

Achieving Optimal Maternal and Infant Health Outcomes for Medicaid Patients, With Application for Commercial Populations

Robin F. Foust, Betty Carey, RN

Maternity management, the cornerstone of Medicaid programs, will support the nation's ability to achieve public health goals related to maternal and infant health. The authors' present data showing how organizations that combine practical solutions garnered from both public and commercially funded programs have the greatest potential for developing successful maternity management programs.

In 1998, the U.S. Medicaid program comprised 18.9 million children, 8.0 million adults, 3.9 million seniors, and 6.6 million people who are blind or disabled. Total Medicaid spending is currently projected to reach \$444 billion by fiscal year 2010.¹ As of June 1999, 55.6% of Medicaid recipients were enrolled in managed care and as enrollment increases so will the percent of medically high-risk patients.² In 1998, the Health Care Financing Administration reported the rate of unavoidable stays for preventable conditions among low-income patients was 2.4 times the rate for commercial populations.¹ Today, more than one-half of all Medicaid beneficiaries, mostly low-income women and children, are enrolled in MCOs, with Medicaid financing more than one-third of all births in the United States. The Medicaid population tends to be younger and generally in poorer health than the overall population. As a result, women receiving Medicaid experience higher-risk pregnancies. It is not surprising that some form of maternity case management and health education is provided by 78% of Medicaid MCOs.³ Seventy percent of Medicaid beneficiaries older than age 15 are women and the majority are in

their child-bearing years.⁴ Achieving optimal maternal and infant health outcomes in this population is dependent on managing risk and promoting health through measures that transcend the population's needs through best practice approaches learned from both commercially and publicly funded maternity management programs.

Numerous studies document the costs from lack of prenatal care, risk management, or education, as well as the value of maternity management programs.⁵⁻²⁵ Properly designed programs can help avoid the "million-dollar" baby, reduce costs, and improve outcomes. Kogan and colleagues¹⁹ reported that women who recalled receiving advice on seven specific topics were found to have improved birth outcomes. They also found that the women who needed the advice most benefited the most but that fewer than one-third of the women reported receiving information on all seven topics. Of those, however, the incidence of low birthweight (LBW) babies was reduced by 25%. The seven topics studied were: (1) gaining weight, (2) taking vitamins, (3) eating well, (4) breastfeeding, (5) drugs, (6) drinking, and (7) smoking (4 factors studied were associated with significantly lower percentages of LBW in the absence of other factors).

In addition to providing educational content,

Ms. Foust is President, Zoe Consulting, Inc., Columbia, South Carolina. Ms. Carey is Owner, Health Market Innovations, Seattle.

alleviating concern, reducing stress, and providing support, maternity management programs provide direct services, such as nutrition education, securing extracontractual benefits if indicated, ensuring compliance, and so forth. However, the Medicaid population can sometimes pose more of a medical management challenge than the commercial population, owing to the differences in associated causes of LBW in commercial versus Medicaid populations. The objectives of reducing risks and achieving optimal birth outcomes seem to be easier to attain in commercial populations, because the primary cause of preterm births is preterm labor from unknown cause (idiopathic preterm labor [IPL] in commercial populations compared with premature rupture of membranes in the Medicaid population)²⁶ (Figure 1). Research has documented that uncontrolled stress and anxiety is a major contributor to IPL.^{27,28} Recent studies also reinforce the value of birth intervals or spacing to improve birth outcomes.^{2,29-31} One of the primary reasons well-designed maternity management programs work, is that these programs provide ongoing patient support that alleviates members' anxiety and helps them control their stressors during the pregnancy.

ESTABLISHING OBJECTIVES AND SYSTEM DESIGN

To develop goals and objectives for a program suitable for the Medicaid population, it is necessary to garner baseline statistics for measuring success. Analysis of both claims and demographic data will help identify specific groups who should receive targeted promotional campaigns and specific condition-related programs that should be offered.

