

THE ESTIMATION OF POTENTIAL ECONOMICIZATION FROM QUALITY INITIATIVES RELATED TO PERINATAL AND ANTENATAL CARE

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An Estimation of Potential Economization from Quality Initiatives Related to Perinatal and Antenatal Care Options

Executive Summary

The West Virginia Perinatal Partnership (WVPP) is a “statewide partnership of health care professionals and public and private organizations working to improve perinatal health in West Virginia.” The following objectives are noted as the Partnership’s mission’s objectives (WVPP 2008):

- For health care providers to be able to best care for pregnant women and their babies.
- Encourage new laws that promote better health for pregnant women and their babies.
- Create opportunities for perinatal professionals to share their expertise with each other.
- Disseminate the latest knowledge about perinatal health through educational programs.
- Work to reduce tobacco and drug use among pregnant women and foster oral health care in pregnant women and infants.
- Study research and trends in mother/child health and work to distribute that information.

Among other initiatives, the Partnership has participated in the following perinatal improvement projects which are discussed in detail in this report. These improvement projects include:

- Reduction in the frequency of elective labor inductions prior to 39 weeks gestation,
- Breastfeeding education and increased lactation consultant time to expectant and new mothers,
- Expanding the number of in-state Neonatal Intensive Care Unit (NICU) beds,
- Healthy spacing of at least 24 months between pregnancies.

In 2006, the WVPP performed studies to classify the issues associated with poor birth outcomes throughout the State. These studies identified ten primary areas that needed attention. The following ten primary areas are listed below (WVPP 2009):

1. Establish a Statewide perinatal system
2. Identify and address obstetrical provider shortage areas
3. Address the lack of oral health care during pregnancy

4. Identify costly medical procedures associated with poor birth outcomes
5. Develop an approach to identify and treat drug use during pregnancy
6. Encourage the development of perinatal worksite wellness programs
7. Promote and support breastfeeding
8. Support and expanded testing of newborns
9. Promote creation of the WV Maternity Mortality Review Team
10. Studied the incidence of pregnancy among WV teens.

In the following year, the Partnership released recommendations pertaining to the ten areas in the report *Blueprint to Improve West Virginia Perinatal Health*. The Partnership continued by also initiating an action plan and work plan through a variety of committees.

The following highlights the potential cost savings provided by the literature associated with the Partnership's involvement with health care professionals, public and private organizations and communities throughout the State. While exact costs were not estimated for the purpose of this report, these estimated cost savings, as well as others are discussed in detail throughout the remainder of this report.

- By decreasing the number of elective labor inductions prior to 39 weeks gestation, the average cost of an induction can simultaneously be reduced. For example, the literature estimated that the cost of an induction before 39 weeks gestation is \$9,568 compared to \$8,915 for a natural progression until 41 weeks.
- By increasing breastfeeding education and awareness, there is a potential cost savings for the State. A national study estimated that \$3.6 billion would be saved if breastfeeding increased to the levels recommended by the US Surgeon General.
- As a result of the expansion of NICU beds in the State, there is a cost savings to both the insurers and families associated with the reduction in infants transferred to more expensive out-of-state health care facilities.
- It has been found in the literature that there is a direct link between healthy spacing of at least 24 months and premature birth. For every infant born prematurely, there is a cost of approximately \$51,600 per birth.

Introduction

Improving the health care received by pregnant women, new mothers and infants is one of the most successful ways to reduce costs of health care delivery and to improve the lives of a state's population. The West Virginia Perinatal Partnership has been heavily involved in programs designed to bring these benefits to the State. The Partnership has contracted with the Center for Business and Economic Research at Marshall University to examine the effectiveness of four WVPP initiatives and the potential costs savings which would result from widespread adoption.

- Reduction in the frequency of elective labor inductions prior to 39 weeks gestation,
- Breastfeeding education and increased lactation consultant time to expectant and new mothers,
- Expanding the number of in-state Neonatal Intensive Care Unit (NICU) beds,
- Healthy spacing of at least 24 months between pregnancies

The high cost of care for pregnant women, new mothers and infants is not often widely recognized. One comprehensive study found that in 2007 23 percent of all individuals discharged from hospitals in the US were mothers and newborn children (Sakala and Corry 2008). The same study found that six of the most commonly performed hospital procedures were associated with childbirth. Cesarean sections are the most common operation performed in the U.S. Only doctor visits for general medical exams, checkups and coughs were more numerous than maternity care.

Another study determined that the charges for birthing women and newborns far exceeded the costs of any other medical condition in the U.S. including heart disease, cancer and stroke (Campbell 2007). These costs directly impact primary payors: firms, government agencies, individuals and taxpayers. These primary payors cover 51 percent of the costs with Medicaid paying 42 percent. Care of mothers and newborns is the most costly hospital condition presented in hospitals and birth centers. These conditions are associated with 27 percent of all hospital charges to Medicaid and 15 percent to private insurers.

By taking appropriate actions, such as those advanced by the WVPP, these costs can be significantly reduced. The greatest benefit is to the mothers and infants themselves who experience fewer complications both at delivery and over their lifetimes.

While some of the costs associated with childbirth are justified, many can be reduced while at the same time providing excellent care and improved patient outcomes. For various reasons maternity care has become increasingly technology-intensive. Use of these technologies in most cases does not appear to improve the results according to “evidence-based” studies (Salaka and Corry 2008). Employing the WVPP programs has already begun to improve maternity health while reducing costs. Expansion of these programs would be highly cost effective as is shown in this CBER report. What follows is a summary of the research performed.

Reduction in Elective Labor Inductions

Inducing labor early (prior to 39 weeks) is both expensive and dangerous. Early induction frequently leads to elective cesarean sections. There is national evidence that both inductions and cesarean sections are becoming more frequent. Over half of these are elective and would have been unnecessary. Over one third of these are preformed prior to 39 weeks. For a variety of reasons either mothers or providers chose early delivery options rather than natural progression of the pregnancy.

