PHYSICIAN- AND MIDWIFE-ATTENDED HOME BIRTHS
Effects of Breech, Twin, and Post-Dates Outcome Data on Mortality Rates

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ABSTRACT

The effect of attending breech, twin, and post-date pregnancies on home birth outcomes was assessed. The same form was used to collect data on a convenience sample of 4,361 home births attended by apprentice-trained midwives from 1970 to 1985 and 4,107 home births attended by family physicians from 1969 to 1981. Data sets were compared to find 1,000 pairs of pregnant women, one from each group, who were matched for age, sex, socioeconomic status, race, and medical risk. The perinatal mortality rate for the midwife-attended births was 14 per 1,000 (three fetal deaths before labor, six intrapartum fetal deaths, and five neonatal deaths). The perinatal mortality rate for births attended by family physicians was five per 1,000 (one fetal death before labor, two intrapartum fetal deaths, and two neonatal deaths). The difference was statistically significant; however, the differences disappeared when cases involving post-dates, twin, or breech deliveries were eliminated from the sample. Although the data are more than a decade old, they support the premise that outcomes for low-risk home births are comparably good whether attended by physicians or midwives. However, the findings do raise questions about the safety of attending high-risk births at home.

Many studies have reported positive outcomes for home birth (1–26), including births attended by apprentice-trained midwives[1] and certified nurse-midwives in the United States and births attended by direct-entry midwives in Canada and the Netherlands. However, there is an ongoing debate regarding whether it is safe for any provider to attend breech deliveries, twin deliveries, and post-dates pregnancies at home. Although standard textbooks of obstetrics do not support home birth for anyone, their authors especially object to home birth for breech, twin, and post-dates pregnancies. *Williams Obstetrics* states, "The provider who might naively champion any childbirth outside of a hospital setting is either not aware of the hazards of breech delivery in such a setting or is totally insensitive to the welfare of the fetus and the mother" (27).

One of the authors (LM) has frequently been asked to testify in court proceedings involving bad outcomes of home births, 84% of which have involved one of these three types of deliveries occurring at home. At a Midwifery Today conference held in New York City in 1995, several presenters argued for the acceptability and desirability of midwives' attending breech and twin deliveries at home. Review of recent publications in the midwifery literature shows a continued effort to attain authority to deliver breeches, twins, and post-dates women at home. Recent published articles include one suggesting that post-dates or post-maturity is a myth (28), that twins may be safely delivered at home (29), and that breeches may be delivered at home by all midwives (30,31). A 1995 front page article in the Burlington, Vermont area told the story of a lay midwife-attended breech delivery in which the midwife assured the mother that she could feel comfortable about having a breech birth at home (32).

It is difficult to analyze midwife-attended home birth outcomes for a number of reasons: 1) women tend to self-select home birth, and the act of self-selection or the psychological factors influencing the choice for home birth could influence the outcome; 2) many complications are sufficiently rare that large numbers of births would be needed to compare outcomes between management of the problem at home versus management of the problem in the hospital, and, given the small numbers of home births in the United States, large numbers are hard to generate; 3) planned and unplanned home births are not always easily distinguishable; and 4) even within home birth, the variations in practice protocols and attitudes toward medicine and hospitals among practitioners can be enormous, varying from a close, cooperative relationship to rejecting attitudes and antagonism.

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[1] A confusing array of terms surround midwives, including direct-entry, empirical, lay, traditional, apprentice-trained, certified, registered, and traditional birth attendants. In this paper, direct-entry midwives (DEM) will refer to those who have higher, formal, academic education in midwifery and who practice in accordance with the International Confederation of Midwives (ICM) definition of a midwife. The term apprentice-trained midwife (ATM) is used to refer to midwives who do not have a formal midwifery education and who practice outside of the full ICM definition. The term lay midwife was prominent while these data were being collected; however, that term has become pejorative in the 1990s and will only be used in a context in which the midwives themselves used the term. Lay midwife will, thus, refer to the same type of midwife as an apprentice-trained midwife. The other terms will not be used except for certified nurse-midwife, defined in accordance with the standards of the American College of Nurse-Midwives.