Maternity-related claims can be identified by researching appropriate obstetric and prematurity-related codes, where management can affect outcomes. Disenrollment issues in this population may make it challenging to ascertain health plan populations' statistics at any given time. If this is the case, other methods for estimating risk and possible gains are provided in Tables I and II.

Figure 2 has proved to be a good tool for estimating net savings and return on investment. Figure 3 is an example of using real data following a methodology related to actuarial conclusion for expected savings. Ideally, actual claims should be used. According to the Centers for Disease Control and Prevention (CDC)³² and the March of Dimes (White Plains, NY), a population's pregnancy rate ranges from 2% to 8%. The Healthy People 2010 objective for a national preterm birth rate is 7.6%.³² Whenever possible, one should use actual data, but demonstration purposes have necessitated using national norms, as indicated above in the Figure 2 sample. These estimates are considered conservative and reasonable based on use with plans, as compared with

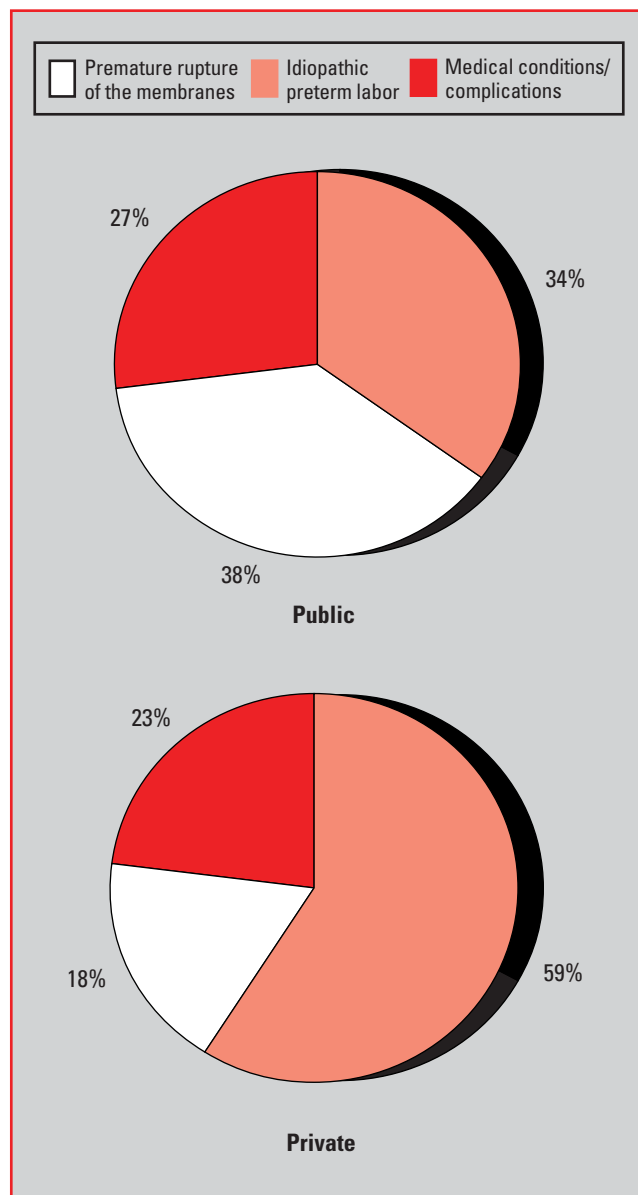


Figure 1. Causes of very low birthweight births: Publicly versus privately funded patients. Adapted from Meis P, Ernest J, Moore M: Causes of low birthweight births in public and private patients. *Am J Obstet* 1987;156:1165-1181.

actual data, and do not include costs related to product rates, physical visits, and after-care costs.