Research shows that the early induction of labor is associated with health related complications for both mother and baby. The risks of early induction include a two to three times higher rate of admission to Neonatal Intensive Care Units (NICU). The cost of a baby which uses the NICU is up to 10 times the cost of a normal vaginal delivery. Delaying birth until at least 39 weeks reduces the admission of newborns to NICU from 18 to 4 percent.

Early induction often results in premature and underweight babies. These infants have a greater probability of respiratory complications and lower birth weights. In addition to the higher original costs the problems of infancy continue into adulthood. Early inductions also are potentially harmful to mothers including risk of infection, uterine rupture and prolonged pain and time of recovery.

Programs to reduce the incidence of elective labor inductions have demonstrated their effectiveness across the nation. WVPP has pushed the adoption of the American College of Obstetricians and Gynecologists recommendations for healthcare providers to reduce elective labor inductions. The Partnership has participated with the WV Health Care Authority and March of Dimes to conduct the “Obstetrical Collaborative Quality Initiative” which is now

operating in 15 state hospitals. In those hospitals the rate of elective deliveries declined from 21.8 percent of births to 8.1 percent.

Increased Breast Feeding Education and Training

In 2003 the U.S. Preventive Services Task Force found the availability of education on breastfeeding to new mothers was the most effective single intervention for increasing breastfeeding. The antibodies within breast milk protect infants from illness, germs and SIDS. Reduced rates of ear infections, stomach viruses, respiratory infections, asthma, obesity, both types of diabetes, atopic dermatitis and necrotizing enterocolitis result from breastfeeding. Breastfeeding benefits mothers who experience lower rates of diabetes, cancer as well as postpartum depression.

In 2002 it was estimated for the nation, insurers paid at least \$3.6 billion to treat diseases preventable by breastfeeding. The cost to the Women, Infant and Children (WIC) program associated with mothers who do not breastfeed is 55 percent higher than the cost of those who do. Failure to breastfeed cost between \$331 and \$475 per child in health care costs.

The U.S. Centers for Disease Control and Prevention established goals for breastfeeding to be achieved by 2010: 75 percent at birth, 50 percent at six months and 25 percent at one year. West Virginia does not come close to meeting those recommendations, having among the lowest rates in the nation: 58.8 percent at birth, 27.2 percent for six months, and 12.6 percent at 6 months. The research identifies successful interventions that include programs that support breastfeeding in the workplace, peer support, professional support, and media and social marketing.

The WVPP has implemented programs and developed policy recommendations to increase breastfeeding rates. Among these includes work with the Legislature to train 140 health care professionals to be certified as lactation consultants. The West Virginia Breastfeeding Alliance was established to provide up-to-date information on lactation education. Further, the WVPP worked with the Legislature to secure passage of legislation which provided that breastfeeding was not an act of public indecency.

Expansion of Neonatal Intensive Care Unit Capacity

There were a significant number of newborns who had to be turned away from the three Neonatal Intensive Care Units (NICU) in the State. In 2005 over 120 infants had to travel out of

state to find a NICU. Costs to PEIA when newborns are transferred to other states generally exceed those charged in-state. Medicaid covers 42 percent of the in-state costs, employer insurance 21 percent, Blue Cross 8 percent and PEIA 5 percent.

The WVPP has played an important role in the expansion of in-state NICU beds in West Virginia. Working with the WV Health Care Authority the number increased at both the WV Children's Hospital and Cabell-Huntington Hospital.

Promotion of Healthy Spacing between Pregnancies

Evidence based recommendations from both national and international agencies indicate that at least 24 months should pass before a woman again becomes pregnant. The health impacts and associated costs for pregnancies occurring prior to the passage of the recommended 24 months are substantial for both child and mother. Early pregnancies increase the risk by 70 percent of premature birth and accompanying complications. These complications include low birth weight, respiratory distress and mental disabilities. One estimate put the national medical cost of a preterm child at over \$50,000.

In 2006, 14 percent of all births in WV were pre-term which was higher than the national rate of 12.8 percent. The WVPP has supported the submission of a Medicaid Waiver plan to federal authorities by meeting with the Bureau for Medical Services staff, legislators and constituent groups. This would provide family planning services for women up to two years postpartum. The federal government would provide 90 percent of the funding. Currently 27 states provide this waiver. It is estimated that the waiver would reduce the number of Medicaid births each year in WV by over 800 with a cost saving of almost \$11,000 per birth.

Conclusion

The WVPP, in its short existence, has address the most pressing and cost-effective ways to reduce the costs of providing health care to pregnant women, mothers and newborns. These programs have great potential for reducing costs to private and government insurers as well as the state and federal government. All have proven track records. The success of WVPP indicates their work has produced benefits to the State which exceed the costs. Their continuation and expansion are in West Virginia's best interests. But the most important consideration is not cost but the health benefits to mothers and their offspring.

Guidance from the Literature

Elective Labor Inductions Prior to Thirty-Nine Weeks

Labor that is started with medicines which begin the process of childbirth is called “induction”. Often, an indicated induction of labor is done because of pregnancy complications, such as an overdue pregnancy, which is usually one to two weeks after the predetermined due date (Intermountain Healthcare 2007). Other complications that may result in the induction of labor before the pregnancy is considered full-term include hypertension, preeclampsia, heart disease, gestational diabetes, or bleeding during pregnancy (American Pregnancy Association 2009). A pregnancy may also be induced early if there is a danger that the infant is not getting enough nutrients from the placenta or if the amniotic sac has ruptured but labor has not begun (American Pregnancy Association 2009).

