ALASKA LEGISLATURE COMMITTEE FILES 1981-1982 8672
1540 SHESS SB 747 (#1)

However, most lay midwifery advocates feel that equitable standards have rarely been established at the state level and thus, exercise caution in recommending regulatory measures. Conditions vary from state to state; and whether the general findings reported in this memorandum might apply in Alaska could bear further investigation. Alaska has a very small lay midwife population as evidenced by the fact that there are only two known lay midwives practicing in Anchorage. Because of this, it might not be in the State's interest to pursue steps toward regulation at this time. The subject of regulation of these practitioners can evoke heated and emotional debate by lay midwives, medical professionals, and public health administrators. On occasion, it appears that more conflict has emerged from the process of legislative action than existed prior to the public's attention to the matter. Part of the problem is surely due to the new definitions that lay midwifery has assumed combined with a lack of model legislation at the State level. Consequently, it may be wise for Alaska to sit back and watch the effects of other states' regulatory provisions prior to adopting legislation of its own.

Background Information

The definition of midwifery has expanded since its inception in the U.S. but basically still refers to the management and attendance of childbirth. In today's society, there are three types of midwife: 1) the traditional midwife, known as the "granny," who has obtained her training in labor and delivery solely through apprenticeship and experience; 2) the nurse-midwife, who generally has obstetric nursing experience and graduate coursework in midwifery; and 3) the modern lay midwife, who generally has been trained through a combination of coursework and apprenticeship. There are more lay midwives, including both the "granny" and her contemporary counterpart, than practitioners of nurse-midwifery. There are about 1800 nurse-midwives in the U.S. In Texas alone a state which exemplifies the proclivity of lay midwifery in the South, there are an estimated 1500 lay midwives. The predominance of the lay midwifery population may be due to the rigorous training required for nurse-midwifery certification. Conversely, state laws that in the past have made it relatively easy to be certified as a lay midwife have been a factor in the maintenance of lay midwives populations.

Most laws governing the practice of lay midwifery were adopted by states in the first quarter of this century. These laws were aimed at the "granny" midwife and, for the most part, set very basic standards of control, generally only requiring a certificate of practice dispensed by the authorized licensing board or agency. As the availability of medicine

and professional health care expanded, the use of midwifery declined from about 50 per cent of all births in 1900 to only 12 per cent by 1935. But many states left their lay midwifery laws unaltered, presumably in deference to the few remaining "granny" midwives. The rate of decline continued until the 1960's when a resurgent interest in lay midwifery occurred. At this point, a number of states found themselves with laws considered by many medical associations and health departments to be outmoded by current health standards. As a result, movements were made in some states to amend existing legislation, thus marking the beginnings of a conflict between the medical and lay midwifery communities regarding a mutually satisfactory interpretation of their respective roles.

At basic issue is the question of home delivery versus hospital delivery. Births attended by lay midwives generally take place in the home or in some instances at special maternity centers. The American Medical Association contends that non-hospital based deliveries place undue risk upon the safety of the infant, presumably because of the mother's distance from emergency medical equipment and professional medical staff. Conversely, lay midwives argue that the nation's obstetricians have poorer maternal and child morbidity and mortality rates than do lay midwives who often are attending impoverished, high-risk patients. As an added point, lay midwife associations offer World Health Organization data that indicate better morbidity and mortality rates in developed countries, such as Sweden and Great Britain, where midwives are used more extensively than is the case in the United States.

Midwives maintain that as doctors of medicine, obstetricians have been taught to treat pregnancy from a pathological perspective rather than as a natural condition, and consequently have developed the same reliance upon anaesthetics and surgery as is prevalent in the medical diagnosis of morbidity. Lay midwives further contend that such procedures as episiotomy, a surgical incision of the perineal tissue to enlarge the vaginal opening, have become routine obstetrical practices because they shorten the delivery time rather than for any health function. The medical profession, in turn, regards lay midwifery and home-births as unnecessary regressions to a lost era, which ignore the capabilities of modern medicine.

In comparison to other developed nations, the U.S. utilizes midwives to a very limited degree. In Sweden, every pregnant woman, including those who are to deliver by Caesarean section, has a midwife. In the

Netherlands, midwives have responsibility for all normal births as is evidenced by the Dutch government's refusal to pay for a doctor's services. if a midwife is available. According to an article by Christopher Norwood in a May 1978 issue of Ms., approximately 80 per cent of the world's babies are delivered by midwives. In the U.S., according to the National Center for Health Statistics, only approximately 1.5 per cent of the nation's births occur out-of-hospitals. Of these, 92% are attended by lay midwives and others, e.g. relatives, taxi cab drivers.*

DDETERMINING THE ROLE OF REGULATION IN LAY MIDWIFERY

The need for regulation of health care personnel has long been regarded as essential by state governing entities. Occupational licensing, as with other professionals, is the basic component of the regulatory process. The fundamental purposes of licensure are to control entry into a profession and to establish and enforce minimum standards of practice. Persons found to be deficient in, or in violation of, these basic standards may be denied licensure; or, if already licensed, may have their licenses revoked or suspended. It is generally regarded that this process protects the public from the purchase of incompetent or unsafe health care services.

The degree to which regulatory controls should be employed proffers controversy. In this matter, development of regulatory provisions for midwifery can be especially complex because of the conflicting opinions regarding its function..The resultant effects of the regulatory process, according to lay midwifery advocates, have been varied.

Potential Benefits of Regulation

Most midwifery advocates interviewed concurred that licensure may be necessary to establish minimum standards of practice, an assurance that is apparently becoming more essential as the interest in home birth continues to grow. For example, Shari Daniels, President of the National Midwives Association and Director of the El Paso Birth Center, stated that under current Texas law, the only requirement to practice midwifery is registration at the local courthouse. Under this relatively loose Texas law, the resurging interest in home births has prompted a number

---

* The percentage of hospital-based births attended by certified nurse-midwives is not available. However, as there are only about 1800 certified nurse-midwives in the United States, the percentage of births attended by these practitioners is projected to be equally low.

of untrained, unskilled people to register as midwives. The danger in this, of course, is the assumption by a consumer seeking midwifery services that she is obtaining the care of an adequately experienced individual. As a result, amendments to the Texas law are currently being proposed that will establish much stricter standards and guidelines for the practice of lay midwifery, e.g. the successful completion of State-approved training and a State-administered examination prior to licensure.

Arizona has pursued similar measures by strengthening a lenient law with precise regulations. In effect since 1957, Arizona's law on lay midwifery merely requires submittal of application to practice, establishes conditions under which a license is revoked or suspended, and authorizes its Department of Health Services to draft rules and regulations, which until several years ago, had few restrictions. The Department of Health Services now requires lay midwives to have completed an approved course of study and to pass a State-administered examination comprised of written, oral, and practical sections. The Department also requires every client of a lay midwife to retain a back-up support physician. Ruth Beeman, the State's administering officer for the lay midwifery program, considers these measures to have been worthwhile in providing better assurances for the health and protection of the public.

An anticipated secondary result of state regulation is improved quality of training in lay midwifery programs. Because a purpose of licensure is the establishment of quality standards, a certain degree of service deficiency in lay midwifery programs can exist in those states, such as Alaska, that do not legally address alternative childbirth practice.

Although not prohibited by law to practice, neither are midwives actually recognized by states such as ours. The result is legal ambiguity clouding the scope and, in turn, the quality of service provided by lay midwives. An example of paramount significance concerns the relationship between lay midwives and physicians. Because Alaskan law does not identify the function of lay midwifery, a number of physicians will not admit as a client any pregnant woman intending to have a lay midwife-attended birth. Consider Juneau: of three clinics available for prenatal care, one clinic refuses the admission of home-delivery patients; a second admits alternative-birth clients but charges them a $400 set fee rather than billing on a per visit basis (thereby automatically committing a client to $400 worth of visits); leaving the third, a public clinic operated through the State, as the only clinic admitting home-birth

clients without restriction. Lay midwives maintain that situations such as these would be alleviated to some extent by regulation.

One local lay midwife compares Alaska to Washington where lay midwifery is regulated. She maintains that regulation can assist to strengthen the relationship between lay midwives and physicians, noting that most lay midwives in Washington perform their deliveries with emergency transport vans and adequate back-up support of physicians. By contrast, in Juneau, she maintains, a number of women have been forced to misrepresent their intentions to their physicians in order to obtain prenatal examinations. She added that because there is no licensure she is denied the use of certain health care tools and equipment, contrasting the local situation with those of Washington and Colorado where she would be entitled to access to labs. Although not a proponent of licensure of lay midwifery in Alaska at this time, she feels that regulation should be considered for the state in the future.

Another Alaskan midwife, who asked that her identity not be disclosed, feels that practitioners would be better protected under licensing. Licensed to practice nursing, she feels she has had problems maintaining her license because of obstetrical opposition to her practice of lay midwifery. She feels her past problems could have been eased had Alaska promulgated clear regulations regarding the role of lay midwifery. Nonetheless, she views the degree of current bias by the medical community to be so strong that an objective consideration of regulation is not currently possible.

Potentially Negative Effects of Regulation

Lay midwifery advocates seem to agree that the primary disadvantage of regulatory control lies not in the concept of licensure but rather in the potential for abuse of its purpose. In other words, lay midwives believe that state regulatory laws can be merely a slimly disguised means for the elimination of midwifery practice. Upon examination of developments subsequent to licensure in states such as Alabama, it is difficult to allay lay midwives' fears. Alabama's law exempts lay midwives from the licensing requirements of nurse-midwifery, stating that these requirements shall not "prevent lay midwives holding valid health department permits from engaging in the practice of lay midwifery as heretofore provided until such time as said permit may be revoked by the county board of health." In 1979, the Alabama State Department of Health issued an order to suspend approval of any new licenses and suggested that old licenses be proscribed from renewal. Other states, through the process of regulation, have established standards so high that the purpose

of lay midwifery appears violated with only "professional" practitioners able to meet requirements. Arizona, with its oral, written, and practical exams has been criticized by the National Midwives Association for its overly competitive admissions criteria; the Association cites the state's total population of only 24 licensed midwives as evidence.

Along similar lines, lay midwives also express apprehension regarding the basis for the minimum standards of eligibility set by states. In this area, there appear to be two issues of concern: 1) should physicians have a role in developing standards for lay midwifery? and 2) can a consensus be reached concerning minimum standards? Regarding the former issue, the InterNational Association of Parents and Professionals for Safe Alternatives in Childbirth (NAPSAC) assume unequivocally that medical doctors cannot give valid consideration to lay midwifery regulation because of their philosophical opposition to the practice. David Stewart, Executive Director of NAPSAC, views the Association's attitude to be justified because midwifery is a profession distinct from that of a physician. Juneau's lay midwife views NAPSAC's philosophy to be biased. She believes that physicians can serve a valuable function in lay midwifery, noting the support she received from medical doctors in Washington as an example. However, she, too, expressed concern that the objectivity of an occupational licensing board may be susceptible to biased philosophies of any physicians on the board.

Similar in nature to this issue, is the general area of concern regarding minimum standards for lay midwifery. Lay midwives differ from one another concerning what constitutes minimally acceptable experience. Unlike certified nurse-midwives, governed by uniform standards defined by the American College of Nurse Midwives, lay midwives operate from no agreed upon standards. For example, David Stewart feels it is important that lay midwifery remain distinct from nurse-midwifery. As spokesperson for NAPSAC, he asserts that lay midwives want concentrated training for all aspects of childbirth and care rather than courses of study required in nursing programs which may be largely irrelevant to childbirth.

Shari Daniels believes in stressing practical experience in training lay midwives, nurse-midwives, and family-practice physicians alike. In terms of lay midwifery, she maintains that lay practitioners must have intensive experience in all aspects of normal and abnormal childbirth in order "to expect the unexpected" in delivery conditions anticipated to be routine. Unlike most lay midwifery birth clinics, her El Paso Maternity Center handles twin and breech deliveries as well as other abnormal births. Five per cent of the Center's patients are classified as high-

risk, requiring emergency transport and hospitalization. According to Ms. Daniels, some states do not want to license lay midwives trained at her center because of the extent of their experience. Because most regulations limit lay midwives to the attendance of normal deliveries, there apparently is some apprehension that lay midwives experienced with abnormal births will not provide for emergency transport when there is cause.

Regulatory Control; Is it Necessary?

In analyzing the effects of regulation, some consideration should be given to the validity of licensure in general as it is currently conceived. At the national level, recent research has questioned the appropriateness and effectiveness of regulations. For example, there appears to be a growing thought that occupational licensing places unequitable and unnecessary restrictions on the mobility of licensed professionals that are no longer in accord with today's transient society. The effectiveness of licensure as a consumer protection tool has been examined in other research. Dr. Patrick O'Donoghue (a medical doctor), in a publication entitled Evidence About the Effects of Health Care Regulation, as prepared for the National Science Foundation, states the following:

> Licensure stops at least one step short of actually assuring on a continuing basis the quality of health care delivered by a paractitioner. In other words, the real concern of a governmental licensing agency should be the protection of the public over the professional lifetime of the practicing health care professional. Up to the present, however, measures of the quality of care have not permitted direct regulation of professional activity. Therefore, the states through their laws have attempted to assure the quality of health care by establishing and certifying the entering qualifications of professionals. They do go slightly beyond this initial assurance in that if a practitioner has been licensed as qualified and shows himself to be unqualified, the law puts the police power of the state into action in removing the dangerous practitioner from his profession. On the other hand, ... the grounds on which a practitioner may disqualify himself are relatively narrow.

Research performed under Dr. O'Donoghue's direction leads him to a tentative conclusion that licensure may not be valid unless it employs continuing education opportunities and routine reviews of a professional's practices

throughout the duration of his or her career. Dr. O'Donoghue notes that the rate of disciplinary actions by state medical licensure boards is quite low, averaging less than 200 actions per year nationally between 1963-1967.

Commensurate with these findings, lay midwifery proponents question apparent disparities between physicians and lay midwives in the matter of license revocation. As one lay midwife in Alaska articulated, "A single error in judgment by a licensed midwife in California can cause her to be unqualified for practice, while such is rarely the case with a physician." Advocates feel that should licensure be employed, it must be devoid of professional bias. Current practices weigh the responsibility for protection of the mother and infant over the individual rights of the mother to exercise her own decision concerning the type of care to be received. NAPSAC argues that this practice violates the freedom of choice and feels that current practice must be amended to embody this freedom in public health law. As the concept of health care expands from traditional interpretations to new philosophies as imbued in naturapathic medicine and alternative birth, NAPSAC maintains that a State's regulatory function also will require expansion and a more adaptable structure so that freedom of individual choice in the treatment of morbidity and health conditions may be respected.

NAPSAC recommends voluntary compliance with licensure standards combined with a strong consumer education program. Voluntary compliance permits the State to establish minimum standards of practice for licensure and to penalize practitioners who falsely represent themselves as having attained state licensure. However, voluntary compliance does not force practitioners to seek licensure if this means acceptance of standards that they regard as foreign to their philosophies of health care. With non-mandatory licensure, the health care consumer, it is argued, has greater freedom concerning the type of services to be purchased.

MODEL REGULATORY PROVISIONS REGARDING LAY MIDWIFERY

Although not requested by your office, in the course of our research, we became curious about the nature of regulatory legislation in certain states having recently addressed the lay midwifery issue. and felt this information might be useful for your purposes. We also became interested in learning what alternative birth associations view to be model legislation regarding lay midwifery. Only two states, Arizona and Florida, were commended to us. Arizona's legislation has met with mixed reaction, but

appears to be generally regarded by midwives as representing a positive approach to regulation. Copies of Arizona's rules and regulations have not as of yet been received by this office; we will transmit them to your office upon arrival.

In Florida, a comprehensive legislative proposal regarding lay midwifery was developed over the past few years. However, the bill, recently died in committee in a 9-affirmed, 10-opposed vote. It is attached for your review. Probably the bill's greatest significance is the standards for licensure eligibility it contains. The bill grants authority to the Department of Professional Regulation to promulgate standards for the development of a midwife apprentice program; proscribes apprentice lay midwives from the receipt of compensation for the provision of services except under the supervision of the sponsoring licensed midwife or physician; and requires the apprentice midwife to participate in a minimum of 50 births, 25 of which have included the "primary responsibility for the prenatal, intrapartal and postpartal management and care, under the observation and supervision of the sponsor."

Although successful completion of a state-administered examination is required, the standards permit the option for a lay midwife seeking a license to include as evidence of experience either a certificate from a midwifery school, a certificate of completion from a training program approved by the administering department, or "evidence of completion of a midwife apprenticeship program."

Training and experience appear to be regarded as essential components of regulatory legislation. This is of special significance in Alaska as no formal training programs are available in the state. Consideration should be extended to the minimum standards of eligibility, especially in light of the varying opinions on this matter. Shari Daniels of the National Midwives Association recommends a program of lay midwifery training that entails a minimum of 50 births with a practicing midwife. Although no states currently offer training for beginning lay midwifery, she regards the following to be a model training course:

3 months prenatal care in a hospital

3 months labor and delivery, "on-floor" in a hospital

3 months neo-natal intensive care and postpartal care

50 births minimum with practicing lay midwife

6 months in-class training with lay midwife, e.g., childcare education and postpartum education

3-12 months probationary status with normal deliveries (with lay midwife on call)

She added that lay midwifery training programs in Europe generally place far greater emphasis on "on-floor," practical training than do programs offered in the United States. Arizona's standards place more emphasis on the amount of theoretical or academic training received, requiring only an attendance at 15 births. Ms. Daniels regards their standards to be highly deficient.

Arizona is the only state, however, to offer a state-administered program in continuing education for lay midwives. Offering workshops in subject areas needing special concentration, such as treatment for excessive bleeding during intrapartal and postpartum stages, the program has been well received by NAPSAC. A strong program in continuing education could possibly counteract the deficiencies perceived by Dr. O'Donoghue in occupational licensure of health care professionals as a public protection mechanism.

We hope this memorandum has met your purposes. It is important to note that David Stewart, of NAPSAC, and Sha[illegible] Daniels, of the National Midwives Association, were pleased to learn that we were conducting preliminary research regarding regulation of lay midwifery whether or not legislation is proposed based on our findings. In the event that legislation is drafted, Ms. Daniels has offered her assistance in reviewing any drafts.

BB/bf
Attachment

INTERVIEW LIST

Dr. David Stuart:
Executive Director
NAPSAC
Post Office Box 207
Marble Hill, Missouri 63764
Telephone: (314)238-2010

Ms. Shari Daniels:
Director
El Paso Maternity Center
1119 E. San Antonio
El Paso, Texas 79901
Telephone: (915)533-8142 (Maternity Center)
(915)565-9623 (Home number)*
*After 6:00 p.m. El Paso time

President
National Midwives Assoc
P. O. Box 163
Princeton, N.J.

Ms. Ruth Beeman:
(Nurse-midwife)
Coordinator
Lay Midwifery Program
Department of Health Services
State of Arizona
Tucson, Arizona
Telephone: (602)255-1024

Ms. Margaret Crawford:
(nurse-midwife)
Greater Juneau Borough Health Clinic
Juneau, Alaska
Telephone: 586-3736

Ms. Peggy Newman:
Director
BABE
Prince of Peace Drive
Anchorage, Alaska
Telephone: 694-9050

Dr. Charles Muller:
Medical Director
Blue Cross of Washington & Alaska
P. O. Box 327
Seattle, Washington 98111
Telephone: (206)361-3417

Dr. Patrick O'Donoghue:*
President
Policy Center, Inc.
Denver, Colorado

*Although we did not interview Dr. O'Donoghue, we have included information provided by him as compiled in his book, Evidence About the Effects of Health Care Regulation.

