical Notes. Scan the QR code to the right to access the full U.S. Report Card.

MARCH OF DIMES POSITION STATEMENT MIDWIFERY CARE AND BIRTH OUTCOMES IN THE UNITED STATES

Summary

March of Dimes supports increased access to midwifery care for low- and moderate-risk women as part of an integrated system of care. In this statement, midwifery refers to certified nurse–midwives (CNMs), certified midwives (CMs) or midwives whose education and licensure meets the International Confederation of Midwives (ICM) Global Standards for Midwifery Education. Studies document that midwifery care is associated with lower interventions, cost-effectiveness, increased patient satisfaction and improved care.

March of Dimes believes that the approach and philosophy of midwifery, as described by the ICM, should be widely available as a choice for women. Midwifery care:[1]

- Sees pregnancy and childbearing as usually normal physiological processes
- Promotes, protects and supports women's human, reproductive and sexual health and rights and respects ethnic and cultural diversity
- Protects and enhances the health and social status of women and builds women's self-confidence in their ability to cope with childbirth
- Takes place in partnership with women, recognizing the right to self-determination; and is respectful, personalized, continuous and non-authoritarian

Summary of March of Dimes position statement:

- **March of Dimes supports efforts to expand access to midwifery care and further integrate midwives and their model of care into maternity care in all states. This can help improve access to maternity care in under-resourced areas, reduce interventions that contribute to risk of maternal mortality and morbidity in initial and subsequent pregnancies, lower costs, and potentially improve the health of mothers and babies.**

- **March of Dimes encourages states to examine their laws and regulations related to midwifery care to ensure they are not unnecessarily restrictive, foster access to these services for women who desire them, and promote full practice authority for midwives as part of an integrated system of care.**

Definitions, training and scope

CNMs and CMs provide a full range of primary health care services for women, including gynecologic and family planning services; preconception care; care during pregnancy,

childbirth and the postpartum period; and care of the normal newborn.[2,3] A number of high-resource countries have a much higher percentage of births attended by midwives (50 to 75 percent of births) compared to the U.S. (less than 9 percent).[4 5]

- CNMs represent most U.S. midwives, and 95 percent of births they attend occur in hospital settings.[6] CNMs have national certification and are licensed, independent health care providers with prescriptive authority in all states.
- CMs are licensed, independent health care providers who complete the same midwifery education as CNMs but have no prior nursing credential.[7]
- Certified professional midwives (CPMs) and lay midwives practice primarily in out-of-hospital settings, including birthing centers and planned home births. CPMs are legally authorized to practice in 30 states.[8]

March of Dimes endorses ICM minimum education and training standards for all midwives. Both CNMs and CMs meet and exceed these standards. March of Dimes welcomes the movement towards CPMs meeting the ICM standards. All births should be attended by licensed providers who meet the ICM standards, and should have a process in place for consultation, safe transfer of care and transport in the event of complications.

Equity

Higher rates of maternal mortality and morbidity and other adverse birth outcomes among black women in the U.S. has prompted interest in models of care that can improve outcomes, including midwifery and specific evidence-based supportive and preventive care programs developed and led by midwives.[9] Some studies have documented some negative experiences of black women in traditional hospital births,[10] the occurrence of provider implicit bias and poorer quality and differential care experienced by women of color.[11] March of Dimes supports efforts to increase the number of midwives of color and diversify the maternity care workforce with individuals who represent the lived and cultural experiences of the patients they serve.[13]

Full practice authority, state regulations and workforce shortages

March of Dimes supports full practice authority for CNMs/CMs, which means they are able to practice to the full extent of their education and training within a health care system that provides for "consultation, collaborative management or referral as indicated by the health status of the woman or newborn."[12] In the 2018 joint statement from ACOG and ACNM:[13]

- "Ob-gyns and CNMs/CMs are experts in their respective fields of practice and are educated, trained and licensed independent clinicians who collaborate depending on the needs of their patients.
- Quality of care is enhanced by collegial relationships characterized by mutual respect and trust; professional responsibility and accountability; and national uniformity in full practice authority and licensure across all states.
- Shortages and maldistribution of maternity care clinicians cause serious public health concerns for women, children and families."

Studies have revealed the importance of integrated care and collaboration. For example, "when professionals collaborate on decision-making and when coordination of care is seamless, fewer intrapartum neonatal and maternal deaths occur during critical obstetric events."[5]

Twenty-seven states have full practice authority for midwives, while the others impose restrictions including supervision and/or a collaborative agreement with a physician.[14] These restrictions can affect hospital privileges and third-party reimbursement, barriers that restrict the supply of midwives and prevent women in many states from accessing midwifery care.[5] States with full practice authority have approximately double the supply of midwives per 1,000 births than states where CNM practice is more restricted,[15] and maldistribution of care is a serious concern. A March of Dimes 2018 report found that 5 million women live in maternity care deserts (1,085 counties) with no hospitals offering obstetric care and no OB providers.[16] A 2016 study documented the crucial role CNMs play in the maternity care workforce in rural U.S. hospitals and the need to increase the number of midwives in rural maternity practice to address workforce shortages.[17]

A 2018 study found that states that have done the most to integrate midwives into their health care systems, as measured by a composite scoring system, have better outcomes for mothers and babies. Integration of midwifery care was strongly associated with fewer interventions (significantly higher rates of spontaneous vaginal delivery, vaginal birth after cesarean and breastfeeding; and significantly lower rates of cesarean sections).[5]

March of Dimes encourages states to examine their laws and regulations related to midwifery care to ensure they are not unnecessarily restrictive, foster access to these services for women who desire them and promote full practice authority for midwives as part of an integrated system of care.

Midwives and birth outcomes

Some studies have found that women with low- to moderate-risk pregnancies who receive midwifery care, or who have access to collaborative care that integrates midwives, are more likely to experience a low-intervention, spontaneous vaginal birth, more likely to be satisfied with their care and less likely to have a first cesarean delivery,[18] [19] thereby improving outcomes for subsequent births. Safely reducing primary cesarean delivery can play a role in reducing maternal morbidity in initial and future pregnancies.[20] Evidence is reviewed in more detail in the appendix.

March of Dimes supports efforts to expand access to midwifery care and further integrate midwives and their model of care into maternity care in all states. This can help improve access to maternity care providers in under-resourced areas, reduce interventions that contribute to risk of maternal mortality and morbidity in initial and subsequent pregnancies, lower costs, and potentially improve the health of mothers and babies.

August 29, 2019

Appendix

Midwives and birth outcomes: More detailed review of evidence

A 2016 Cochrane review of 15 randomized controlled trials (conducted in Australia, Canada, Ireland and the United Kingdom) compared the midwifery practice model to other models of care, focusing on lower-risk women:

- Women who received midwife-led care were less likely to experience intervention, more likely to have a spontaneous vaginal birth and more likely to be satisfied with their care.
- Women who received midwife-led care were less likely to experience preterm birth, fetal loss before and after 24 weeks and neonatal death. Further research is needed to explore these findings.
- The authors stated that "due to the exclusion of women with significant maternal disease and substance abuse from some trials of women at mixed risk, caution should be exercised in applying the findings of this review to women with substantial medical or obstetric complications."[29]

Other studies have found that midwifery care increases the chance of having a low-intervention birth, lowers costs and reduces the chance of having a first cesarean delivery (when compared to physician care for equally low-risk women),[21] thereby improving outcomes for subsequent births.

- A 2017 U.K. study found that low-risk women giving birth for the first time at interprofessional centers (midwives and physicians) were less likely to experience induction, oxytocin augmentation and cesarean birth than women at centers with only physicians.[22]
- Another U.K. study found that low-risk women who had given birth multiple times had significantly higher rates of vaginal birth, including vaginal birth after cesarean delivery, and lower likelihood of labor induction when cared for in centers with midwives.[23]
- U.S. studies have found that midwifery care is linked to lower cesarean delivery rates among low-risk women.[24] [25] For example, a study of hospital data in New York found that hospitals with more midwife-attended births had lower utilization of obstetric procedures (including cesarean delivery and episiotomy) among low-risk women.[26]

Safely reducing primary cesarean deliveries can play a role in reducing maternal morbidity in initial and future pregnancies. ACOG states that "although the initial cesarean delivery is associated with some increases in morbidity and mortality, the downstream effects are even greater because of the risks from repeat cesareans in future pregnancies."[29] Given the evidence that midwifery care may reduce cesarean deliveries, it can be inferred to play a role in reducing the effects of increased maternal morbidity and mortality in future pregnancies. A 2019 California study found that cesarean delivery was associated with 2.7 times the risk of severe maternal morbidity compared to vaginal delivery, and was estimated to contribute to 37 percent of severe maternal morbidity cases.[27] A 2009 study of a sample of U.S. deliveries from 1998 to2005 found that cesarean delivery was associated with an increasing trend of severe delivery complications.[28]

---

[1]International Confederation of Midwives. Philosophy and Model of Midwifery Care. Available at: www.internationalmidwives.org.