Whether one decides to develop a program internally, use an outsourced program, or share in the development of the program, the essential system elements for success remain the same. For instance, the program must be based on credible standards and guidelines. For example, guidelines can be purchased from the American College of Obstetricians and Gynecologists (ACOG) or downloaded from the following organizations: ACOG (www.acog.com), the American Academy of Pediatricians' Guidelines for Perinatal Care (www.aap.org/visit/pracguid.htm), the Institute for Clinical Systems Integration (free use with certain restrictions, www.icsi.org/)

guidelst.htm#guide- lines), the National Guideline Clearinghouse (www.guidelines.gov/index.asp), the March of Dimes (www.modimes.org), and Bright Futures for Families (www.brightfutures.org/bf2/about.html), and CDC (www.cdc.gov/nccdphp/drh/wh_violence.htm and www.cdc.gov/health/violence.htm). The Public Health Service's 1989 Expert Panel Report "Caring for Our Future: The Content of Prenatal Care," is another valuable resource, which addresses the content,

frequency, and timing of prenatal care. Conducted by the U.S. Department of Health and Human Services, the researchers set out to establish quality assurance measures and objectives for the pregnant mother, infant, and family. Three components identified by the Panel as essential included: (1) health promotion, (2) risk assessment, and (3) intervention.

One should also establish an obstetrics/gynecology (Ob/Gyn) and pediatric (neonatology) provider panel to review, comment, and accept guidelines or protocols of care. The program should plan to distribute the guidelines and provide continuing education services to ensure application of the guidelines/protocols.

PROMOTION AND RECRUITMENT

The first step to promotion and recruitment is to identify patient access points. A diagrammatic chart that delineates the flow of entry points and process of interventions will provide a systematic approach to recruitment.

Ideally, the patient's physician would refer the patient into a program. However, this is not generally the case. Promotion through member-welcome calls; promotion posters at churches, community-based stores, and recreation centers; or home visits through accredited home health agencies are all effective. Outreach through community-based public health networks, such as federally funded programs like Healthy Start, Resource Mothers, Bright Futures, and Women Infant and Children, can also be effective recruitment tools.

BASED ON CLAIMS PERIOD _____

Name of Company/Client: (Medicaid)

Cost of Program	Sample
A. Number of contracts	100,000
B. Expected pregnancies (contracts \times 0.04)	4,000
C. Participants (contracts [B] \times 0.40)	1,600
D. Cost of program (capitated or participant rate) (participants [C] \times \$225)	\$360,000
E. Implementation cost (orientation—1 day, plus expenses)	0
F. Total cost	\$360,000
Estimated Savings	
G. Expected participants (insert from line C)	1,600
H. Expected premature births (pregnancies [G] \times 0.07)*	112
I. Cost for premature births (premature births [H] \times \$20,000)	\$2,240,000
J. Reduction in prematurity costs (cost of premature birth [I] \times 0.20)	\$448,000
K. Expected maternity costs (participants [G] \times \$2,000)	\$3,200,000
L. Reduction in cost (maternity cost [K] \times 0.03)	\$96,000
M. Total Estimated Claims Reduction (prematurity [J] + maternity [L])	\$544,000
N. Net Savings (claims reduction [M] – cost of the program [F])	\$184,000

Figure 2. Maternity management estimated cost–benefit analysis. Note: Savings do not include additional savings associated with absenteeism, lost productivity, emotional trauma, and other immeasurable results. Use actual rates and numbers when available. Adjust percentages appropriately for use with commercial groups. *The current U.S. preterm birth rate is 11.6% (2002).

It is essential to reach the Medicaid population through any creative outlet. Many state Medicaid agencies now identify members who are pregnant and provide that information to Medicaid HMOs at the time of enrollment. The Medicaid agency may automatically enroll the pregnant woman in the program. This is referred to as "presumptive eligibility." One effective community-based approach is built on classes or other events held in the community for any consumer who is pregnant or considering pregnancy. The community-driven approach fosters success, because the community trusts the organizers and promoters of the events and recruitment.

Another approach is to provide easy access through 24-hour toll-free telephone lines for women to self-refer. This represents an ideal opportunity to discuss signs and symptoms of early labor and address lifestyle changes like smoking cessation, coordinating care, arranging for contact with health plan program nurses or nutritionists, handling transportation needs, and so forth.³³

Several health plans use claims review to identify candidates, by analyzing Current Procedural Terminology codes, laboratory claims, and/or pharmacy codes. However, physician verification of viable pregnancy is needed to avoid misidentification. Federal privacy laws may prohibit direct contact, depending on contract language giving permission for case management contact. Once identified, however, targeted innovative and appropriate recruitment campaigns can be designed and implemented.