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

Pouch Y, State Capitol
Juneau, Alaska 99811
(907) 465-3991

April 21, 1981

MEMORANDUM

TO: Representative Tony N. Vaska

FROM: Peter B. Froehlich
Issues Analyst

RE: Oregon Attorney General Opinion on Lay Midwives
Research Request 81-98

Your staff has asked us to analyze a June 17, 1977 Oregon Attorney General's opinion concerning the practice of lay midwifery. This opinion was discussed in two memoranda to you, dated March 27 and March 31, 1981, from Leslie Longenbaugh of this office. The opinion itself was forwarded to you several days later.

In summary, our analysis of the opinion indicates that it is based on Oregon statutory language which is similar to Alaska statutory and regulatory language. A strong argument can be made, therefore, that an Alaska Attorney General opinion would be likely to reach the same conclusion as does the Oregon opinion.

The Oregon opinion addresses two questions: 1) whether a person in Oregon, other than a licensed physician or nurse, can legally be a midwife and assist at a normal childbirth; and 2) if so, whether the person (lay midwife) can legally administer medicine or perform an episiotomy. The first question was answered affirmatively and the second negatively by the Oregon Attorney General's office.

Permissibility of Lay Midwifery

The basis for the first answer that one could legally serve as a midwife without licensure as a physician or nurse hinges upon the explicit use of the word "midwife" in the Oregon statutes requiring the filing of birth certificates.

The Oregon statutes provide in pertinent part:

> 432.205 (1) a certificate of birth shall be filed with the local registrar or the registration district in which the birth occurred within the time prescribed by the division, by either the physician or midwife in attendance at the birth, or if not so attended, by one of the parents;.... (Emphasis added)

> 432.210 If neither of the parents of the newborn child, unattended by either physician or midwife, is able to prepare a birth certificate, the local registrar shall secure the necessary information for the preparation of a birth certificate from any person having knowledge of the birth. (Emphasis added)

A predecessor Oregon statute, adopted in 1905, also referred specifically to "midwives." The Oregon Board of Examination and Registration of Graduate Nurses was established six years later, in 1911, to license people who engage in the practice of nursing, without any mention of midwives or the functions they performed.

However, like the Alaska legislature, the Oregon legislature never defined the practice of nursing to specifically include midwifery and never required licensure of midwives. Thus, the Oregon opinion concludes that the Oregon legislature has recognized "midwifery as an occupation distinct from nursing" for which there has never been a licensing requirement imposed.

The Alaska statutes concerning birth certificates provide in part:

> Section 18.50.160 Birth Registration...
>
> (c) When a birth occurs outside an institution, the certificate shall be prepared and filed by one of the following in the indicated order of priority:
>
> (1) the physician in attendance at or immediately after the birth; or in his absence;
>
> (2) a person in attendance at or immediately after the birth; or in his absence;....
>
> Section 18.50.240 Fetal Death Registration...
>
> (b) The funeral director or person acting as the funeral director who first assumes custody of a fetus shall file the fetal death certificate. In his absence, the physician or other person in attendance at or after the delivery shall file the certificate of fetal death....

Although the word "midwife" is not currently used in either of these sections, nor indeed, in any other Alaska statute, the word is used in a 1960 regulation, 7AAC 05.370, adopted under AS 18.50.150.

> 7AAC 05.370 PERSON RESPONSIBLE FOR FILING... When a birth occurs outside an institution, the following shall be the order of responsibility for preparing and filing the certificate:

(1) physician in attendance;

(2) nurse in attendance;

(3) sub-registrar of village, if any;

(4) midwife or any other person in attendance (Emphasis added)

The broad language of the statutes (i.e., "person in attendance at the birth,") and the specific use of the word "midwife" in the regulations indicate that the practice of midwifery is recognized and permitted in Alaska, as in Oregon, as an occupation distinct from nursing. Likewise, just as in Oregon, there is no Alaska requirement that midwives be licensed. Furthermore, the word "midwife" was used in the Alaska statute requiring birth certificates from its first enactment in 1917 (§2 ch 35 SLA 1913) until it was rewritten more broadly in 1960 (§13 ch 18 SLA 1960) to include anyone attending a birth, and not only midwives. The Alaska Nurses Examining Board was not established until 1941 (ch 46 SLA 1941), and the practice of nursing was not defined until 1949 (§1 ch 28 SLA 1941). Neither enactment and none of the several subsequent amendments to the nurse licensing statutes has prohibited or mentioned midwifery directly or indirectly.

Scope of Lay Midwifery

The second part of the Oregon opinion concluded that lay midwives could not legally administer medication or perform episiotomies. This result was based on Oregon statutes and Attorney Generals' opinions which define the practice of medicine and of nursing to include performing surgery and administering medication respectively.

Alaska statutes clearly also include performing surgery such as episiotomies within the definition of the practice of medicine (AS 8.64.380(2)(e)) and therefore, a license to practice medicine is required by AS 08.64.170(a). Performing surgery has been included in the statutory definition of the "practice of medicine" since the first Alaska Medical board was created in 1917 (§14 ch 8 SLA 1917).

The Alaska definition of the "practice of professional nursing" includes:

> ...the administration of medications and treatments prescribed by a licensed physician or dentist which require substantial specialized judgment and skill based on knowledge and application of the principles of biological, physical and social science.... (Emphasis added) AS 8.68.410(5)

Thus, some medications can be legally administered only by licensed nurses, while other medications can be administered by anyone, including a lay midwife. Under the Alaska Administrative code, the

prescription eyedrops which prevent infant blindness due to maternal gonorrhea, must be placed in the eyes of newborn infants by a "physician, nurse, or certified (nurse) midwife." (7AAC 27.111) It is not perfectly clear that the eyedrops are medication that requires the type of "substantial specialized judgment" which, under AS 8.68.410(5) would mean they must be administered by a licensed nurse (or physician). Nonetheless, the Department of Health and Social Services eliminated in 1980 any remnant of doubt by adopting 7AAC 27.111 which requires in no uncertain terms that the drops be administered by a doctor or nurse. Therefore, anyone other than a physician or dentist who administers these eyedrops or any other prescribed medication which requires "substantial specialized judgment and skill" must be licensed as a nurse under AS 8.68.160.

In conclusion, Alaska law is very similar to Oregon law on this subject, and we believe that an Alaska Attorney General opinion would probably reach a result very similar to that of the Oregon opinion. Informal discussion with an Assistant Alaska Attorney General further confirms this supposition.

Please contact us if we can provide any further information or assistance. You may also wish to contact the Legal Services Division of the Legislative Affairs Agency concerning this subject.

PF/bf

March 16, 1982

747

Charlie Parr
ESS
And all State Legislators
Juneau, Alaska.

Dear Sir,

I am writing You concerning Senate Bill 747, concerning Home Birth. I have had a home birth myself and support Sen Frachers Bill. Homebirth needs control but also, it needs to be a viable alternative for those parents that want it. We need to make Home birth safer not stop it. In reality, Parents will choose home birth whether this bill is passed or not, but this bill does attempt

to make this Alternative better for everyone.

Thankyou for your time, and hopefully your support.

Sincerely,

Marylynne C. Maryanna
SRA Box 23961
Anchorage, Alaska 99507.

Senator Charlie Parr
HESS Committee
Pouch V
Juneau, Alaska
99811

March 22, 1982

Senator Charlie Parr and all other Legislators

Sir:

I am in support of SB 747 "An Act Related to Midwifery". I feel that pregnancy and childbirth is a natural physiological process and, in as much, a state of wellness rather than disease. For that reason, I feel that safe birthing alternatives such as midwifery within birthing center and home deliveries be offered as options as well as the hospital settings.

I urge you and other legislators to support passage of this bill, so families might exercise their freedom of choice in matters relating to safe, healthy childbirth.

Sincerely,

Leo + Carolyn Evans

Note:

Gentlemen:

I, Carolyn Evans, am a Childbirth Educator in Sitka + feel very strongly that HB747 must + should be passed legalizing midwives in Alaska. We live a rural + isolated area, + we need choices + alternatives for our

(over)

mothers & couples when it comes to their childbirth!

Please vote in favor of this bill!!

Thank you,

C Evans
Box 902
Sitka, AK
99835

Statistical Outcomes of Homebirths in the U.S.: Current Status

Lewis E. Mehl, MD*

We began our studies on the statistical outcomes of home deliveries because of the tremendous rise in the number of home deliveris occurring across the country and the lack of any available data on their outcomes. We had hoped to provide data which parents and professionals could use on their individual scales of relative value along with the experiential data on emotional outcomes as they weighed the risks and benefits to determine what kind of delivery they would choose.

First, I will report the statistical outcomes of 1146 planned homebirths in the San Francisco Bay Area and then I will compare this to 180 similarly selected hospital deliveries performed by one of the same groups of physicians. This is part of some ongoing work in which we are attempting to accumulate a matched hospital series with which to compare the home delivery statistics.

Our sources of data (Mehl, et al., 1976)[1] were the medical charts from five home delivery services in northern California. The five services included 3 physician groups and 2 lay midwife groups as follows:

(1) A rural-based family practice in Western Marin County (Point Reyes) composed of 3 family physicians and 3 registered nurses, performing both home and hospital deliveries since 1970 as part of a comprehensive family practice.
(2) An urban-based family practice in Hill Valley composed of 2 physicians and 2 registered nurses--one a maternity nurse practitioner--in practice since 1973.
(3) An urban-based group in Berkeley consisting of 1 physician (whose training had been in pediatrics/neonatology) and 2 registered nurses, affiliated with a women's health cooperative in Berkeley. This group did not have hospital privileges and performed only home deliveries, referring women requiring hospital care to local obstetricians. They had been functioning since early 1974.
(4) 10 lay midwives from Santa Cruz County, functioning in both urban and rural settings without immediate medical supervision, and with limited medical backup, performing births since 1971.
(5) A rural lay midwife (Nancy Hills) from Sonoma County with good physician backup, performing births since 1970.

---

* *LEWIS E. MEHL is on the faculty of the University of Wisconsin, Center for Health Sciences, Department of Family Practice and Psychiatry, and is Coauthor of "The Homebirth Trend," "Management of Complications of Home Delivery," and other works.*

In the latter service, records had been kept only for the last 171 of her estimated 500 deliveries during a five year time span. All records until April 1975 were reviewed by one of us (LEM). They were adequately detailed regarding prenatal care, intrapartum and post partum events, and infant and maternal follow-up. The groups represented the following percentages of the total sample:

(1) The Point Reyes physician group:	40.4%
(2) The Mill Valley physician group:	11.2%
(3) The Berkeley physician group:	7.6%
(4) The Santa Cruz County midwives group:	30.8%
(5) The Sonoma County midwife:	10.0%

The lay midwife from Sonoma County (Nancy Hills) began her midwifery activities accidentally, visiting a friend in labor. Others learned she had attended a birth and asked her to their deliveries, until she eventually developed a reputation as a midwife (See the Chapter by Nancy Hills later in this book for more details on her midwifery experience). Her training was self-acquired through reading and experience. The Santa Cruz midwives began functioning in much the same fashion, becoming midwives to meet an experienced need in the community, and educating themselves through discussion groups, experience, and reading. Their average fee per birth was $35.00, so that their motivation was clearly not monetary. Typically, they were women who had had an unattended homebirth and had decided to help other women avoid their predicament. The Sonoma County midwife had good medical backup through physicians (mainly family practice residents) at the Community Hospital of Santa Rosa, who, while unwilling to attend home deliveries, were willing to discuss problems over the telephone and handle complicated deliveries in the hospital. The Santa Cruz group had poor medical backup, and were not able to obtain telephone consultation. They were often heavily criticized and condemned when bringing women to the hospital who needed hospital care, and had few supportive physicians to whom they could refer women with complications. Labors in the Sonoma area were occasionally as far as one hour from a hospital, although the usual distance was approximately 15 minutes. Labors in the Santa Cruz area were occasionally as far as 45 minutes from a hospital, but usually ranged from 5 to 15 minutes. Transport facilities for both lay midwife groups consisted of the midwife's car without any specialized support equipment. Equipment present at deliveries with the lay midwives was also minimal and typically consisted of a bulb syringe, sterile gauze, sterile gloves, a fetoscope, blood pressure cuff, urine dipsticks for testing acetones, glucose, and protein, a portable scale, and little else. Their mode of operation has been described by Lang.[10]

The physician services brought a home delivery kit with them to births. Typically the nurse would attend the labor from its inception and the physician would arrive during the second stage for primigravidae and late first stage for multigravidae. The physician kit included IV equipment, oxytocin and methergine for use after delivery, other emergency drugs, forceps to use if necessary, as well as suture supplies. (However, there was no intravenous oxytocin or forceps used at home in this series.) The only equipment or drugs not present in their kit and usually present in the hospital was whole blood. A

complete list of supplies is available on request (see addresses of authors tabulated at end of book). The transport vehicle for the physician groups was also the car belonging to the birth attendant. For the Point Reyes group, the closest hospital was 20 miles. For the Berkeley and Mill Valley groups the distance from a hospital was usually 5-10 minutes.

Prenatal care was essentially the same for all groups and did not deviate from the standards recommended by the American College of Obstetrics and Gynecology with regard to visit frequency, laboratory tests, and clinical assessment. The lay midwife groups required a minimum of two visits to a physician at which time clinical pelvimetry, Rh status, blood type, rubella titre, hemoglobin, hematocrit, VDRL and gonorrhea culture were determined. Nutrition, the avoidance of prenatal medication, and the psycho-social aspects of pregnancy were stressed more than is typically done in prenatal care, and visits usually lasted 20-30 minutes for the physician groups involving discussions with the nurse and then the doctor. For the lay midwife group, the visits were typically 30-60 minutes. Three women had no prenatal care, and first presented themselves in labor.

There was no limiting of weight gain. It was felt that every woman should gain at least 20-30 lbs. during pregnancy and the average weight gain was in the 30-35 lb range. Women with chronic medical disease were encouraged to seek a hospital, as were women who remained anemic. The threat of a hospital birth usually increased patient compliance with iron-containing preparations and, as a result, the number of women delivering at home with hemoglobins of less than 11.0 gm% was minimal (less than 12).

Intrapartum care was essentially similar among the groups as well. The lay midwife groups did not perform breech or twin deliveries at home. The physician groups did, on occasion, although only after explaining the problems inherent in such deliveries. After 1976 the usual policy was to recommend Cesarean section to women with low breech scores (Zatuchni-Andros breech score) and to attend women with breech scores indicating safe vaginal delivery at home if the women so desired and requested. (Since the completion of this study, the lay midwives have begun attending some breech deliveries at home because of parents' dissatisfaction with the rising incidence of Cesarean section in the breech presentation.)

Labor prolongation, of itself, was not treated as a complication requiring hospitalization. Uterine inertia was initially often treated with buccal oxytocin by the physician group at home, and if results were not forthcoming, the woman was transported to the hospital for IV oxytocin. Prolongation of the second stage of labor was also not treated as a complication; indeed, most of the practitioners felt that a slower second stage with little pushing by the mother (often 2-3 hours) was *preferable* to a shorter second stage (less than 2 hours) characterized by an intense pushing effort by the mother. Cases of second stage arrest, however, if not responsive to buccal oxytocin over a 1-2 hour period, were transported to the hospital for forceps delivery. The midwives were unable to administer oxytocin and, consequently, sent more of their patients to the hospital for dystocia.

LAY MIDWIVES HAVE BEGUN ATTENDING SOME BREECH DELIVERIES AT HOME BECAUSE OF PARENTS' DISSATISFACTION WITH THE RISING INCIDENCE OF CESAREAN SECTION IN THE BREECH PRESENTATION.

Both groups monitored the fetal heart rate closely throughout the first and second stage, using a fetal stethoscope or Doppler ultrasound fetoscope, and felt that any significant drop in heart rate requiring intervention would be noticed. Blood pressures were checked approximately every 1-2 hours during labor. Fetal heart tones were checked as often as after every contraction during second stage if some variability had been noted or if the mother were pushing particularly hard, but usually were taken every 15 minutes during second stage and every 25-40 minutes during first stage, depending on the character of the labor and the fetal heart rate pattern. The fetal heart was occasionally listened to through a contraction and for some time afterwards to determine the presence of any abnormal pattern.

Meconium staining without fetal heart rate irregularities was not treated. (Meconium staining with fetal heart rate irregularities was cause for hospitalization, and the infants, with one exception, were treated with intubation and lavage.) Prolonged rupture of membranes in a term sized infant was followed, but not treated unless necessary. It was felt that if the mother did not show signs of amnionitis and had a good socioeconomic/nutrition background, that intervention was not necessary within 24 hours. If labor had not begun by 24 hours, induction in the hospital was usually undertaken.

The midwives practiced perineal massage to prevent tearing, while the physicians typically did not. This was optimally done by the mother and father for the month prior to delivery and was done by the midwife during the last half of the second stage. This was not done consistently by all parents or all midwives, but it was felt by the midwives that it helped prevent lacerations during delivery.

Forceps deliveries were not conducted at home, and no analgesia or anesthesia was administered at home. If the latter was desired, hospital transport was necessary for the woman to receive it.

The room in which the delivery occurred was kept warm and the baby was given to the mother immediately after delivery to hold and nurse, with blankets being placed around the infant to prevent heat loss. The umbilical cord was not clamped until it ceased pulsating except in Rh negative mothers, in whom it was clamped immediately after delivery. RhoGam was given to the Rh negative mothers within 48 hours. Silver nitrate was not applied routinely to the infants' eyes unless there had been a past history of gonorrhea, or one or both parents were unsure of the other. Most of the infants were fed only by breast without glucose or formula supplementation, and were fed ad lib.

Home visits were usually made each day for the first three postpartum days, and telephone contact was maintained with the couple. The infants were seen by the physicians at one week in their offices and again at four weeks. After that point, the recommendations for well

child care of the American Academy of Pediatrics were observed. Midwives referred infants for newborn care after the first week to pediatricians or family physicians, and continued to follow the infants themselves for varying periods of time. All mothers had a postpartum examination from 4-6 weeks by a physician, and for the lay midwives, results of this examination were recorded in their records.

STUDY POPULATION

Hazell[8] has described the demographic characteristics of the homebirth population in the San Francisco Bay Area in a study of 300 home deliveries from the socioanthropological standpoint. Her subjects overlapped to some extent with our sample and were derived from the same subject pool--San Francisco Bay Area couples planning homebirth.

TABLE 1
HOME DELIVERY STUDY POPULATION

Contacted Home Delivery Services	1,348	100.0%
Screened Out, Medical Dx	55	4.1%
Decided Against	147	10.9%
Attempted Home Delivery*	1,146	85.0%
Physicians	685	59.8%
Midwives	461	40.2%
Taken to Hospital:	136	11.9%
Physicians	58*	5.1%
Midwives	78*	6.8%
Completed Home Delivery	1,010	74.9%

* Patients hospitalized represented 8.5% of physicians' cases, 16.9% of midwives' cases.

In Hazell's study, 90% lived in typical American fashion, with the father gainfully employed, in a single family dwelling with one or two cars, were not members of an ethnic minority, not on welfare, and without household servants. A general characteristic of the group was described as a self awareness shown in a concern for nutrition, health foods, ecology, humanistic psychology, and a strong feeling for a natural birth process. Typically, the mother and father had both attended college, but neither had graduated. The fathers' occupations were noted to vary through the range of occupations present in the Bay Area, from auto mechanic to physician to homesteader. Only one tenth were classified as "hip," in rebellion to "normal American Values," living in a variety of alternative styles.