[2] Renfrew MJ, McFadden A, Bastos MH, et al. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. Lancet 2014 Sep 20;384(9948):1129-45.

[3] ACNM. Definition of Midwifery and Scope of Practice of Certified Nurse-Midwives and Certified Midwives. Available at www.midwife.org.

[4] Martin JA, Hamilton BE, Osterman MJKS, Driscoll AK, Mathews TJ. National Vital Statistics Reports, Volume 66, Number 1, January 5, 2017. 2015 [cited 2017 May 10];66(1).

[5] Vedam S, Stoll K, MacDorman M, et al. Mapping integration of midwives across the United States: Impact on access, equity, and outcomes. PLoS One 2018;13(2):e0192523).

[6] Walker, D, et al. Midwifery Practice and Education: Current Challenges and Opportunities. The Online Journal of Issues in Nursing. 2014 19(2).
[7] ACNM. Essential Facts about Midwives. Available at: http://www.midwife.org/Essential-Facts-about-Midwives
[8] Midwives Alliance of North America. Legal Status of U.S. Midwives. Available at: mana.org.
[9] Black Mamas Matter Alliance. April, 2018. Black Paper: Setting the Standard for Holistic Care of and for Black Women.
[10] Black Women Birthing Justice. (2016). Battling over Birth.
[11] Jain JA, Temming LA, D'Alton ME, et al. SMFM Special Report: Putting the "M" back in MFM: Reducing racial and ethnic disparities in maternal morbidity and mortality: A call to action. Am J Obstet Gynecol 2018;218(2):B9-B17.
[12] ACNM. (2012). Position Statement: Independent Midwifery Practice. Available at midwife.org.
[13] ACOG ACNM. (revised and reaffirmed April 2018). Joint Statement of Practice Relations between Obstetrician-Gynecologists and Certified Nurse-Midwives/Certified Midwives.
[14] Midwifeschooling.com. States that Allow CNMs to Practice and Prescribe Independently vs those that Require a Collaborative Agreement. Available at: midwifeschooling.com.
[15] Yang et al, State Scope of Practice Laws, Nurse-Midwifery Workforce, and Childbirth Procedures and Outcomes. Women's Health Issues 26-3 2016 262-267.
[16] March of Dimes. (2018). Nowhere to Go: Maternity Care Deserts Across the U.S.
[17] Kozhimannil, KB, Henning-Smith, C., Hung, P. The Practice of Midwifery in Rural US Hospitals. Journal of Midwifery and Women's Health 16 Jul;61(4):411-8.
[18] ACNM. Midwifery: Evidence-Based Practice. Available at: www.midwife.org.
[19] Rosenstein MG, Nijagal M, Nakagawa S, Gregorich SE, Kuppermann M. The Association of Expanded Access to a Collaborative Midwifery and Laborist Model With Cesarean Delivery Rates. Obstet Gynecol 2015 Oct;126(4):716-23.
[20] ACOG Obstetric Care Consensus No. 1. Safe Prevention of the Primary Cesarean Delivery. March 2014 (Reaffirmed 2016).
[21] ACNM. Midwifery: Evidence-Based Practice. Available at: www.midwife.org.
[22] Hollowell J, Li Y, Bunch K, Brocklehurst P. A comparison of intrapartum interventions and adverse outcomes by parity in planned freestanding midwifery unit and alongside midwifery unit births: secondary analysis of 'low risk' births in the birthplace in England cohort. BMC Pregnancy Childbirth 2017;17(1):95)
[23] Symon A, Winter C, Cochrane L. Exploration of preterm birth rates associated with different models of antenatal midwifery care in Scotland: Unmatched retrospective cohort analysis. Midwifery 2015;31(6):590-6.
[24] Rosenstein MG, Nijagal M, Nakagawa S, Gregorich SE, Kuppermann M. The Association of Expanded Access to a Collaborative Midwifery and Laborist Model With Cesarean Delivery Rates. Obstet Gynecol 2015 Oct;126(4):716-23.
[25] Rosenstein M, Nakagawa S, King TL, Frometa K, Gregorich S, Kuppermann M. 154: The association between adding midwives to labor and delivery staff and cesarean delivery rates. *Am J Obstet Gynecol*. 2016;214(1):S100.
[26] Symon A, Winter C, Inkster M, Donnan PT. Outcomes for births booked under an independent midwife and births in NHS maternity units: matched comparison study. BMJ 2009 Jun 11;338:b2060.
27 Leonard S, Main E, Carmichael S. The contribution of maternal characteristics and cesarean delivery to an increasing trend of severe maternal morbidity.BMC Pregnancy and Childbirth 2019 19:16
[28] Kuklina EV, Meikle SF, Jamieson DJ, Whiteman MK, Barfield WD, Hillis SD, et al. Severe obstetric morbidity in the United States: 1998-2005. Obstet Gynecol. 2009;113(2 Pt 1):293–9.

MARCH OF DIMES

HB 1215

ARKANSAS

What are Nurse Midwives and What Do They Do?

Nurse-Midwives, or "Certified Nurse-Midwives" (CNMs) are nurses who have completed education and training in nursing and graduate-level education in Midwifery. According to the American College of Nurse-Midwives, CNMs provide a full range of primary health care services for women, including primary care, gynecologic and family planning services, preconception care, care during pregnancy, childbirth and the postpartum period, and care of the normal newborn during the first 28 days of life.

What Does the Evidence/Research on Midwives Tell Us?

Research demonstrates that nurse-midwives are an essential part of high-value, high-quality women's health care. The safety and quality of care by Certified Nurse-Midwives is indisputable. CNMs in the United States exceed all international standards for midwifery competencies and standards of practice.[1] Midwifery care has been shown to decrease the rates of:[2]

- cesarean birth
- preterm birth
- stillbirth
- severe perineal trauma (birth trauma)
- severe blood loss
- newborns with low birthweight
- newborn admissions to the neonatal intensive care unit (NICU)

Increasing Midwife-led care from just 8% of pregnancies to 20% in the next 10 years could result in a $4 Billion savings and 30K fewer preterm births. – *University of Minnesota (2019)*[8]

These studies shows the benefits of independent practice for CNMs:

- Women in states with independent nurse-midwifery practice have lower odds of cesarean delivery, preterm birth, and low birth weight infants.[3]
- States that promote and integrate midwives into their systems of care have:[4]
  - significantly higher rates of spontaneous vaginal delivery, vaginal birth after cesarean, and breastfeeding
  - significantly lower rates of cesarean, preterm birth, low birth weight infants, and neonatal death.
- Conversely, states with the most restrictive practice environments for nurse-midwives (e.g. less independent practice, restricted scope of practice) score worse on critical maternal and infant health indicators (cesarean, preterm birth, neonatal mortality).[4]
- States where midwives have independent practice have a higher proportion of rural hospitals with CNM-attended births.[5]
- States with regulations that support independent practice have a larger CNM workforce, and a greater proportion of CNM-attended births.[3]
- The single best predictor of distribution of nurse-midwives in a state is the degree to which midwifery practice is restricted.[6]
- Economic analyses demonstrate the feasibility of independent practice as a realistic method of reducing the maternity workforce shortage while simultaneously increasing health care savings.[7]

1. American College of Nurse-Midwives. Definition of Midwifery and Scope of Practice of Certified Nurse-Midwives. https://tinyurl.com/8x5a8xz2. Retrieved February 16 2021
2. Ten Hoope-Bender P, De Bernis L, Campbell J, et al. Improvement of maternal and newborn health through midwifery. Lancet. 2014; 384(9949):1226-35
3. Yang Y.T., Altanasio L.B., Kozhimannil K.B. State Scope of Practice Laws, Nurse-Midwifery Workforce, and Childbirth Procedures and Outcomes. Womens Health Issues 2016;26(3):262-7
4. Vedam, S., et al. (2018). "Mapping integration of midwives across the United States: Impact on access, equity, and outcomes." PLoS One 13(2):e0192523
5. Kozhimannil, K.B., et al. (2016). "The Practice of Midwifery in Rural US Hospitals." J Midwifery Womens Health 61(4): 411-416
6. Declercq, E.R., et al. (1998). "State regulation, payment policies, and nurse-midwife services." Health Aff (Millwood) 17(2): 190-200
7. Conover C., Richards R. Economic benefits of less restrictive regulation of advanced practice nurses in North Carolina. Nurs Outlook. 2015 Sep-Oct;63(5):585-92
8. University of Minnesota School of Public Health. https://www.sph.umn.edu/sph-2018/wp-content/uploads/docs/policy-brief-midwife-led-care-nov-2019.pdf

CONTACT Erin Gildner, MPA **PHONE** (501) 920-1432

EMAIL egildner@marchofdimes.org

MARCH OF DIMES LEADS THE FIGHT FOR THE HEALTH OF ALL MOMS AND BABIES.