Another type of labor induction is an “elective induction” which occurs when labor is induced for non-medical reasons. Elective induction may occur for a variety of reasons. Often times, pregnant women request for their pregnancy to be ended due to physical discomfort, concern for rapidly progressing labor precluding timely arrival at the hospital or epidural placement, scheduling issues, or ongoing concerns for maternal, fetal, or neonatal complications.

It is not solely the pregnant woman that may request an elective induction of labor. Clinicians who care for pregnant women may have similar non-medical reasons for choosing elective induction of labor for their patients (Caughey 2009). They, too, may wish to end their patients' physical discomfort or have concerns about either distance from the hospital or ongoing risk in the pregnancy. In some cases it may be simply for “convenience”.

For many years, “term” has been used by American obstetricians to describe a pregnancy that has reached a gestational age of 37 to 42 weeks (The Female Patient 2009). Recent studies have shown that 10 percent to 15 percent of all deliveries are elective in the United States where many of these deliveries are as early as 37 weeks (Clark 2009). Although elective labor induction has gained popularity, inducing labor before at least 39 weeks gestation or before the mother's cervix is ready for birth produces additional risk for both mother and child.

When labor is electively induced before 39 weeks, the risk of an infant being admitted to intensive care is two to three times higher than if the labor had progressed naturally

(Intermountain Healthcare 2007). Two other studies found that cesarean section rates and admissions to neonatal intensive care units are higher with elective induction between 38 and 40 weeks gestation as opposed to expectant management, but this was only applicable to first time mothers (Cammu 2002; Boulvain 2001). In a survey of approximately 17,000 deliveries, 18 percent of newborns delivered between 37 weeks, 0 days and 37 weeks, 6 days required some type of treatment in the newborn intensive care unit (NICU) (Clark 2009). For pregnancies induced between 38 weeks and 38 weeks, 6 days, approximately 8 percent of deliveries required admittance to the NICU. After 39 weeks gestation or full term, the percentage of newborns delivered that required NICU admission was dramatically lower at 4 percent (Clark 2009).

Whether an induction of labor is elective for an uncomplicated, full term pregnancy or a pregnancy before 39 weeks gestation, there can be added costs and legal risks (Santana and Meyer 2006). Because an elective induction of labor requires cervical ripening, extra monitoring, and medications to promote uterine contractions, elective inductions always incur added costs which are described in more detail in the Cost Savings section of this report (Santana and Meyer 2006). It has been found that the induction of labor is also associated with health-related complications for both the mother and baby (ACOG 2009). These complications may include an increased risk of infection, problems with the umbilical cord during delivery, overstimulation of the uterus, uterine rupture and a change in fetal heart rate.

Elective cesarean deliveries are common for the reasons mentioned previously. These reasons include patient discomfort and convenience, and physician convenience (Tita et al. 2009). In the United States, the rate of cesarean delivery rose from 20.7 percent in 1996 to 31.1 percent in 2006 (Tita et al. 2009). Elective cesarean deliveries are, however, discouraged before 39 weeks gestation because of the increased risks of infant respiratory complications, unless there is evidence that the fetal lungs have matured. In a study of 24,077 repeat cesarean deliveries, 55 percent were performed electively (Tita et al. 2009). Of that 55 percent, 35.8 percent were performed before 39 weeks gestation. The same study concluded that elective cesarean births between 37 and 38 weeks gestation were more likely to be at risk for adverse respiratory outcomes, newborn sepsis, mechanical ventilation, hypoglycemia, hospitalization for more than 5 days, and admission to a neonatal intensive care unit.

While the elective induction of labor, both vaginally and by cesarean, is a common procedure on the national level, state-wide data is not available to illustrate the negative outcomes associated with elective inductions of labor before 39 weeks gestation. Despite the availability of state data, it has been determined from the literature that the elective induction of labor before at least 39 weeks of pregnancy is associated with a higher risk of complications and negative fetal outcomes.

Breastfeeding Education and Increased Lactation Consultant Time

Breastfeeding is noted to be the most beneficial feeding method for the health of most infants (Weimer 2001). Breastfeeding provides infants with necessary nutrients needed for continued growth and development. The World Health Organization recommends exclusive breastfeeding up to six months of age (WHO 2009). In 2005, the American Academy of Pediatrics also released a similar recommendation by stating in its policy that exclusive breastfeeding for approximately the first six months provides extensive health benefits to both mother and baby. Both organizations also recommend continue support of breastfeeding through the first year and beyond as long as the process is beneficial for both mother and child (American Academy of Pediatrics 2009).

Extensive research and studies indicate that breastfeeding provides health benefits to infants and children. The antibodies within breast milk protect infants from illness, germs, and SIDS. Also connected with breastfeeding is a smaller risk of specific health problems for infants including ear infections, stomach viruses, respiratory infections, asthma, obesity, type one and type two diabetes, atopic dermatitis, and necrotizing enterocolitis (National Women's Health Information Center 2009).

Breastfeeding provides not only benefits for the child, but the feeding method also provides benefits for nursing mothers. Type two diabetes, breast cancer, ovarian cancer, and even postpartum depression are linked to a lower risk rate for these health problems for mothers who breastfeed (National Women's Health Information Center 2009). A study conducted in 2009 of approximately 140,000 women concluded that women who breastfed for at least one year were 10-15 percent less likely to have high blood pressure, diabetes, high cholesterol, and cardiovascular disease compared to mothers who never breastfed (Schwarz et al. 2009).

While the literature illustrates the benefits of breastfeeding for both mother and baby, West Virginia's 2009 breastfeeding rates still fall below national averages for breastfeeding. In 2000, the U.S. Department of Health and Human Services issued *Healthy People 2010* which is a national health promotion initiative of federal, state and local government agencies, non-profit organizations and professional groups. Goals were established to improve the health of the nation. Goals 16-19 strive to "increase the proportion of mothers who breastfeed their babies in the early postpartum period to 75 percent, at 6 months to 50 percent and at 12 months to 25 percent" (Centers for Disease Control and Prevention 2009). These goals were to be achieved from a 1998 national baseline of 64 percent at postpartum, 29 percent over the first 6 months, and 16 percent through the first year. It is important to compare the data on achievement of these goals by looking at national rates, those in West Virginia and surrounding states.