In our study, patients of the lay midwives tended to belong more to the counter-culture than Hazell's population. In the physician groups, more professional couples were included. A detailed socioeconomic study on one of the lay midwife groups (the Sonoma County sample) is currently being coordinated by one of us (KEH), and a psychological/developmental outcome study on a subsample of the Santa Cruz group is being analyzed by two of us (LEH and CHP).

Table 1 (p. 77) presents statistics on the selection of the study population. Only 4% of those women who requested a home delivery were screened out for medical reasons (including premature labor, toxemia, and underlying systemic disease). This low percentage would seem to indicate that women seeking home deliveries are a self-selected healthy group, probably knowledgeable about childbirth, and the importance of nutrition in pregnancy. Nine women with previous fetal deaths were included in the homebirth sample. Previous obstetrical complications (with the exception of Cesarean section) were not used as screening criteria, since it was felt that these were, to some extent, iatrogenic.

11% of the women who considered home delivery decided against it for non-medical reasons. This was highest in the lay midwife groups and may have been related to a hesitation to deliver without physician backup. In the physician-directed services, a common reason cited for switching to a hospital birth was that Medicaid would cover only hospital deliveries.

TABLE 2
CHARACTERISTICS OF MOTHERS

	Number	Percent	Calif 1973
Mother's Age:	1,146	100.0%	100.0%
< 20	60	5.2	17.3
20-34	1,068	93.2	77.6
≥ 35	18	1.6	5.1
Parity:	1,146	100.0%	100.0%
para 0	729	63.6	43.3
para 1	237	20.7	31.0
para 2	126	11.2	13.3
para 3	34	3.0	6.0
para ≥ 4	18	1.6	6.3
Prenatal Care Began:	1,146	100.0%	100.0%
1st trimester	707	61.7	72.8
2nd trimester	362	31.6	20.2
3rd trimester	74	6.5	4.5
none	3	0.3	2.4*

*includes prenatal care unknown

Of the 1,146 women beginning labor at home with the intention of delivering there, 136 (11.9%) were sent to the hospital to complete their delivery for treatment of intrapartum (11%) or postpartum (0.9%) problems. 88% of the deliveries begun at home were completed there. Thus, of the initial set of women contacting the home delivery services, 75% successfully delivered at home.

Four surviving infants required hospitalization for other than phototherapy within 3 days of delivery; a fifth was born very prematurely in the hospital, and remained there for one month.

Table 2 (p. 78) presents characteristics of the mothers and compares them to California statistics for 1973. Over 90% were in the optimal childbearing age of 20-34 years, the average being 24.9 years. There was a high number (64%) of primigravidae in this series, and a incidence of grand multiparity of less than 1%. Virtually all of the women were trained in childbirth classes such as Bradley or Lamaze. 1145 women attempted breastfeeding (i.e., all but 1 of the series of 1146 total) and at 6 months of age 1138 were successful (i.e., 99.4%). These women tended to begin prenatal care later than the California 1973 sample, perhaps because they felt more knowledgeable and therefore, less of a need.

TABLE 3
CHARACTERISTICS OF PRESENTATION & DELIVERY

Presentation:	1,146	100.0%
Vertex	1,125	98.2%
Brow	(3)	(0.3%)
Shoulder	(3)	(0.3%)
Breech	21	1.8%
Delivery:	1,146	100.0%
Cesarean	28	2.4%
Vaginal	1,118	97.6%
Analgesia only	(14)	(1.2%)
Anesthesia only	(3)	(0.3%)
Both	(6)	(0.5%)
None	(1,095)	(95.5%)
Oxytocin:		
1st & 2nd Stage Labor	85	7.4%
3rd Stage Labor	235	20.5%
Forceps:		
Low Forceps	11	1.0%
Mid Forceps	6	0.5%
Perineal lesions:		
Lacerations Requiring Repair	148	12.9%
Episiotomies	89	7.8%

Table 3 (above) presents statistics on the presentations and deliveries. Most of the deliveries were vertex presentations (98.2%). Of the 21 breech presentations (1.8%) 10 delivered successfully, by choice, at home, while 11 were taken to the hospital. The latter were all unexpected and with lay midwives.

1% of the women studied had low forceps deliveries, 0.5% had mid forceps deliveries, and 2.4% were delivered by primary Cesarean section. The California Cesarean section rate was 9.9% in 1973. It was the Mayo Clinic[1] found, half of the Cesarean sections are repeat; then California's primary section rate would approximate 50% (or double) the rate of this study.

OF THE 1,146 HOMEBIRTHS OF THIS STUDY, ONLY 8% HAD EPISIOTOMIES AND ONLY ANOTHER 13% HAD TEARS IN NEED OF REPAIR; THE LOWEST INCIDENCE OF TEARING WAS AMONG LAY MIDWIVES, ONLY 5%, WHILE IT WAS 40% AMONG THE HOMEBIRTHS ATTENDED BY PHYSICIANS.

Lacerations requiring repair were lowest (4.4% and 5.7%) in the lay midwife groups and highest (40.2%) in the physician group with the shortest experience in performing home deliveries without episiotomies. Similarly, episiotomies were much lower for the lay midwife groups than for the physician group..

TABLE 4
INDICATIONS FOR THE 45 C-SECTIONS & FORCEPS DELIVERIES IN THE 1,146 WOMEN BEGINNING LABOR AT HOME

LOW FORCEPS DELIVERY	
Protracted descent	6
Arrest of descent	2
Dysfunctional labor	
Brow presentation with arrest of descent	
Fetal heart drop	
	11
MID FORCEPS DELIVERY	
Protracted descent	3
Arrest of descent	1
Dysfunctional labor	
Fetal heart drop, occiput posterior (OP) presentation	1
	6
C-SECTIONS	
Cephalopelvic disproportion (CPD)	16
Failure to descend, OP presentation, relative CPD.	6
Arrest of active dilation, fetal heart drop, cord 4x neck	
Prolapsed cord	
Breech with amnionitis	
Psychotic reaction to labor	
Acutely dropping fetal heart tones	
Toxemia	1
	28

Analgesia and/or anesthesia were used in only 2% of the vaginal deliveries. During the first and second stage of labor, 38 women (or 3.3%) received buccal oxytocin at home, while 47 women (or 4.1%) received IV oxytocin in the hospital. Following completion of the third stage of labor, 146 mothers received oxytocics at home (given entirely by the physician group), 89 in the hospital. The mean length of first stage was 10.2 hours for primigravidae and 4.6 hours for multigravidae; second stage means were 118 and 45 minutes respectively. Table 4 (above) presents the indications for forceps deliveries and Cesarean sections in the women beginning labor at home. There were 23 C-sections for cephalopelvic disproportion, 1 for fetal distress, 1 for toxemia, 1 for amnionitis, and 1 for psychotic reaction to labor.

TABLE 5
COMPLICATIONS OF LABOR & DELIVERY
(INDIVIDUAL WOMEN MAY BE LISTED UNDER MORE THAN 1 COMPLICATION)

Complication	PRIMIGRAVIDAE (N=135/729=19.5%) Home	Hosp	Total	Percent[1]	MULTIGRAVIDAE (N=[illegible]=18.7%) Home	Hosp	Total	Percent[1]
Intrapartum								
Dystocia[2] 1st stage	27	34	61	8.4%	2	12	14	3.4%
Dystocia 2nd stage	10	14	24	3.3	4	9	13	3.1
CPD	0	23	23	3.2	11	1	12	2.9
Meconium stain, only	24	3	27	3.7	3	4	7	1.7
FHT(2,3 meconium)	6	13	19	2.6	7	0	7	1.7
Hypertension	3	6	9	1.2	1	2	3	0.7
Brow presentation	1	2	3	0.4				
Shoulder dystocia	1	1	2	0.3				
Polyhydramnios	0	2	2	0.3				
Other[3]	1	10	11	1.5				
TOTALS	73	109	181		28	28	56	
Postpartum								
Hemorrhage[3]	1	3	4	0.5%	4	1	5	1.2%
Excessive PP Bleeding[3]	11	7	18	2.5	9	4	13	3.1
Retained Placenta	10	4	14	1.9	4	4	8	1.9
Endometritis	9	2	11	1.5	3	1	4	1.0
PP Depression	0	4	4	0.5	0	1	1	0.2
TOTALS	31	20	51		20	11	31	

[3] single cases of oligohydramnios, amnionitis, toxemia, prolapsed cord, thromboplebitis, placenta previa, placenta abruptio, dehydration, urinary tract infection, 2nd trimester bleeding, and precipitous labor.

[3] single cases of cephalopelvic disproportion (CPD), shoulder dystocia, oligohydramnios..

1 Percent complications per 723 primigravidae, 417 multigravidae.
2 Dystocia is defined here as: prolonged or arrested 1st stage, failure to dilate [illegible]

TABLE 7
REASONS FOR TRANSPORTATION TO THE HOSPITAL & THERAPY APPLIED

COMPLICATION & THERAPY	M.D.'s N=584	Midwives N=78*	Stat. Sign.†
1st Stage Complications			
No prenatal care			
Dehydration→IV Hydration	1	0	NS
Severe Toxemia→Cesarean	0	1	NS
Prolonged rupture of membranes→Induction	0	4	p 0.01
Dystocia 1st stage (excluding CPD)			
Uterine inertia Oxytocin	7	19	p 0.001
Labor prolongation with FHT→			
Internal monitor & Oxytocin	1	0	NS
Arrest of Dilation			
Involving FHT & uterine inertia→			
Internal monitor & oxytocin	1	0	NS
Brow presentation→Oxytocin & low forceps	1	0	NS
Arrest & Uterine inertia→Oxytocin & low forceps	0	2	NS
Arrest→CPD, Cesarean	10	7	NS
Arrest→FHT, nuchal cord x4, C-sec	1	0	NS
Hypertension→			
Rx'ed with magnesium sulfate	1	0	NS
Untreated	5	0	NS
Bleeding during labor→No treatment	1	0	NS
Amnionitis→Antibiotics	1	0	NS
Fear, Desire for hospital	2	6	p 0.05
Desire for anesthesia→			
Anesthesia given	3	0	NS
Analgesia only	1	0	NS
Hyperemesis→IV's and compazine	1	0	NS
Dropping FHT's			
No therapy, monitor applied	0	4	p 0.001
Cesarean section	0	1	NS
Cord prolapse→Cesarean	0	1	NS
With meconium→Intubation	0	3	p 0.025
Psychotic reaction to labor→Cesarean	0	1	NS

* sums of complications
† based on total N's (685 & 461 respectively)

TABLE 7 CONT'D
REASONS FOR TRANSPORTATION TO THE HOSPITAL & THERAPY APPLIED

COMPLICATION & THERAPY	M.D.'s N=58*	Midwives N=78*	Stat. Sign.†
2nd Stage Complications			
Protracted descent→			
Rx'ed with low forceps (1 FHT↓)	4	2	NS
Rx'ed with mid forceps with FHT↓	2	1	NS
Rx'ed with oxytocin	5	9	NS
Arrest			
CPD→Cesarean section	4	2	NS
Abnormal presentation→Mid forceps	1	1	NS
Brow presentation→Low forceps	0	1	NS
Dropping FHT's			
Low forceps	1	0	NS
With meconium→Oxytocin, intubation	0	2	NS
Mid forceps	1	0	NS
Bleeding→Oxytocin	0	1	NS
3rd Stage Complications			
Retained placenta→Manual removal	2	5	p<0.05
Hemorrhage→Oxytocin, methergine, blood	1	4	p<0.025
Cervical laceration→Suturing	0	1	NS

* sums of complications
† based on total N's (685 & 461 respectively)

PERINATAL OUTCOME

Six sets of twins were successfully delivered at home, bringing the total number of births to 1,152. There was no maternal mortality or residual morbidity. Infant morbidity is summarized in Table 8 (p. 86).

Fifteen infants, including two sets of twins, weighed less than 2501 grams at birth. Eleven of these were over 2350 grams. Fourteen of the low birthweight infants were born at home.

One 1332 gram infant was born in the hospital following second trimester bleeding and remained there for a month. Two of the smaller babies weighing 1700 and 2200 grams were admited to the hospital with mild respiratory distress syndrome. All the low birth weight babies survived without other postnatal complications th: those mentioned above.

Three cases of failure-to-thrive were switched from breast to bottle feeding with successful results. The average length of infant follow-up was 11.5 months. Some children are still being followed now at 3 to 5 years of age. Over 80% were followed at least 6 months.

The 9 women with previous fetal deaths had no complications.

Finally, the causes of fetal and infant death are given in Table 10 (p. 89). The perinatal mortality rate in this study is significantly lower than the 20.3 rate for the State of California in 1973. California's fetal death rate in 1973 for white women, age 20-29, was 1.2 per 1000 total births as compared to 4.3 in the home birth series. Unfortunately there is no comparable neonatal death rate available for this specific group.

There was no association in this series between length of first or second stage labor with the incidence of low Apgar scores at birth or other complications. Arrest of descent was weakly associated with somewhat lower Apgar scores, but this was also strongly associated with the use of forceps, and the total number of cases were too small to draw meaningful conclusions. There were 34 cases of prolonged rupture of membranes, but no resultant infections in the infants.

The average cost for home deliveries in the physician-directed services was $330 for mother and baby for the entire study population, $272. This was an all inclusive rate, covering prenatal care, home visits postpartum and all necessary supplies. The average cost for total care with hospital delivery and 3 days hospitalization was $1450. This latter figure is low as it does not include the additional fee for Caesarean section.

THE PLANNED HOSPITAL COMPARISON GROUP

The planned hospital comparison was drawn from the records of the Point Reyes Family practice and consisted of 180 deliveries. These women came from the same population pool and had many of the same attitudes as the women planning home delivery and would have been attended at home had they chosen this alternative. Women with complications of prenatal care obviating a home delivery who were delivered in the hospital were excluded from this sample.

For the hospital comparison group, 81.2% were followed at least six months. 12% of the infants and mothers were discharged at the end of two hours post-delivery. The hospital comparison group tended to be less from the counter-culture and were characterized by a more uniform middle class socioeconomic background with usually one or both parents a college graduate.

Table 11 (p. 90) compares the statistics of the selection of the study population. There were more primigravidae in the hospital group and fewer multiparas. The other differences were not significant. The maternal age was not statistically different between groups.

TABLE 10
CAUSES OF PERINATAL DEATH

As noted earlier, some mothers were medically screened out of the home delivery group because of premature labor. There were such cases. If included, the total premature rate becomes 3.0 California the prematurity rate in 1973 for white women, age 20 was 5.3%).

The average Apgar scores were 8.9 at 1 and 9.7 at 5 minutes and were usually assessed by a nurse or lay midwife who did not ... the infant. Forty infants (or 3.5%) born both at home and ... hospital had 1 minute Apgar scores of 4-6 and 7 infants (0.6%) ... minute Apgars of 3 or less and required resuscitation. (Drage ... Berendes[3] have found a 2% incidence of 1 minute Apgar scores b... Lack of drugs, both prenatally and intrapartum, may be asso... with these relatively high scores.

Two other surviving infants were admitted to the hospital in the first 3 days; one for repair of an omphalocele, and one a result of the only unattended delivery with gross meconium stain and fetal distress, who was taken to the hospital within ten min after delivery, where intubation and lavage were not performed. ... delivery was part of the lay midwife sample. Table 9 (below) de... cribes the perinatal outcomes.

TABLE 9
PERINATAL OUTCOME

	Number	Study Rate	California Rate - 197[illegible]
Total Births*	1152		
Live Births*	1147		
Fetal Deaths	5	4.3†	10.2
Neonatal Deaths	6	5.2‡	10.3
Total Perinatal Deaths	11	9.5†	20.3
Low Birthweight (<2500 g)	15	1.3%	6.4%

* Includes 6 sets of twins

† Fetal and perinatal death rates based on 1000 total births

‡ Neonatal death rates based on 1000 live births.

Four infants (or 0.3%) were neurologically abnormal at fol... up: 2 with cerebral palsy and 2 mentally retarded. This compares favorably to the 1.7% incidence of neurologically abnormal infan... 1 year found by the National Institute of Neurological Diseases ... Stroke.[10] A fifth infant was slow, albeit consistent, in develop... and did not walk until 18 months.

In addition to those listed in Table 9, there were 21 cases (1.8%) of jaundice requiring phototherapy. Only a few not already in the hospital were admitted, as parents were able to rig up fluore... lights or, preferably, grow lights over bassinets at home.

TABLE 11
CHARACTERISTICS OF MOTHERS

	Home Number	Home Percent	Hosp Number	Hosp Percent	Calif. 1973	Stat. Sign.
Mother's Age	1156*	100.0%	180	100.0%	100.0%	NS
<20	60	5.2	12	6.7	17.3	NS
20-34	1078	93.2	160	89.9	77.6	NS
≥35	18	1.6	6	3.4	5.1	NS
Parity	1146	100.0%	180	100.0%	100.0%	
para 0	729	63.6	133	73.9	43.3	p<.005
para 1	237	20.7	33	18.3	31.0	NS
para 2	129	11.2	9	5.0	13.3	p<.025
para 3	34	3.0	2	1.1	6.0	NS
para 4	18	1.6	1	0.6	6.3	NS
Prenti Care Began	1146	100.0%	180	100.0%	100.0%	
1st Trimester	707	61.7	114	64.0	72.8	NS
2nd Trimester	362	31.6	63	35.4	20.2	NS
3rd Trimester	74	6.5	1	0.6	4.5	**
None	3	0.3	0	0.0	2.4†	NS

* for home group: Mean age=24.9, Range=16-44, Varience=16.8, SD=4.1
† includes prenatal care unknown

Virtually all of the women in the planned hospital group were trained in childbirth classes (as were the home group) such as Bradley or Lamaze. A high incidence of breastfeeding also characterized the planned hospital group. All women in the plannnd hospital group attempted breastfeeding except for one. For a variety of reasons, two of these women were not successful.

RESULTS

Statistics on the presentations and deliveries are compared in Table 12 (p. 91). The planned hospital group contained more breech infants, had more Cesarean deliveries, had more analgesia, received more oxytocin during first, second, and after third stage labor, and had more low and mid forceps deliveries and episiotomies. It is important to note that their attendants had the same philosophies as the home delivery attendants, so that these differences come as a result of being in the hospital and may relate to a lower motivation for the women to have natural childbirth or to a more readily available analgesia or to a feeling of pressure transmitted to the birth attendents to intervene sooner and more aggressively in the hospital than in the home. These may all be related to the subtle effects of "atmosphere" which are, as yet, difficult to measure. The indications given for forceps and Cesarean deliveries are compared in Table 13 (p. 92). The planned hospital group had more Cesarean sections, primarily related to CPD and have more low forceps deliveries, significantly more because of a falling fetal heart rate.

