

SECTION II - HEALTH GOALS

FIVE  
NATIONAL GOALS

What should--and reasonably can--be our national goals for health promotion and disease prevention?

They must be concerned with the major health problems and the associated--and preventable--risks for them at each of the principal stages of life: infancy . . . childhood . . . adolescence and young adulthood . . . adulthood . . . and older adulthood.

This section examines those problems and risks and presents specific, quantified objectives for each stage.

They are realistic objectives--based upon our own recent mortality trends for each age group, the rates achieved in other countries with resources similar to our own, and the very great likelihood that a reasonable, affordable effort can make the goals achievable.

### CHAPTER 3 HEALTHY INFANTS

Goal: To continue to improve infant health, and, by 1990, to reduce infant mortality by at least 35 percent, to fewer than nine deaths per 1,000 live births.

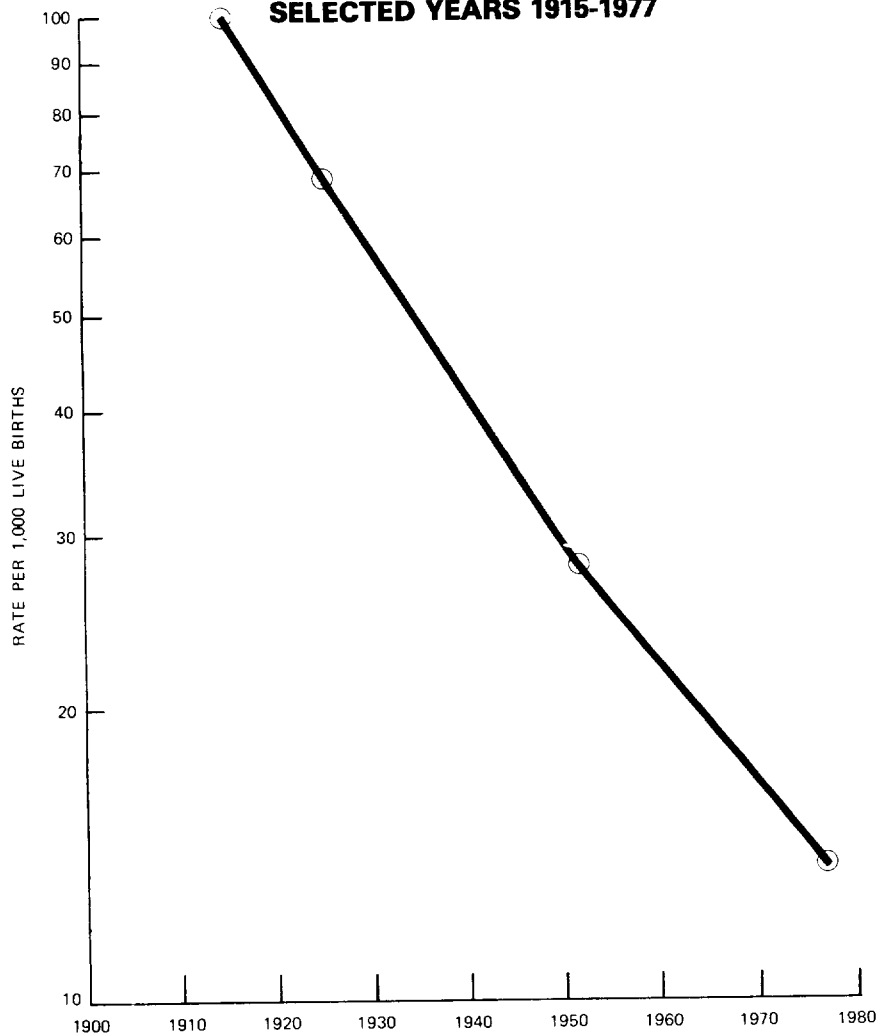
Much has happened in recent years to make life safer for babies. The infant mortality rate now is only about one-eighth of what it was during the first two decades of the century (Figure 3-A) thanks to better nutrition and housing, and improved prenatal, obstetrical, and pediatric care. In 1977, a record low of 14 infant deaths per 1,000 live births was achieved, a seven percent decrease from the previous year.