MARCH OF DIMES

MARCH OF DIMES

HB 1215

ARKANSAS

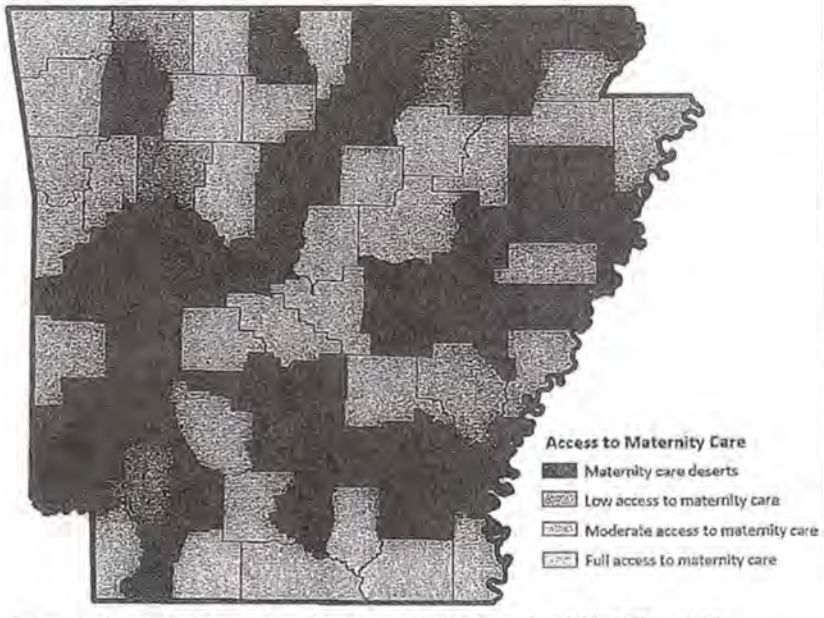
HB 1215: FULL PRACTICE AUTHORITY FOR CERTIFIED NURSE MIDWIVES

Expanding Choice & Access in Arkansas

Access to quality maternity care is a critical component of maternal health and positive birth outcomes, especially in light of the high rates of maternal mortality and severe maternal morbidity in the U.S. in recent years. However, a 2020 March of Dimes report found that more than 2.2 million women across the country childbearing age live in maternity care deserts (1,095 counties) that have no hospital offering obstetric care, no birth center, and no obstetric provider. In **Arkansas**, more than **105,000** women (15-44 yrs. old) live in maternity care deserts, with **37** of Arkansas' 75 counties having **very limited or no access** to maternity care services at all.[1]

Even higher rates of maternal mortality and morbidity and other adverse birth outcomes among Black women in the U.S. has prompted interest in models of care that can improve outcomes, including midwifery and specific evidence-based supportive and preventive care programs developed and led by midwives.[2] Moreover, even as the nation struggles to address one of the most severe pandemics in U.S. history, Arkansas' requirement for signed collaborative practice agreements "restricts CNMs from exercising their full scope of practice or from receiving hospital credentials, clinical privileges, or third-party reimbursement for services that fall within the scope of their trainings and licensure"[3] – barriers that restrict the supply of midwives and can prevent women from accessing midwifery care.[4]

MATERNITY CARE DESERTS[1]



"Now is the time to eliminate the outdated regulations and organizational and cultural barriers that limit the ability of nurses to practice to the full extent of their education, training and competence." -*Institute of Medicine*

"To provide highest quality and seamless care, ob-gyns and CNMs should have access to a system of care that fosters collaboration among licensed, independent providers." - *American College of Obstetricians & Gynecologists*

"[Scope of practice] restrictions are inefficient, increase costs, and reduce access to care."- *The New England Journal of Medicine (2020)*

"March of Dimes supports full practice authority for CNMs/CMs, which means they are able to practice to the full extent of their education and training within a health care system that provides for "consultation, collaborative management or referral as indicated by the health status of the woman or newborn." - *March of Dimes*

"There are still barriers to the practice of midwifery across the country even though midwifery has proven to be a safe and cost-effective mode of maternal health care" - *Center for Medicaid and Medicare Services*

1. March of Dimes. Nowhere to Go: Maternity Care Deserts across the U.S. September, 2020. Full Report Link: https://www.marchofdimes.org/maternitycaredesertsreport
2. Black Mamas Matter Alliance. April, 2018. Black Paper: Setting the Standard for Holistic Care of and for Black Women.
3. ACNM Board of Directors. (Reviewed and approved by the ACNM Board of Directors, Dec. 2011) Position Statement: Collaborative Agreement between Physicians and Certified Nurse-Midwives and Certified Midwives.
4. Vedam S., Stoll K., MacDorman M., Declercq E., Cramer R., Cheyney M., et al. (2018) Mapping integration of midwives across the United States: Impact on access, equity, and outcomes. PLoS ONE 13(2): e0192523. https://doi.org/10.1371/journal.pone.0192523

CONTACT Erin Gildner, MPA **PHONE** (501) 920-1432
EMAIL egildner@marchofdimes.org

FOLLOW US ON

VISIT MARCHFORBABIES.ORG

MARCH OF DIMES

OFFICE OF GOVERNMENT AFFAIRS
T (202) 659-1800
E advocacy@marchofdimes.org
MARCHOFDIMES.ORG

scope of their trainings and licensure"[5] – barriers that restrict the supply of midwives and can prevent women from accessing midwifery care.[6]

March of Dimes believes that the approach and philosophy of midwifery, as described by the International Confederation of Midwives (ICM), should be widely available as a choice for women, and endorses ICM minimum education and training standards for all midwives whose education and licensure meets the Global Standards for Midwifery Education. Further, March of Dimes welcomes efforts to increase the number of midwives of color and diversify the maternity care workforce with individuals who represent the lived and cultural experiences of the patients they serve.[7]

March of Dimes supports HB 1215 as it would allow Certified Nurse Midwives (CNMs) to practice to the full extent of their education and training. HB 1215 would allow for low-and moderate-risk women to access midwifery care as part of an integrated system of care that further integrates midwives and their model of care into maternity care. Studies have revealed the importance of integrated care and collaboration, and suggest, "When professionals collaborate on decision-making and when coordination of care is seamless, fewer intrapartum neonatal and maternal deaths occur during critical obstetric events."[8]

March of Dimes further endorses HB 1215 as we believe the bill can improve access to maternity care providers in under-resourced areas, reduce interventions that contribute to risk of maternal mortality and morbidity in initial and subsequent pregnancies, lower costs, and potentially improve the health of mothers and babies. We thank you for the state's continued efforts to improve the health of *all* moms and babies in Arkansas, and urge your support of HB 1215.

Respectfully,

Kim Parker

Kim Parker, MSPH, MSW

CC: The Honorable Mary Bentley, Representative, 73rd House District
The Honorable Kim Hammer, Senator, 33rd Senate District
Honorable Members, House Public Health, Labor and Welfare Committee

---

[5] ACNM Board of Directors. (Reviewed and approved by the ACNM Board of Directors, Dec. 2011) Position Statement: Collaborative Agreement between Physicians and Certified Nurse-Midwives and Certified Midwives.
[6] Vedam S, Stoll K, MacDorman M, et al. Mapping integration of midwives across the United States: Impact on access, equity, and outcomes. PLoS One 2018;13(2):e0192523).
[7] ACOG ACNM. (revised and reaffirmed April 2018). Joint Statement of Practice Relations between Obstetrician-Gynecologists and Certified Nurse-Midwives/Certified Midwives.
[8] Vedam S, Stoll K, MacDorman M, et al. Mapping integration of midwives across the United States: Impact on access, equity, and outcomes. PLoS One 2018;13(2):e0192523).

