The perinatal paradox: doing more and accomplishing less

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Commentary

The Perinatal Paradox: Doing More And Accomplishing Less
by Roger A. Rosenblatt

In 1985, 3,760,561 children were born in the United States.\(^1\) Of these births, 99 percent occurred in hospitals, making childbirth the most common diagnosis in American hospitals. Physicians attended 98 percent of these births, with the balance delivered by midwives. Although the average weight at birth was unchanged from the previous year, the overall proportion of infants weighing less than 2,500 grams at birth increased slightly to 6.8 percent. Twenty-four percent of all mothers did not receive prenatal care until after the first trimester; 6 percent received no care at all or only started prenatal care in the third trimester, a proportion that has increased every year since 1980.\(^2\) More states reported increases in the proportion of mothers receiving little or no prenatal care than declines in these figures. Babies born prematurely (before thirty-seven completed weeks of gestation) rose to 9.8 percent, continuing the upward trend of the past several years. And disturbing information suggests that neonatal mortality rates, which have decreased steadily for years and plateaued in the mid-1980s, have begun to rise in a number of states.\(^3\) Preliminary vital statistics for 1986 show no changes in these underlying trends.\(^4\)

During this same period, expenditures for obstetric and neonatal care continued to rise rapidly, exceeding $15 billion in 1985.\(^5\) Neonatal intensive care units (NICUs) continued to proliferate, with hundreds of U.S. hospitals competing for the franchise to care for infants with very low birthweight.\(^6\) Fellowship programs in perinatology and neonatology continued to grow, and increasing numbers of obstetricians and pediatricians restricted themselves to the care of high-risk mothers and babies. Regionalized perinatal care programs, catalyzed by grants from a variety of foundations in the 1970s, became commonplace.\(^7\)

Unraveling The Paradox

Something is awry. We have invested billions of dollars in basic

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research into the mechanisms of maternal and neonatal disease. We have spent large sums of money to set up service delivery programs that try to make the products of this research available to women. Yet, despite these efforts, perinatal outcomes in the United States show signs of deterioration, not improvement. We have developed an unmatched ability to deliver high-quality perinatal care to some segments of our population, yet we lag farther behind other countries in most measures of perinatal outcome than we did thirty years ago. The situation is an apparent paradox, the causes of which must be unraveled if we wish to pursue a logical path toward improving perinatal outcomes for society as a whole.

The basic incongruity in American perinatal care lies in our superb ability to care for the individual patient and our dismal failure to address the problems of the larger society. We tend to allocate resources—and, conversely, ration care—based upon the specifics of individual patients, not upon a predetermined attempt to optimize national outcomes. The individual anguish of the patient searching publicly for a liver transplant is more likely to influence public policy than are grim but impersonal statistics about rising rates of infant mortality.

This tyranny of the individual case over the public good can be seen at two different levels: the way in which we organize the delivery of maternal and child services and the prevailing clinical approach toward individual patients. The defects in the organization of our maternal and child care system are well known. Less well appreciated is the likelihood that current clinical protocols may be less than optimal even for many patients who have ready access to prenatal care. This is not some esoteric phenomenon; it can be seen in the routine care of mothers and infants in all parts of the country. The current clinical approach to obstetrics and perinatal care has been distorted by factors that at best have little correlation—and at worst are antagonistic—to better outcomes for the population as a whole. This is obvious in the entire spectrum of perinatal care, from early prenatal care of the low-risk patient to the attempts to salvage ever smaller and more premature infants in the NICU. The first step in unraveling this paradox is to understand the factors that prompt clinicians to adopt a style of clinical practice that is not necessarily in society’s or the individual patient’s best interests.

The ‘maximin approach’ to perinatal care. Most pregnancies require no specific medical interventions. Women are judged to be low risk at conception, and low risk they remain. The optimal role of the attendant—whether physician or midwife—is to be vigilant without being meddlesome. Unfortunately, that is a role that physicians, in particular, perform poorly. Their training and clinical stance predispose them toward managing the case rather than toward letting nature take its teleo-
logical and usually beneficent course.\textsuperscript{13}

Our current obstetric style has been aptly described as the “maximin approach” to problem resolution-first imagine the worst possible calamity and then manage the patient to salvage the best possible outcome.\textsuperscript{14} This is a logical strategy only when the population in question has a high prevalence of the conditions one seeks: for example, providing care to a population of diabetic mothers, whose children are at risk for a variety of problems ranging from congenital anomalies to hypoglycemia. In a low-risk population, the maximin strategy is much less efficient, and as likely to trigger inappropriate interventions and cause iatrogenic injury as to avert disaster.