Yet, despite the progress, the first year of life remains the most hazardous period until age 65, and black infants are nearly twice as likely to die before their first birthdays as white infants. The death rate in 1977 for black infants (24 per 1,000 live births) is about the same as that for white infants 25 years ago.

Additional gains are clearly attainable. Sweden, which has the lowest rate of infant deaths, averages nine per 1,000 live births (Figure 3-B). If present trends in the United States continue, our rate should drop below 12 in 1982, and new preventive efforts could allow us to reach the goal of nine by 1990.

The two principal threats to infant survival and good health are low birth weight and congenital disorders including birth defects (Figure 3-C). Accordingly, the two achievements which would most significantly improve the health record of infants

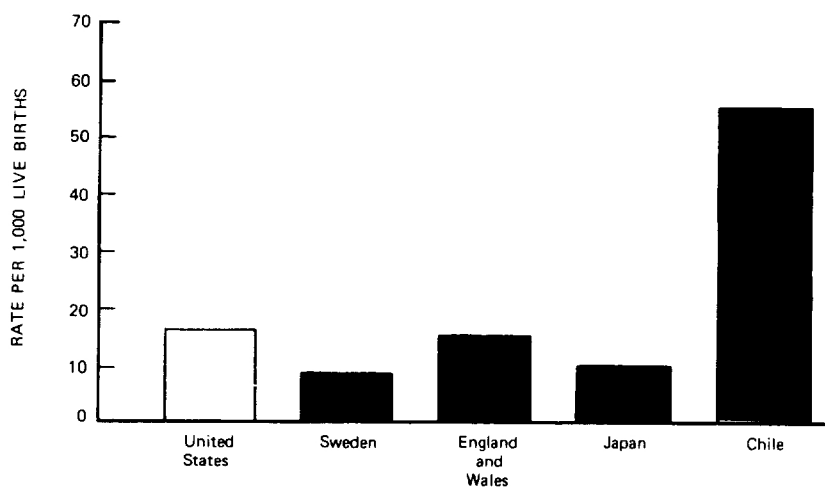
FIGURE 3-A  
**INFANT MORTALITY RATES: UNITED STATES,  
SELECTED YEARS 1915-1977**



NOTE: 1977 data are provisional; data for all other years are final. Selected years are 1900, 1925, 1950, 1977.

Source: National Center for Health Statistics, Division of Vital Statistics.

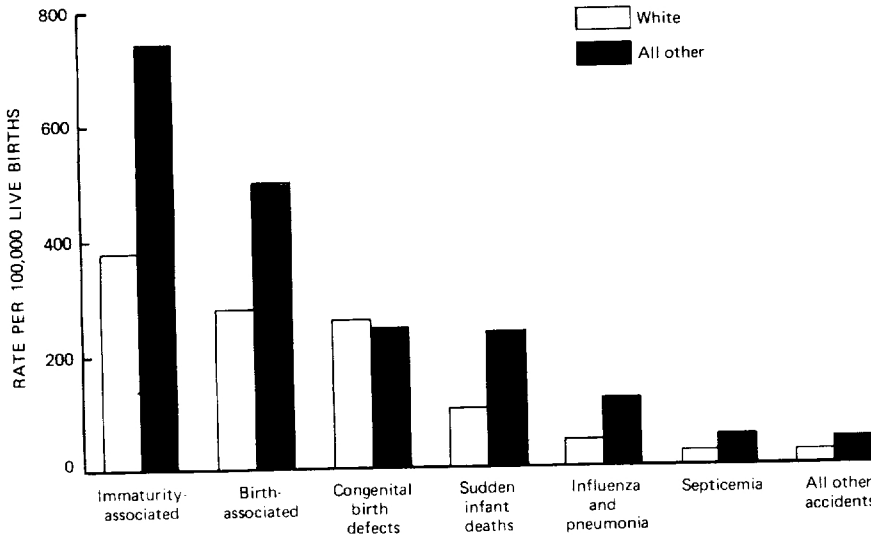
**FIGURE 3-B**  
**INFANT MORTALITY RATES: SELECTED COUNTRIES, 1975**



NOTE: The most recent year of data for Chile is 1971.