MARCH OF DIMES

OFFICE OF GOVERNMENT AFFAIRS
T (202) 659-1800
E advocacy@marchofdimes.org
MARCHOFDIMES.ORG

February 5, 2021

The Honorable Jack Ladyman, Chair
House Public Health, Welfare and Labor Committee
Arkansas State Capitol
500 Woodlane St. Suite 350
Little Rock, AR 72201-1089

RE: HB 1215 – To Grant Full Practice Authority to Certified Nurse Midwives - Support

Dear Chairman Ladyman:

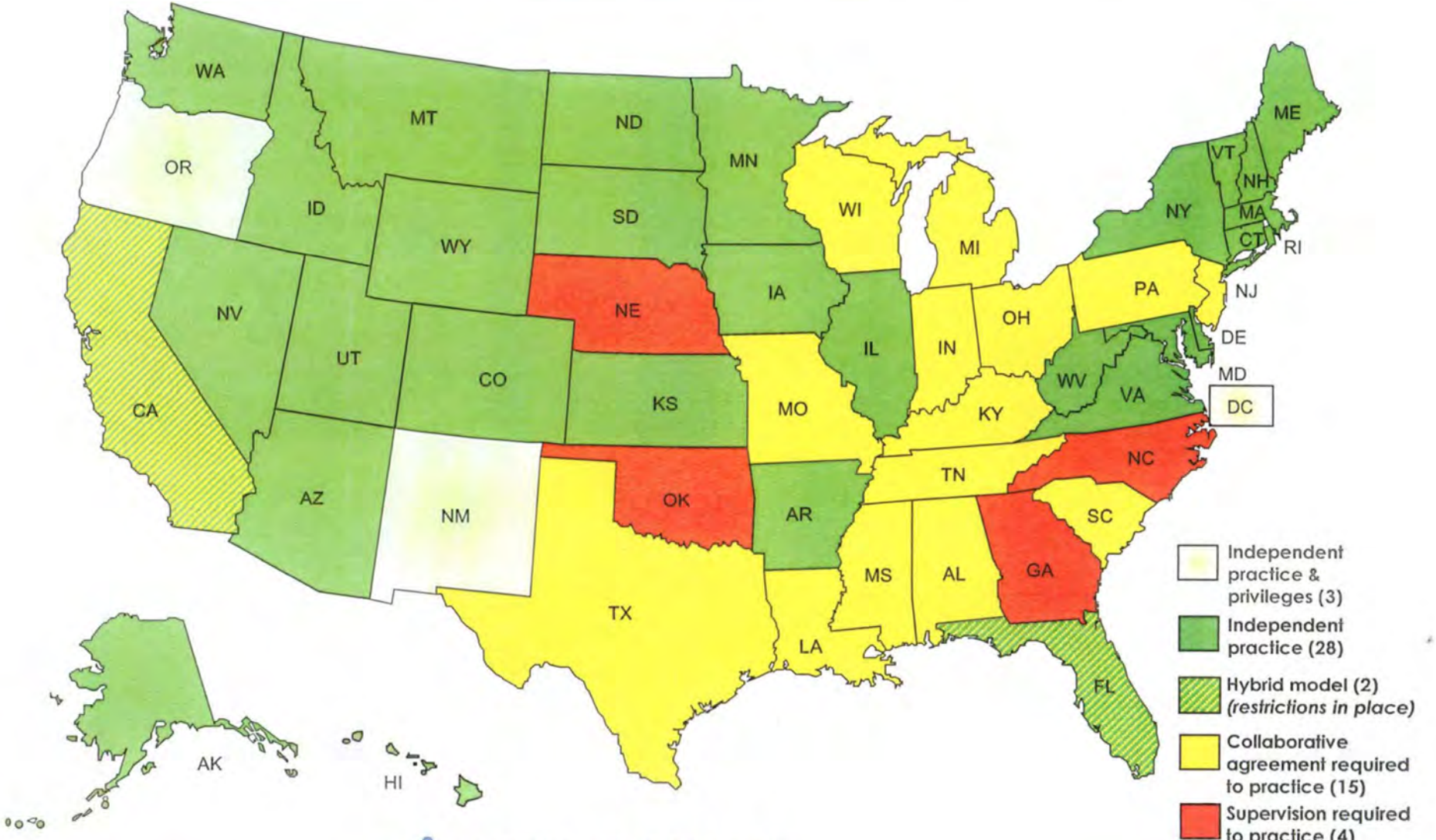
On behalf of March of Dimes, which leads the fight for the health of all moms and babies, I write today to express our support for House Bill 1215.

Access to quality maternity care is a critical component of maternal health and positive birth outcomes, especially in light of the high rates of maternal mortality and severe maternal morbidity in the U.S. in recent years. However, a 2020 March of Dimes report found that more than 2.2 million women across the country childbearing age live in maternity care deserts (1,095 counties) that have no hospital offering obstetric care, no birth center, and no obstetric provider. In Arkansas, more than 105,000 women (15-44 yrs. old) live in maternity care deserts, with 37 of Arkansas' 75 counties having very limited or no access to obstetric services at all.[1]

Even higher rates of maternal mortality and morbidity and other adverse birth outcomes among Black women in the U.S. has prompted interest in models of care that can improve outcomes, including midwifery and specific evidence-based supportive and preventive care programs developed and led by midwives.[2] Studies have documented negative experiences of Black women in traditional hospital births,[3] the occurrence of provider implicit bias, and poorer quality and differential care experienced by women of color.[4] Moreover, even as the nation struggles to address one of the most severe pandemics in U.S. history, Arkansas' requirement for signed collaborative practice agreements "restricts CNMs from exercising their full scope of practice or from receiving hospital credentials, clinical privileges, or third-party reimbursement for services that fall within the

[1] March of Dimes. (2020). Nowhere to Go: Maternity Care Deserts Across the U.S.
[2] Black Mamas Matter Alliance. April, 2018. Black Paper: Setting the Standard for Holistic Care of and for Black Women.
[3] Black Women Birthing Justice. (2016). Battling over Birth.
[4] Jain JA, Temming LA, D'Alton ME, et al. SMFM Special Report: Putting the "M" back in MFM: Reducing racial and ethnic disparities in maternal morbidity and mortality: A call to action. Am J Obstet Gynecol 2018;218(2):B9-B17.

Practice Environments for Certified Nurse-Midwives
October 2022



AMERICAN COLLEGE of NURSE-MIDWIVES With women, for a lifetime®

Encourage and Provide Resources to our communities to support unplanned pregnancies

APPENDIX H

Temporary Assistance for Needy Families "TANF"

From: Samantha Galloway
To: JuliAnn Merciez; Beverly Hicks
Subject: TANF Policies
Date: Tuesday, October 11, 2022 1:13:13 PM

With our current drug screening policy for the TANF work program, we are missing opportunities to connect Oklahomans to services and help that could stabilize the family and improve the future for their children. If we automatically deny benefits due to positive screening for substance use, we are shutting a door to treatment and hope for a full year with our statute and policies. If a parent wants the help and will engage in services, we should stand ready to serve them without roadblocks and hesitation.

> The **proposed** change would provide an opportunity for the hours needed for substance use or mental health treatment to be counted towards work activities. As long as the parent is completing treatment hours and following their Career and Family Success Plan, the TANF benefits continue. If the parent does not complete the activities and services in the plan, they would lose the cash payment and supportive services. This would close the TANF case.

When a parent is applying for TANF benefits, their income and resources are considered to determine eligibility for the program. Income requirements are low, but there is one resource limitation that is problematic for families. If a parent has an automobile with an equity value of higher than $5000, that is counted as a resource against eligibility.

> The **proposed** change would allow the parent to have one automobile not considered a resource that counts against eligibility. Reliable transportation is critical for parents to provide for their children and family. They need to make it to services, complete education and work activities and eventually maintain employment. With most of Oklahoma being rural, there is limited public transportation. Even where public transportation is available, transportation does not reach all areas, nor is it available for swing and graveyard shift. This would require a legislative change.