TABLE 12
CHARACTERISTICS OF PRESENTATION & DELIVERY

	Home Number	Home Percent	Hosp Number	Hosp Percent	Statis. Signif.
Presentation	1146	100.0%	178	100.0%	
Vertex	1125	98.2	167	93.8	p<0.005
Brow	3	(0.3)	0	0.0	**
Shoulder	3	(0.3)	1	0.6	**
Breech	21	1.8	9	5.1	p<0.010
Delivery	1146	100.0%	178	100.0%	
Cesarean	28	2.4	10	5.6	p<0.025
Vaginal	1118	97.6	168	94.4	p<0.025
Analgesia only	14	(1.2)	9	(5.0)	p<0.025
Anesthesia only	3	(0.3)	3	(1.7)	**
Both	6	(0.5)	1	(0.6)	**
None	1095	(95.5)	154	(86.5)	p<0.001
Oxytocin					
1st & 2nd stage	85	7.4	29	15.3	p<0.001
3rd stage labor	235	20.5	54	30.3	p<0.005
Forceps					
Low forceps	11	1.0	7	3.9	p<0.001
Mid forcep	6	0.5	2	1.1	p<0.001
Perineal Lesions					
Lacerations req. repair	148	12.9	26	15.6	NS
Episiotomies	89	7.8	42	25.1	p<0.001

Table 14 (p. 93) presents the comparison complication figures for the planned hospital population, and compares these results with those obtained by the population delivering at home. The planned hospital group showed significantly more second stage labor dystocia ($p<0.025$), more drops of the fetal heart rate ($p<0.005$), more postpartum hemorrhage ($p<0.001$) and less "excessive bleeding" (defined as less than 650 cc's but more than the attendant is comfortable with) postpartum ($p<0.001$). The planned hospital population had significantly more forceps deliveries ($p<0.001$), episiotomies ($p<0.001$), Cesarean sections ($p<0.025$), and analgesia ($p<0.001$), and significantly less total unmedicated deliveries ($p<0.001$)

RELATIVE PERINATAL OUTCOME

Table 15 (p. 94) compares the perinatal outcome data. The neonatal mortality and perinatal mortality results were not significantly different between the planned hospital group and the home delivery group, nor was the rate of low birthweight infants, or the mean length of infant follow-up. The hospital neonatal death rate was 5.5 per 1000 with 11.1 perinatal deaths per 1000.

TABLE 13
INDICATIONS FOR C-SECTIONS &... JACCPS DELIVERIES
IN WOMEN BEGINNING LABOR AT HOME

	Home Number	Hosp Number
Low Forceps Delivery		
Protracted descent	6	0
Arrest of descent	2	3
Dysfunctional labor	1	0
Brow presentation with arrest of descent	1	0
Fetal heart drop	1	3
Bleeding during 2nd stage	0	1
	11	7
Mid Forceps Delivery		
Protracted descent	3	0
Arrest of descent	1	1
Dysfunctional labor	1	0
Fetal heart drop, occiput posterior (OP) pres.	1	0
FHT↓, amnionitis, maternal hypertension	0	1
	6	2
C-Sections		
Cephalopelvic disproportion (CPD)	16	7
Failure to descent, OP presentation, rel. CPD	6	0
Arrest of active dilation, FHT↓, cord 4x neck	1	0
Prolapsed cord	1	(1)
Breech with amnionitis	1	0
Psychotic reaction to labor	1	0
Acutely dropping fetal heart tones	1	0
Toxemia	1	0
Breech with low breech score, poor labor progress	0	1
Transverse lie with one prolapsed cord	(1)	2
	28	10

TABLE 14
COMPLICATIONS OF LABOR & DELIVERY (HOSPITAL GROUP)
(INDIVIDUAL WOMEN MAY BE LISTED UNDER MORE THAN 1 COMPLICATION)

PRIMIGRAVIDAE (N=522) 11=39.1%)				MULTIGRAVIDAE (N=1045=22.2%)			
Complication	Hosp	Percent	Statis. Sign.[1]	Complication	Hosp	Percent	Statis. Sign.[1]
Intrapartum				Intrapartum			
Dystocia[2] 1st stage	15	11.3	NS	Dystocia[2] 1st stage	2	4.4	NS
Dystocia 2nd stage	10	7.5	p<0.025	Dystocia 2nd stage	1	2.2	NS
CPD	7	5.3	NS	CPD with breech	1	2.2	NS
Meconium stain only	4	3.0	NS	Precipitous labor	2	4.4	NS
FHT↓(c.s meconium)	10	7.5	p<0.005	FHT↓	1	2.2	NS
Hypertension	2	1.5	NS	Hypertension	1	2.2	NS
Precipitous labor	2	1.5	NS	Transverse lie	1	2.2	NS
Others	6	4.5	NS	TOTAL	9		
TOTAL	56						
Postpartum				Postpartum			
Hemorrhage[3]	5	3.8	p<0.001	Hemorrhage[3]	0		NS
Excessive PP bleeding[3]	2	1.5	p<0.001	Excessive PP bleeding[3]	1	2.2	NS
Retained placenta	2	1.5	NS	Retained placenta	1	2.2	NS
Endometritis	3	2.3	NS	Endometritis	1	2.2	NS
PP Depression	1	0.8	NS	TOTAL	3		
TOTAL	13						

4 single cases of amnionitis, shoulder presentation, cord prolapse, cord knot, recurrent pyelonephritis, transverse lie.
5 Compared with Table 5 on page 81.

1 Percent complications per 100 primigravidae, by multigravidae.
2 Dystocia as used in this table is defined as...

TABLE 15
COMPARATIVE PERINATAL OUTCOME

	Home Number	Home Rate	Hosp Number	Hosp Rate	Calif. 1973	Stat. Sign.
Total Births	1152[a]		180†			
Live Births	1147[a]		180†			
Fetal Deaths	5	4.3α	1	5.5α	8.2α,Y	NS
Neonatal Deaths	6	5.2β	1	5.5β	10.3β	NS
Total Perinatal Deaths	11	9.5Y	2	11.1α	20.3α	NS
Low Birthweight (<2501 g)	15	1.3β	3	1.7β	5.3β,Y	NS
Mean Length of Infant Follow-up	11.5 mos.		11.6 mos.			NS
S.D. Length of Follow-up	10.3 mos.		10.4 mos			NS
% Infants Followed to 6 mos.	83.4%		81.2%			NS

* Includes 6 sets of twins.
† Includes 2 sets of twins.

α 1 per 1000 total births
β 1 per 1000 live births
Y for white, non-Spanish surname, age 20-29

Table 16 (p. 95) presents infant morbidity for the hospital group. Table 17 (pp. 96-97) compares neonatal complications. The planned hospital group had significantly more fetal hypoxia ($p<0.025$) and significantly more 1 minute Apgar scores less than 4 ($p<0.025$). Among the homebirth series, the midwives had more infants who received phototherapy for jaundice than did the physicians ($p<0.025$). Causes of fetal deaths are compared in Table 18 (p. 98).

The prematurity rate for the population initially seeking assistance from one of the services studied was 3.0%. For the planned hospital population it was 2.8%. There was no significant differences between 1 minute Apgar scores ranging from 4-6 between the homebirth group and the planned hospital group with 40 & 7 such ratings, respectively. Average Apgar scores for the planned hospital group were 8.6 at 1 minute and 9.7 which were not significantly different from the homebirth group.

There was no association among the hospital group either between length of labor and length of second stage of incidence of low Apgar scores at birth or other complications.

TABLE 16
INFANT MORBIDITY OF PLANNED HOSPITAL GROUP*

Complication	Number	Rate per 1,000 LS Delivery		Complications	Outcome
Low Birthweight	3	16.6	Hosp		
Case one	1		Hosp	PROM prior to del.	neonatal sepsis and antibiotics
Case two	1		Hosp	None	mild RDS
Case three	1		Hosp	None	mild RDS
Hyperviscosity syndrome	1	5.5	Hosp	None	resolved

* To compare these data with the homebirth group, see Table 8, p. 86.

The mean length of 1st stage labor among the group planning hospital birth was 12.5 hrs for primigravidae and 5.4 hrs for multigravidae. For the home group it was 10.2 hrs and 4.6 hrs respectively. The standard deviations were 2.[illegible] and 1.3 hrs, respectively, for planned hospital group and 1.9 and 1.2 hrs, respectively, for planned home group. This difference was significant at $p<0.05$.

The mean length of 2nd stage labor for the planned hospital primigravidae was 106.8 min ± 31.0 min and for multigravidae was 50.1 min ± 28.3 min. For the home series, the mean length of 2nd stage was 118.2 min ± 40.5 min for primigravidae and 44.6 min ± 23.7 min for multigravidae. The primigravidae differences were significant at $p<0.05$. Multigravidae were not comparable for parity and could not be compared.

There were 14 cases of prolonged rupture of membranes in the homebirth series and 11 in the planned hospital series ($p<0.01$). There were no infections of the infants except for one low birthweight infant whose mother developed amnionitis. She was in the planned hospital series.

TABLE 17
COMPARATIVE NEONATAL OUTCOMES

COMPLICATIONS	HOME PRIMIGRAVIDAE N=729				STATIS. SIGNIF.[1]
	M.D.'s N=464		Midwives N=265		
	Home	To Hosp	Home	To Hosp	
Jaundice Req. Rx	1	5	2	9	p<0.025
Fetal Hypoxia	2	0	0	0	NS
Neurological Abnormalities[2,3]	2	1	0	1	NS
Cerebral Palsy	1	0	0	1	NS
Neonatal FTT	1	1	0	1	NS
Apgar (1 min.)					
Score < 4	3	0	1	1	NS
Score = 4-6	12	7	5	3	NS

COMPLICATIONS	HOME MULTIGRAVIDAE N=417				STATIS. SIGNIF.[1]
	M.D.'s N=221		Midwives N=195		
	Home	To Hosp	Home	To Hosp	
Jaundice Req. Rx	2	1	0	1	NS
Fetal Hypoxia	0	1	0	0	NS
Neurological Abnormalities[2,3]	0	0	0	1	NS
Cerebral Palsey	0	0	0	0	NS
Neonatal FTT	0	0	0	0	NS
Apgar (1 min.)					
Score < 4	0	1	0	1	NS
Score = 4-6	2	4	2	5	NS

COMPLICATIONS	HOME TOTAL N=1146				STATIS. SIGNIF.[1]
	M.D.'s [illegible]		Midwives N=461		
	Home	To Hosp	Home	To Hosp	
Jaundice Req. Rx	3	6	2	10	p<0.025
Fetal Hypoxia	2	1	0	0	NS
Neurological Abnormalities[2,3]	2	1	0	2	NS
Cerebral Palsey	1	0	0	1	NS
Neonatal FTT	1	1	0	1	NS
Apgar (1 min.)					
Score < 4	3	1	1	2	NS
Score = 4-6	14	11	7	8	NS

Cont'd on next page

TABLE 17 CONT'D
COMPARATIVE NEONATAL OUTCOMES

COMPLICATIONS	PLANNED	STATIS. SIGNIF.[1]
Jaundice Req. Rx	3	NS
Fetal Hypoxia	3	p<0.025
Neurological Abnormalities[2,3]	0	NS
Cerebral Palsy	0	NS
Neonatal FTT	1	NS
Apgar (1 min.)		
Score < 4	6	p<0.025
Score = 4-6	7	NS

1 Calculated on the basis of home & hospital
2 Includes cerebral palsied infants
3 Development at 1 year follow-up

CONCLUSION

In conclusion, the home delivery group of women were a self-selected group screened for obvious problems and complications occurring during pregnancy, while the hospital group is a similarly selected group who would have been eligible for a home delivery had they decided to have one. While the home delivery outcomes are not directly comparable to State statistics, their outcomes are better than average and lower than might have been expected. Behrman et al.[7] have studied 39,000 white middle-class women in Oregon receiving prenatal care from private physicians and found a neonatal mortality rate of 12 per 1000 live births and a perinatal mortality rate of 17 per 1000 total births. Interestingly enough, if one eliminates premature infants from Behrman's series, the neonatal death rate was 3.5 per 1000 and the perinatal death rate was 7.5 per 1000 which is not statistically significantly different from the home delivery series of this report (cf. Table 15, p. 94).

Another often asked question is that of the need for routine fetal monitoring. Chan et al.[8] have studied the role of fetal monitoring in reducing intrapartum deaths and in a study in which patients were randomly assigned to fetal monitoring, there was no statistically significant difference between the monitored group and the non-monitored group. Also important is that Chan's study revealed an intrapartum death rate of 1.7 per 1000 in his 1162 monitored patients. This is not statistically significantly different from the intrapartum death rate of 0.95 per 1000 in our series of 1146 home deliveries. In another study, Shenker et al.[13] reported a 0.5 per 1000 intrapartum death rate in monitored patients. This is not statistically significantly different from our series either.

TABLE 18
CAUSES OF PERINATAL DEATH IN PLANNED HOSPITAL GROUP*

Age At Death	Number	Delivery	Complications	Cause of Death
During labor	1	Hosp	Rapidly ↓ FHT	Meningoencephalitis, etiology unknown
8 days	1	Hosp	None	Aplastic left ventricle

* To compare these data with the homebirth group, see Table 10, p. 89

Shenker et al,[13] did, however, show a significant decrease in intrapartum deaths in the monitored series versus the unmonitored series in Bellevue Hospital in New York City. Clearly, the nursing care in Bellevue Hospital is not adequate, which brings us to recent studies from the West Coast showing an equivalent success rate of nurses versus fetal monitor, but with less infections reported with the nurses. It is not hard to imagine which was the more supportive personal care.

Other important points can be made. The perineal massage technique used by the midwives to aid in preventing vaginal lacerations during delivery was effective, and, as the physicians adopted this technique, their laceration rate decreased. The higher utilization of oxytocin after delivery by the physicians may have reflected its availability to them and their training to use it frequently. The equivalence of hemorrhage and blood loss results between the physician and midwife group suggests that it was not needed as frequently as used. The lay midwives took women to the hospital more frequently than the physicians, presumably reflecting their decreased capabilities to handle specific complications at home and their lower threshold level for going to the hospital possibly related to a lower level of knowledge. The physicians were able to treat some of their cases of uterine inertia with buccal oxytocin at home, and removed several retained placenta at home, as well as carrying oxytocin and methergine to treat third stage bleeding at home. The greater number of FHT problems brought to the hospital by the midwives may reflect their greater level of anxiety in dealing with and desire for transporting abnormal situations to the hospital early.

Comparisons with the planned hospital group suggests that for women delivering at home with the philosophies and practices of this particular group of practitioners, there was no significant increase in risk with a home delivery versus a hospital delivery. In fact, by avoidance of obstetrical medication, such as was used more frequently in the hospital by equivalently prepared women (presumably because of the effect of the hospital atmosphere on the encouragement for obstetrical medication); the incidence of low Apgar scores was less at home as was the incidence of fetal hypoxia.

The greater use of analgesia in labor by the planned hospital group may have also contributed to their greater incidence of second stage dystocia and greater incidence of fetal heart-rate drops. The breech infants did not contribute to these problems. The incidence of postpartum hemorrhage was greater in the planned hospital group and may represent the greater tendency to pull on the umbilical cord to aid in the delivery of the placenta. At home, the umbilical cord was rarely pulled to aid placental delivery, but rather, the natural expulsive forces of the uterus were relied upon. This is substantiated by the longer third stages seen in the home group. The contribution of other factors such as lower stress in the home environment, alternative delivery positions, and the like cannot be assessed in a study such as this, but may be significant.

Of note, as well, are the close similarity of these findings to the home delivery statistics in the Netherlands (personal communication, Jan Kloosterman, MD, University of Amsterdam) and to home delivery statistics compiled by Gregory White, MD,[15] in Chicago, and by Victor Berman, MD,[3] in Los Angeles.

Generally, the response of physicians to home delivery has been negative. Many view homebirth as an irresponsible risk to mother and child. They do not encourage or attend home deliveries, and many have refused to give prenatal care, advice, or instruction to couples planning homebirth. A dichotomy exists in obstetrics today between the technological trend represented by high risk obstetric units with fetal monitoring and readily available medical and surgical intervention, and the family-centered, natural childbirth trend represented in its extreme by couples planning home delivery *without medical support*. We feel that reducing the antagonism between these divergent poles would enhance care for women choosing hospital as well as home deliveries.

More studies of this kind are needed before any conclusions can be drawn. We are currently engaged in a study in which we are attempting to match a comparison hospital group. However, evidence from this study population already strongly suggests that home delivery is a safe alternative for medically screened healthy women; they deserve adequate care for the delivery of their choice. This would include prenatal care by a physician, childbirth education, and only necessary intervention by attendants. Hospitals should be encouraged to adopt those techniques of homebirth that improve pregnancy outcome, which might include perineal massage and gentle head delivery to avoid episiotomies and lacerations, choice of the use of analgesia and anesthesia, and generally provide a supportive, friendly, and comfortable environment for labor and delivery.

Finally, what these statistics have missed is the importance of the spiritual and the emotional aspects of birth. Someday, perhaps, we will be able to empirically validate what our feelings tell us is true.

REFERENCES

1. Aaro, L.A., Saed, F: Low-Incidence Cesarean Section: 12-year experience. Mayo Clinic Proc. 50:365-369, 1975

2. Behrman, R.E., Babson, G.S., and Lessel, A.: Fetal and Neonatal Mortality in White Middle Class Infants. Am. J. Dis. Child 121:486-489, 1971

3. Berman, V: Comment at First Annual Meeting of the North American Society of Psychosomatic Obstetrics and Gynecology (NASPOG) Chicago, Illinois, April 10, 1976

4. Chan, W.H., Paul, R.H., and Toews, J.: Intrapartum Fetal Monitoring. Ob Gyn 41:7-13, 1973

5. Drage, J.S., Berendes, H: Apgar Scores and Outcome of the Newborn. Pediat. Clin. N. Amer. 13:635-643, 1966

6. Eastman, N.J., Hellman L.M.: Williams Obstetrics, New York, Appleton-Century-Crofts, 1966, p. 986

7. Friedman, E.A.: Patterns of Labor as Indicators of Risk. Clin OB Gyn 16:172-183, 1973

8. Hazell, L.D.: A Study of 300 Elective Home Births. Birth & the Family Jour. 2:11-18, 1975

9. Klaus, M., Fanaroff, A.: Care of the High Risk Neonate. Toronto, Wm Saunders Co., 1973, p. 141

10. Lang A.: The Birth Book. Ben Lomond, California, Genesis Press, 1972

11. Mehl, L.E., Peterson, G.H., White, M.C., and Hayes, W.: Outcomes of Elective Home Births: A Series of 1146 Cases. Paper presented at the First Annual Meeting of the North American Society for Psychosomatic Obstetrics and Gynecology, Chicago, April 10, 1976

12. Niswander, K.R., Gordon, M.: The Women and Their Pregnancies. The Collaborative Perinatal Study of the National Institute of Neurological Diseases and Stroke. U.S. Dept, HEW, Philadelphia, W.B. Saunders Co., 1972, p. 45

13. Shenker, L., Post, R.C., Seller, J.S.: Routine Electronic Monitoring of the Fetal Heart Rate and Uterine Activity During Labor. OB Gyn 46:185-189, 1975

14. State of California, Department of Health, Center for Health Statistics, 1975

15. White, C.: Home and Hospital Delivery, 25 Years Experience With Each. Paper presented at the First Annual Meeting of NASPOG, Chicago, April 10, 1976

child care of the American Academy of Pediatrics were observed. Midwives referred infants for newborn care after the first week to pediatricians or family physicians, and continued to follow the infants themselves for varying periods of time. All mothers had a postpartum examination from 4-6 weeks by a physician, and for the lay midwives, results of this examination were recorded in their records.