Another drawback of the current approach to prenatal care is that it focuses attention on the search for deviation from the physiological norm and diverts attention from the psychosocial elements of pregnancy that may have more direct relevance to everyday maternal and infant outcomes. The clinician has a limited amount of energy and resources to expend with each pregnant woman. In a population of women with few antecedent biological risk factors, it might make sense to pay more attention to the woman’s social and emotional adaptation to pregnancy and birth rather than to expend most of one’s energy ordering and interpreting tests. These are obviously not mutually exclusive strategies. However, the current emphasis in prenatal care lacks balance; basing prenatal protocols on the risk status of the mother might improve the effectiveness and reduce the cost of prenatal care.

\textbf{The search for spurious precision.} Our increasing understanding of the basic physiology of pregnancy and birth has allowed more precision in understanding many aspects of the process that once were murky. Ultrasound technology allows us to see the fetus within days of conception, inspect individual organs, and measure every conceivable fetal dimension. Chorionic villus sampling (CVS) and amniocentesis let us examine the fetal genome long before the fetus reaches viability, giving precise genetic diagnoses that parents may use to determine whether or not to continue pregnancies to term. Maternal serum not only gives us access to the mother’s physiological adaption to pregnancy, but also allows us to draw inferences about fetal structural and biochemical integrity.

These elegant diagnostic maneuvers are not without cost or risk. No test is perfect. Each carries with it a certain percentage of false positives and false negatives, and the information gleaned may inappropriately trigger a cascade of diagnostic and therapeutic interventions that inadvertently expose mother and baby to increased risk.\textsuperscript{15} The tests themselves may be dangerous: both CVS and amniocentesis may harm the fetus.
Our search for precision—and the reassurance of sequential numeric indices—leads us to order an increasingly large number of tests and procedures during the course of pregnancy and then anoint them as the “standard of care.” But we fail to assess the cumulative effect of these interventions on the cost of care, the increasingly high chance of false positive findings, and the potential iatrogenic injuries that can be triggered by any intervention.16

**Inappropriate acceptance of new technology.** The proliferation of new technology in perinatal care is part of a wider societal trend.17 There is a general tendency to adopt new technological interventions without considering their efficacy, safety, or effect on the larger system of care.18 In the field of perinatology, some conspicuous examples include electronic fetal monitoring (EFM), biophysical profiles, and ultrasound.

EFM dramatically illustrates both the advantages and the disadvantages of introducing major technological devices into the birth process. EFM is a simple concept: a recording device used as a surveillance technique in high-risk pregnancy, which simultaneously displays the electrocardiogram of the fetus and the uterine contraction pattern of the mother. Certain fetal heart rate patterns, particularly juxtaposed to the uterine contractions of the mother, indicate fetal distress and prompt a variety of interventions. Because the criteria for aberrant fetal heart rate patterns are not particularly precise, the process has scientific limitations. Many normal fetuses have tracings that are labelled as ominous, triggering inappropriate interventions. In a series of seven randomized controlled trials of continuous EFM in low-risk populations, women who were monitored tended to have a higher rate of interventions, such as cesarean sections, without any commensurate improvement in outcome.19 The only rational conclusion is that continuous EFM is not advisable in the care of low-risk women.20 Despite these studies, electronic fetal monitoring is the norm, not the exception.

This incongruity is emblematic of our current obstetric dilemma. The technology is beguiling; we are able to see the fetus develop, monitor uterine contractility throughout gestation, and assess maternal and infant physiology during the stress of labor. All of these modalities offer considerable promise both in our understanding of the normal physiology of labor and in improving our ability to detect and intervene when equilibrium is disturbed. But we must not prematurely rush to translate laboratory advances into the clinical realm; too often, the promising innovation has unanticipated side effects when applied to the entire population. We already demand meticulous protection of human subjects during the experimental phase of our studies. We also should make sure that we protect human patients before injecting new technology into
the clinical arena.

The practice of defensible medicine. In the current obstetric climate, every patient is approached as a potential litigant. This may sound like hyperbole, but the clinical protocols adopted by physicians are designed as much for their ability to bolster successful subsequent malpractice defenses as they are to address the clinical needs of the patient. In a climate in which a bad outcome is de facto evidence of medical negligence unless proven otherwise, the wary clinician systematically constructs a malpractice defense while caring for every patient. No one is sued for obtaining multiple ultrasounds, blood sugars, or biophysical profiles; their absence always violates someone’s expert interpretation of the prevailing standard of care.