The last change would be to consider a woman with a positive pregnancy test to have a dependent and therefore eligible for TANF services which includes: case management, family stabilization classes and services, work training, educational assistance, transportation and a small amount of income while they actively participate.

Samantha

Samantha Galloway, Deputy Director, Interim Director
Oklahoma Department of Human Services

Empower Non-Profit Organizations, Local Faith Communities along with state agencies to support families and mothers before, during, and after childbirth

APPENDIX I

Attachment 1

Safe Haven Law

Attachment 2

Fatherhood Program

ATTACHMENT 1

Safe Haven Law

OFFICE OF THE ATTORNEY GENERAL RECOMMENDATIONS

1. Amend the Oklahoma Adoption Code (10 O.S. § 7505-3.2(C)) to increase the initial amount authorized to be expended on birth mother living and transportation expenses from $1,000 to $3,500 without first obtaining court approval. (*See* Attachment A – Proposed Amendment)

2. Amend the Oklahoma Safe Haven Law (10A O.S. § 1-2-109) to increase the number of days to relinquish a child without prosecution for child abandonment or child neglect from 30 days of age or younger to 60 days of age or younger. (*See* Attachment B – Proposed Amendment)

    a. Amend corresponding criminal law (21 O.S. § 851) consistent with the same.

3. Attorney General to host and facilitate an annual Adoption CLE Seminar beginning November 2023 (National Adoption Awareness Month). (*See* Attachment C – CLE Seminar Proposal)

4. Create an Oklahoma pro-life brand with a website that compiles pro-life resources, initiatives, programs, assistance, and educational information to fulfill task force objectives, with request for funding from Legislature.

    a. Create a marketing campaign to promote the Oklahoma pro-life brand and website that could include advertising through billboards, social media, and television ads.

    b. Add the Oklahoma pro-life website to Attorney General's SAFELINE cards.

ATTACHMENT A

PROPOSED AMENDMENT TO OKLAHOMA SAFE HAVEN LAW – RAISING AGE OF CHILD FROM 30 DAYS TO 60 DAYS

Oklahoma Statutes – Title 10A. Children and Juvenile Code
Article 1 – Oklahoma Children's Code
Chapter 2 – Reporting and Investigations
Section 1-2-109 – Relinquishment of Child to Medical Services Provider or Child Rescuer

A. A parent subject to the provisions of this act shall not be prosecuted for child abandonment or child neglect under the provisions of any statute which makes child abandonment or child neglect a crime, when the allegations of child abandonment or child neglect are based solely on the relinquishment of a child ~~thirty (30)~~ sixty (60) days of age or younger to a medical services provider or a child rescuer as defined in this section.

B. The following entities shall, without a court order, take possession of a child ~~thirty (30)~~ sixty (60) days of age or younger if the child is voluntarily delivered to the entity by the parent of the child and the parent did not express an intent to return for the child:

1. A medical services provider; or

2. A child rescuer.

C. Delivery of the child may be effectuated by an in-person transfer of the child to the medical services provider or child rescuer or by leaving the child in a newborn safety device that is:

1. Voluntarily installed by the medical services provider or child rescuer;

2. Physically located inside a police station, fire station, child protective services agency, hospital or other medical facility; and

3. Located in an area that is conspicuous and visible to the employees of the police station, fire station, child protective services agency, hospital or other medical facility.

D. A medical services provider or child rescuer that installs a newborn safety device shall:

1. Be responsible for the cost of the installation; and

2. Install an adequate dual alarm system connected to the physical location of the newborn safety device that is:

a. tested at least one time per week to ensure the alarm system is in working order, and

b. visually checked at least two times per day to ensure the alarm system is in working order.

E. Any entity identified in subsection B of this section to which a parent seeks to relinquish a child pursuant to the provisions of this section may:

1. Request, but not demand, any information about the child that the parent is willing to share. The entity is encouraged to ask about, but not demand, the details of any relevant medical history relating to the child or the parents of the child. The entity shall respect the wish of the parent if the parent desires to remain anonymous; and

2. Provide the parent with printed information relating to the rights of the parents, including both parents, with respect to reunification with the child and sources of counseling for the parents, if desired.

F. Once a child has been relinquished to any entity identified in subsection B of this section, the entity receiving the child shall:

1. Perform or provide for the performance of any act necessary to protect the physical health or safety of the child; and

2. Notify the local office of the Department that a parent of a child ~~thirty (30)~~ sixty (60) days of age or younger, in the best judgment of the receiving entity, has relinquished such child and that the entity has taken possession of the child.

G. Upon being made aware that a medical services provider or child rescuer has possession of a child under the provisions of this section, the Department of Human Services shall immediately check with law enforcement authorities to determine if a child has been reported missing and whether the missing child could be the relinquished child.

H. The Department shall design and disseminate:

1. A simplified form for the recording of medical or other information that a relinquishing parent wishes to share with the entity to whom the child is being relinquished;

2. Easily understood printed materials that give information about parents' rights with regard to reunification with a child including, but not limited to, information on how a parent can contact the appropriate entity regarding reunification, and information on sources of counseling for relinquishing parents; and

3. Media information including printed material that creates public awareness about the provisions of this act.

I. For purposes of this section:

1. "Medical services provider" means a person authorized to practice the healing arts including a physician's assistant or nurse practitioner, a registered or practical nurse and a nurse aide; and

2. "Child rescuer" means any employee or other designated person on duty at a police station, fire station, child protective services agency, hospital or other medical facility.

J. A medical services provider or child rescuer with responsibility for performing duties pursuant to this section shall be immune from any criminal liability that might otherwise result from the actions of the entity, if acting in good faith in receiving a relinquished child. In addition, such medical provider or child rescuer shall be immune from any civil liability that might otherwise result from merely receiving a relinquished child.

Oklahoma Statutes – Title 21. Crimes and Punishments
Chapter 31 – Abandonment or Neglect of Wife or Children
Section 851 – Abandoning Child under Age Ten

A. Any parent of any child or children under the age of ten (10) years, and every person to whom such child or children have been confided for nurture or education, who deserts such child or children within this state, or takes such child or children without this state, with the intent wholly to abandon it shall be deemed guilty of a felony and upon conviction thereof shall be punished by imprisonment in the State Penitentiary for any period of time not less than one (1) year nor more than ten (10) years.

B. It is an affirmative defense to a prosecution under this section that a parent voluntarily delivered a child under the age of ~~thirty (30)~~ sixty (60) days to and left the child with, or voluntarily arranged for another person to deliver a child to and leave the child with, a medical services provider or child rescuer as provided in Section 1-2-109 of Title 10A of the Oklahoma Statutes.

ATTACHMENT B

PROPOSED AMENDMENT TO OKLAHOMA ADOPTION CODE – RAISING PRE-APPROVED BIRTH MOTHER EXPENSES FROM $1,000 TO $3,500

Oklahoma Statutes – Title 10. Children
Chapter 75 – Oklahoma Adoption Code
Chapter 2 – Reporting and Investigations
Section 7505-3.2 – Cost of Adoptive Family

A. 1. An affidavit shall be attached to the petition for adoption, or may be filed after the filing of the petition for adoption, but prior to the final decree of adoption, which discloses to the court all of the costs, funds, or monies expended by the adoptive family or expected to be expended in connection with the adoption of a minor.

2. No final decree of adoption shall be entered until the court is satisfied that all costs and expenses have been disclosed, are reasonable, and that the costs and expenses do not violate the provisions of subsection B of this section. Upon its review of the affidavit of monies expended, the court shall in writing disapprove any expenditure that the court deems unreasonable or in violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes and, to the extent necessary to comply with Oklahoma law, shall order reimbursement of any consideration given in violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes. Payments made pursuant to this section shall not be a violation of Sections 865 through 870 of Title 21 of the Oklahoma Statutes. Court approval of the affidavit of monies expended shall not exempt a person, attorney or licensed child-placing agency from prosecution if the information provided to the court is fraudulent or false.