STUDY POPULATION

Hazell[8] has described the demographic characteristics of the homebirth population in the San Francisco Bay Area in a study of 300 home deliveries from the socioanthropological standpoint. Her subjects overlapped to some extent with our sample and were derived from the same subject pool--San Francisco Bay Area couples planning homebirth.

TABLE 1
HOME DELIVERY STUDY POPULATION

Contacted Home Delivery Service:	1,319	100.0%
Screened Out, Medical Dx	55	4.1%
Decided Against	147	10.5%
Attempted Home Delivery:	1,146	85.2%
Physicians	635	59.2%
Midwives	451	40.2%
Taken to Hospital:	136	11.9%
Physicians	55*	5.1%
Midwives	75*	5.5%
Completed Home Delivery	1,010	74.9%

* Patients hospitalized represented 8.5% of physicians' cases, 16.9% of midwives' cases.

In Hazell's study, 90% lived in typical American fashion, with the father gainfully employed, in a single family dwelling with one or two cars, were not members of an ethnic minority, not on welfare, and without household servants. A general characteristic of the group was described as a self awareness shown in a concern for nutrition, health foods, ecology, humanistic psychology, and a strong feeling for a natural birth process. Typically, the mother and father had both attended college, but neither had graduated. The fathers' occupations were noted to vary through the range of occupations present in the Bay Area, from auto mechanic to physician to homesteader. Only one tenth were classified as "hip," in rebellion to "normal American Values," living in a variety of alternative styles.

In our study, patients of the lay midwives tended to belong more to the counter-culture than Hazell's population. In the physician groups, more professional couples were included. A detailed socioeconomic study on one of the lay midwife groups (the Sonoma County sample) is currently being coordinated by one of us (LEM), and a psychological/developmental outcome study on a subsample of the Santa Cruz group is being analyzed by two of us (LEM and GHP).

747 file

Re: Midwifery

Supports bill -
will send written testimony -

Patrick Durkin
SRA BOX 8705
Indian AK.
99540

Cannot attend
Friday's meeting -

for Charlie

HOME BIRTH VERSUS HOSPITAL BIRTH:

COMPARISONS OF OUTCOMES OF MATCHED POPULATIONS [1]

Lewis E. Mehl, M.D.

Lewis A. Leavitt, M.D., F.A.A.P.

Gail H. Peterson, M.S.S.W.

Don C. Creevy, M.D., F.A.C.O.G.

CENTER FOR RESEARCH ON
BIRTH and HUMAN DEVELOPMENT
2340 Ward Street, Room 105
Berkeley, Calif. 94705
Phone (415) [illegible] 849-3667

Address communications to Dr. Mehl

1. Presented at the annual meeting of the American Public Health Association, Miami, Florida, Oct. 20, 1976.

Abstract

1046 matched home and hospital deliveries are compared with regard to the frequency of obstetrical procedures utilized, incidence of maternal and neonatal complications, and morbidity and mortality. Each home delivery is matched with a hospital delivery with respect to age, parity, length of gestation, major risk factors, and total risk factor score on the Nova Scotia risk factor screening criteria. Educational and socioeconomic factors are matched so that the hospital population is equally or better educated than the home birth population and of equal or higher socioeconomic class. Home deliveries were collected from six home delivery services in northern California. Hospital deliveries were collected from two community hospitals in Madison, Wisconsin. Results show no significant differences in neonatal and perinatal mortality, number of neurologically abnormal infants, incidence of low birth weight infants, and cases of neonatal infection. There were more neonatal infections and more infants requiring resuscitation in the hospital group. The general equivalence of results are discussed as indicating that pre-selected women may labor and deliver at home in the United States without significant additional risk, and at a lower cost than hospital delivery.

Key Words

Home Birth	Midwife	Obstetric anesthesia
Birth injury	Neonatal infection	Neonatal resuscitation

A continuing trend toward home delivery has been noted recently across many segments of the American population (Hazell, 1975; Ward and Ward, 1976; Arms, 1975). Much of the impetus for home delivery has been derived from consumer rather than professional initiative. Medical reaction to this trend has been largely negative and based on the contention that home deliveries present an unacceptable medical risk to mothers and infants. It has been contended that the technological advances of recent years make hospital delivery mandatory (Cox, 1976). Yet, in the Netherlands, a medically sophisticated technologically advanced country, more than two thirds of all deliveries occur at home with morbidity and mortality statistics that may be favorably compared with those of any nation in the world (Kloosterman, 1968, 1975). In Cardiff, Wales, recent data suggests that a change in the past decade from largely home to largely hospital delivered babies has had essentially no effect on maternal or neonatal outcome (Chalmers, 1976a, b). Given the psycho-social advantages proposed by advocates of home delivery (Ward and Ward, 1976) and the data from the Netherlands in home delivery outcome, is it possible that under some conditions home delivery may be a reasonable alternative in the United States? Several recent report have indicated low levels of complications associated with home delivery in the United States (Mehl, et. al., 1975; Brew, 1976). These reports, however, have not included comparison populations who are delivered in hospitals. In order to more appropriately assess the relative safety of home deliveries when compared to hospital deliveries it is necessary to compare the home delivered

population to a hospital delivered population of equivalent age, parity, socioeconomic status, and prenatal medical condition.

In this study, we present a comparison study of 1046 home deliveries with 1046 hospital deliveries, matched for age, risk factors, gestational length, parity, education, and socioeconomic status. This data provides needed information for the assessment of the safety and appropriateness of home delivery for selected patients.

Methods

The methods of data collection for the home birth series have been described elsewhere (Mehl, 1976) and consisted of chart reviews of 6 home delivery services in northern California and one in Madison, Wisconsin. We found all of the medical charts - both home and hospital - to be complete and of a similar quality of observation. Diagnostic criteria used were ours and were based on those defined by Friedman and Greenhill (1974). From reviewing the record and discussing them with all the practitioners concerned, it was our impression that practices in observing, diagnosing and recording clinical findings were not different among all the groups studied. This does not, of course, obviate the problem of retrospective chart review and the disadvantage of this technique, but indicates that the disadvantages were uniformly distributed. Statistics regarding the hospital deliveries were collected by chart review at two hospitals in Madison, Wisconsin, a largely upper middle class community with a median income of $16,000 per annum and from one of the home birth practices in northern California. Both were private

community hospitals, both University affiliated, both performing approximately 2000 deliveries yearly, one with a regional neonatal intensive care unit and the other with a regional maternal intensive care unit and a developing regional neonatal intesive care unit. Both were staffed by neonatologists and University pediatric and obstetrical faculty and residents as well as private physicians. One hospital's obstetrical services were also staffed by University family practice residents. 90% of the hospital deliveries were from Wisconsin; 10% from northern California.

Risk factors were grouped according to the Nova Scotia Risk Factor Screening Criteria, and for each home delivered patient, a hospital delivered patient was matched for age, length of gestation, parity, risk factor score, education and socioeconomic status, race, presentation, and individual major risk factors (including 1st, 2nd, and 3rd trimester bleeding, rupture of membranes exceeding 24 hours without labor, multiple gestation, hypertension, signs of pre-eclamps pre-existing maternal disease, abnormal glucose tolerance tests, and the like. The risk score for each home and hospital delivered pair were equated for the time of onset of labor.

The home delivery sample included all those women planning to deliver at home immediately prior to the initiation of labor, rupture of membranes, or emergence of a complication necessitating immediate hospitalization and delivery. All cases transferred to the hospital during or after labor or meeting the above criteria are included. For the home birth group, of all the women contacting the home delivery services, 4% were screened out for medical reasons. More

may have been screened out through telephone conversations which would not have appeared in the medical records.

The characteristics, philosophies, and methods of practice of the home delivery attendants are summarized elsewhere (Mehl, 1975, 1976; Eisenstein, 1976; Ettner, 1976; Epstein, et. al., 1976; Mills, 1976; Lang, 1972). Review of these sources will reveal that an inextricable complicating variable in this study is the mode and philosphy of practice of the attendants. The home birth practitioners were predominantly non-interventionist and had a higher threshold for intervention than did the hospital practitioners.

Educational attainment and socio-economic status were matched so that the hospital group had the same educational and/or socio-economic level as the home birth group or higher.[1] Mean maternal age was 25.2 years. 96% of the women were between the ages of 20 and 35. 22% were less than 20 and 1.8% were older than 35. 57.7% were primigravida, 24.3% were para 1, 10.4% were para 2, 2.2% were para 3, 0.9% were para 4, 0.4% were para 5, and 0.1% were para 6. The mean years of education for the home birth group was 13.5 years compared to 14.6 years for the hospital group. All were Caucasian women. Data for each group are presented up to 4 days of age, the time of hospital discharge. Follow-up data on home birth up to a mean of 11.5 months was available on all the home cases but not the hospital births. This is presented in Mehl (1976). 97.7% of the deliveries were vertex with 2.3% breech and other presentations. There were five sets of twins. 74.9% of the hospital deliveries were obstetrician attended; 25.1% were family physician attended.

1 They were matched so that each woman in the hospital group was as educated or more so than her counterpart in the

For the home deliveries, 66.5% were family physician attended; 30.8% lay midwife attended; and 2.7% nurse-midwife attended. The average risk factor score was 1.6% and 9.2% of each group was high risk by the Nova Scotia criteria (We felt this was artificially high.).

Results

Table 1 presents a summary of the procedure utilized during the deliveries of each of the two groups. The hospital practitioners used significantly more oxytocin, both before and after delivery. In home births buccal oxytocin was occasionally administered for uterine inertia, ~~if no results were forthcoming~~, whereas in the hospital, women were given intravenous oxytocin. Many more forceps deliveries were performed by the hospital practitioners, as well as more Cesarean sections. Despite a nine-fold greater incidence of episiotomies, hospital delivered women sustained significantly more third and fourth degree and cervical lacerations. Analgesia and anesthesia were also used much more frequently in hospitals (with the exception of caudal anesthesia (Analgesia, anesthesia, and forceps deliveries were only given or performed after transport to the hospital for the home birth group.) The incidence of manual removal of the placenta was the same in both groups. Indications for procedures were derived from review of charts.

Table 2 presents the indications for oxytocin for the two groups. The differences were seen to emerge from greater use of oxytocin in the hospital group for rupture of membranes without labor, first stage uterine inertia, and for elective induction. More oxytocin was used in the home group for second stage uterine

2. All of the women had had childbirth preparation.

inertia than in the hospital group. Typically, the home birth group waited longer, occasionally longer than 24 hours, before the initiat of oxytocin therapy.

Table 3 presents the indications for forceps deliveries for the two groups. The majority of the hospital practitioners used the criterion of a second stage of labor longer than one hour as an indication for forceps delivery. The home practitioners typically accepted any length of second stage as long as some progress was evident and there were no signs of fetal distress. This difference in approach is reflected in the greater number of forceps deliveries in the hospital for "prolonged second stage." The hospital practitioners used occiput posterior as an indication for forceps rotation and did not permit any patient to deliver OP, whereas the home birth practitioners did not intervene in the OP labor and deliveries unless signs of labor arrest or fetal distress were present. This i reflected in the higher number of mid forceps rotations in the hospital group. The two groups of practitioners also defined the sa type of forceps delivery by different terms. For the home group, a low forceps delivery was equivalent to a hospital practitioners outl forceps delivery and a mid forceps delivery was equivalent to a low forceps delivery. The home birth practitioners definitions for forceps deliveries were the same as Friedman and Greenhill (1974). There were also signi cantly more forceps deliveries in the hospita group. delivery for fetal distress.

Table 4 presents the indications given for Cesarean sections fo by both groups. The hospital group did many more Cesarean sections

for 1st stage arrest, cephalopelvic disproportion, and/or non-progressive labor than did the home birth practitioners, and did more Cesarean sections for primi-gravida breech presentations and for fetal distress. The home birth practitioners delivered breech infants in the home if the parents continued to request home delivery after risks had been explained and if the Zatuchni-Andros score indicated vaginal delivery. From the table, it is also evident that the indications for Cesarean section were more liberal for the hospital group than for the home group.

Some significant differences in labor length emerged in that for para 0 and 1, length of first and second stages were significantly longer for women delivering at home (See Table 5).

Figure 1 presents significant differences in complications of labor and delivery for the two groups. The hospital group had significantly more intra-uterine fetal distress, elevated blood pressure during labor (from a non-elevated pre-labor baseline), meconium staining, and reported shoulder dystocia. The home group had more bleeding during labor and posterior delivery. The hospital group had significantly more postpartum hemorrhage. There were no statistically significant differences in the incidence of face deliveries, first or second stage dystocia (excluding CPD), occult cord prolapse, placenta previa, abruptio placenta, cord prolapse, posterior labor, retained placental fragments, late Dilation and Curettage after one week, hemorrhage from day 1 to day 3, hemorrhage after day 3, endometritis, vilamentous insertion of the cord, and postpartum thrombophlebitis.

Figure 2 presents statistically significant differences in the incidence of neonatal complications. The hospital group experienced significantly more birth injuries, received significantly more oxyge at 2, 3, 4, and 5 or more minutes, more respiratory distress lasting 12 hours or more among full term infants, and more total non-congeni tal neonatal complications. There were no significant differences in the incidence of total number of congenital anomalies, congenital heart disease, Down's syndrome, fetal wasting, hypoglycemia, metabolic acidosis, neonatal hypotension, neonatal hypovolemic shock, individual neonatal infections, meconium asperation, pneumonitis, amniotic fluid asperation pneumonitis, pyloric stenosis, polycythemi lung water syndrome, ITP, and cystic fibrosis with meconium ileus. From Table 5, it is evident that the hospital group neonates were gi more resuscitation, and had lower one minute and five minute Apgar scores than the home group. There was no significant difference in the incidence of fetal, intrapartum, or neonatal deaths, or in the incidence of neurologically abnoraml infants. Bith injuries includ cephalhematomas resulting in severe anemia requiring transfusion or hyperbilirubinemia requiring exchange transfusion, fractured clavic branchial plexus injuries, facial nerve paralyses, skull fractures, and hemopneumothorax.

Discussion

Given two puerpally matched populations, outcome differences should accrue from the events occurring during labor and delivery. The data presented here indicate that for the home delivery population described, a group selected for low medical risk and attend

by midwife or physician, one may expect an outcome for baby and mother essentially as good as the resulting from a medically matched population delivery in community hospitals delivering high standards of medical care. The significant differences noted in the mangement of the women indicate that those hospital delivered are more likely to encounter oxytocin augmentation of labor, forceps delivery, analygesia, anesthesia, and Cesarean section. Recall that both groups of women were matched for identical medical risk factors prior to labor. In addition, incidence of neonatal infection was higher for hospital deliveries. The incidence of maternal infection was not significantly different for the two groups.

In this group of more than 1000 cases, it is not clear that the additional medical and obstetrical procedures rendered in hospital resulted in improved group outcome over the home delivered group. It therefore seems appropriate to conclude that for low medical risk women, home delivery is an alternative that cannot be dismissed as contraindicated because of unacceptable high risk to maternal and infant health. This data, of course, does not apply to home delivery in a medically unselected population, nor to home deliveries unattended by midwife or physician.

The results are, of course, limited by the limitations of the case-control method and the method of retrospective chart review. More definitive studies are needed, such as prospective studies by non-clinically involved individuals including practitioners doing both home and hospital deliveries and with controls for obstetrical practice philosophy, nutrition, and others, with all of the deliver

occurring in the same geographical area. Such a study should also include uniform examination and evaluation of the neonate by an independent examiner blind to the place of delivery.

From these results, it would seem reasonable and prudent to plan pilot projects in out-of-hospital deliveries or in changing hospital policy to create a more home-like environment and in evluating them as discussed above. It would also seem of importance to identify the specific aspects of the hospital environment which increase risk to mothers and infants and eliminate these aspects of hospital deliveries.

References

Arms, S., Immaculate Deception, San Francisco Books, 1976.

Brew, T., "Outcomes of 400 home deliveries," paper presented at annual meeting National Association of Parents and Professionals for Safe Alternatives in Childbirth, Washington, D.C., 1976.

Eisenstein, M., Homebirths and the physician, In Stewart, D. and Stewart, L. (eds.). Safe Alternative in Childbirth, NAPSAC, Chapel Hill, N.C., 1976.

Epstein, J. L., McCartney, M. F., Brew, J. D., and Devocht, L. J., A safe homebirth program that works, In Stewart, D. and Stewart, L. (eds.), Safe Alternatives in Childbirth, NAPSAC, Chapel Hill, N.C., 1976.

Ettner, F. M., Comparative study of obstetrics - with data and details of a working physicians home OB service, In Stewart, D. and Stewart, L. (eds.), Safe Alternatives in Childbirth, NAPSAC, Chapel Hill, N.C., 1976.

Friedman, I. and Greenhill, J., The Biological Basis of Modern Obstetrics, W. P. Saunders and Co., Philadelphia, 1974.

Hazell, L. A., "A study of 300 home deliveries," Birth & The Family Journal 2:1-18, 1975a.

Hazell, L. A., Birth Goes Home, ICEA Press, Seattle, Washington, 1975b.

Lang, R., The Birth Book, Genesis Press, Felton, California, 1972.

Mehl, L. E., Peterson, G. H., Shaw, N. S., Creevy, D. C., Complications of home delivery: A study of a series of 287 deliveries from Santa Cruz County, California, Birth & The Family Journal, 2:123-135, 1975.

Mehl, L. E., Current status of home delivery research in the U.S., in Stewart, D. and Stewart, L., Safe Alternatives in Childbirth, NAPSAC Press, Chapel Hill, N.C., 1976.

Mills, N., The lay midwife, in Stewart, D. and Stewart, L. (eds.), Safe Alternatives in Childbirth, NAPSAC, Chapel Hills, N.C., 19

Sousa M., Childbirth at Home, Prentice-Hall, Englewood Cliffs, N.J., 1976.

Taylor, C., "Outcomes of home delivery in Oklahoma City," paper presented at the biennial meeting, International Childbirth Education Association, Seattle, Washington, June, 1976.

Chalmers, I., Changing Obstetrical Practices in Cardiff, Wales, 1965-72, Br. Med. J. 1: 732-734, 1976.
735-738

Ward, C. and Ward, T., The Home Birth Book, Inscape Press, Washington, D.C., 1976.

White, G., "25 years experience with both home & hospital delivery," paper presented at annual meeting of North American Society of Psychosomatic Obstetrics and Gynecology, Chicago, Illinois, 1976.

Kloostermann, G.J., Statistical Section, Vital Statistics Office Netherlands, 1965, 1975. (Amsterdam).

Cox, C.A., Fox, J.S., Zinkin, P.N., and Matthews, A.E.B., Critical appraisal of domiciliary obstetric and neonatal practice, Br. Med. J. 1: 54-56, 1976.