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Because of the experiences of one of the authors (LM), especially those in the courtroom and in medical and nursing board proceedings; the ongoing controversy over attending breech, twin, and post-dates pregnancies at home; and the difficulty of collecting additional data, we decided to use an existing data base, composed of home births attended by midwives from 1970 to 1985, to learn more about the safety and risks of attending births with any of these complicating factors. Although this was a 10-year-old data base, much of it had never been used before in published research; furthermore, the published results from earlier versions of this data base are still used in support of home births attended by both physicians and midwives. This data base was thought to be able to provide a reasonable approximation of the safety and risks of attending twin, breech, and post-dates deliveries at home during the 1970s and 1980s. Although midwifery practices may have changed and increased experience may better prepare the contemporary midwife to attend these types of deliveries safely at home, examination of practitioners' data from the past can at least provide an estimate of risks against which current practitioners can compare their own results and make future practice decisions.

METHODS

Although randomized, controlled trials are currently considered the only completely unbiased research design, some clinical phenomena, such as home birth, do not permit the use of this approach. Randomized controlled trials have also been criticized for their lack of resemblance to the way patients and health care providers actually make decisions in practice. Home birth in the United States is not amenable to randomization, because women who choose home births would not allow their birth site to be selected at random. For this reason, in earlier studies (1–4), the next best possible manner to answer the question of home birth safety seemed to be to find the most similar populations of home birth mothers and hospital birth mothers to compare.

Data on the Midwife-Attended Births

From 1969 to 1977, data from a convenience sample of physicians' and midwives' cases were gathered to explore the safety of home birth (1–4). In 1974, data were collected on 287 births attended by apprentice-trained midwives in Santa Cruz County, California (4). The authors reviewed charts in the midwives' offices and abstracted information onto a standardized data collection form in which all terms had been operationally defined. Then, data on another 859 births, primarily from physicians in the San Francisco Bay area of northern California, were added to the growing data set, giving a total of 1,146 births (2), all still collected by direct chart audit in the physicians' and midwives' offices. Data were collected in this manner using the same standardized data collection form for both physicians and midwives until a total of 2,330 births was attained, to be used in a matched comparison study with hospital births (1). Table 1 shows the sequence of data collection. Births collected beyond this earlier number have not been used previously in data analysis for any published article.

To enrich the available sample of apprentice-trained midwife-attended births, beginning in 1975, data were solicited from a larger cohort of midwives in the far west. The cooperation of midwives was solicited at conferences and by mail. Forms, instructions for use of the forms, and definitions of terms were mailed to midwives who agreed to collect these data; however, site visits were made only to a subset of those whose location was convenient. The births occurred between 1970 and 1985, as some midwives offered retrospectively collected data. The larger portion of the births were collected prospectively.

The data collection form used in the earlier studies (1–4) was sent with an attached sheet defining all terms, including fetal distress, postpartum hemorrhage, first-stage labor dystocia, second-stage labor dystocia, etc.[2] Midwives recorded their own data. They were encouraged to call the first author with any questions about how

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[2] Postpartum hemorrhage was defined as blood loss of at least 1,000 mL resulting in significant maternal symptoms (lightheadedness, dizziness, loss of consciousness, nausea, orthostatic blood pressure changes), preferably confirmed by at least a 20% drop in hemoglobin. Neonatal resuscitation was defined as a minimum of vigorous bagging with an ambu-bag/mask set with 100% oxygen in a baby whose 1-minute Apgar score was 4 or less. Most of these babies would be intubated, at least temporarily, in the hospital setting. Other definitions are available upon request along with the data entry form.