B. 1. Except as otherwise specifically provided by law, the following list of adoption-related costs and expenses specified in this paragraph may be deemed proper items for a person to pay in connection with an adoption:

a. reasonable attorney fees and court costs,

b. reasonable medical expenses for birth mother and minor to be adopted,

c. reasonable adoption counseling expenses for birth parents before and after the birth of the minor, not to exceed six (6) months from placement of the minor,

d. reasonable fees of a licensed child-placing agency, including social services staff fees provided by agency employees that include:

(1) casework services,

(2) adoptive child and family studies,

(3) placement services,

(4) certification of agency facilities,

(5) admission assessments, and

(6) service planning,

e. (1) reasonable and necessary living expenses of the birth mother that are incurred during the adoption planning process or during the pregnancy, not to exceed two (2) months after the birth of the minor or after the consent or relinquishment of the birth mother. Reasonable and necessary living expenses include but are not limited to:

(a) housing expenses,

(b) utilities, such as electric, gas, water, or telephone bills,

(c) food for the birth mother and any minor child of the birth mother residing in the home of the birth mother,

(d) travel expenses for transportation to support the pregnancy, such as gasoline, bus fares, or providing for the temporary use of a vehicle during the pregnancy, and

(e) child care or foster care for any minor child of the birth mother associated with pregnancy-related medical care.

(2) Reasonable and necessary living expenses shall not include:

(a) any expenses met by existing resources of the birth mother,

(b) any expenses used for the support of family members who are not minor children of the mother,

(c) any expenses for recreational or leisure activities, and

(d) the purchase or gift of an automobile,

f. reasonable expenses for a home study,

g. reasonable and necessary costs associated with an international adoption,

h. reasonable expenses legally required by any governmental entity related to the adoption of a minor, and

i. a one-time gift to the birth mother from the prospective adoptive parents of no greater value than One Hundred Dollars ($100.00).

2. In addition, all expenses approved by the court should be commensurate with other customary fees for similar services by persons of equivalent experience and training where the services are performed. Any services provided outside this state shall be allowed in an amount as if the services had been performed within the State of Oklahoma.

3. The provisions of this subsection shall apply to living and transportation expenses incurred after the biological mother of the minor contacts the child-placing agency or attorney for adoption services.

4. The provisions of this subsection shall not prohibit a court from extending any time period, or including any additional costs and expenses in connection with an adoption other than those specified in this subsection based on unusual circumstances or need. If additional costs and expenses in connection with an adoption are approved by the court, the court shall specify in writing the unusual circumstances that justify the approval.

5. Except as otherwise ordered by the court except for good cause shown, all payments made pursuant to this section shall be paid directly to the third-party provider of services or goods. Any living expense paid on behalf of a birth mother in a domestic adoption which is not supported by an itemized receipt shall not be allowed for payment. If gift cards are issued to pay expenses, an itemized receipt verifying purchases shall be required for approval by the court. The accounting shall include vouchers for all monies expended, copies of all checks written and receipts for all cash payments attesting to the accuracy of the accounting.

6. No person, attorney or licensed child-placing agency shall have a financial interest in a third-party provider of services or goods, without disclosing in an affidavit the financial interest to the court and the other parties to the adoption.

C. Any person, attorney, or licensed child-placing agency desiring to pay living and transportation expenses on behalf of a birth mother is authorized to expend an initial amount not to exceed ~~One Thousand Dollars ($1,000.00)~~ Three Thousand Five Hundred Dollars ($3,500) plus deposits for housing and utilities for such costs and expenses without first obtaining court approval as required by paragraph 1 of subsection D of this section. Any such costs and expenses shall be disclosed as is otherwise required by the Oklahoma Adoption Code.

D. 1. Except for the amount authorized by subsection C of this section, the payment of any living or transportation expenses for benefit of the birth mother as authorized in subparagraph e of paragraph 1 of subsection B of this section shall be approved in advance by the court.

2. The person, attorney, or licensed child-placing agency desiring to pay living or transportation expenses on behalf of a birth mother which exceed the amount in subsection

C of this section shall file a petition for an order approving payment of adoption-related expenses.

3. The petition for an order approving payment of adoption-related expenses shall be filed in the district court where the adoption petition is to be filed, as provided in Section 7502-1.2 of this title.

4. The petition shall be captioned: "In the matter of Baby (name)." The petition shall include a listing of all anticipated living or transportation expenses to be paid on behalf of the birth mother for which court approval is being sought. If additional expenditures not previously authorized by the court are needed on behalf of the birth mother, an amended petition may be filed with the court.

5. The petition shall be heard by the court within ten (10) days of filing. The court clerk shall charge the same cost for a petition for payment of expenses as is charged for the filing of an adoption petition. In the event an adoption petition is later filed in the same county, the adoption petition shall be filed as an amended petition within the same case in which payment for expenses was approved and no additional court costs shall be required. In the event a petition for preadoption termination of parental rights is later filed in the same county, the court clerk shall not assess an additional filing fee and may use the same case number as for the petition for adoption.

6. Any order authorizing payment shall be attached to a petition for adoption. If no adoption petition is filed, the court shall retain jurisdiction to enter any orders deemed appropriate regarding the reimbursement of costs and expenses paid. If the child is placed for adoption outside the State of Oklahoma, any such order shall be submitted to the Interstate Compact of the Placement of Children and to the court in the other state where the petition for adoption is to be filed.

E. 1. In addition to the adoptive family affidavit requirement of subsection A of this section, a Disclosure Statement of Adoption-related Costs and Expenditures shall be prepared in writing by the person, attorney or child-placing agency in a direct-placement adoption. The Disclosure Statement of Adoption-related Costs and Expenditures shall include a declaration of all fees, expenses, and costs charged or expected to be charged for the adoption including, but not limited to, the following:

a. retainer fees, the hourly rate, and the number of hours billed for the adoption,

b. any fee charged for preplacement or other home studies of any prospective birth parents, regardless of whether the home study was performed by an outside agency,

c. any costs, fees or expenses or any other thing of value paid to or on behalf of the birth parents related to the adoption of a minor by any party other than the adoptive parents, and

d. any other fees and expenses related to the adoption not otherwise specifically listed in this section.

2. The Disclosure Statement of Adoption-related Costs and Expenditures containing true and accurate information shall be filed before or when the final decree of adoption is ordered in each adoption of a minor in this state. A statutory Disclosure Statement of Adoption-related Costs and Expenditures is provided in Section 2 of this act. A copy of the statement shall be a public record to be compiled and maintained by the court clerk and available for public inspection; provided, that any information identifying the person, attorney or child-placing agency in the direct adoption shall be redacted from the document prior to filing with the court clerk and shall not be made public. In addition, the identity of the child, the adoptive parents, and the birth parents shall be redacted from the document prior to filing with the court clerk and shall not be made public.

ATTACHMENT C

ATTORNEY GENERAL'S ANNUAL ADOPTION CLE SEMINAR PROPOSAL

- Full day seminar with six, 50-minute Continuing Legal Education (CLE) presentations (including one hour of ethics)
- Beginning November 2023 (National Adoption Awareness Month)
- Objectives:
    - Raise awareness for adoption in community and within the Oklahoma Bar
    - Create community enthusiasm for and interest in adoption
    - Build attorney competency for those practicing in adoption
    - Help lawyers stay up-to-date on current laws and trends in adoption
    - Give lawyers who practice in adoption an opportunity to connect
- Potential Topics:
    - Current laws and trends in adoption
    - Competency and candor in adoption practice (ethics)
    - Understanding the Oklahoma Adoption Code
    - Relative Adoptions
    - Private/infant Adoptions
    - DHS Adoptions
    - Contested adoptions
    - Indian Child Welfare Act (ICWA)
    - G.A.L., C.A.S.A., & Foster Care topics

ATTACHMENT 2

Fatherhood Program

OKLAHOMA

FATHERHOOD INITIATIVE

RESEARCH & PLAN PROPOSAL

COMPILED BY:

LIFE FACTORS FATHERLESS MINISTRIES

TABLE OF CONTENTS

3. Oklahoma Fatherhood Initiative Goals

4. Why Fatherlessness

6. Oklahoma-Specific Studies

8. Oklahoma Fatherhood Initiative Plan

10. Life Factors Fatherless Ministries

FATHERHOOD INITIATIVE GOALS

- TO SEE FATHERS REUNITED WITH THEIR CHILDREN
- TO SEE FATHERLESS CHILDREN CARED FOR BETTER
- TO SEE SINGLE MOMS ENCOURAGED AND HELPED
- TO SEE DADS BETTER EQUIPPED
- TO SEE ASSIST GRANDPARENTS FILLING THE GAP
- TO SEE FATHERLESS CHILDREN BREAKING THE CYCLE
- TO SEE MOTHERLESS CHILDREN CARED FOR BETTER
- TO SEE SINGLE DADS ENCOURAGED AND HELPED
- TO SEE HOMELESS CHILDREN FIND A HOME
- TO SEE HURTING CHILDREN GET THE RESOURCES THEY NEED TO HEAL
- TO SEE COMMUNITY GROUPS WORK TOGETHER
- TO SEE CHURCHES MINISTER TO THESE FAMILIES BETTER
- TO SEE OKLAHOMA HELP CHANGE THE TRAJECTORY FOR MANY FAMILIES FROM FAILURE, POVERTY, AND STRUGGLE TO SUCCESS, PROSPERITY, AND STABILITY!