TABLE 1

Procedures Utilized

	Home		Hospital		
	Number	Percent	Number	Percent	Stat. S
1st stage oxytocin	69	6.6	159	15.2	<0.00(
2nd stage oxytocin	38	3.6	159	15.2	<0.00(
Total prepartum cases	76	7.3	173	16.5	<0.00(
3rd stage oxytocin	251	24.0	993	95.0	<0.00(
Mid (low) forceps	10	0.9	205	19.6	<0.00(
Low (outlet) forceps	3	0.3	115	11.0	<0.00(
Mid forceps rotations	3	0.3	40	3.8	<0.001
Manual rotations	0	0.0	5	0.5	NS
Cesarean Sections	28	2.7	86	8.2	<0.05
Episiotomy	103	9.8	914	87.4	<0.00(
1st degree lacerations	18	1.7	18	1.7	NS
2nd degree lacerations	136	13.0	56	5.4	<0.00(
3rd degree lacerations	8	0.7	44	4.3	<0.001
4th degree lacerations	5	0.5	73	7.0	<0.00(
Cervical lacerations	3	0.3	32	3.2	<0.00(
Pudendal anesthesia	0	0.0	655	62.6	<0.00(
General anesthesia	2	0.2	96	9.2	<0.00(
Paracervical block	1	0.1	52	5.0	<0.00(
Manual removal of placental	15	1.4	15	1.4	NS
Analgesia	14	1.3	555	53.1	<0.00(
Caudal anesthesia	32	3.0	0	0.0	<0.00(

TABLE 2

Indications for Oxytocin

Indication	Home Number	Hospital Number	Stat. Sig.
Rupture of membranes without labor	6	56	$p < 0.0001$
1st stage uterine inertia	44	79	$p < 0.025$
Protracted descent, OP pres.	0	4	NS
Elective induction	0	22	$p < 0.005$
2nd stage uterine inertia	19	8	$p < 0.05$
Partial abruption	0	1	NS
Elevation blood pressure	0	1	NS
Baby died in early-labor	0	1	NS

TABLE 3

Indications for Forceps

Indication	Home Number	Hospital Number	Stat. Sig.
Low Forceps			
Arrest of descent	2	0	NS
Elective		42	p <0.0001
Prolonged 2nd stage and/or protracted descent	1	54	p <0.0001
Fetal distress	0	18	p <0.005
Piper forceps to ACH	0	1	NS
Mid Forceps			
Elective	0	63	p <0.0001
Prolonged 2nd stage and/or protracted descent	4	86	p <0.0001
Fetal distress	4	53	p <0.0001
2nd stage arrest	2	0	NS
Bleeding	0	1	NS
Meconium staining	0	1	NS
Perineal dystocia	0	1	NS
Mid Forceps Rotation			
Elective, OP	0	30	p <0.0001
Elective, OT	0	3	NS
2nd stage arrest	0	1	NS
Prolonged 2nd stage and/or protracted descent	2	2	NS
Fetal distress	1	4	NS
Manual Rotation			
Elective	0	1	NS
Fetal distress	1	2	NS

TABLE 4

Indications for Cesarean Sections

Indication	Home Number	Hospital Number	Stat. Sig
Hypertonic labor (after oxytocin)	0	3	NS
Hypotonic labor, no response to oxytocin	0	1	NS
Vaginal obstruction by paraovarian cyst	0	1	NS
History of previous difficult forceps	0	1	NS
2nd stage arrest, CPD	6	4	NS
Rupture of membranes, no response to oxytocin	1	1	NS
Labor longer than 24 hours total	0	1	NS
Placenta previa	0	1	NS
Fetal distress	5	8	NS
Repeat Cesarean	0	1	NS
1st stage arrest, CPD	12	45	$p < 0.005$
Multigravida breech (with or w/o CPD)	1	2	NS
Primigravida breech (as above)	0	7	$p < 0.05$
Severe toxemia	1	0	NS
Meconium at 42 weeks	0	1	NS
Face presentation	0	2	NS
Transverse lie	0	2	NS
Suspected postmaturity	0	1	NS
Positive stress test	0	1	NS
Prolapsed cord	1	0	NS
Fetal arrhythmia on monitor	0	1	NS
Amnionitis, no labor, no rupture of membranes	1	0	NS

TABLE 5

	Home	Hospital	Stat. Sig.
Birthweight, mean	3518	3439	NS
Labor length			
para 0, 1st stage	14.5 hrs	10.4 hrs	<0.01
para 0, 2nd stage	94.7 min	63.9 min	<0.05
para 1, 1st stage	8.5 hrs	5.9 hrs	<0.01
para 1, 2nd stage	48.7 min	19.0 min	<0.005
para 2, 1st stage	7.7 hrs	6.6 hrs	NS
para 2, 2nd stage	21.7 min	15.9 min	NS
3rd stage	21.0 min	4.6 min	<0.005

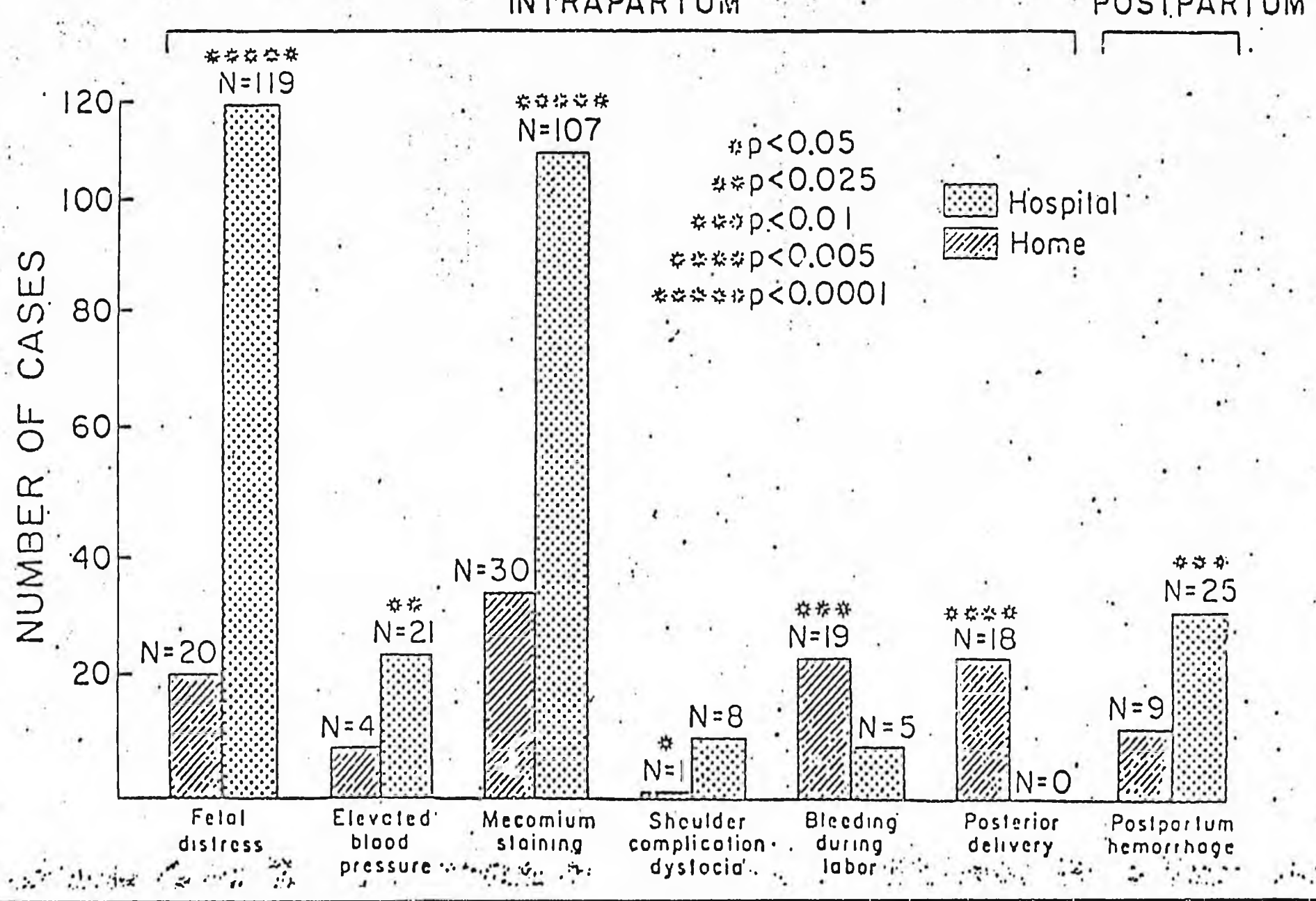
TABLE 6

Neonatal Outcomes

	Home	Hospital	Stat. Sig
Intrapartum death	1	1	NS
Fetal death	2	0	NS
Neonatal death	0	1	NS
Perinatal mortality/1000	2.9	1.9	NS
Neonatal mortality/1000	0	0.9	NS
Neonatal asphyxia	3	7	NS
Neonatal resuscitations required	14	52	$p < 0.0001$
Birth injuries	0	30	$p < 0.0001$
Neurological abnormal infants	1	6	NS
1 min Apgar score 4	20	36	$p < 0.05$
1 min Apgar score 7	56	116	$p < 0.0005$
5 min Apgar score 4	3	8	NS
5 min Apgar score 7	11	23	$p < 0.05$

Figure 1

STATISTICALLY SIGNIFICANT DIFFERENCES IN COMPLICATIONS OF LABOR AND DELIVERY



2.

Outcomes of Elective Home Births: A Series of 1,146 Cases*

LEWIS E. MEHL, M.D., GAIL H. PETERSON, M.S.S.W., MICHAEL WHITT, M.D., and WARREN E. HAWES, M.D.

Institute for Childbirth and Family Research
Berkeley, California
and the Infant Health Unit, Maternal Child Health
California State Dept of Health, Berkeley, California

Medical records of 1,146 elective home births from five home delivery services in northern California were reviewed. Three of the services consisted of family physicians and nurses, whereas two consisted of lay midwives without immediate physician supervision. Rates of medical complications in both groups were low. Perinatal morbidity and mortality were lower than California averages. Fifteen premature infants (1.3%) were delivered successfully. Apgar scores were high. Four infants (0.3%) were neurologically abnormal at follow-up. The perinatal mortality rate was 9.5 per 1,000 total births. There were no maternal deaths.

These figures demonstrate that in a self-selected, medically screened, low-risk population, home delivery with medical facility back-up can be a reasonable alternative to hospital delivery. Possible reasons for the good results obtained are cited.

Key words: Home birth, midwife, family physicians, perinatal mortality, infant morbidity.

INTRODUCTION

A steady increase has been noted in recent years in the incidence of home delivery in certain California counties and presumably in other areas of the country as well. For the past five years, registered out-of-hospital births in California have increased steadily, at the rate of 0.1% a year.[1] This rise has been decried by some members of the medical community while supported by others. Many highly emotional statements have been made by both sides without data to support either position. This study is an attempt to provide such data on 1,146 planned home deliveries conducted by five home delivery services in northern California. One similar study has been published to date—that of Hazell,[6] which was a sociodemographic study and did not emphasize medical outcomes.

METHODS

Sources of Data

Medical charts from five home delivery services in northern California were reviewed. The five services included three physician groups: (1) a rural-based family practice in western Marin County (Point Reyes Station) composed of three family physicians and three registered nurses, performing both home and hospital deliveries since 1970 as part of a comprehensive family practice; (2) an urban-based (Mill Valley) family practice of two physicians and two registered nurses—one a maternity nurse practitioner—in practice since 1973; and (3) an urban-based (Berkeley) group consisting of one physician (whose training had been in pediatrics/neonatology) and two registered nurses, affiliated with a woman's health cooperative in Berkeley. This last group did not have hospital privileges and performed only home deliveries, referring women requiring hospital care to local obstetricians; they had been functioning since early 1974. The lay midwife groups consisted of (1) 10 lay midwives from Santa Cruz County, functioning in both urban and rural settings without immediate medical supervision and with limited medical backup, performing births since 1971, and (2) a rural lay midwife from Sonoma County, California, with good physician back-up, performing

*Supported by contract #74-51098 from the California State Department of Health, Maternal and Child Health. A Collaborative Study from the Infant Health Unit of Maternal and Child Health, California State Department of Health.

births since 1970. (In the latter service, records had been kept only for the last 171 of her estimated 500 deliveries during a five-year time span.)

All records until April 1975 were reviewed by one of us (L. E. M.). They were adequately detailed regarding prenatal care, intrapartum and postpartum events and infant and maternal follow-up. The groups represented the following percentages of the total sample: (1) the Point Reyes physician group, 40.4%; (2) the Mill Valley physician group, 11.2%; (3) the Berkeley physician group, 7.6%; (4) the Santa Cruz County midwives group, 30.8%; (5) the Sonoma County midwife, 10.0%.

The lay midwife from Sonoma County began her midwifery activities accidentally, while visiting a friend in labor. Others learned she had attended a birth and asked her to be at their deliveries until she eventually developed a reputation as a midwife. Her training was self acquired through reading and experience. The Santa Cruz midwives began functioning in much the same fashion, becoming midwives to meet an experienced need in the community and educating themselves through discussion groups, experience and reading. Their average fee per birth was $35.00, so their motivation was clearly not monetary. Typically, they were women who had had an unattended home delivery and had decided to help other women avoid this predicament.

The Sonoma County midwife had good medical back-up through physicians (mainly family practice residents) at the Community Hospital of Santa Rosa, who, although unwilling to attend home deliveries, were willing to discuss problems over the telephone and handle complicated deliveries in the hospital. The Santa Cruz group had poor medical back-up and was not able to obtain telephone consultation. They were often criticized heavily and condemned when bringing women who needed hospital care to the hospital and few supportive physicians to whom they could refer women with complications. Laboring women in the Sonoma area were occasionally as far as one hour from a hospital, although the usual distance was approximately 15 minutes. Laboring women in the Santa Cruz area were occasionally as far as 45 minutes from a hospital but usually ranged from 5 to 15 minutes.

Transport facilities for both lay midwife groups consisted of the midwife's car without any specialized support equipment. Equipment present at deliveries with the lay midwives was also minimal and typically consisted of a bulb syringe, sterile guaze, sterile gloves, a fetoscope, blood pressure cuff, urine dipsticks for testing for acetones, glucose and protein, a portable scale and little else. Their mode of operation has been described by Lang.[9]

The physician services brought a home delivery kit with them to births. Typically the nurse would attend the labor from its inception, and the physician would arrive during the second stage for primigravidae and first stage for multigravidae. The physician kit included IV equipment, oxytocin and methergine for use after delivery, other emergency drugs and forceps to use if necessary as well as suture supplies. (However, there was no intravenous oxytocin or forceps used at home in this series.) The only equipment or drugs not present in their kit and usually present in the hospital was whole blood. (A complete list of supplies is available on request.) The transport vehicle for the physician groups was also the car belonging to the birth attendant. For the Point Reyes group, the closest hospital was 20 miles. For the Berkeley and Mill Valley groups, the distance from a hospital was usually 5 to 10 minutes.

Prenatal care was essentially the same for all groups and did not deviate from the standards recommended by the American College of Obstetricians and Gynecologists with regard to frequency of visits, laboratory tests and clinical assessment. The lay midwife groups required a minimum of two visits to a physician, at which times clinical pelvimetry, Rh status, blood type, rubella titer, hemoglobin, hematocrit, VDRL and gonorrhea culture were determined. Nutrition, the avoidance of prenatal medication and the psychosocial aspects of pregnancy were stressed more than is typically done in prenatal care, and visits usually lasted 20 to 30 minutes for the physician groups, involving discussions with the nurse and then the doctor. For the lay midwife group, the visits were typically 30 to 60 minutes. Three women had no prenatal care and first presented themselves in labor.

There was no limiting of weight gain. It was felt that every woman should gain at least 20 to 30 pounds during pregnancy, and the average weight gain was in the 30 to 35-pound range. Women with chronic medical disease were encouraged to seek a hospital birth, as were women who remained anemic. The threat of a hospital birth usually increased patients' willingness to use iron-containing preparations, and, as a result, the number of women with hemoglobins

of less than 11.0 gm% giving birth at home was minimal (less than 1%).

Intrapartum care was essentially similar among the groups. The lay midwife groups did not perform breech or twin deliveries at home. The physician groups did so on occasion, but only after explaining the problems inherent in such deliveries. After 1973, the usual policy was to recommend cesarean section to women with low breech scores (Zatuchni-Andros breech score) and to attend women with breech scores indicating safe vaginal delivery at home if the women so desired and requested. (Since the completion of this study, the lay midwives have begun attending some breech deliveries at home because of parents' dissatisfaction with the rising incidence of cesarean sections in breech presentation.)

Labor prolongation, of itself, was not treated as a complication requiring hospitalization. Uterine inertia was often treated initially with buccal oxytocin by the physician group at home, and if results were not forthcoming, the woman was transported to the hospital for IV oxytocin. Prolongation of the second stage of labor also was not treated as a complication; indeed, most of the practitioners felt that a slower second stage with little pushing by the mother (often extending two to three hours) was preferable to a shorter second stage (less than two hours) characterized by an intense pushing effort by the mother. Patients with second stage *arrest*, however, if not responsive to buccal ocytocin over a one- to two-hour period, were transported to the hospital for forceps delivery. The midwives were unable to administer oxytocin and consequently sent more of their patients to the hospital for dystocia.

Both groups monitored the fetal heart rate closely throughout the first and second stage, using a fetal stethoscope or Doppler ultrasound fetoscope, and felt that any significant drop in heart rate requiring intervention would be noticed. Blood pressures were checked approximately every one to two hours during labor. Fetal heart tones were checked as often as after every contraction during second stage if some variability had been noted or if the mother was pushing particularly hard but usually were checked every 15 minutes during second stage and every 25 to 40 minutes during first stage, depending on the character of the labor and the fetal heart rate pattern. The fetal heart was occasionally listened to through a contraction and for some time afterwards to determine the presence of any abnormal patterns.

Meconium staining without fetal heart rate irregularities was not treated. (Meconium staining *with* fetal heart rate irregularities was cause for hospitalization, and the infants, with one exception, were treated with intubation and lavage.) Prolonged rupture of membranes in a term-sized infant was followed but not treated unless necessary. It was felt that if the mother did not show signs of amnionitis and had a good socioeconomic and nutritional background, intervention was not necessary within 24 hours. If labor had not begun by 24 hours, induction was usually undertaken in the hospital.

The midwives practiced perineal massage to prevent tearing, but the physicians typically did not. This was optimally done by the mother and father for the month prior to delivery and was done by the midwife during the last half of the second stage. It was not done consistenly by all parents and midwives, but the midwives felt it helped prevent lacerations during delivery.

Forceps deliveries were not conducted at home, and no analgesia or anesthesia was administered at home. If the latter was desired, hospital transport was necessary for the woman to receive it.

The room in which the delivery occured was kept warm, and the baby was given to the mother immediately after delivery to hold and nurse, with blankets placed around the infant to prevent heat loss. The umbilical cord was not clamped until it ceased pulsating except in Rh negative mothers, in whom it was clamped immediately after delivery. RhoGam was given to the Rh negative mothers within 48 hours. Silver nitrate was not applied routinely to the infants' eyes unless there had been a history of gonorrhea or one or both parents were unsure about the other. Most of the infants were fed only by the breast, without glucose or formula supplementation, and were fed ad lib.

Home visits were usually made each day for the first three postpartum days, and telephone contact was maintained with the couple. The infants were seen by the physicians at one week in their offices and again at four weeks. After that point, the recommendations for well child care of the American Academy of Pediatrics were observed. Midwives referred infants for newborn care to pediatricians or family physicians after the first week and continued to follow the infants themselves for various periods of time. All mothers had an examination from four to six weeks postpartum by a physician; results of

the examination were entered in the lay midwives' records.

Study Population

Hazell[6,7] has described the demographic characteristics of the home birth population in the San Francisco Bay Area in a study of 300 home deliveries from the socioanthropological standpoint. Her subjects overlapped to some extent with our sample and were derived from the same subject pool—San Francisco Bay Area couples planning home delivery. According to her study, 90% lived in typical American fashion, with the father gainfully employed and in a single family dwelling with one or two cars; they were not members of an ethnic minority, not on welfare and had no household servants. A general characteristic of the group was described as self-awareness, shown in a concern for nutrition, health food, ecology, humanistic psychology and a strong feeling for a natural birth process. Typically, the mother and father had both attended college, but neither had graduated. The fathers' occupations were noted to vary through the range of occupations present in the Bay Area—from auto mechanic to physician to homesteader. Only one-tenth were classified as "hip," in rebellion to "normal American values" and living in a variety of alternative styles.