ASSESSMENT

The use of risk assessment tools has increased over the last decade, but their role in managing maternal and infant health outcomes has been questioned recently, because they identify only about 50% of women who deliver preterm.^{34,35} Findings now support that categorizing risk through risk scoring is not optimal: Perhaps the best approach is to identify risk for the purpose of assigning type of intervention.³⁴⁻³⁷ In other words, assessment tools should not be scored for identifying risk levels. Rather, they should be used for the purpose of matching need(s) with appropriate services.

According to Mawn and Bradley,³⁶ "there is no real consensus regarding any one tool when it comes to reliability and sensitivity for predicting risk in pregnancy in women in various populations." Furthermore, the report made no recommendations regarding any specific tool, despite a review of more than 10 tools over a 15-year period. They summarized, "If any consensus existed, it was that no tool could ever replace careful monitoring and clinical judgment by experienced practitioners during the prenatal period."³⁶

It is also important to note that many of those women identified at low risk for LBW or preterm birth are not identifiable by any risk appraisal and can account for upward of 60% of the newborns in neonatal intensive care units. These newborns and their parents also need focused case management to reduce costs through improved outcomes. In addition, important considerations must be made regarding disparities in adverse outcomes associated with ethnicity (i.e., African American and Hispanic populations, who tend to be disproportionately affected by

socioeconomic risks, especially undereducation, teen pregnancy, single parenting, and poverty).

Although ample evidence discounts the reliance on risk appraisal in and of itself, an assessment is useful for identifying individualized needs and therefore for determining intensity of resources needed. Assessments also identify risk factors that may be changed and should be addressed with patients. Linking identified risks to appropriate protocols of education, behavior change, and care management are beneficial to influencing birth outcomes. Empowering all women with the knowledge necessary to become active participants in their care makes it more likely that they will enter care earlier by reporting both signs and symptoms to their provider.

The assessment should be based on the latest reliable research on the subject. The most reliable assessments are based on standard instruments that assess previous pregnancy history and antenatal, prenatal, and psychosocial risk factors. Asking questions generally increases the opportunity to address desired

	Cases	Days	Cost	Average Cost per Case (calculated)
Total deliveries	3,273	9,130	\$7,366,349	\$2,551
Total NICU	249	4,302	\$4,925,819	\$19,782
Savings calculations (from decreased incidence and severity of NICU cases):				
Year 1	Year 2	Decrease in NICU cases		
3,273	3,273	Deliveries		
× 0.0057	× 0.015	Decrease in total deliveries resulting in NICU admits		
19	49	Fewer NICU cases (<i>decreasing from 249 to 200 NICU cases/yr</i>)		
× \$19,782	× \$19,782	Average cost/NICU case		
375,858	\$969,318	Cost decrease owing to fewer NICU cases		
		Decrease in average cost per case for participant versus nonparticipant NICU case		
200	200	Total NICU cases		
× 0.4	× 0.7	Participation		
80	140	Participant NICU cases		
\$19,782	\$19,782	Average NICU cost per case, nonparticipants		
× 0.096	× 0.096	Decrease in average cost for participant NICU cases		
\$1,899	\$1,899	Lower cost per case for participant NICU cases		
× 80	× 140	Total participant NICU cases		
\$151,920	\$265,860	Savings related to decrease in cost per NICU case for participant infants		
+\$375,859	+\$969,318	Savings as a result of decreased incidence of NICU infants		
\$527,779	\$1,235,178	Total decrease in cost of NICU cases		
-\$333,400	-\$470,793	Estimated program costs, including 1/3 of projected development cost		
\$194,379	764,385	Net savings		
\$100,000 to \$200,000		Recommended net savings projection for Year 1 at 40% participation		
\$500,000 to \$765,000		Recommended net savings projection for Year 2 at 70% participation		

Figure 3. Cost savings analysis for integrated delivery system using real data and calculations based on actuarial study results. *Annual maternity data for the year ending September 1998. NICU = Neonatal intensive care unit.

lifestyle changes, reduction of risk, and/or appropriate physician or clinical intervention for medical factors that suggest the possibility of a pregnancy at risk for complication. Existing tools should be replaced by standardized tools. Educational content must be provided to all mothers and coordinated with appropriate follow-up and needed interventions.