As shown in the table below, the rate of mothers that breastfed in West Virginia was 58.8 percent. Maryland and Virginia both achieved the *Healthy People 2010* goal with breastfeeding rates of 76.4 and 79.7 percent respectively. Two other surrounding states, Kentucky (53.6 percent) and Ohio (58.5 percent) performed below West Virginia. Only Maryland and Virginia performed above the national rate of 73.9 percent. The rate of mothers that were still breastfeeding at 12 months in West Virginia met only half of the *Healthy People 2010* target of 25 percent at 12.6 percent. West Virginia had the lowest rate of all neighboring states except Ohio at 12.0 percent.

It has been recommended by the literature that the longer breastfeeding continues the greater the benefits for the child. Nationwide, only 22.7 percent of mothers were still breastfeeding at 12 months. West Virginia, however, illustrates that 12.6 percent of its resident mothers are still breastfeeding at 12 months. Of the surrounding states Ohio performed worse than West Virginia with 12 percent of its mothers continuing to breastfeed at 12 months. Virginia and Maryland both performed above the national average with 25.8 percent and 25.4 respectively of mothers continuing breastfeeding until at least 12 months. At the critical six month period for breastfeeding, only 27.2 percent of West Virginia mothers were breastfeeding which was well below the national average of 43.4 percent.

Breastfeeding Rates for West Virginia, Surrounding States, and the US for 2009					
	Ever breastfed	Breastfeeding at 6 months	Breastfeeding at 12 months	Exclusive breastfeeding at 3 months	Exclusive breastfeeding at 6 months
U.S.	73.9%	43.4%	22.7%	33.1%	13.6%
West Virginia	58.8%	27.2%	12.6%	21.3%	8.4%
Kentucky	53.6%	28.9%	15.8%	27.2%	9.4%
Maryland	76.4%	43.3%	25.4%	28.5%	10.1%
Ohio	58.5%	29.7%	12.0%	22.4%	9.1%
Pennsylvania	67.6%	35.8%	19.4%	29.3%	10.1%
Virginia	79.7%	48.3%	25.8%	38.7%	18.8%

Source: CDC Breastfeeding Report Card 2009

West Virginia's breastfeeding rates from 2007 through 2009 are illustrated in the table below. The rates have generally remained relatively stable during the three year period with some fluctuations. The rate of West Virginia mothers breastfeeding at six months has increased to 27.2 percent, but as mentioned previously this rate still falls well below the national average.

West Virginia's Breastfeeding Rates 2007-2009			
	2007	2008	2009
Ever breastfed	59.3%	57.7%	58.8%
Breastfeeding at 6 months	26.8%	22.5%	27.2%
Breastfeeding at 12 months	14.0%	12.0%	12.6%
Exclusively breastfeeding at 3 months	21.3%	14.7%	21.3%
Exclusively breastfeeding at 6 months	5.2%	9.0%	8.4%

Source: CDC; Breastfeeding Report Cards 2006-2009

Neonatal Intensive Care Units

A neonatal intensive care unit (NICU) provides services to premature infants and other ill newborns. Conditions commonly treated in the NICU include, but are not limited to, some of the following (March of Dimes 2008):

- Anemia
- Breathing problems (including respiratory syncytial virus, respiratory distress syndrome, pneumonia, bronchopulmonary dysplasia, and apnea)
- Congenital heart defects
- Feeding

- Hypoglycemia
- Intrauterine growth restriction
- Jaundice
- Macrosomia
- Necrotizing enterocolitis
- Retinopathy of prematurity
- Sepsis.

In October of 2009, a National Vital Statistics Report was released which illustrated descriptive statistics on births occurring in 2006 (Osterman, Martin and Menacker 2009). The statistics included data from the nineteen states¹ that had implemented the 2003 U.S. Standard Certificate of Live Birth as of January 1, 2006. For the year 2006, there were 2,073,368 births to residents of the nineteen states, and six percent of all newborns were admitted to a NICU (Osterman, Martin and Menacker 2009).

Compared with three developed countries (Australia, Canada, and the United Kingdom), the US has more neonatal intensive care resources. As of 2002, the US had 3.3 intensive care beds per 10,000 live births while Australia and Canada had 2.6 beds (Thompson, Goodman and Little 2002). The following table illustrates the increase of NICU beds in the United States in 1998, 2001, and 2004.

Neonatal Intensive Care Units and Neonatal Intensive Care Beds in the United States 1998, 2001, and 2004			
	1998	2001	2004
Hospitals reporting NICU beds	760	787	839
Total number of NICU beds	13,825	14,997	17,109

Source: American Hospital Association Annual Survey

In West Virginia, three hospitals, Cabell-Huntington Hospital, Charleston Area Medical Center, and West Virginia University, provide NICU care. WVU Children’s Hospital houses 39 NICU beds (WVU Children’s Hospital 2009), and Cabell-Huntington Hospital supplies 36 NICU beds (Cabell-Huntington Hospital 2007). In an effort to combat the large number of newborns

¹ The nineteen states include: California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York, North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming.

admitted to NICUs, both hospitals have increased the number of NICU beds since 2007. The following charts illustrate the number of NICU discharges from 2002-2008.