In our study, patients of the lay midwives tended to belong more to the counter culture than did Hazell's population. In the physician groups, more professional couples were included. A detailed socioeconomic study on one of the lay midwife groups (the Sonoma County sample) is currently being coordinated by one of us (W.E.H.), and a psychological/developmental outcome study on a subsample of the Santa Cruz group is being analyzed by two of us (L.E.M. and G.H.P.).

Table I presents statistics on the selection of the study population. Only 4% of those women who requested a home delivery were screened out for medical reasons (including premature labor, [on some services] toxemia and underlying systemic disease). This low percentage would seem to indicate that women seeking home deliveries are a self-selected healthy group, probably knowledgeable about childbirth and the importance of nutrition in pregnancy. Nine women with previous fetal deaths were included in the home birth sample. Previous obstetric complications (with the exception of cesarean section) were not used as screening criteria because it was felt that they were iatrogenic to some extent.

TABLE I

HOME DELIVERY STUDY POPULATION

	Number	Percent
Contacted home delivery service	1,348	100.0
Screened out, medical dx	55	4.1
Decided against	147	10.9
Attempted home delivery	1,146	85.0
Taken to hospital	136	10.1
Completed home delivery	1,010	74.9
Attemped home delivery	1,146*	100.0
Physicians	685	59.8
Midwives	461	40.2
Taken to hospital	136	11.9
Physicians	58*	5.1
Midwives	78*	6.8

*Patients hospitalized represented 8.5% of physicians' cases, 16.9% of midwives' cases.

Eleven percent of the women who considered home delivery decided against it for nonmedical reasons. This number was highest in the lay midwife groups and may have been related to a hesitation about giving birth without physician back-up. In the physician-directed services, a common reason cited for switching to a hospital birth was that Medicaid would cover only hospital deliveries.

TABLE II

CHARACTERISTICS OF MOTHERS

	Number	Percent	California 1973
Mother's age	1,146	100.0	100.0
<20	60	5.2	17.3
20-34	1,068	93.2	77.6
≥35	18	1.6	5.1
Parity	1,146	100.0	100.0
0	729	63.6	43.3
1	237	20.7	31.0
2	128	11.2	13.3
3	34	3.0	6.0
≥4	18	1.6	6.3
Prenatal care began	1,146	100.0	100.0
1st trimester	707	61.7	72.8
2nd trimester	362	31.6	20.2
3rd trimester	74	6.5	4.5
None	3	0.3	2.4*

*Includes prenatal care unknown.

TABLE III

CHARACTERISTICS OF PRESENTATION AND DELIVERY

	Number	Percent
Presentation	1,146	100.0
Vertex	1,125	98.2
Brow	(3)	(0.3)
Shoulder	(3)	(0.3)
Breech	21	1.8
Delivery	1,146	100.0
Cesarean	28	2.4
Vaginal	1,118	97.6
Analgesia, only	(14)	(1.2)
Anesthesia, only	(3)	(0.3)
Both	(6)	(0.5)
None	(1,095)	(95.5)
Episiotomy		
1st and 2nd stage labor	85	7.4
3rd stage labor	235	20.5
Low forceps	11	1.0
Mid forceps	6	0.5
Lacerations requiring repair	148	12.9
Episiotomies	89	7.8

Of the 1,146 women beginning labor at home with the intention of delivering there, 136 (11.9%) were sent to the hospital to complete their delivery for treatment of intrapartum (11%) or postpartum (0.9%) problems. Eighty-eight percent of the deliveries begun at home were completed there. Thus, of the initial set of women contacting the home delivery services, 75% successfully gave birth at home.

Four surviving infants required hospitalization for other than phototherapy within three days of delivery; a fifth was born very prematurely in the hospital and remained there for one month.

Table II presents characteristics of the mothers and compares them to California statistics for 1973.[11] Over 90% were in the optimal childbearing age of 20 to 23 years, and the average was 21.9 years. There was a high number (61%) of primigravidae in this series and an incidence of grand multiparity of less than 1%. Virtually all the women were trained in childbirth classes such as Bradley or Lamaze. All women except one attempted breast feeding; for a variety of reasons, eight women were not successful.

RESULTS

Delivery: Home Sample

Statistics on the presentations and deliveries are given in Table III. Most of the deliveries were normal vertex presentations. Of the 21 women with breech presentations, 10 were delivered successfully by choice at home, and 11 were taken to the hospital. The last were all unexpected and with lay midwives.

One percent of the women studied had low forceps deliveries, 0.5% had midforceps deliveries and 2.4% were delivered by primary cesarean section. (The California cesarean section rate was 9.9% in 1973.[11] If, as the Mayo Clinic[1] found, half of the cesarean sections are repeats, then California's primary section rate would approximate 5%, or double the rate in this study.) The indications given for forceps and cesarean deliveries are listed in Table IV.

TABLE IV

INDICATIONS FOR C-SECTIONS AND FORCEPS DELIVERIES IN WOMEN BEGINNING LABOR AT HOME

	Number
Low forceps delivery	
Protracted descent	6
Arrest of descent	2
Dysfunctional labor	1
Brow presentation with arrest of descent	1
Fetal heart drop	1
	11
Mid forceps delivery	
Protracted descent	3
Arrest of descent	1
Dysfunctional labor	1
Fetal heart drop, occiput posterior presentation	1
C-sections	
Cephalopelvic disproportion	16
Failure to descend, occiput posterior presentation, relative CPD	6
Arrest of active phase dilation, fetal heart drop, cord 4× neck	1
Prolapsed cord	1
Breech with amnionitis	1
Psychotic reaction to labor	1
Acutely dropping fetal heart tones	1
Toxemia	1
	28

Lacerations requiring repair were lowest (4.4% and 5.7%) in the lay midwife groups and highest (40.2%) in the physician group with the shortest experience in performing home deliveries without episiotomies. Similarly, episiotomies were lower for the lay midwife groups than for the physician groups.

Analgesia and or anesthesia were used in only 2% of the vaginal deliveries. During the first and second stages of labor, 38 women (3.3%) received buccal oxytocin at home, whereas 47 women (4.1%) received IV oxytocin in the hospital. During the third stage of labor, 146 mothers had oxytocin at home and 89 in the hospital. Mean length of first stage was 10.2 hours for primigravidae and 4.6 hours for multigravidae; second stage means were 118 and 45 minutes, respectively.

Complications of labor and delivery of the home birth group are shown in Table V (individual women may be listed under more than one complication). Interestingly, the total percentages of complications were comparable for primigravidae and multigravidae (18%). The majority of the intrapartum problems involved first stage dystocia. However, the total incidence of protracted labor in this series is noticeably low when compared to that in the literature,[6] as are meconium staining and fetal heart irregularities.[3,8] There was no maternal hypotension prior to or during delivery.

The lay midwives took significantly more of their patients (16.9%) to the hospital than did the physician groups (8.5%). The former took more women to the hospital for induction for prolonged rupture of membranes, uterine inertia during the first stage of

TABLE V

COMPLICATIONS OF LABOR AND DELIVERY

(Individual women may be listed under more than one complication)

Primigravidae (N = 136/729 = 18.6%)				
Complication	Home	Hospital	Total	Percent*
Intrapartum				
Dystocia† 1st stage	27	34	61	8.4
Dystocia 2nd stage	10	14	24	3.3
CPD	0	23	23	3.2
Meconium stain, only	24	3	27	3.7
FHT ↓ (c, s meconium)	6	13	19	2.6
Hypertension	3	6	9	1.2
Hypertension	3	6	9	1.2
Blow presentation	1	2	3	0.4
Shoulder dystocia	1	1	2	0.3
Polyhydramnios	0	2	2	0.3
Other*	1	10	11	1.5
Total	73	108	181	
Postpartum				
Hemorrhag ‡	1	3	4	0.5
Excessive PP bleed ‡	11	7	18	2.5
Retained placenta	10	4	14	1.9
Endometritis	9	2	11	1.5
PP depression	0	4	4	0.5
Total	31	20	51	

*Single cases of oligohydramnios, amnionitis, toxemia, prolapsed cord, thrombophlebitis, placenta previa, abruptio placentae, dehydration, urinary tract infection, 2nd trimester bleed, precipitous labor.

Multigravidae (N = 78/417 = 18.7%)				
Complication	Home	Hospital	Total	Percent*
Intrapartum				
Dystocia 1st stage	2	12	14	3.4
Dystocia 2nd stage	4	9	13	3.1
Meconium stain, only	11	1	12	2.9
FHT ↓ (c, s meconium)	3	4	7	1.7
Precipitous labor	7	0	7	1.7
Other*	1	2	3	0.7
Total	28	28	56	
Postpartum				
Hemorrhage	4	1	5	1.2
Excessive PP bleed	9	4	13	3.1
Retained placenta	4	4	8	1.9
Endometritis	3	1	4	1.0
PP depression	0	1	1	0.2
Total	20	11	31	

*Single cases of CPD, shoulder dystocia, oligohydramnios.

*Percent complications per 729 primigravidae, 417 multigravidae.

†Dystocia as used in this table is defined as: prolonged or arrested 1st stage, failure to dilate; prolonged or arrested 2nd stage, failure to descend (as per Greenhill and Friedman[6]).

‡Hemorrhage is defined as more than 650 ml; excessive bleeding as "more than normal," including third-day postpartum bleeding.

TABLE VI

COMPLICATIONS OF LABOR AND DELIVERY

(Individual women may be listed under more than one complication)

Physicians (N = 134/68 = 19.6%)			Midwives (N = 80/461 = 17.4%)		
Complication	Number	Percent*	Complication	Number	Percent*
Intrapartum			Intrapartum		
Dystocia† 1st stage	47	6.9	Dystocia 1st stage	28	6.1
Dystocia 2nd stage	24	3.5	Dystocia 2nd stage	13	2.8
DPD	14	2.0	CPD	10	2.2
Meconium stain, only	28	4.1	Meconium stain, only	11	2.4
FHT ↓ (c, s meconium)	16	2.3	FHT ↓ (c, s meconium)	10	2.2
Hypertension	7	1.0	Hypertension	2	0.4
Brow presentation	2	0.3	Brow presentation	1	0.2
Shoulder dystocia	1	0.1	Shoulder dystocia	2	0.4
Polyhydramnios	1	0.1	Polyhydramnios	1	0.2
Oligohydramnios	1	0.1	Oligohydramnios	1	0.2
Precipitous labor	8	1.2	Precipitous labor	0	0.2
Other*	6	0.9	Other*	0	—
Total	155		Total	82	
Postpartum			Postpartum		
Hemorrhage†	5	0.7	Hemorrhage	4	0.9
Excessive bleeding†	19	2.8	Excessive bleeding	12	2.6
Retained placenta	15	2.2	Retained placenta	7	1.5
Endometritis	10	1.5	Endometritis	5	1.1
Depression	3	0.4	Depression	2	0.4
Total	52		Total	30	

*Single cases of amnionitis, placenta previa, abruptio placenta, dehydration, urinary tract infection, 2nd trimester bleeding.

†Percent complication for 685 MDs' patients, 465 midwives' patients. See Table V.

*Single cases of toxemia, prolapsed cord, thrombophlebitis.

labor, fear of completing the delivery at home, falling fetal heart rate, manual removal of placenta and treatment of postpartum hemorrhage. The physician groups used significantly more oxytocin after delivery of the placenta than did the midwives and reported more precipitous deliveries. Complications by midwives' and physicians' groups are shown in Table VI.

There were no maternal deaths.

Perinatal Outcome

Six sets of twins were delivered successfully at home, bringing the total number of births to 1,152.

Fifteen infants, including two sets of twins, weighed less than 2,501 grams at birth (1.3%). Most of them (11) were 2,250 grams and over. Fourteen of the low birthweight infants were born at home. One (1,332 grams) was born in the hospital after second trimester bleeding and remained there for a month. Two of the smaller babies (1,729 and 2,154 grams) were admitted to the hospital with mild respiratory distress syndrome.

As noted earlier, some mothers were medically screened out of the home delivery group because of premature labor. There were 20 such patients. If they are included, the total premature rate becomes 3.0%. (California's premature rate in 1973 for white women 20 to 29 was 5.3%.) All the low birthweight babies survived without other postnatal complications other than those mentioned above.

The average Apgar scores were high—8.9 and 9.7 at one and five minutes—and were usually assessed by a nurse or lay midwife who did not deliver the infant. Though the scores may be in-

TABLE VII

INFANT MORBIDITY

Condition	Number	Rate per 1,000 lb	Delivery	Complications	Outcome
Congenital defects	6	5.2			
PDA			Home	None	Repaired surgically at one year
Coarctation of aorta			Home	None	Repaired surgically at two years
Omphalocele			Home	None	Repaired surgically at 15 hours
Myelomeningocele, thoracic			Home	None	Mental and motor retardation at 18 months
Multiple minor anomalies			Hospital	RHT ↓, c-s	No mental or motor retardation at one year
Down's syndrome			Home	Meconium	Mental retardation
Cerebral palsy	2	1.7	Home	Meconium+++ FHT ↓	Motor retardation
			Home	None	Mild spastic with slow verbal development
Surgical conditions	2	1.7	Home	None	Pyloric stenosis repaired at five and eight days
Low birthweight	15	13.1	Hospital	2nd Tri Bleed	1,332 g, in hospital one month, no problem
			Home	None	1,729 g, in hospital two weeks, mild RDS
			Home	Breech	2,154 g, in hospital 12 days, mild RDS
		Others:	Home	None	No problems

flated, they probably are no more so than in the hospital, where the physician delivering the infant assesses the Apgar. Forty infants (3.5%) born both at home and in the hospital had one-minute Apgar scores of 4 to 6, and seven infants (0.6%) had one-minute Apgars of 3 or less and required resuscitation. (Drage and Berendes[2] found a 21% incidence of one-minute Apgar scores b[illegible]7.) Lack of drugs, both prenatally and intrapartum, may be associated with these relatively high scores.

Two other surviving infants were admitted to the hospital during the first three days—one for repair of an omphalocele and one who was the result of an unattended (the only one) delivery with gross meconium staining and fetal distress and who was taken to the hospital within 10 minutes after delivery, where intubation and lavage were *not* performed. This delivery was part of the lay midwife sample. Table VII describes the cases of infant morbidity and their outcome.

Four infants (0.3%) were neurologically abnormal at follow-up: two had cerebral palsy and two were mentally retarded. This finding compares favorably with the 1.7% incidence of neurologically abnormal infants at one year found by the National Institute of Neurological Diseases and Stroke.[10] A fifth was slow, albeit consistent, in developing and did not walk until 18 months.

In addition to those listed in Table VII, there were 21 cases (1.8%) of jaundice requiring phototherapy. Only a few not already in the hospital were admitted, for parents were able to rig up flourescent lights over bassinets at home. Three babies with failure to thrive were switched from breast to bottle feeding, with successful results. The average length of infant follow-up was 11.5 months. Some children are still being followed now at three to five years of age. Over 80% were followed at least six months.

The nine women with previous fetal deaths had no complications.

TABLE VIII

PERINATAL OUTCOME

	Number	Study rate	California rate — 1973
Total births*	1,152		
Live births*	1,147		
Fetal deaths	5	4.3	10.2
Neonatal deaths	6	5.2	10.3
Total perinatal deaths	11	9.5	20.3
Low birthweight (<2,501 g)	15	1.3%	6.4%

*Includes six sets of twins.

Fetal and perinatal death rates are based on 1,000 total births; neonatal death rates, on 1,000 live births.

TABLE IX

CAUSES OF PERINATAL DEATH

Age at death	Number	Delivery	Complications	Cause of death
5 months est. gest. age	1	Home	None	Rh incompatability, insisted on home delivery
35 weeks est. gest. age	2	Home	None	Intrauterine death, unknown cause
During labor	1	Hospital	Amnionitis, IUD in place	Overwhelming intrauterine sepsis
During labor	1	Home	None	Unknown cause
2 days	1	Hospital	None	Macrosomia, single umbilical artery, bilateral adrenal hemorrhage, numerous congenital anomalies
7 days	1	Home	None	Cystic fibrosis, meconium ilius, postoperative peritonitis and sepsis
7 days	1	Home	None	Coarctation of aorta
10 days	1	Home	None	Cor biloculare
2 weeks	1	Home	None	Sudden infant death syndrome
3 weeks	1	Home	None	After surgery for tetralogy of Fallot

Perinatal outcome rates and the causes of fetal and infant deaths are given in Tables VIII and IX. The perinatal mortality rate in this study is significantly lower (95% confidence interval) than the 20.3% rate for the state of California in 1973. The state's fetal death rate in that year for white women 20 to 29 was 8.2 per 1,000 total births as compared to 4.3 in the home birth series. Unfortunately, there is no comparable neonatal death rate available for this specific group.

There was no association in this series between length of first or second stage labor and the incidence of low Apgar scores at birth or other complications. Arrest of descent was weakly associated with somewhat lower Apgar scores, but this was also strongly associated with the use of forceps, and the total number of cases was too small to draw meaningful conclusions. There were 14 cases of prolonged rupture of membranes but no resultant infections in the infants.

The average cost of home deliveries in the physician-directed services was $325 for mother and baby; for the entire study population, $277. This was an all-inclusive rate, covering prenatal care, home visits postpartum and all necessary supplies. The average cost for total care with hospital delivery and three days' hospitalization was $1,450. This latter figure is low, for it does not include the additional fee for cesarean section. (Estimated figures for a normal vertex delivery in California hospitals in 1975 were $1,150 to 1,550.)

DISCUSSION

This is a self-selected healthy group of women, screened for obvious problems and complications occurring during pregnancy, so the data presented here are not directly comparable to state statistics. Still, their outcomes are better than average and the complication rates lower than expected.

Generally, the response of physicians to home delivery has been negative. Many view home birth as an irresponsible risk to mother and child. They do not encourage or attend home deliveries, and many have refused to give prenatal care, advice or instruction to couples planning home birth.

There is a dichotomy in obstetric thinking today. There is the technological trend represented by high-risk obstetric units with fetal monitoring and readily available medical and surgical intervention, and there is the family-centered, natural childbirth trend represented in its extreme by couples planning home delivery without any medical support. Reducing the antagonism between these divergent poles would enhance care for women choosing hospital deliveries as well as for those choosing home deliveries.

More studies of this kind are needed before any conclusions can be drawn. However, evidence from this study population strongly suggests that home delivery is a safe alternative for medically screened, healthy women; they deserve adequate care for the delivery of their choice. This care would include prenatal care by a physician, child birth education and only necessary intervention by attendants. Hospitals should be encouraged to adopt those techniques of home birth that improve pregnancy outcome. These techniques would include perineal massage and gentle head delivery to avoid episiotomies and lacerations, choice of the use of analgesia and anesthesia and provision of a supportive, friendly and comfortable environment for labor and delivery.

Acknowledgment

Acknowledgment is gratefully made to Carol Madore and Deborah Wingard for their statistical and editorial assistance in the preparation of this manuscript.