TABLE 1
Sequence of Data Collection of Home Births Available for Analysis in This Study*

Dates of Birth	*Place of Data Collection*	*Cumulative Number and Percent of Births by Provider*	*Data Collection Methods*	*Reference*
1970–1974	Santa Cruz, California	100% midwives for 287 births; no physicians	Chart review by researchers	(4)
1969–1975	Northern California	31% midwives for 355 total births; 69% physicians for 791 total births	Chart review by researchers	(2)
Added more births for the period of 1970–1976	Northern California and Wisconsin	35% midwives for 816 total births; 65% physicians for 1,514 total births	Chart review by researchers	(1)
1977–1985	Northern California and Wisconsin	Added 2,593 births: all physicians	Chart review by researchers	Not previously published
1970–1985	Western United States	Added 3,545 births: all midwives	Completion of data form by midwives	Not previously published
Cumulative date: 1969–1985	Western United States and Wisconsin	4,361 total births with midwives; 4,107 total births with family physicians	Midwives: both self-report and chart review; physicians: only chart review	Total data available for analysis in this paper

* Entries are in order of when each study was begun. Dates of birth may be out of sequence because of retrospective data collection.

to define terms or how to code events. They were encouraged to provide a narrative description of complications in the event that they were unsure how to code. This procedure permitted some room for variability in recording between physicians and midwives.

Midwives were asked to submit consecutive data of all their cases, including all transfers from home to hospital. Data were to be included on what happened at the hospital for all women transferred if they had begun labor with the intention of delivering at home. There were limited checks on the accuracy of data submitted, which could bias the results in favor of better midwife outcomes. (One would expect that if any reporting bias existed, it would tend to be toward underreporting of adverse outcomes.)

Of the 153 midwives who could be identified and were invited to contribute data, 30% responded. Twelve percent of these provided the bulk of the data, contributing more than 50 cases per midwife. The mean number of births contributed for all midwives was 87 (range nine to 626; median 53). Twenty-four midwives submitted data for the years 1970–1980 (1,919 births); 11 midwives submitted data for the years 1975–1985 (1,234 births); another 11 midwives submitted data in Wisconsin for 1977–1983 (392 births). Far-west midwives practiced in California, Oregon, Washington, Idaho, Arizona, Nevada, and Hawaii; because some of them practiced illegally, they were given code names and no identifying data were received. No identifying data were used for midwives or their patients. Incomplete forms or forms with logically impossible data (implying data entry error) were discarded if the midwife could not be contacted for clarification or could not provide further insight. Data on an additional 3,545 apprentice-trained midwife-attended cases were accumulated (see Table 1). These midwives did not have a policy of excluding twin, breech, or post-dates pregnancies from home birth, although the data from the earlier 816 midwives (collected by chart review) came from practices in which there was a policy not to attend breech, twin, or post-dates births at home. Combining these two data sets gave a total of 4,361 apprentice-trained midwife-attended births for use in matching.

The Comparison Group: Data on Home Births Attended by Family Physicians

Data were abstracted from the charts of all women having home births with 10 physicians who were attending home births in the San Francisco Bay area from 1969 to 1981 and three family physicians attending home births in the greater Madison, Wisconsin area from 1975 until 1981. This was done through a complete audit of their client records. All physicians were interviewed regarding their protocols and procedures. One of the authors (LM) had attended births with all but two of these physicians. Their recording of data was observed and judged to be reliable. The chief of obstetrics at each physician's referral hospital was called to determine whether any bad outcomes had occurred that were not included in the data obtained; no omissions were detected. One of the authors or a research assistant recorded data onto a standard form in each practitioner's office (1–3). All

TABLE 2
Occurrence of Congenital Anomalies, Twins, Breeches, and Post-Dates Pregnancies in the Matched Sample and the Entire Sample*

	Entire Sample			*Matched Sample*		
Type of Complication	*FPs*	*DEMs*	*Signif.*	*FPs*	*DEMs*	*Signif.*
Lethal congenital anomalies	2.86	1.69	.05	3	2	NS
Twins	0.32	8.94		1	8	<.05
Breeches	2.92	32.10		2	29	<.0001
Post-dates pregnancies	7.79	24.08		6	26	<.001

FPs = family physicians; DEMs = direct-entry midwives; NS = not significant.