Number of NICU Discharges from 2002-2008									
	2002	2003	2004	2005	2006	2007	2008	Total	Percent
Cabell Huntington Hospital	526	566	580	592	577	611	548	4,000	35.58%
Charleston Area Medical Center	451	536	489	507	562	515	471	3,531	31.41%
WVU Children's Hospital	487	496	507	554	518	566	582	3,710	33.00%
Total	1,464	1,598	1,576	1,653	1,657	1,692	1,601	11,241	100%

Number of NICU Discharges of West Virginia Residents Only from 2002-2008									
	2002	2003	2004	2005	2006	2007	2008	Total	Percent
Cabell Huntington Hospital	302	283	327	366	329	388	332	2,327	26.52%
Charleston Area Medical Center	437	518	473	500	543	501	461	3,433	39.13%
WVU Children's Hospital	393	388	398	459	424	485	467	3,014	34.35%
Total	1,132	1,189	1,198	1,325	1,296	1,374	1,260	8,774	100%

Healthy Spacing of At Least 24 Months between Pregnancies

When pregnancies occur too close together, there is an increased risk of infant and maternal health complications. When a pregnancy occurs less than 24 months from the last live birth, there is an increased risk of infant prematurity, low birth-weight, respiratory problems and mental disabilities (Contra Costa Health Services 2010).

Low birth weight is associated with other problems that include heart defects, bleeding in the brain, intestinal complications and vision loss (Contra Costa Health Services 2010). There is also an increased risk that infants may not grow normally and are more likely to die before the age of five (USAID 2009). If spacing between pregnancies is less than six months from the last live birth, there is an increased risk of the maternal mortality during childbirth, as well as an even greater risk of abnormal infant growth and low birth-weight (USAID 2009).

One study found that birth-to-pregnancy intervals of less than six months were associated with a 150 percent increased risk of maternal mortality (USAID 2008). Other complications and the

increased risks that can occur as a result of short intervals between pregnancies are shown in the table below.

Increased Risks When Pregnancy Occurs Six Months After a Live Birth	
Adverse Outcomes	Increased Risk
Induced Abortion	650%
Miscarriage	230%
Newborn Death (<9 mos.)	170%
Preterm Birth	70%
Stillborn	60%
Low Birth Weight	60%

Source: United States Agency for International Development.

The Partnership also found that child health was negatively affected, including a 223 percent increased risk of newborn mortality (Health Communication Partnership 2008). In a study conducted on 18 countries in four world regions, it was found that infants born to mothers that plan pregnancies 3 to 4 years apart are healthier at birth and more likely to survive at all stages of infancy and childhood (USAID 2008).

There are many benefits to planning for healthy spacing between pregnancies. It is important for mothers to wait at least 24 months after a live birth before trying to get pregnant because it is healthier for both the mother and infant. The mother benefits from healthy spacing between pregnancies because she is likely to have more energy, less stress and will less likely suffer from postpartum depression (Utah Department of Health 2010; Contra Costa Health Services 2010). By planning for healthy spacing in between pregnancies, a mother will also have time to replenish her nutritional stores before the next pregnancy, which is beneficial for the mother and the infant. Healthy spacing between pregnancies is not just beneficial for the mother and infant, but for the entire family within the given household. This is because the families will have more time to bond with the child and will have time for other activities other than child care (Contra Costa Health Services 2010).

Proven Successes and West Virginia Perinatal Partnership's Continuing Efforts

Reduction in Unnecessary Labor Inductions

In 2007, the American College of Obstetricians and Gynecologists (ACOG) recommended that health care providers utilize specific guidelines in order to determine whether or not to induce labor (Intermountain Healthcare 2007).

Before inducing labor, it is recommended by the ACOG that healthcare providers (Intermountain Healthcare 2007):

- Confirm that previous pregnancies were not delivered by cesarean and that there is no history of any major surgeries on the uterus.
- Attempt to pinpoint an exact due date in order to reduce the risk of delivering an underdeveloped infant.
- Require mothers to be at least 39 weeks gestation to ensure the delivery of a fully developed baby.
- Examine the cervix to confirm that it is prepared for child birth by determining whether the Bishop Score (standard for measuring the cervix's readiness for labor) is at least a ten for first-time mothers and an eight for others (with these scores, it is more likely that an induced vaginal delivery will progress as a natural delivery would).

The ACOG determined that labor can be induced before 39 weeks gestation if the health of the mother or baby is at risk, but this is not recommended and should be avoided if possible (ACOG 2009). Some health risks where induction may be necessary include high blood pressure caused by pregnancy, health-related problems that could harm the infant, a placental abruption which may require a cesarean birth or if the membrane (water) ruptures prematurely (ACOG 2009).

In June 2003, Intermountain Health Care based in Salt Lake City, Utah facilitated an intervention to reduce the inappropriate use of elective inductions of labor through the implementation of an evidence-based guideline along with patient education, performance monitoring, and peer review (Oshiro 2004). In a study conducted as part of the intervention, it was found that approximately one-third of labor inductions were inappropriate and unnecessary based on the guidelines recommended by the ACOG (ACOG 2006). In response to the elevated rate of inappropriate induction procedures, the Intermountain Health Care council implemented a set of guidelines for labor induction procedures for health care providers in the area. As a result of the intervention, total elective inductions for pregnancies of less than 39 weeks gestation decreased from an average of 27 percent of births in 2001 to five percent of all births in 2004 for the participating hospitals (Oshiro 2004).

In an effort to reduce elective labor inductions in the State, the West Virginia Perinatal Partnership has participated in research endeavors and developed recommendations. The WVPP has studied the frequency of labor induction among first-time mothers, both in cases with and without preexisting medical complications.

The WVPP also worked closely with the WV Health Care Authority and the March of Dimes to conduct the Obstetrical Collaborative Quality Initiative. This Initiative aimed to reduce elective deliveries prior to 39 weeks gestation and with 15 hospitals in the State participating, the program was successful. The rate of elective deliveries declined from 21.8 percent of births to 8.1 percent of births from January through August of 2009. The WVPP also identified the frequency of C-sections among first-time mothers after elective labor inductions. From this information, the Partnership proposed recommendations for elective labor induction to occur only after 39 weeks gestation.