Sources: United States, National Center for Health Statistics, Division of Vital Statistics; other countries, United Nations.

**FIGURE 3-C  
MAJOR CAUSES OF INFANT MORTALITY:  
UNITED STATES, 1976**



Source: Based on data from the National Center for Health Statistics, Division of Vital Statistics.

would be a reduction in the number of low birth weight infants and a reduction in the number born with birth defects.

Other significant health problems include birth injuries, accidents, and the sudden infant death syndrome which may be the leading cause of death of infants older than one month.

But not all health problems are reflected in mortality and morbidity figures. It is also important to foster early detection of developmental disorders during the first year of life to maximize the benefits of care. And the first year is a significant period for laying the foundation for sound mental health through the promotion of loving relationships between parents and child.

Subgoal: Reducing the Number of Low Birth Weight Infants

Low birth weight is the greatest single hazard for infants, increasing vulnerability to developmental problems--and to death.

Of all infant deaths, two-thirds occur in those weighing less than 5.5 pounds (2500 grams) at birth. Infants below this weight are more than 20 times as likely to die within the first year.

Low birth weight is sometimes associated with increased occurrence of mental retardation, birth defects, growth and development problems, blindness, autism, cerebral palsy and epilepsy.

In the United States in 1976, about seven percent of all newborns weighed less than 5.5 pounds. In Sweden, however, the figure was four percent. The difference probably explains Sweden's more favorable infant mortality experience. Because substantial reductions in infant mortality and childhood illness could be expected to follow any significant reductions in the number of infants of low birth weight in this country, that should be a major public health goal.

Many maternal factors are associated with low infant birth weight: lack of prenatal care, poor nutrition, smoking, alcohol and drug abuse, age (especially youth of the mother), social and economic background, and marital status.

Given no prenatal care, an expectant mother is three times as likely to have a low birth weight child.

And many women least likely to receive adequate prenatal care are those most likely to have other risk factors working against them.

Women from certain minority groups are half as likely as white women to receive the minimum of prenatal care recommended by the American College of Obstetrics and Gynecology. About 70 percent of expectant mothers under age 15 receive no care during the first months of pregnancy, the period most important to fetal development; 25 percent of their babies are premature, a rate three times that for older mothers.

The lower risk with regular prenatal care may result from the benefits of medical and obstetrical services--and from accompanying social and family support services.

Infants born to women experiencing complications of pregnancy such as toxemia\* and infections of the uterus have a four to five times higher mortality rate than others. For mothers with such medical conditions as diabetes, hypertension, or kidney and heart disease, there is a higher risk of bearing babies who will not survive their first year--a risk which competent early medical care can reduce.

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\* Toxemia--present in two percent of pregnancies--is characterized by high blood pressure, tissue swelling, headaches, and protein in the urine. It can provoke convulsions and coma in the mother, death for the fetus.



Maternal nutrition is a critical factor for infant health. Pregnant women lacking proper nutrition have a greater chance of bearing either a low birth weight infant or a stillborn. Diet supplementation programs--especially those providing suitable proteins and calories--materially increase the likelihood of a normal delivery and a healthy child, and attention to sound nutrition for the mother is a very important aspect of early, continuing prenatal care.

Also hazardous for the child are maternal cigarette smoking and alcohol consumption. Smoking slows fetal growth, doubles the chance of low birth weight, and increases the risk of stillbirth. Recent studies suggest that smoking may be a significant contributing factor in 20 to 40 percent of low weight infants born in the United States and Canada. Studies also indicate that infants of mothers regularly consuming large amounts of alcohol may suffer from low birth weight, birth defects, and/or mental retardation. Clearly, both previously developed habits need careful attention during pregnancy.