* Results expressed as cases per 1,000.

consecutive births were reviewed, as determined by taking names from the list of patients due each month. The home birth doctors all used a female labor support person (or doula), usually a nurse or a midwife, who came at the onset of active labor and called the physician to come later. The apprentice-trained midwives came at the onset of labor and stayed with the woman throughout labor. They usually brought an assistant who functioned as a doula.

All of the physicians had a policy against delivering breeches and twins at home, although this occurred accidentally several times in multiparous patients. A total of 4,107 physician-attended home births were accumulated for matching.

Matching

Matching was done for maternal age group (less than 16, 16–19, 20–24, 25–29, 30–34, 35–39, 40 or older), insurance status as an indicator of socioeconomic status (none, Medicaid, private), parity, and medical risk score at 36 weeks (1 to 3) on the Popras Scoring System (but modified so as to award no points for breeches, twins, or post-dates). Only white women were used in the data analysis. The computer was programmed to start with a case from the midwife sample and to search for a match from the physician-attended home birth sample based only on the above indices. Matching was stopped when 1,000 pairs were obtained. The procedure was blinded to outcome and was automatic once programmed.

Matching was relatively easy because most women were low risk (Popras score 1), in their early twenties, insured, and nulliparous. Cases were selected as matches at random when the computer identified more than one match from the MD sample for a particular midwife birth.

The steps in the analysis were as follows: 1) calculate intrapartum and neonatal mortality rates and the incidence of neonatal resuscitation in both groups (1,000 matched patients in each group), and compare the results; 2) calculate these rates after excluding infants with lethal congenital anomalies; and 3) calculate these rates after the stepwise elimination of breech presentations, twin births, and post-dates pregnancies.

We used *t* test procedures of the Systat System for Statistics to assess the significance of differences between the groups. A subsequent analysis was performed with McNemar's statistics of discordant pairs, with no substantial change in the results. Logistic regression as implemented in Systat was used to calculate the odds ratios of risk for attending breech, twin, and post-dates pregnancies.

RESULTS

Because the two samples of 1,000 births from physicians and 1,000 births from midwives were obtained by matching for maternal socioeconomic status, education, parity, age groupings, and medical risk score, there were no differences between the groups for these factors.

There were significant differences between the groups in the numbers of breech deliveries, twin deliveries, and post-dates deliveries that occurred at home (Table 2), with the midwives attending more of these complicated deliveries. The midwife group also had significantly more intrapartum deaths and deaths before labor than the physician group (Table 3). There was no difference in neonatal deaths, but the midwife group had significantly more neonatal resuscitations and their total mortality rate was greater. When congenital anomalies were removed, significant differences in total mortality remained between midwives and physicians. As twins, post-dates pregnancies, and breech presentations were removed, the differences between physicians and midwives progressively narrowed until no significant differences remained (Table 3).

For the two entire samples of physicians and midwives (not the matched samples), the physicians had significantly more lethal congenital anomalies (cause unknown), whereas the midwives had significantly more deaths of the second twin during labor, other intrapartum deaths, deaths of post-dates fetuses during labor, deaths of breech infants during labor, deaths due to meconium

TABLE 3
Outcomes of Matched Sets of Births for Apprentice-Trained Midwives and Family Physicians