It was once thought that increasing inductions of labor could potentially result in cost savings to the health care providers involved in the procedures. However, literature has determined that elective induction of labor provides no health care cost savings (Kirby 2002). In one study it was found that elective induction at or before 39 weeks is more expensive than the cost of a naturally progressed delivery (Caughey 2009). The average cost of an induction at 39 weeks gestation is \$9,568 compared to \$9,253 for a naturally progressed pregnancy until 40 weeks and \$8,915 for a natural progression until 41 weeks (Caughey 2009). Based on empirical evidence, there are actually significant cost savings associated with programs and initiatives designed to implement guidelines to reduce unnecessary labor induction procedures—for both elective and complication-related occurrences. Because elective inductions carry a higher risk of a resulting cesarean birth, a routine increase in elective inductions could result in more than 12,000 excess cesarean births at a cost of nearly \$100 million a year (Kaufman, Bailit, Grobman 2002).

Another example of demonstrated success in cost reduction was proven by the Intermountain Healthcare intervention in an attempt to decrease the number of inappropriate inductions of labor at less than 39 weeks. This particular intervention resulted in a total maternal and neonatal variable cost decrease from \$1,622 per case in January 2003 to \$1,480 in the first half of 2004 for the participating hospitals (Oshiro 2004). Previous studies are convincing that initiatives to

reduce the number of unnecessary elective labor inductions prior to 39 weeks gestation and after would substantially reduce costs.

Increased Breastfeeding Education and Training

In 2003, the U.S. Preventive Services Task Force found that the availability of education on breastfeeding to new mothers was the most effective single intervention for increasing breastfeeding initiation and duration (Shealy 2005). The longer breastfeeding continues, the more pronounced the beneficial effects. In order to expand the awareness of the importance of breastfeeding education, it is recommended that clinicians involved with mothers and infants possess basic skills in breastfeeding management and focus on the facilitation of proper breastfeeding techniques with new mothers (Shealy 2005).

One such program at Evergreen Hospital Medical Center in Kirkland, Washington that offers infant feeding classes to new mothers interested in breastfeeding has proven to be successful and is now part of the global program, *Baby Friendly Hospital Initiative* (BFHI), which encourages and recognizes hospitals and birthing centers that offer an optimal level of care for lactation. No hospital in West Virginia has achieved this designation to date. As part of another lactation support program provided by Harvard Pilgrim Healthcare in Massachusetts, enrollees who are pregnant can take a prenatal breastfeeding class at no charge (Shealy 2005). In Ohio, Bright Future Lactation Education Resource Centre offers guidance and training for those developing and conducting education on breastfeeding for mothers.

Other practices for which there is strong empirical evidence as to their effectiveness are discussed below.

- Programs that support breastfeeding in the workplace encourage women continue breastfeeding even after returning to work. Support for breastfeeding women in the workplace includes writing policies that support women who breastfeed, teaching other employees about the benefits of breastfeeding, providing private places for breastfeeding and milk expression and allowing flexible scheduling to allow feeding during working hours (Shealy 2005).
- Peer Support provides encouragement to pregnant women and those who breastfeed. This includes individual counseling by women who have breastfed and mother-to-mother

support groups. Having peer support programs available is a major determinant of whether a woman continues with the practice. These programs have been judged to be low cost and highly effective (Chapman, Damio and Perez-Escamilla 2004).

- Professional support is provided by health professionals to mothers during pregnancy and after birth. This support is provided by those sufficiently trained who can provide counseling and manage lactation crisis. Lack of professional support has been found to be a major factor in a mother's decision to discontinue breastfeeding (Guise, Palda et al. 2003).
- Media and social marketing initiatives include promotions that support or encourage breastfeeding and strengthen the public perception that breastfeeding is a normal, acceptable activity. Marketing can be delivered to a general audience through traditional media or targeted to specific groups. Media campaigns have been determined to have a positive influence on acceptance of breastfeeding by mothers and the general public particularly when delivered by television (Fairbank et al. 2000).

The West Virginia Perinatal Partnership has implemented programs and developed policy recommendations to increase the breastfeeding rates in the State. Before 2007, breastfeeding was considered a public act of indecency. The WVPP supported the Legislature in its deliberations to establish that breastfeeding is not an act of public indecency, and this legislation passed in 2007.

Through efforts of the Legislative Oversight Committee on Health and Human Resources, the WVPP obtained \$20,000 (in FY 07 and 08) to provide lactation consultant training to hospital obstetrical nurses and other health care professionals. In 2007, over 70 health care professionals were trained and certified in lactation consultation. The training continued in 2008 with 70 more health care providers receiving the training. The WVPP also assisted in establishing the WV Breastfeeding Alliance. The Alliance provides the opportunity for health care professionals and nurses to learn the most up-to-date information on lactation education.

There are substantial costs to both employers and governments when infants are not breastfed. A survey completed at the national level found that:

- Private and government insurers must pay a minimum of \$3.6 billion each year to treat diseases preventable by breastfeeding.
- Increased health care services for babies which were not breastfed ranged between \$331 and \$475 per child over the first year of life.
- For lower-respiratory infections the costs ranged from \$26,585 to \$30,750 more for non-breastfed babies
- Insulin-dependent diabetes mellitus (IDDM) was much more likely to occur in non-breastfed babies costing an additional \$1-2 billion dollars in treatment for Type 2 diabetes (Labbok and Taylor 2008).

The same study found that nonmedical costs of not breastfeeding were also substantial. Two billion dollars was spent on providing breast milk substitutes or around \$1,200 per family annually. Since lower income and minority mothers are least likely to breastfeed, the costs affect those individuals disproportionately. Costs to the government to support a breastfeeding mother in the Women, infants and Children (WIC) are almost half of those for a formula-feeding mother.