Maternal age is another determinant of infant health. Infants of mothers aged 35 and older have greater risk of birth defects. Those of teenage mothers are twice as likely as others to be of low birth weight. And subsequent pregnancies during adolescence are at even higher risk for complications. Family planning services, therefore, are important--and, for pregnant adolescents, good prenatal care, which can improve the outcome, is receiving increased emphasis in many communities.

Racial and socioeconomic groups show great disparity in low birth weight frequency. Not only is infant mortality nearly twice as high for blacks as for whites, prematurity and low birth weight are also twice as common for blacks and some other minorities.

Evidence indicates that the racial differential is associated with corresponding socioeconomic differences. Analyses of birth weight distribution according to socioeconomic status among homogeneous

ethnic populations reveal a clear relationship between birth weight and social class; the birth weight of black infants of higher socioeconomic status is comparable to that of whites.

Marital status is another important factor. In 1975, the risk of having a low birth weight infant was twice as great for unmarried as for married women--at least partly because the unmarried are less likely to receive adequate prenatal care.

Although further research can help define more precisely the relationship between all these factors and low birth weight and infant mortality, we have clear indications of measures which can be taken now to reduce the risks. Chapter 8 is devoted to those measures.

#### Subgoal: Reducing the Number of Birth Defects

Birth defects include congenital physical anomalies, mental retardation, and genetic diseases. Many present immediate serious hazards to infants. Many others, if not diagnosed and treated immediately after birth or during the first year of life, can affect health and well-being in later years.

Birth defects are responsible for one-sixth of all infant deaths. They are the second leading cause of death for children one to four years old, and the third leading cause for those five to 14 years old.

Nearly one-third of all hospitalized children are admitted because of genetically determined or influenced disorders which often result in long-term economic and social strains for affected families.

Approximately two to three percent of infants have a serious birth defect identified within the first weeks of life--and five to 10 percent of these are fatal. Those most likely to be lethal include malformations of brain and spine, congenital heart defects, and combinations of several malformations.

In about one-fourth of birth defects, the cause is thought to be purely genetic; in one-tenth, purely environmental. In the remaining two-thirds, the cause is unknown. Interaction between genetic and environmental factors is an important concept guiding substantial research in this area.

Given current knowledge, many birth defects cannot be prevented. But many can be. Identifiable environmental hazards can be reduced. Carrier identification, amniocentesis, and neonatal screening procedures (Chapter 8) can aid in detecting some genetic disorders before, during, and after pregnancy.

#### Inherited Factors

Although some 2,000 genetic disorders are known, fewer than 20 are responsible for most genetic disease in this country.

Five types cause most of the illness and death:

Down syndrome. One of the best known genetic disorders, Down syndrome is associated with the presence of an extra chromosome, and occurs in about one of every 1,000 births. It causes physical defects which require lifelong care, and is responsible for 15 to 30 percent of the severe mental retardation in children living to age 10.

The risk of having a Down syndrome child increases with maternal age, especially after 35; at least one-fourth of the 3,000 infants with the syndrome born each year are those of women 35 or older. Recent research has shown that the father, rather than mother, contributes the extra chromosome in about one-fourth of all cases.

Down syndrome can be detected by sampling intra-uterine fluid through amniocentesis but the procedure currently is being performed for only about 10 percent of the 150,000 women aged 35 and older who become pregnant in any one year. The advisability of having amniocentesis depends upon individual circumstances and should be discussed with a physician.

Severe brain and spinal cord (neural tube) defects. Neural tube defects not only occur more frequently than Down syndrome but also result in more deaths within the first month of life.