Being the object of a malpractice suit is among the most traumatic professional experiences a physician can undergo. Whether or not the physician as defendant is vindicated in court, being subjected to legal attack is understandably a cause of dread. The obstetrician—knowing that a small but significant proportion of all deliveries will end in the death of or damage to the baby—adopts a clinical approach designed to reduce the risks of litigation. Unfortunately, the most defensible clinical protocol does not necessarily represent the best medical care. Not only is excessive testing and intervention expensive, but it also increases the number of false positive diagnoses and exposes the patient to increased iatrogenic risk.

Salvage versus prevention: the dilemma of the NICU. The previous discussion focused on the obstetric end of the perinatal continuum, but the growing debate about the extent of neonatal intensive care is another symptom of the tyranny of the individual case over the public good. The remarkable improvements in birthweight-specific neonatal mortality rates in the United States are less a tribute to our obstetric sophistication than a reflection of our technologic prowess in salvaging increasingly small and premature infants. However, these advances come at a price that can be measured in subsequent infant disability, family disruption, ethical quagmires for physicians, government intervention, and, of course, dollars.

The NICU is perhaps the most vivid example of the lack of balance in a system in which high-risk mothers cannot receive public subsidies for their prenatal care, yet neonatal intensive care is an inalienable right once the baby arrives in the NICU. The arithmetic of the equation is trivial and has been demonstrated in numerous studies: funds expended in the
prenatal care of mother and fetus reduce the amounts that are inevitably spent later in the attempt—often flawed or futile—to salvage the products of these conceptions. In addition, we should not lose sight of the fact that in the care of premature infants—no matter how dismal their prospects—the technological throttle is stuck open. At what weight or gestation are attempts at fetal resuscitation inadvisable for the fiscal integrity of the medical system, for the physical integrity of the infant, and for the psychosocial integrity of the family that is too often consigned to a prolonged vigil beside an incubator in an NICU? We have no mechanism to ask or answer these questions coherently. Pediatricians, confronted with such a newborn as it emerges from the womb, are in no position to make policy, and quite understandably deploy the therapeutic skills they have mastered, no matter what the consequences.

Creating A Rational Approach To Obstetric Care

The clinical strategy adopted by the health care provider is shaped by a combination of forces: the provider’s perception of what constitutes the best care for the patient at that moment, the attempt to minimize malpractice risk, a response to prevailing standards of care, and a desire to maximize professional satisfaction and income. If we wish to change the prevailing patterns of care, we must create an environment in which other clinical choices represent a new optimum solution for the individual clinician.

Society has a different set of objectives: to provide access to prenatal, intrapartum, and neonatal care to all women in a cost-effective manner. These goals frequently run counter to the objectives of the clinician and often collide with the desires of the patient as well. However, it should be possible to change the environment in which individual patient care decisions are made, to bring these disparate sets of objectives into closer harmony. Two practical approaches would be to develop clinical protocols that are likely to confer the greatest benefit on the most people, and to allocate resources based on the efficacy of such funding in meeting national rather than individual clinical goals.

Population-based clinical protocols. Current protocols are shaped by a strategy designed to eliminate to the extent possible all risk to individual patients and to minimize malpractice risk to the practicing physician. Prenatal care is made up of a sequence of screening tests, each of which has a known proportion of false negative and false positive results. By setting the test thresholds low enough not to miss any patients with these conditions, we increase the proportion of false positives. These misclassified patients are multiplied by the number of tests performed, thus
making it likely that most women will generate at least one false positive result.

A more rational approach would use the tools of decision analysis to subject each potential element of prenatal care to a rigorous examination.” The criterion for including a specific test in the standard protocol should be its impact on the population being screened, including in our equations the additional financial and emotional burdens of the inevitable false positives. The decision about the efficacy of any given test depends not only on the sensitivity and the specificity of the test, but also on the prior probability that the condition being sought exists in the population in question. If prenatal care can be simplified and made less costly, a much larger proportion of the population can receive such services without requiring additional resources. Screening for conditions with lower incidence then could be individualized based upon the medical and social history of the specific person.

Despite the disappointing impact of consensus panels on physician behavior, it would be fruitful to establish some authoritative body to review the optimal content of prenatal care. Current consensus efforts tend to examine individual technologies in isolation, to be dominated by proponents of the medical model, and to avoid examining the impact of adopting new technologies on the structure and cost of the health care delivery system. Because prenatal care is so ubiquitous—and because it consists of a sequence of activities over a prolonged period of time—a more global approach is preferable. The panel should include not only medical experts but also patient representatives, health administrators, and public and private third-party payers.