An infant who is not breastfed also contributes to additional health care costs. According to a study published by the American Academy of Pediatrics, between \$331 and \$475, per a never-breastfed infant during the first year of life is absorbed by Medicaid, insurance companies, hospitals, and parents. The study also concluded that per 1,000 never-breastfed infants there were 2,033 excess office visits, 212 excess days of hospitalization, and 609 excess prescriptions for the illnesses of lower respiratory tract illnesses, otitis media, and gastrointestinal illness (Ball and Wright 1999).

In a study published by the US Department of Agriculture in 2001, an estimated \$3.6 billion would be saved if breastfeeding increased to the levels recommended by the US Surgeon General. This figure, however, only estimates the cost savings for the treatment of three diseases including otitis media, gastroenteritis, and necrotizing enterocolitis. The savings would be the outcome of reduced formula costs, physician fees, hospital charges, laboratory, and procedural fees. Indirect costs could also be reduced such as wages and time lost by parents caring for a sick child (Weimer 2001).

Studies have also illustrated potential cost savings of a breast fed child than a formula fed child. Kaiser Permanente conducted an internal research effort to determine the benefits of sponsoring an official lactation program in 1995. The results from the study illustrated that an additional cost of a bottle fed baby over its first year of life was \$1,435.00. The savings were calculated from reduced office visits, fewer prescription drugs, and hospitalizations (WABA 1998).

While this CBER study did not attempt to update these figures or to perform an analysis of the cost savings to the West Virginia health care system if the incidence of breastfeeding reached the Healthy 2010 goals, previous studies are convincing that expansion of breast feeding, particularly among at-risk groups, would substantially reduce costs.

Expansion of Neonatal Intensive Care Unit Capacity

After completion of a 2006 survey of WV perinatal providers, the results illustrated that pregnant women and their newborn infants needing care were being turned away due to lack of bed capacity. The research also illustrated that NICU facilities were operating at 100 percent capacity. The following chart illustrates the number of transports turned away due to the lack of availability of NICU beds in 2005.

WV Tertiary Care Facility	NICU Transports Turned Away 2005	Number of Babies Turned Away 2005	Maternal Transports Turned Away 2005
Cabell-Huntington Hospital	25	32	59
CAMC Women’s and Children’s Hospital	44	-	5
WVU Hospital	59	65	57

Source: WV Perinatal Partnership 2007; Final Report and Recommendation from the Central Advisory Council Subcommittee on Adequacy of NICU beds

The WVPP has played an important role in the expansion of the number of in-state NICU beds. Initially, the WVPP conducted research on the adequacy of NICU beds throughout the State. The Partnership then made a recommendation to the WV Health Care Authority to allow bed increases in an effort to keep WV infants needing NICU care close to home. The efforts of the Partnership were successful, and bed increases were gained at both West Virginia University and Cabell-Huntington Hospitals. West Virginia University Children’s Hospital now houses 39 NICU beds (WVU Children’s Hospital 2009), which is an increase of nine beds (WVPP 2007). Cabell-Huntington provides 36 NICU beds (Cabell-Huntington Hospital 2007).

From 1999 to 2005, the number of infants discharged from the NICUs’ of Cabell-Huntington, CAMC, and WVU Children’s Hospitals increased by 165 percent. While this increase is alarming, the national trend of infants discharged from NICUs are also increasing. This increase can be attributed to an increase of low birth weight infants, high rates of mothers smoking while pregnant, demand for detoxification care of infants, and elective labor inductions (WVPP 2007).

NICU care is costly to society. Medicaid covers 42 percent of all in-state NICU admissions, and commercial and employer/union insurance covers 21 percent. Mountain State Blue Cross Blue Shield covers 8 percent, PEIA covers 5 percent, and other WV government covers 1 percent of all NICU admissions. The costs for out-of-state and in-state NICU care vary greatly by payor. The following table illustrates the significant differences in reimbursement rates for NICU care (WVPP 2007).

Daily Reimbursement Rates for NICU Care 2004-2006	
PEIA Average Daily Reimbursement for NICU 2004-2006	
In-state	\$194.99
Out-of-state	\$1,297.96
Medicaid Average Daily Reimbursement for NICU 2004-2006	
In-state	\$521.69
Out-of-state	\$479.36

Source: WV Perinatal Partnership 2007; Final Report and Recommendation from the Central Advisory Council Subcommittee on Adequacy of NICU beds

The chart illustrates that it is much more costly for PEIA to provide reimbursement for out-of-state NICU care. Another immeasurable cost after transferring an infant out-of-state is the distance between parent(s) and infant. This creates transportation costs and even lodging expenses for parents who must travel a long distance to be with their ill newborn.

Promotion of Healthy Spacing between Pregnancies

In 2006, it was recommended by the World Health Organization that after a live birth, at least a 24 month interval should be considered before attempting the next pregnancy (USAID 2009). This was suggested in order to reduce the risk of adverse maternal, perinatal, and infant outcomes (USAID 2009). It has become a global consideration to increase awareness of the

importance of healthy spacing between pregnancies in order to ensure healthy mothers, children and lifestyles.

The Healthy Timing and Spacing of Pregnancy (HTSP) intervention is a global initiative facilitated by the United States Agency for International Development to help women and families delay or space their pregnancies to achieve the healthiest outcomes for women, newborns, infants, and children (USAID 2008). In a report published by the USAID, it was stated that “HTSP encompasses a broader concept of the reproductive cycle—starting from healthiest age for the first pregnancy in adolescents, to spacing subsequent pregnancies following a live birth, still birth, miscarriage or abortion – capturing *all* pregnancy-related intervals in a woman’s reproductive life...” (USAID 2008).

It is the goal of HTSP to provide guidance on planning healthy pregnancies to women around the world. HTSP promotes three key messages (USAID 2008):

- Women should space the births of their children at least two years apart—where three to four years is optimal.
- There are added benefits to the health of the mother and children when properly spaced.
- Several family planning methods are available that can help women achieve optimum birth spacing.