Characterized by lack of development of parts of the central nervous system or its skeletal protection, neural tube defects include spina bifida (a vertebral column defect) and anencephaly (very small head and brain). The defects occur in about two of every 1,000 infants, half of whom die in the newborn period. In addition to amniocentesis, a maternal blood screening test for a substance called alpha-fetoprotein can detect pregnancies at risk for neural tube defects.

Risk for neural tube defects is 2.5 times greater for whites than other racial groups. At greatest risk are families with previous history of the defects or with an affected child; genetic counseling is recommended for them.

Defects related to particular ethnic groups. These include Tay-Sachs disease, sickle cell anemia, and cystic fibrosis.

Tay-Sachs disease is 100 times more frequent among Jewish families of Ashkenazi (Eastern European) descent than in the general population. Although children with the disease appear normal at birth, they die by age five as a result of severe mental retardation and progressive neurologic deterioration. The disease is caused by accumulation of a fatty substance in the brain. Because the responsible gene is recessive, Tay-Sachs disease occurs only when both parents carry the gene. Each prospective child then has a 25 percent chance of developing the disease. Fortunately, a carrier detection screening test is available to identify an at-risk couple before pregnancy.

Sickle cell anemia is the most common serious genetic disease among blacks. About 1,000 infants each year are born with sickle cell disease in which

red blood cells are damaged because of altered stability of their hemoglobin content. Although no mental retardation is associated with sickle cell disease, it is a serious condition leading to years of pain, discomfort, and even death from complications. Specific treatment has yet to be found.

Cystic fibrosis occurs primarily among whites in about one of every 2,000 births, affecting 1,500 infants a year. In the disease, abnormal production of mucus leads to chronic lung obstruction and disability during childhood and early adult life. The disease can also affect the pancreas, liver, and intestines. In 1976, it caused the death of twice as many infants as tetanus, whooping cough, syphilis and rubella combined. Although there is no specific cure, there have been many advances in caring for patients so that, if they survive through infancy, many now reach adult life.

Sex-linked defects. These congenital disorders affect the sons of mothers who carry an abnormal X chromosome. Hemophilia and muscular dystrophy are two prominent examples. The bleeding disorder, hemophilia, is due to deficiencies in the clotting mechanism of the blood. In muscular dystrophy, muscle is replaced by fat, leading to gradual muscular weakness and wasting.

Metabolic disorders. The most widely known of this group--and the one for which infants are most frequently tested--is PKU (phenylketonuria). It involves a genetic liver enzyme deficiency which allows an amino acid to accumulate abnormally, impairing brain function and leading to increasingly severe mental retardation later in childhood. PKU, which occurs in one of every 15,000 births, can be treated with special diet that compensates for the enzyme deficiency.

Congenital hypothyroidism (cretinism) is a more common metabolic disorder capable of causing mental retardation. Some cases result from genetic predisposition but others may be the result of circumstances (e.g. maternal iodine deficiency) occurring

during fetal development. About 600 infants a year--one per 5,000 births--are affected, but early detection and prompt treatment with thyroid medication in the first weeks of life can prevent the retardation.

The availability of specific tests for both PKU and congenital hypothyroidism has prompted States to consider requiring both for each newborn. Even though the number of affected babies detected will be small, the benefits of early diagnosis and treatment for the affected babies can be profound.

#### External Factors

Birth defects can result from exposure of the fetus to infectious or toxic agents during pregnancy, especially during the first three months (first trimester).

Infections. Rubella (German measles), when it affects a mother during the first trimester, can lead to congenital malformations as well as still-birth and miscarriage.

The greatest risk occurs when most women may not even be aware of being pregnant. The likelihood of rubella-induced malformations is approximately 25 percent during the first three months, after which it begins to decline substantially. The most serious problems for the fetus include blood disorders, heart defects, cataracts or other eye defects, deafness, and mild to profound mental retardation.

For prospective mothers who have not been exposed to rubella, vaccination prior to pregnancy can help prevent all of the problems for the fetus.