WHY FATHERLESSNESS?

The affects of fatherlessness are worse than ever.
If we don't do something who will?

“

Fatherless Children are at a dramatically greater risk of drug and alcohol abuse, mental illness, suicide, poor educational performance, teen pregnancy, and criminality.

— U.S. Department of Health and Human Services, 1993

The #1 Social Issue in the United States is Fatherlessness.

Look at the statistics and quotes below to help you understand why this is such a big deal!

“

“Children whose parents separate are significantly more likely to engage in early sexual activity, abuse drugs, and experience conduct and mood disorders. This effect is especially strong for children whose parents separated when they were five or younger.”

— Journal of the American Academy of Child and Adolescent Psychiatry 33 (1994)

“Three out of four teenage suicides occur in households where a parent has been absent.” *– Jean Bethke Elshtain, Family Matters: The Plight of America’s Children. The Christian Century (July 1993)*

“85% of youths in prisons grew up in a fatherless home.” *– U. S. D.H.H.S. Bureau of the Census*

“80% of rapists motivated with displaced anger come from fatherless homes.” *- Criminal Justice & Behavior, Vol. 14*

SEX & ABORTION

AFFECTS OF FATHERLESSNESS

"Adolescent females between the ages of 15 and 19 years reared in homes without fathers are significantly more likely to engage in premarital sex than adolescent females reared in homes with both a mother and a father." – *Contextual Effects on the Sexual Behavior of Adolescent Women, Journal of Marriage and Family 56 (1994)*

"A white teenage girl from an advantaged background is five times more likely to become a teen mother if she grows up in a single-mother household than if she grows up in a household with both biological parents." – *Facing the Challenges of Fragmented Families, The Philanthropy Roundtable.*

DRUGS & ALCOHOL

AFFECTS OF FATHERLESSNESS

"Fatherless children are at a dramatically greater risk of drug and alcohol abuse." – *The U.S. Department of Health and Human Services. National Center for Health Statistics. Survey on Child Health.*

"Teenagers living in single-parent households are more likely to abuse alcohol and at an earlier age compared to children reared in two-parent households." – The Effects of Family Cohesiveness and Peer Encouragement on the Development of Adolescent Alcohol Use. A Cohort-Sequential Approach to the Analysis of Longitudinal Data, Journal of Studies on Alcohol 55 (1994)

"The absence of the father in a home affects significantly the behavior of adolescents and results in the greater use of alcohol and marijuana." – Deane Scott Berman, Risk Factors Leading to Adolescent Substance Abuse, Adolescence 30 (1999)

POOR EDUCATION & DROPOUTS

AFFECTS OF FATHERLESSNESS

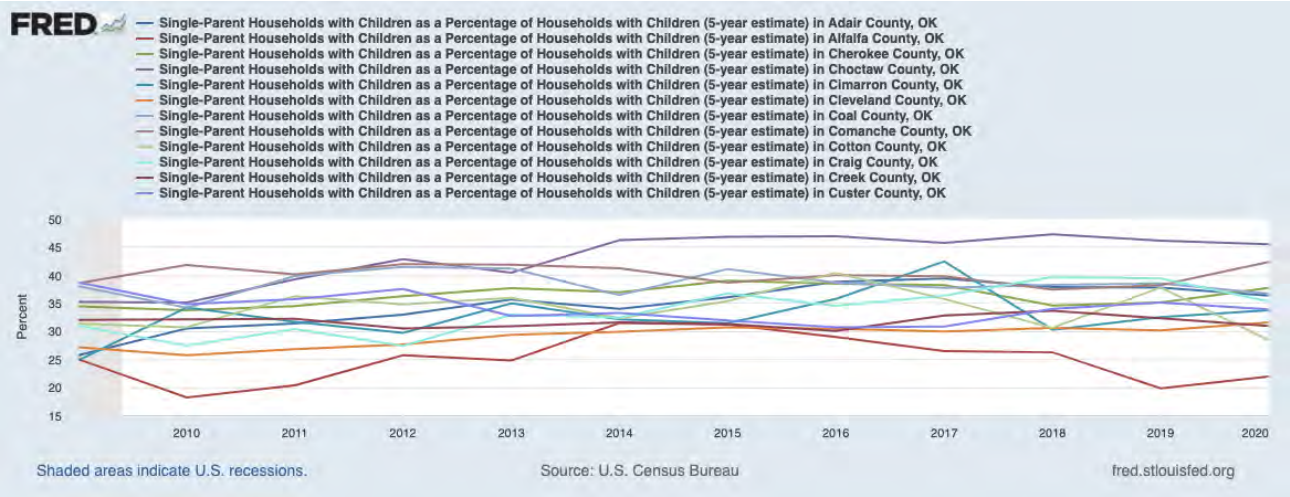
"In studies involving over 25,000 children using nationally representative data sets, children who lived with only one parent had lower grade point averages, lower college aspirations, poor attendance records, and higher dropout rates than students who lived with both parents." – *Sara McLanahan, Gary Sandefur, Growing Up With a Single Parent: What Hurts, What Helps.*

WORRY, HOPELESSNES, FEAR, STRESS, AND ANXIETY.

These are the feelings that many individuals have when they think of some or all of the issues above.

Fatherlessness is affecting everyone in the United States!

OKLAHOMA SPECIFIC STUDIES



2020 SINGLE-PARENT HOUSEHOLDS WITH CHILDREN AS A PERCENTAGE OF HOUSEHOLDS WITH CHILDREN, ANNUAL: OKLAHOMA

ADAIR COUNTY, OK 36.29070
ALFALFA COUNTY, OK 21.89349
ATOKA COUNTY, OK 30.22020
BEAVER COUNTY, OK 26.79245
BECKHAM COUNTY, OK 39.15115
BLAINE COUNTY, OK 30.03565
BRYAN COUNTY, OK 36.94173
CADDO COUNTY, OK 35.52542
CANADIAN COUNTY, OK 22.52450
CARTER COUNTY, OK 35.04435
CHEROKEE COUNTY, OK 37.68047
CHOCTAW COUNTY, OK 45.41096
CIMARRON COUNTY, OK 33.69963
CLEVELAND COUNTY, OK 31.50301
COAL COUNTY, OK 36.63551
COMANCHE COUNTY, OK 42.26275
COTTON COUNTY, OK 28.36439
CRAIG COUNTY, OK 35.26851
CREEK COUNTY, OK 30.86453
CUSTER COUNTY, OK 33.80699
DELAWARE COUNTY, OK 33.77206
DEWEY COUNTY, OK 16.66667
ELLIS COUNTY, OK 26.96335
GARFIELD COUNTY, OK 33.60694
GARVIN COUNTY, OK 39.12119
GRADY COUNTY, OK 23.39132
GRANT COUNTY, OK 30.92784
GREER COUNTY, OK 38.40683