Web-based applications and programs, used through physician offices, hospitals, or clinics; outreach workers during home visits; or even placed in the patient's home, can directly record assessments and monitor progress. The Web-based solution can bring cost efficiency to the process of care by eliminating the need for purchasing and mailing materials as well as reducing one-on-one time with those patients who are capable of greater self-management.

Initially, women may be identified as at risk for a variety of medical and lifestyle factors. Assessments must consider the possibilities of domestic violence; anxiety and depression scores³⁸⁻⁴³; group streptococcus B; multiple gestation; and conception intervals.^{29,31} The National Institute of Mental Health

Women under high stress during pregnancy are four times more likely to deliver preterm than women who experience little stress.

(NIMH) (www.nimh.nih.gov) is an excellent resource for help. One social variable found to be associated with birthweight is stress. The March of Dimes is conducting research along these lines and the American Psychological Association, Washington, DC, has highlighted studies from several researchers who found women under high stress during pregnancy are four times more likely to deliver preterm than women who experience little stress.²⁸ Maternal stress levels can account for significant variation in birthweight.²⁸

Smoking has been shown repeatedly to be related to poor birth outcomes.⁴⁴⁻⁴⁶ In 1995, CDC estimated that 26% of women of reproductive age smoked, with about 19% to 27% smoking while pregnant. These women accounted for 11% of total expenses for all complicated births.⁴⁴ A 1986 study found that women smoking more than 20 cigarettes per day while pregnant had a 60% increased incidence of LBW babies.⁴⁰

In addition, combinations of factors can indicate the need for monitoring or intervention. For example, the presence of a kidney or bladder infection coupled with low iron levels, and working in a physically challenging position, can raise the risk for poor birth outcomes.^{26,47}

At 26 to 28 weeks' gestation, clinical reassessment may identify complications easily, and laboratory tests may indicate a potential or actual problem. Risk assessment tools can identify problems and facilitate triage to appropriate interventions based on the patient's likelihood to adhere to recommended or prescribed therapies, barriers to compliance, and readiness for change. The risk assessment may identify factors that involve not only medical, but home or work issues, environmental factors, and psychosocial concerns.

Finally, a postpartum assessment should be conducted to monitor risk status, provide a rationale for intensity of intervention, and provide baseline data for analyzing the effect of the intervention. Postpartum assessments should include questions related to postpartum depression; postpartum obsessive-compulsive disorder; and psychosis, with appropriate referrals along with outcomes data, satisfaction, and information about the newborn's health status. The NIMH estimates that 7.9% of women in the United States experience depression during their lifetime; 70% to 80% report "baby blues" about three days after birth, and 10% develop severe postpartum depression.³⁸⁻⁴³

In addition to lifestyle, history, and clinical indicators of risk, biochemical markers may improve the identification of women who are more likely to deliver preterm. The presence of fetal fibronectin or high levels of salivary estriol are valid predictors of preterm labor; however, preventive measures have not yet proved effective.⁴⁸

Fetal fibronectin is an extracellular matrix protein that acts like glue between the decidua and chorion. The presence of fetal fibronectin in the vagina after 24 weeks' gestation indicates an increased risk for delivery within seven to 14 days.⁴³ Fetal fibronectin release may be a response to infection, contractions, or other mechanical disruptions within the uterus. The sensitivity of the test is 83.3% and the specificity is 82.9% for delivery within 14 days. The positive and negative predictive values are 16.7% and 99.2%, respectively, for delivery within 14 days.⁴⁸