Births Included in This Analysis	*Midwife Births*	*Family Physician Births*	*Probability Level (P)*
Entire matched set			
Number	1,000	1,000	
Fetal deaths before labor	3	1	NS
Fetal deaths during labor	6	2	NS
Neonatal resuscitations	22	6	<.05
Neonatal deaths	5	2	NS
Total mortality	14	5	<.05
Babies with lethal congenital anomalies	2	3	NS
Women carrying twins	8	1	<.05
Women with babies in the breech position	29	2	<.0001
Women entering labor after 42 weeks' gestation	26	6	<.001
Outcomes minus babies with lethal congenital anomalies			
Number	998	997	
Fetal deaths before labor	2	0	NS
Fetal deaths during labor	6	1	NS
Neonatal resuscitations	13	4	<.05
Neonatal deaths	4	1	NS
Total mortality	12	2	<.05
Outcomes minus twins and lethal anomalies			
Number	990	996	
Fetal deaths before labor	2	0	NS
Fetal deaths during labor	4	1	NS
Neonatal resuscitations	13	4	<.05
Neonatal deaths	4	1	NS
Total mortality	10	2	<.05
Outcomes minus breeches and lethal anomalies			
Number	971	994	
Fetal deaths before labor	2	0	NS
Fetal deaths during labor	5	1	NS
Neonatal resuscitations	8	4	NS
Neonatal deaths	3	1	NS
Total mortality	10	2	<.05
Outcomes minus post-dates and lethal anomalies			
Number	974	994	
Fetal deaths before labor	0	0	NS
Fetal deaths during labor	3	1	NS
Neonatal resuscitations	9	4	NS
Neonatal deaths	3	1	NS
Total mortality	7	2	NS
Outcomes minus post-dates, breeches, twins, and lethal anomalies			
Number	935	988	
Fetal deaths before labor	0	0	NS
Fetal deaths during labor	1	1	NS
Neonatal resuscitations	4	4	NS
Neonatal deaths	2	1	NS
Total mortality	3	2	NS

NS = not significant at $P < .05$.

aspiration of term newborns, and deaths due to meconium aspiration of post-dates newborns (Table 4).

Logistic regression was used to determine whether the year of delivery had an effect on mortality; no effect was found. When breeches, twins, and post-dates pregnancies were eliminated from the analysis, no effect of type of practitioner was observed. The odds ratio of death for the infant born at home with one or more of the three conditions under study was 3.1 (95% confidence interval, 2.1–12.3, $P = .002$). Thus, the high-risk population delivering at home was 3.1 times more likely to experience a mortality event than the low-risk population delivering at home.

This study is limited by nonrandom selection of both midwives and physicians. The data arose from births that occurred between 1969 and 1985, and there was no

TABLE 4
Causes of Neonatal Death for Entire Sample*

Cause of Death	*MDs (N = 4,107)*	*MWs (N = 4,361)*	*Significance (P)*
Death before labor (after 36 weeks)	1.0	2.1	NS
Death from congenital anomalies	2.9	1.6	<.05
Death during labor, second twin	0.0	1.4	<.05
Death during labor, not otherwise specified	1.9	0.9	<.05
Death during labor, post-dates	0.0	3.4	<.01
Death during labor, breech	0.0	1.4	<.05
Neonatal death, not congenital anomalies	1.0	1.1	NS
Meconium aspiration, term newborns	0.0	2.1	<.01
Meconium aspiration, post-dates	0.0	1.6	<.05
Total number of deaths	6.8	15.6	<.01

MWs = midwives; NS = not significant.

* Results expressed as cases per 1,000.

way to assess the accuracy and completeness of the data contributed by the midwives who reported their own data. The data collection procedures varied between physicians and midwives. Because of these limitations, the findings and conclusions cannot be generalized to current apprentice-trained midwifery practice.

DISCUSSION

Current topics at recent Midwifery Today Conferences during 1995 and 1996 (a prime continuing education activity for apprentice-trained midwives) have included how to attend breech and twin births. Videotapes are marketed for midwives' self-instruction. The concept of post-dates is argued to be a myth (28). Thus, the controversy continues and few data are available with which to address it. Although this data set is old and imperfect, its findings are strong.

Adverse outcomes were more commonly reported by the midwives than were found among the physician-attended births. This statistically significant difference was not found, however, when twins, breech births, and post-dates births were removed from the samples. One would assume that bias, if it existed, would be in favor of the midwives because they would, if biased, tend to underreport their adverse outcomes. This strengthens the direction of the conclusions.

Parents decide on home births for many reasons. Some insist on home births even when they know that they have an increased risk of serious complications from factors such as multiple pregnancy, nonvertex presentation, and post-dates pregnancy. Births involving these conditions are associated with higher perinatal mortality regardless of the place of birth. Some apprentice-trained midwives are willing to attend these births at home. Thus, our results address a continuing controversy.