References

1. Auro LA, Saed F: Low-incidence cesarean section: 12 year experience. Mayo Clinic Proc 50:365-369, 1975
2. Drage JS, Berendes H: Apgar scores and outcome of the newborn. Pediatr Clin North Am 13:635-643, 1966
3. Eastman NJ, Hellman LM: Williams Obstetrics. New York, Appleton-Century-Crofts, 1966, p 988
4. Friedman EA: Patterns of labor as Indicators of risk. Clin Obstet Gynecol 16:172-183, 1973
5. Greenhill JP, Friedman EA: Biological Principles and Modern Practice of Obstetrics. Philadelphia, WB Saunders, 1974
6. Hazell LH: A study of 300 elective home births. Birth and the Family 2:11-18, 1975
7. Hazell LH: Birth Goes Home. Seattle, ICEA Press, 1975
8. Klaus M, Fanaroff A: Care of the High Risk Neonate. Toronto, WB Saunders, 1973, p 141
9. Lang R: The Birth Book. Palo Alto, CA, Science & Behavior Books, 1972
10. Niswander KR, Gordon M: The Women and Their Pregnancies. The Collaborative Perinatal Study of the National Institute of Neurological Diseases and Stroke. United States Department of Health Education and Welfare. Philadelphia, WB Saunders, 1972, p 49
11. State of California, Department of Health, Center for Health Statistics, 1975

Address reprint requests to: Lewis E. Mehl, M.D., Director of Research, Institute for Childbirth and Family Research, 2522 Dana St., Suite 201, Berkeley, California 94704.

RISK FACTORS IN LOW RISK CHILDBIRTH[1,2]

I. Differences between home and hospital births

Lewis E. Mehl, M.D.
Jean-Richard Ramiel, B.A.
Barbara Hoff, R.N.
Brenda Leininger, R.N.
Gail H. Peterson, M.S.S.W.
Don C. Creevy, M.D., F.A.C.O.G.

Center for Research on Birth and Human Development
Berkeley, California 94702

Address communication to:

Dr. Mehl, CRBHD
2522 Dana St., Suite 201
Berkeley, California 94704

---

[1]Presented at the annual meeting of the American Public Health Association, Washington, D.C., October 31, 1977.

[2]Supported in part by a grant from the American Foundation for Maternal and Child Health, New York, New York.

Summary

Previous studies with matched low-risk populations indicated that a planned home delivery group did better on some indicators of perinatal outcome than a planned hospital group. Matching was done with a case-control format so that each of the 1046 women planning a home birth were matched with a counterpart planning a hospital birth who was the same age, had the same length of gestation, education, presentation, individual risk factors, and total risk factor scale. The planned hospital group had significantly more fetal distress, meconium staining, birth injuries, post partum hemorrhages, and lower Apgar scores at one and five minutes. The planned hospital group also experienced more forceps deliveries, oxytocin, and analgesia compared to the planned home group, along with exposure to more obstetrical procedures.

Canonical correlation analysis indicated that probable reasons for these differences did relate to the differences found between the two groups in the use of analgesia, forceps for delivery, and oxytocin. The combination of forceps, obstetrical procedures, and an aggressive management philosophy were associated with more birth injuries, fetal distress, lower Apgar scores, resuscitation, and 3rd and 4th degree lacerations. The combination of analgesia and an aggresseve management philosophy was associated with more fetal distress, resuscitation, and low Apgar scores. Finally, the combination of oxytocin for labor and obstetrical procedures was associated with more fetal distress, infant

resuscitation, and postpartum uterine atony, psychiatric depression, and postpartum placenta problems.

The results of this study suggested that an aggressive management philosophy for the low risk patient may not be congruent with the needs of such patients. It was also suggested that forceps, analgesia, and oxytocin have intrinsic risks above those associated with the reasons for their use. The use of aggressive or active management of labor with many interventions for the low-risk patient is suggested to increase risk for some patients, although more study is needed to understand how this effect is mediated.

Key words: obstetrical procedures perinatal outcome
Oxytocin fetal distress obstetrical intervention

Introduction

In previous research we matched 1,046 women planning home deliveries with 1,046 women planning hospital deliveries and found interesting differences in obstetrical outcome (Mehl , 1977). Matching was done on a case by case basis for such parameters as maternal age, length of gestation, maternal education, presentation, prenatal risk factors and total risk factor score. Both home and hospital populations were low risk and received childbirth preparation. The planned hospital group was found to have significantly more fetal distress, meconium staining, birth trauma, postpartum hemorrhages, and the like. Apgar scores at one and five minutes were also significantly lower. Possible reasons for this were discussed, including greater use of forceps, oxytocin, and analgesia in the planned hospital group as well as a more aggressive interventionist attitude on the part of hospital practitioners. This was characterized by a more frequent us of obstetrical procedures.

Our interest was in further investigating these differences. To do this we choose to subject a portion of the sample to statistical analysis in order to increase our understanding of what factors might be contributing to the differences found.

Methods

Sample Selection

Since 1973 we have been collecting data on both planned home and hospital deliveries. For home deliveries, we have identified reliable practitioners (obstetricians, midwives, family practitioners, etc.), with adequate record-keeping. We have spoken with them to understand their definition of terms, their mode of practice, and their training and knowledge of obstetrics and pediatrics. We then collect data on every consecutive birth they attend, using them as "index practitioners." This solves one of the sampling problems involved in studying a phenomenon such as home birth. Birth certificate reporting in the United States is grossly underrepresented for home births, with a bias toward complicated deliveries that come in contact with health facilities being uniformly reported (as required by law) and uncomplicated, successful home births not being reported. Reasons related to us by parents for this under-reporting include fear of harassment by public health authorities, fear of eliciting prosecution for unlicensed birth attendants, desire for noninvolvement with the established health-governmental system, lack of initiative, and, prior to the cessation of selective service induction, a desire to not provide a means for the Selective Service System to locate their male child. We have found that birth certificate reporting ranges from 25 percent to 100 percent, with low reporting occurring more with unlicensed attendants and high reporting occurring when births are attended by licensed physicians or midwives (Mehl et al., 1975; Mehl and Stewart, 1977). Because of this, birth

certificates cannot be used to randomly select a home birth sample. Neither do birth certificates differentiate between planned and unplanned out-of-hospital delivery, type and training of attendant, and sociodemographic characteristics of the mother. Without this information, data would be meaningless.

Our question of interest is if selected women can deliver at home attended by competent, trained practitioners without unreasonably increasing risk.

For purposes of this study we included only data from physicians, and not from midwives working independently of physicians (Mehl, 1976).

Home delivery data was taken from four practices:

1) a general family practice in western Marin County, California, composed of three family physicians and three midwives;

2) a general family practice in Mill Valley, California, composed of two family physicians and two midwives;

3) a birth service in Berkeley, Califirnia, consisting of one neonatologist and two midwives; and

4) a birth service in southern Wisconsin, consisting of two family physicians and two midwives.

The time from which these deliveries occurred ranged from 1970 to 1976. Data collection was retrospective (except in the fourth practice, which was prospective) and suffered from the limitations of all retrospective chart review studies.

Hospital deliveries were collected from two hospitals in Madison, Wisconsin for the years 1974-1975, and from the planned

hospital deliveries (not screened-out home deliveries) of the first home birth practice. A total of 8,000 deliveries were available for analysis. Both Wisconsin hospitals were private community hospitals affiliated with university teaching programs. Details of their function are available in Mehl et al. (1977).

Birth attendants were categorized as either having an aggressive management philosophy or a conservative management philosophy.

Data Analysis

Matching was carried out as described in Mehl et al. (1977), but with the elimination of cases of midwives. Matching criteria were maternal age, risk factor score, individual major risk factors, parity, length of gestation, presentation, and maternal education. Missing data was replaced by the sample mean for age, education, and length of gestation. The incidence of this was small.

Matching was done by means of a face sheet as described in Mehl et al. (1977) and was done so that the delivery characteristics would not be known to the matcher. Matching was random. Cases were selected in chronological order from the hospital group. A match was searched for in the home group. If no match was found, the hospital case was put aside, and the search was repeated for the next card.

Matched cases were keypunched and entered onto magnetic tape. A canonical correlation analysis was then performed for the

entire sample (Anderson, 1958) using the CANCORR procedure of the SPSS series of statistical programs (Nie et al., 1975) as adapted for the CDC 6000 computer series (Version 6.5, Vogelback Computing Center, Northwestern University). Analysis was performed at the University of California, Berkeley Computing Center on the CDC 6400 system.

A total of 94 variables were used in the analysis representing prenatal characteristics and complications, and neonatal and maternal outcome measures. Variables used in canonical correlation analysis are already partialed out from each other, so that variable overlap is eliminated to the extent that is possible.

Results

Results of the analysis are shown in Table 1. The variables loading most highly on the first canonical variable were the linear combination of forceps, obstetrical procedures, and aggressive management. This group was associated with birth injuries, fetal distress, low Apgar scores at 1 minute and 5 minutes, need for resuscitation, and third and fourth degree lacerations. Only the hospital practitioners did elective forceps and the planned hospital group had 30% forceps deliveries compared to 1.2% for the planned home group. (Forceps for this group were used only after transport to the hospital). The inclusion of planned hospital in the first set may reflect a philosophical difference of the hospital practitioners in defining the need for forceps.

The second canonical variable consisted of the linear combination of analgesia and planned hospital delivery in association with the combination of fetal destress, low Apgar scores at 1 and 5 minutes and need for neonatal resuscitation.

The third canonical variable consisted of the linear combination of first stage oxytocin, second stage oxytocin, and obstetrical procedures in association with a linear combination of newborn metabolic problems, poor infant condition, maternal infection, infant resuscitation, fetal distress, and transport to neonatal intensive care. The canonical correlation coefficients were 0.68, 0.54, and 0.32, respectively. All were significant.

As a check on the loadings of variables on the canonical variables, the sample was split into two random parts. This was done by adding the subject number and the attendant number and then creating two groups based upon whether the last digit was even or odd. The variability of the loading was not more than 10 percent.

Discussion

Our interest is in understanding what factors contribute to differences in obstetrical outcome among a series of populations. Canonical correlation analysis is one way of sorting out a series of significant relationships from among a large number of variables. Since many of the variables involved were effect coded with 1's and 0's, the difficulty of fitting these values into a

linear equation increases. Thus, smaller canonical correlations may be more significant with the use of effect coding than with the use of continuous variables. Because of the non-normality of effect coded variables, discussion continues regarding the best method for significance testing. One commonly accepted method for verification of important relationships found is to repeat the analysis on randomly chosen subsamples (D. Brillinger, personal communication, 1977). This procedure in the current sample suggested that, at least for this sample, the relationships found were valid ones.

The predominant loading of outcome measures onto the second set of the first canonical variable (cf. Table I) related to difficulties with the infant. These included intrapartum fetal distress, low Apgar scores, a need for resuscitation, and poor infant condition. (Poor infant condition was a six-point rating scale developed from considering all factors operative during the first hours of life.[1]) These were associated with the linear combination of planned hospital delivery and analgesia. The planned hospital variable could also reflect population differences. Women planning out-of-hospital birth may be more attentive to

---

[1]Poor infant condition was derived according to the following scheme:

0 - no problems
1 - one minor problem, e.g., mild hypothermia or acrocyanosis
2 - several minor problems
3 - one or more major problems
4 - severe distress, need for intensive care, resuscitation
5 - death

having a good diet, to avoiding chemical or drug exposure during pregnancy, to not smoking, and the like. Another component of this variable may be related to an environmental stress factor operative in the hospital setting. All of the speculations require further investigation.

For the third canonical variables deleterious effects of oxytocin administration begin to become apparent along with obstetrical procedures. Such procedures included amniotomy, fetal monitoring, etc. More cases are needed to separate out exactly which obstetrical procedures affected the loading, or whether the effects of procedures are additive. The possible similarities of these results with the findings of Caldeyro-Barcia's group deserve comment. In several studies from Dr. Caldeyro-Barcia's research group in Montevideo, Uruguay, deleterious effects of artificial rupture of membranes and use of oxytocin have been demonstrated (Schwarcz et al., 1973, 1974a, b, 1975; Caldeyro-Barcia et al., 1972, 1974). It will be most interesting to see what factors separate out as the important one(s) as we continue the analysis.

The use of oxytocin and obstetrical procedures was associated with newborn metabolic problems (acidosis, hypoglycemia, etc.), maternal infections, infant resuscitation, poor infant condition, fetal distress, and transport to neonatal intensive care.

In conclusion, there seem to be reasons for the outcome differences previously found between the planned home delivery patients and the planned hospital delivery patients. It is important to stress that the reasons for obstetrical procedures, oxytocin, and the like have been partialed out to the extent pos-

sible when the variables enter the analysis. Thus, in this analysis, we are seeing, to the extent the partialing was successful, the effect of procedural variables, per se. Further research is needed to better understand the relations that are beginning to be elucidated. Also from our analysis of the initial hospital-home comparison sample (see Table 1) it would appear that analgesia, forceps and oxytocin are associated with increased infant problems and that their elective use should be discouraged. Further work is needed to understand the relationship between benefits of these procedures for certain kinds of problems and the risks which the use of these procedures entail.

Table 1. Results of Canonical Correlation Analysis of Mehl (1977)

Matched Sample

	1st Canonical Variable	2nd Canonical Variable	3rd Canonical Variable
1st Set	Forceps (0.92)	Analgesia (0.72)	Oxytocin 1st stage (0.82)
	Obstetrical procedure (0.34)	Aggressive management philosophy (0.28)	Oxytocin 2nd stage (0.71)
	Aggressive management philosophy (0.58		Obstetrical procedure (0.63)
2nd Set	Birth injuries (0.82)	Fetal distress (0.44)	Newborn metabolic problem (0.44)
	Fetal distress (0.50)	Low Apgar at 1 min. (0.49)	Poor infant condition (0.35)
	Low Apgar at 1 min. (0.46)	Low Apgar at 5 min. (0.36)	Maternal infection (0.26)
	Low Apgar at 5 min. (0.39)	Poor infant condition (0.34)	Infant resuscitation (0.30)
	Resuscitation (0.37)	Resuscitation (0.32)	Fetal distress (0.64)
	3rd degree lacerations (0.71)		Transport to neonatal intensive care (0.28)
	4th degree lacerations (0.82)		

References

Anderson, T.W. An Introduction to Multivariate Statistical Analysis. New York: Wiley & Sons, 1958.

Caldeyro-Barcia, R., Schwarcz, R.L. and Althabe, O. "Effects of rupture of membranes on fetal heart rate pattern." Int'l. J. Gyn. Ob. 10 (1972): 169-172.

Caldeyro-Barcia, R., Schwarcz, R., Belizan, J.M., Martell, M., Neeto, F., Sabatino, H., and Tenzer, S.M. "Adverse perinatal effects of early amniotomy during labor," in Modern Perinatal Medicine. Edited by L. Gluck. Chicago: Year Book Medical Publishers, Inc., 1974.

Mehl, L.E. "Current States of Research on Home Birth," in Safe Alternatives to Childbirth. Edited by L. Stewart and D. Stewart. Chapel Hill, N.C.: NAPSAC, 1976.

Mehl, L.E. "Results of Home Confinement in the United States," in A Place To Be Born. Edited by S Ketzinger and J. Davis. Oxford, England: Oxford University Press, 1977.

Mehl, L.E., Peterson, G.H., Shaw, N.S., and Creevy, D.C. "Complications of Home Birth. A Series of 287 Cases from Santa Cruz County, California." Birth and the Family Journal 1 (1975): 110-123.

Mehl, L.E. and Stewart, D. "Reply to ACOG's Negative Home Birth Data," in 21st Century Obstetrics Now. Vol.1. Edited by L. Stewart and D. Stewart. Chapel Hill, N.C.: NAPSAC, 1977.

Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K., and Bent, D.H. Statistical Package for the Social Science (SPSS). San Francisco: McGraw Hill, 1975.

Schwarcz, R., Althabe, O., Belitzky, R., Lanchares, J.L., Alvarez, R., Berdaguer, P., Capurro, H., Belizan, J.M., Sabatino, J.H., Abusleme, C., and Caldeyro-Barcia, R. "Fetal heart rate patterns in labors with intact and with ruptured membranes." J. Perinatal Med. 1 (1973): 153-165.

Schwarcz, R.L., Belizan, J.M., and Caldeyro-Barcia, R. "Conservative Management of Labor," in Recent Progress in Obstetrics and Gynecology. Edited by L.S. Persianinov, T.V. Chervokova, and J. Presl. Amsterdam: Excerpta Medica, 1974a.

Schwarcz, R.L., Belizan, J.M., Cifuentes, J.R., Caudro, J.C., Marques, M.B., and Caldeyro-Barci, R. "Fetal and maternal monitoring in spontaneous labors and in elective inductions." Am. J. Ob. Gyn. 120 (1972): 169-172.

Schwarcz, R., Belizan, J.M., Neeto, F. and Tenzer, S.M. "La Potura precoz de las membranas ovulares y sus efectos sobre el parto y el neonato." Investigacion colaborative entre maternidades de America Latina. Enero: Centro Latino americano de perenatologia y desarrollo humano. : Publicacion cientifica No. 595, 1975.

Statistical Outcomes of Home Delivery
I. Comparison to similarly selected Hospital Deliveries [1,2]

Lewis E. Mehl, M.D.
Departments of Family Practice and Psychiatry
University of Wisconsin Center for Health Sciences

Gail H. Peterson, B.A.
School of Social Work
University of Wisconsin
Madison, Wisconsin 53705

Michael C. Whitt, M.D.
West Marin Medical Center
Point Reyes Station, California 94589

Don C. Creevy, M.D., FACOG
Department of Gynecology and Obstetrics
Stanford University
School of Medicine
Stanford, California 94305

1 Supported in part by Contract #74-51098 from the California State Department of Health, Section of Maternal and Child Health.

2 Presented at the first annual meeting of the National Association of Parents and Professionals for Safe Alternatives in Childbirth, Washington, D.C., May 15, 1976.

ABSTRACT

Medical records of 1,146 elective home births from 5 home delivery services in northern California were compared with medical records of 180 planned hospital deliveries conducted by one of the same services, and consisting of women who met their criteria for home delivery. Three of the services consisted of family physicians and nurse-midwives, while two consisted of lay midwives without immediate physician supervision. Rates of medical complications in both groups were low. Significantly more analgesia and anesthesia (although low) was used in the planned hospital group; the incidence of low Apgar scores in this group was higher than for the planned home group. Results of both groups were better than those of the general population. Possible reasons for this are discussed. Most other measures of perinatal outcome and complications were not significantly different between the two groups or between physicians and midwives. The neonatal mortality rate was 5.0/1000; the perinatal mortality rate was 9.5/1000. There were no maternal deaths. These figures support the conclusion that in a self-selected, medically screened population, home delivery can be a safe alternative. Possible reasons for this are cited.

Key Words

Home Birth Midwife Perinatal
Neonatal Mortality Infant Morbidity

Acknowledgments

Acknowledgments are gratefully made to Joni Dean for her clerical assistance.

Introduction

We began our studies on the statistical outcomes of home deliveries because of the tremendous rise in the number of home deliveries across the country and the lack of available data on their outcomes. We had hoped to provide data which parents and professionals could use on their individual scales of relative value along with the already available experiential data on emotional outcomes as they weighed risks and benefits to determine what kind of delivery they would choose to have or to attend. The purpose of this study was to compare the outcomes of 1146 elective home deliveries with 180 similarly selected hospital deliveries performed by one of the same groups of physicians involved in the home deliveries.