OKLAHOMA SPECIFIC STUDIES

2020 OKLAHOMA SINGLE-PARENT HOUSEHOLDS WITH CHILDREN AS A PERCENTAGE OF HOUSEHOLDS WITH CHILDREN, ANNUAL:

HARMON COUNTY, OK 22.53521
HARPER COUNTY, OK 14.92537
HASKELL COUNTY, OK 28.85958
HUGHES COUNTY, OK 37.96680
JACKSON COUNTY, OK 34.27978
JEFFERSON COUNTY, OK 36.87822
JOHNSTON COUNTY, OK 38.31283
KAY COUNTY, OK 44.92561
KINGFISHER COUNTY, OK 26.79426
KIOWA COUNTY, OK 37.04453
LATIMER COUNTY, OK 33.10105
LE FLORE COUNTY, OK 37.97268
LINCOLN COUNTY, OK 24.54324
LOGAN COUNTY, OK 25.41799
LOVE COUNTY, OK 28.66044
MCCLAIN COUNTY, OK 18.84384
MCCURTAIN COUNTY, OK 38.15789
MCINTOSH COUNTY, OK 36.44119
MAJOR COUNTY, OK 22.28989
MARSHALL COUNTY, OK 35.64955
MAYES COUNTY, OK 35.75281
MURRAY COUNTY, OK 29.56393
MUSKOGEE COUNTY, OK 43.15613
NOBLE COUNTY, OK 26.70807
NOWATA COUNTY, OK 35.11706
OKFUSKEE COUNTY, OK 29.20434
OKLAHOMA COUNTY, OK 35.81377
OKMULGEE COUNTY, OK 39.37980
OSAGE COUNTY, OK 29.01543
OTTAWA COUNTY, OK 42.36842
PAWNEE COUNTY, OK 31.93069
PAYNE COUNTY, OK 26.46715
PITTSBURG COUNTY, OK 32.76353
PONTOTOC COUNTY, OK 34.92553
POTTAWATOMIE COUNTY, OK 31.62771
PUSHMATAHA COUNTY, OK 32.84804
ROGER MILLS COUNTY, OK 31.48688
ROGERS COUNTY, OK 26.83944
SEMINOLE COUNTY, OK 37.44794
SEQUOYAH COUNTY, OK 36.18340
STEPHENS COUNTY, OK 29.12974
TEXAS COUNTY, OK 28.63378
TILLMAN COUNTY, OK 33.96482
TULSA COUNTY, OK 34.00465
WAGONER COUNTY, OK 26.85631
WASHINGTON COUNTY, OK 32.11756
WASHITA COUNTY, OK 32.10863
WOODS COUNTY, OK 31.13343
WOODWARD COUNTY, OK 30.26445

SOURCE: HTTPS://FRED.STLOUISFED.ORG/RELEASE/TABLES?RID=412&EID=360742#SNID=360797

OK FATHERHOOD INITIATIVE PLAN

MISSION

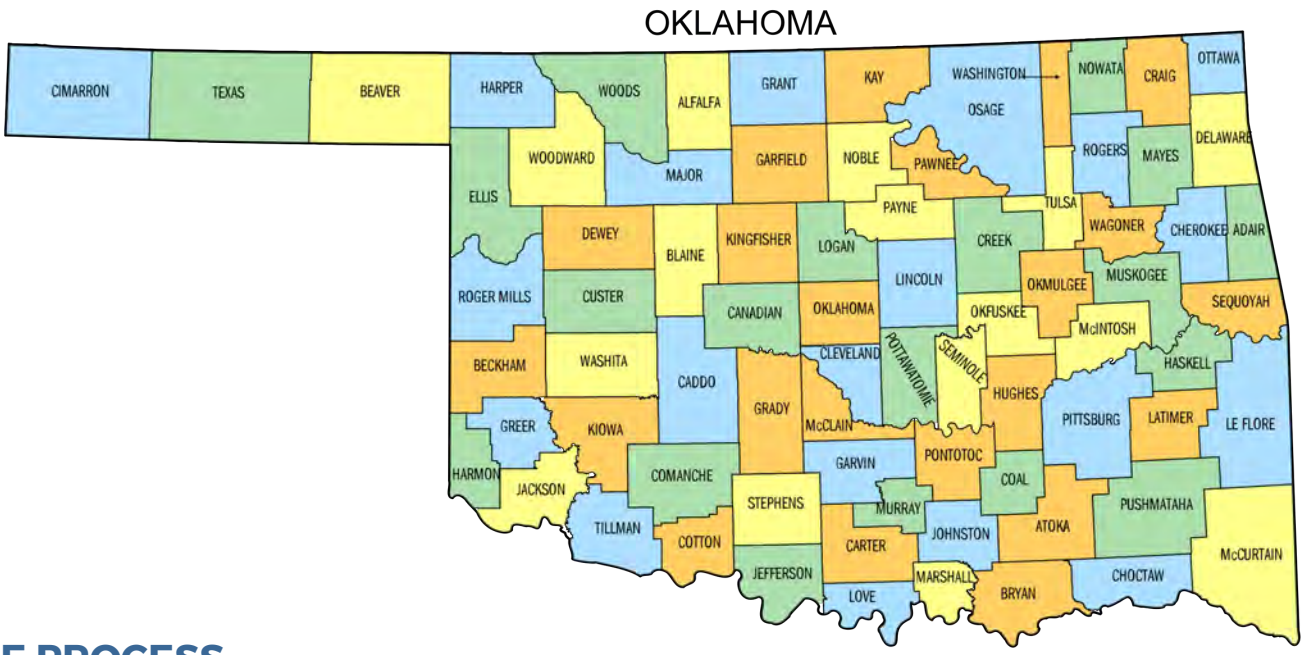
To make a lasting impact in the lives of fathers and fatherless families residing in the state of Oklahoma.

MISSION

Impacting fathers and fatherless families by identifying their critical urgent and long-term needs, incorporating established local and national organizations to address these individuals' and families needs statewide through a county-by-county initiative.

COUNTY-BY-COUNTY INITIATIVE

Breaking down the efforts of the Oklahoma Fatherhood Initiative into a county-by-county operation will allow for more local impact and greater statewide success.



THE PROCESS

- **Perform a comprehensive review of the fathering and fatherless needs of each County:**
  - Fatherhood
  - Fatherlessness
  - Motherlessness
  - Single Moms
  - Single Dads
  - Grandparents Raising Their Grandchildren
  - Foster Care
  - Homeless Children
  - Single Dads
  - Mentoring
  - Etc.

OK FATHERHOOD INITIATIVE PLAN (CONT.)

THE PROCESS (CONT.)

- **Compile a list of local, statewide, and national resources available to these families:**
  - Medical
  - Social
  - Mental Health
  - Housing
  - Financial
  - Employment
  - Developmental
  - Etc.
- **Promote the available resources locally to individuals and families:**
  - Promote local Oklahoma Fatherhood Initiatives through local government authorities, public schools, medical facilities, local government facilities, and local community partners.
- **Optional Ideas:**
  - Helping students break the cycle is much easier than helping adults take corrective action. To assist in this:
    - Perform a statewide school assemblies tour focused on leadership that includes the topic of fatherlessness helping students break the cycle in their future.
    - Provide access to custom optional educational resources focused on leadership that includes the topic of fatherlessness.

LIFE FACTORS FATHERLESS MINISTRIES

THIS PLAN WAS DEVELOPED BY LIFE FACTORS MINISTRIES

Life Factors Ministries is a non-profit ministry currently focused exclusively on leading fatherless families to the Heavenly Father through spreading awareness, creating unique resources, speaking, partnering with local churches, and establishing local fatherless family ministries and support for these families nationwide.

DEVELOPED BY SEAN & JACKIE TEIS

Since 2008 Pastor Sean Teis and his wife Jackie have been evangelizing and discipling fatherless families nationally through the non-profit organization they founded, Life Factors Ministries. Sean is an ordained minister and has served on staff and volunteered at various churches throughout the country. They have authored six books for fatherless families and similar situations. They have also developed GodismyDad.com for fatherless families, which also includes a mobile app in the Apple and Google Play Stores. Sean has spoken on fatherlessness at a variety of events including conferences, colleges, and in 200+ churches throughout the United States. Recently they did a Hope for Fatherless America National Tour for three years ministering to the fatherless and teaching on fatherlessness in churches and other various events across the United States! Sean is also a national youth speaker which includes public school assemblies. Currently, in addition to their National Ministry, they are helping establish local fatherless family ministries in Las Vegas, NV, and Oklahoma. You can learn more about the Teis Family, Life Factors Fatherless Ministries, and God is my Dad at lifefactors.org.

HOW WE CAN HELP

We offer our services to the State of Oklahoma to lead or assist in the development of The Oklahoma Fatherhood Initiative. Our organization is already in the initial process of recruiting and working with at least one church in every county of the state of Oklahoma to establish local single-mom support groups. In addition to our ministry's efforts, we are willing to work out a plan to offer county-by-county support to The Oklahoma Fatherhood Initiative to help carry out this plan of action.