Salivary estriol is another biochemical marker that can indicate risk of spontaneous preterm labor in singleton pregnancies between 22 and 36 weeks' gestation. The test identifies the presence of estriol, one of the key hormones of pregnancy and a communicator from the fetus to the mother, indicating a process that precedes labor by at least seven days. A value of at least 2.1 mg/mL is considered positive and indicates a relative risk of 4.2 for delivery within two weeks of testing, and two positive tests indicate a relative risk of 7.8. A negative test gives a negative predictive value of 98%.⁴⁸

Transvaginal ultrasonographic measurement of cervical length is a valid predictor of evaluating risk

for preterm delivery and is considered the “gold standard” if available.⁴⁹ Studies indicate that a “snapshot” view of the cervix seems to be a more reliable method to evaluate threatened labor than uterine contractions alone; the additional information from fibronectin levels provides only slight benefits.⁵⁰ Predictive values of cervical length and fetal fibronectin tests were almost equal. More research is needed to compare cost efficiency and efficacy among these risk assessment methods.

The identification of women in the early stages of preterm labor is critical, as antenatal corticosteroid therapy to reduce the severity of possible respiratory distress syndrome and lower the risk of intraventricular hemorrhage and necrotizing enterocolitis must be started *in utero* 12 to 24 hours before delivery in order to be beneficial.⁵¹

EDUCATION

Research supports the contention that increasing patient awareness through education positively affects behavior and health outcomes.¹⁹ Selecting easy-to-comprehend education materials for diverse populations is essential (the materials should be written at a reading level of no more than 7th grade). Materials can be purchased from multiple vendors (e.g., The March of Dimes, United Learning, American Institute for Preventive Medicine, The Work Care Group, Marshall Educational Solutions). Alternatively, an expert can conduct a suitability assessment of materials review. The review scores content, literacy demand, graphics, layout and typography, learning simulation, motivation, and cultural appropriateness. The book *Teaching Patients With Low Literary Skills* is a valued resource for anyone evaluating educational reading materials for Medicaid as well as commercial populations.⁵²

Numerous tests are available with which to assess a population’s average reading, literacy, and comprehension levels. These include the Wide Range Achievement Test or the Rapid Estimate of Adult Literacy in Medicine for literacy, and the Cloze Test for comprehension.⁵³

INTERVENTION

In maternity management programs, the nurse is generally the educator, counselor, coach, case manager, patient advocate, benefits manager, expert, and social worker. This is far from ideal. A collaborative approach is needed, involving other professionals and paraprofessionals. Participation by health promotion managers, claims managers, social workers, public health nurses, health educators, resource mothers, outreach workers, nutritionists, and others should be encouraged. The most successful maternity initiatives involve specialists and experienced Ob/Gyn labor and delivery nurses who are

also educators and skilled in behavior change and computer use.⁵⁴ This type of support during pregnancy is instrumental in achieving cost-effective and optimal maternal and infant health outcomes.^{33,54}

Home health visits by outreach workers have been shown to improve outcomes in medically assisted populations.^{25,36} Coordination of care and collection of data from the visit are essential for monitoring patient progress. Home visits are also conducive to assessing the member’s literacy level and/or comprehension level.

Working with and integrating public health services and personnel can ensure quality and efficiency. This collaborative and cooperative effort needs further exploration and advocacy by both the private sector health plans and public health.

The ultimate goal of intervention is to empower participants in lifestyle management; self-care; and informed, shared decision making for optimal outcomes. The more successful systems of care have integrated behavior change theory into everyday

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practice (e.g., using the Choices and Changes Model, as developed by the Bayer Institute for Health Care Communication, West Haven, CT).

OUTCOMES AND PROCESS DATA TRACKING

Data tracking and documentation usually include quality-of-care information on monitoring activity, clinical and behavioral risk factors, progress toward goals, outcomes, program ramifications, quality assurance performance measures (e.g., Health Employer Data and Information Set [HEDIS]), return on investment, and cost savings.