In 2008, the WVPP began the WV Healthy Pregnancy and Baby Project which was funded by the National Campaign to Prevent Unplanned and Teen Pregnancies. After a series of meetings discussing the issue of unplanned pregnancy in WV, the WVPP applied for grant funding to begin work on some of the issues. The Partnership received \$40,000 and began the project with the following key strategies (Daniels 2009):

- Encourage the adoption of a Medicaid waiver to expand family planning coverage to two years postpartum
- Study issues of lack of insurance coverage for contraception for dependent minors
- Incorporate healthy pregnancy education into public school curriculum
- Decrease repeat pregnancy rate through coordinated approach involving parenting programs, medical providers, and others.

When conception occurs less than six months after a live birth, the risk that the infant will be born prematurely is increased by 70 percent. Preterm birth is a serious health problem in the United States (Institute of Medicine 2006). In a report brief published by the Institute of Medicine, it was estimated that premature births cost the nation more than \$26 billion annually (Institute of Medicine 2006).

For every infant born prematurely, there is a cost of approximately \$51,600 per birth (Institute of Medicine 2006). In 2006, 14 percent of all births in West Virginia were preterm. This was slightly higher than the national rate of 12.8 percent of all births (Kaiser Family Foundation 2010). The medical procedures associated with preterm births are costly and the costs continue into the infants first year of life—generally because other complications are associated with prematurity, including low birth weight, respiratory distress syndrome, and mental disabilities (WVPP 2009). On average, first-year medical costs for an infant born preterm are about 10 times greater (\$32,325) than for full-term infants (\$3,325) (Institute of Medicine 2006).

In both 2008 and 2009, the WVPP has supported the submission of a Medicaid Waiver plan. This plan would extend Family Planning services for women for up to two years postpartum. This plan would not only benefit women, but it would also benefit the State. The federal match rate of dollars for family planning services is 90 percent to the State's 10 percent. As of 2009, 27 other states were already receiving this waiver. It has been estimated by the West Virginia Family Planning Program that this Medicaid Waiver plan could result in 830 fewer Medicaid births each year. This is estimated to save \$10,720 for each birth (Pore 2008).

As has been illustrated, the costs associated with the negative outcomes of pregnancies spaced too closely together can be substantial. Although no state-wide data on the spacing of pregnancies exist, with continual global, national and state interventions designed to promote the importance of family planning and healthy spacing between pregnancies, it is estimated that the cost savings can be significant.

The WVPP's Other Accomplishments and Initiatives

While this report focuses on four of the WVPP's initiatives, the Partnership is also involved in a wide range of other projects and initiatives to improve birth outcomes throughout the entire State. While the Partnership has only been operating since 2006, the WVPP has conducted a

series of studies, issued a variety of reports, and supported many legislative actions. The following describes the WVPP's accomplishments thus far.

Since the Partnership's inception in 2006, the WVPP has worked to establish a statewide perinatal system. The WVPP has published guidelines for neonatal and obstetrical practices and has worked to increase the usage of the guidelines by providers. The Partnership has also focused on increasing the usage of telemedicine to provide prenatal services those living in areas with limited access to providers. Working together, Charleston Area Medical Center and the Partnership received funding from the USDA and Health Care Authority to develop a telecommunication network for prenatal clinics and rural hospitals. The WVPP has also created the Hospital Self Assessment Initiative to encourage birthing hospitals to meet national guidelines for training and equipment. By working with the Marshall University School of Nursing, a joint MSN/certified nurse midwife (CNM) program was also created (WVPP 2009).

The Partnership has also worked to address the shortage of obstetrical providers in the State. The WVPP has not only identified the locations where maternity care is limited, but the Partnership has also created a model rural maternity service for these underserved areas. In an additional effort to address the shortage of providers, the WVPP is promoting the certification of nurse midwives by identifying financial aid programs that are available to nurses (WVPP 2009).

The Partnership also places a large emphasis on oral health care during pregnancy. The WVPP has partnered with Right from the Start to increase oral health care among pregnant women. A partnership with the WVU Department of Pediatrics and the WV Birth Score program created a report on oral health of pregnant women in the State (WVPP 2009).

The prevalence of drug use during pregnancy is also a growing problem within the State, and the WVPP has also taken an interest in this issue. The Partnership researched the data to identify the problem and issued a report from the results of their findings. The WVPP has also played a role in a medical service provided at CAMC which provides medical assistance for pregnant women addicted to drugs. The Partnership has also released the Guidelines to Identify Drug/Alcohol Use during Pregnancy and Refer for Treatment and a tool kit to identify addicted newborns. Both the guidelines and the tool kit are designed to assist health care providers. The Partnership also collaborated on a study involving eight hospitals in the State by utilizing umbilical cord

tissue to identify drug and alcohol use in pregnant women². The study found that 19 percent of the pregnant women use drugs or alcohol (WVPP 2009).

The Partnership has also participated in wide variety of other endeavors. The WVPP has supported the expansion of testing in newborns to cover all 29 metabolic conditions. The WVPP has also studied topics including the incidence of teen pregnancy and the incidence of births to single women in the State. The Partnership is also promoting the development of perinatal worksite wellness programs. The WV Perinatal Outreach Education Project was developed in 2009, and this provides perinatal providers with current educational opportunities. The Partnership continues to work with over 60 organizations and hospitals to further its mission and objectives. By developing working committees, initiating research, establishing policy recommendations, creating work plans, and releasing reports, the Partnership continues to strive to improve perinatal outcomes for West Virginia (WVPP 2009).

² WV Umbilical Cord Tissue Study—The Prevalence of Addicted Substances in WV Newborns. David Chaffin, Michael Stitely, Stefan Maxwell, Sandy Young.

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