Similarly, midwives decide to attend higher-risk births at home for many reasons. Many, even most, of these births can be achieved successfully at home. Being "high risk" only means that the incidence of untoward outcomes is higher; it does not mean that every high-risk birth will have a poor outcome. Some midwives believe that parents who insist on home birth for a higher-risk pregnancy have the right to professional attendance. It is also true that births involving twins, breech presentation, and post-dates pregnancies are at higher risk regardless of the type of delivery. For example, breech infants have a higher perinatal mortality rate even if delivered by elective cesarean at term, as compared with elective cesarean at term for vertex presentations (27).

If the argument is made that today's midwife is better equipped to handle twins, breech, or post-term home births, or that, with better screening, some of these three types of deliveries could be safely managed outside of the hospital, then we believe that this article establishes a reference point against which these claims could be tested. Until proven otherwise, however, practitioners should strive to avoid such deliveries at home, given the findings of this study and despite the age of the data set. To explore this controversy further, the first step should probably be a randomized trial of home-like midwifery care within a hospital for breech births or twin births, which would, of course, include written informed consent and an analysis based on intent to deliver. The results of this study should not be used to argue that breeches, twins, or post-dates infants should never be delivered outside of a hospital. Rather, because currently available data do not support this practice, the burden of proof would be on a future researcher to show under what circumstances, with what type of care, and with what type of practitioner these deliveries could occur safely in alternative settings. Certainly there is a strong need to humanize all high-risk deliveries and to apply the insights and wisdom of normal birth care to the avoidance of excessive intervention for all pregnant women.

Midwifery care and home births are appropriate choices for normal, low-risk births. However, services that may be needed at higher-risk births are not available as quickly or readily at home, and few midwives have enough experience with complicated births to acquire the necessary competency for their delivery at home. Having experience with a few high-risk births that turn out well can be deceiving and may lead to false confidence. Bad outcomes of high-risk home births hurt babies, parents, individual midwives, and the midwifery and home birth movements. The philosophy of home birth is based on normal births—births that do not have a substantially increased risk of serious complications. Attending high-risk births at home undermines that philosophy.

Similar findings regarding post-dates births were seen in the National Birth Center Study (23,33). Post-term births were the only category of births in which outcomes for infants were not better than low-risk hospital comparison groups. The intrapartum death rate per 1,000 births was 2.3 for post-term births and 0.2 for term births. The neonatal death rate per 1,000 births was 1.5 for post-term births and 0.7 for term births. The combined intrapartum and neonatal death rate was 3.8 for post-term births and 0.9 for term births. The combined intrapartum and neonatal death rate among low-risk patients in hospitals ranged from 0.9 to 4.3 in studies of low-risk in-hospital births used as comparisons in the National Birth Center Study (23,33). These data were based on births during 1969–1985, the period in which the births in this study occurred.

For comparison purposes with this data set, it should be noted that the combined intrapartum and neonatal mortality in the Wormerveer study of 7,980 Dutch home births, including those transferred to the hospital during labor, was 2.3 per 1,000, with a 0.4% cesarean rate (24). The same rate for home births in Cardiff, Wales in 1979 was 4.1 per 1,000 births (25). There were no perinatal deaths in a 5-year prospective study of home birth in Essex, England from 1978 to 1983 (26). The National Birth Center Study found a combined intrapartum and neonatal mortality rate of 1.3 per 1,000 and a neonatal mortality rate of 0.8 per 1,000, with a cesarean rate of 4.4%, among 11,814 women giving birth from mid-1985 through the end of 1987 (23,33). The physician-attended home births from this study and the apprentice-trained midwife-attended home births (excluding breeches, lethal anomalies, twins, and post-dates pregnancies) compare favorably with these international results from the same time.

Previous studies by the first author helped to increase the support for home birth. A concern remains, however, about an overconfident approach to attending high-risk births at home. Although there are limitations to the data on which this study is based, most of these limitations apply also to the earlier studies (1–4). Historic data, such as these previous studies, are consistently used to "prove" the safety of home births. This analysis adds to the historic data that are available.

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