For health plans, HEDIS has at least 12 measures that directly involve maternity care: (1) prenatal care in the first trimester, (2) well versus complex births (and average length of stay [ALOS]), (3) availability of obstetric/prenatal care providers, (4) check-ups after delivery, (4) frequency of ongoing prenatal care, (5) date of first prenatal visit, (6) smoking cessation, (7) continuity of care for substance abuse, (8) human immunodeficiency virus management, (9) very low birthweight (VLBW) and LBW rates, (10) cesarean-section and vaginal-birth-after-cesarean rates, (11) discharge and ALOS for maternity care, and (12) telephone access to nurses, nutritionists, health educators, and/or social workers for support and information. Of course, other objective measures, as

Continued on page 53

defined earlier in this article, should also be reported.

Targeted intervention has resulted in significant cost savings and improved maternity care measures. In 1991, Trigon Blue Cross Blue Shield, Richmond, Virginia, reported that their Baby Benefits program saved more than \$330,000 in claims amounts on the basis of lower LBW and VLBW rates. It registered a net savings of 30% and a 3.7% savings on all maternity claims. In terms of hospital care, preterm delivery ALOS was approximately 4.5 days less on average for the study group compared with the control group.⁹

A 21,000-member Medicaid HMO reported more than \$300,000 in savings and no premature births during a 12-month study period using targeted interventions.²⁴

Matria Healthcare, Inc. based in Marietta, Georgia, reported a \$45 million saving with their study representing approximately 55 health plans for more than 121,000 births managed during the four-year period from 1997 through 2000.⁵⁵

Neonatal intensive care unit graduate programs have been successful in managing costs and health when prenatal programs result in NICU admission. A randomized trial of early discharge and nurse specialist providing home care reported a net \$18,580 for the intervention group.²² Likewise, an evaluation of a program for LBW infants discharged early with home care from the University of Cincinnati found reduction in hospital charges was 30 times higher than program expenses or a net \$10,609 per infant discharge.^{23,56,57}

WHAT THE FUTURE HOLDS

In addition to prenatal and NICU graduate programs, some preconception, interconception, and parenting (infant health management) systems are now operating. Preconception is more challenging in commercial populations because of the "churning" of the population. However, this is a wise investment for public health policy makers with stable Medicaid populations and for self-insured employers. Parenting programs ensure solid performance on HEDIS measures and other quality measures, including immunization, injury prevention, and early periodic screening, detection, and treatment.

Interconception is a relatively new initiative that involves care management between pregnancies. A Utah study of more than 173,000 live births revealed an increased risk for adverse perinatal outcomes for infants conceived after very short or very long birth intervals (> 18 mo or > 10 yr). Infants conceived 18 to 23 months after a previous live birth were at lowest risk for LBW and preterm birth.²⁹⁻³¹ Clinicians and programs should address the contraceptive needs of postpartum women to reduce these risks.

Trends for maternal and child health management

for both the commercial and Medicaid population will be affected by increasing use of the Internet and certainly by the related issue of information privacy.⁵⁸ In addition, the use of telemedicine devices in patients' homes will help ensure access to care, continuity of care, and ability to monitor high-risk patients for timely crisis prevention or management.

CONCLUSION

America's Healthy People 2000 goal was to reduce infant mortality to no more than seven per 1,000 live births. This goal has been achieved overall, although infant mortality among specific populations still exceeds this rate. Healthy People 2010 goals support addressing special population needs, including the need for medical assistance. Key areas to focus on include smoking cessation, oral hydration, stress and/or anxiety management, support by telephone and/or home visits, social support, and education about how to help patients recognize the signs and symptoms of preterm labor and take appropriate action. Maternity management is the cornerstone of Medicaid programs that will support the ability to achieve public health goals related to maternal and infant health. Organizations that combine practical solutions garnered from both public and commercially funded programs have the greatest potential for developing successful maternity management programs.

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Address for correspondence/reprints: Robin F. Foust, Zoe Consulting, Inc., 840 Sparkleberry Lane, Suite 1002, Columbia, South Carolina 29229. E-mail: robinzoe@bellsouth.net.

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