The advantage of such a protocol is in giving the physician some authoritative reference point on which to base individual clinical decisions. Anxiety about potential litigation—perhaps the most important factor shaping current obstetric protocols—could thus be allayed. Just as we construct rigorous clinical appraisals of protocols in the treatment of cancer, so should we subject other protocols to such careful evaluation.

The zero sum game—reallocating resources in perinatal care. Enormous strides have been made in the technical aspects of our provision of perinatal care. The improvements in birthweight-specific mortality are the direct result of investments in biomedical research, which have been rapidly translated into treatment protocols in NICUs. In the best of all possible worlds, we would continue to develop our technical prowess while simultaneously ensuring universal access to obstetric and neonatal care for all women and children.

But we do not live in the best of all possible worlds. Third-party payers and individuals are groaning under the burden of inexorably rising
health care costs, and the trend during the past eight years has been to respond to these burdens by limiting rather than expanding access to care. In a rational system, we would directly compare the benefits to society of investing in perinatal care with competing alternatives such as heart transplantation. But not only do we lack a rational system, we lack even the outlines of a system that would allow such tradeoffs to be made explicit. As a result, we must search for those few preexisting opportunities that allow for the rational reallocation of resources, as the state of Oregon recently did in denying Medicaid funds for bone marrow transplantation while expanding prenatal care services.31

Currently, most perinatal costs are assumed by third-party carriers, a number of private insurers, and federal and state governments via Medicaid. The groups at highest risk are the medically indigent, even though problems certainly are not limited to this group. Measures of social disadvantage are highly correlated with prematurity, the underlying cause of the majority of neonatal deaths and NICU admissions. The medically indigent cannot afford private insurance. Restrictive criteria for government programs pose significant barriers to women seeking Medicaid, and many receive coverage only late in pregnancy or not at all. The access problem is further compounded by physicians who leave the practice of obstetrics because of malpractice concerns and physicians who are unwilling to accept high-risk or poor patients.

Unlike in the debates over the cost efficacy of other medical interventions, there is no question that prenatal care is cost-effective, even given the defects of current clinical protocols. However, there is currently no linkage between the financing and delivery of services at the two ends of the perinatal spectrum: prenatal care to the mother and neonatal intensive care for the sick newborn. The obstetricians, family physicians, and perinatologists who provide the majority of obstetric care in this country inhabit a different organizational world than do the neonatologists and pediatricians who staff the NICUs. Each group charges separately for its services, and most hospitals treat each as a separate cost and revenue center.

One potential mechanism for bridging this organizational gap is to view conception, pregnancy, birth, and the neonatal period as a clinical continuum and to make this change concrete through the financing mechanism. Specifically, if we think of conception through the neonatal period as a single “episode of illness,” it becomes possible to capitate providers of care for the entire period. In this manner we would confer longitudinal responsibility for a series of intertwined clinical interventions upon organized groups of health care providers, making the interrelationships between the parts explicit.
In such a system, the provider would have a major incentive to provide state-of-the-art prenatal care to the mother, to avert much more costly care for the newborn. Individual states could pioneer such an effort by determining the amount they currently spend on the continuum of prenatal, intrapartum, and postnatal care in the Medicaid program and distributing these funds prospectively on a capitated basis to providers willing to provide longitudinal care to cohorts of patients at risk. If the experiment is effective, we will have a mechanism for transferring resources from neonatal intensive care to prenatal care without having to deny services to segments of the population.

Whatever the mechanism, we must ensure as a society that every pregnant woman receives appropriate medical care. More than half a million women who give birth each year have no insurance coverage whatsoever. Seventeen percent of women in the childbearing years—almost ten million women—have neither public nor private health insurance. Despite piecemeal approaches to the situation at both the state and federal levels, the number and proportion of women without access to basic prenatal care has increased, not diminished. Only a national program that is binding on the states can effectively address this problem.

Conclusion

Pregnancy and birth can be a joyful experience, or it can be a time of anxiety and anguish. The lusty cry of the healthy newborn has universal meaning and appeal. Yet, too frequently in the United States today it is replaced with the insistent wheeze of a respirator attached to a premature infant, sustaining a tenuous life by heroic means. We are very good at heroic medicine in the United States but very poor at the much simpler, more mundane preventive care that precludes its use.

The perinatal paradox is rooted in our inability to improve the lot of the individual by paying attention to the collective. The result has been the emergence of third-world medicine in the midst of medical profligacy and an increasing number of women who cannot find a clinician willing to take care of them during their pregnancy. We have made vast strides in learning how to salvage babies that would have died of their disabilities ten years ago. A fraction of that investment spent in designing a rational perinatal care system for all women would have far greater rewards.

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33. Gold et al., *Blessed Events and the Bottom Line*.