Radiation and chemicals in the workplace. These environmental factors have their greatest potential for harm during the early weeks of fetal development--again, often before a woman realizes that she is pregnant. And they remain hazards throughout pregnancy. High doses of ionizing radiation in

utero not only can increase risk of fetal malformation; there is suggestive evidence of increased risk of subsequent leukemia and other childhood cancers. To reduce risks, protective measures should be taken to help pregnant women avoid unnecessary exposure.

Drugs. A broad range of medications, including some seemingly innocuous over-the-counter preparations, may harm the fetus.

A now-classic example of drug hazard is the epidemic several years ago of birth defects caused by maternal use of thalidomide. Taken as a mild sedative and sleeping aid, thalidomide led to developmental defects, particularly of the limbs, in approximately 35 percent of infants of mothers using it. Throughout the world, an estimated 10,000 deformed infants were born. Thalidomide was on the European market approximately five years before the problem was identified and the product removed, but it was never approved for use in the United States.

Other drugs known to cause birth defects include some hormones such as DES (diethylstilbestrol), as well as certain anti-cancer and anticonvulsant agents. DES taken by mothers during pregnancy has been linked to vaginal cancer development in daughters during adolescence and early adulthood.

Among drugs currently under study for possible birth defect potential are warfarin, diphenylhydantoin, trimethadione, and lithium. Some women need these drugs for serious problems such as post-rheumatic heart disease, seizures, and severe mental disturbances. Also under investigation are some drugs used during childbirth which may have detrimental effects on the child's central nervous system.

It must be emphasized to the public--and perhaps to some physicians--that exposure to any drug should be avoided at any time during pregnancy, but especially during the first trimester, unless there are overriding medical considerations to use a drug for the mother's health.

Alcohol. The incidence of alcohol-induced birth defects is now estimated to be one for every 100 women consuming more than one ounce of alcohol daily in early pregnancy. The fetal alcohol syndrome therefore accounts for the occurrence of approximately one birth defect in every 5,000 births in the United States.

Affected infants are often of low birth weight, mentally retarded, and may have behavioral, facial, limb, genital, cardiac and neurological abnormalities.

The risk and degree of abnormality increases with increased alcohol consumption. According to a Boston City Hospital study of infants born to heavy drinkers (average 10 drinks a day), 29 percent had congenital defects compared to 14 percent for moderate drinkers and only eight percent among non-drinkers. Furthermore, 71 percent of infants born to women who consumed more than 10 drinks daily had detectable physical and developmental abnormalities.

Safe alcohol consumption levels during pregnancy have yet to be determined. But, in view of the association between high levels and fetal abnormalities, women who are pregnant or think they might be should be encouraged to use caution. And women alcoholics, until treated effectively for their addiction, should be encouraged by public information programs and by direct counseling to avoid conception.

#### Other Important Problems

Several other problems with major impact on infant health are noted in Figure 3-C.

#### Injuries at Birth

Birth injuries, difficult labor, and other conditions causing lack of adequate oxygen for the infant are among the leading reasons for newborn deaths.



Although most pregnant women experience normal childbirth, complications may occur during labor and delivery. Some--such as small pelvic cavity--can be detected in advance, during prenatal care.

Others unidentifiable beforehand require prompt management. They include hemorrhaging from the site of attachment of the placenta (afterbirth); abnormal placental location; abnormal fetal position; premature membrane rupture; multiple births; sudden appearance or exacerbation of toxemia; and sudden intensification of a known medical problem such as heart disease or diabetes.

#### Sudden Infant Death

Certain babies, without apparent cause or warning, suddenly stop breathing and die, even after apparently uncomplicated pregnancy and birth.

This unexplained event, called the sudden infant death syndrome, is believed by some authorities to be the leading cause of death for babies older than one month.

Recently evidence has been accumulating that abnormal sleep patterns with increased risk of breathing interruptions (apnea) may be associated with the unexpected deaths. A variety of factors, such as prematurity and maternal smoking, are emerging as possible contributors to increased risk for sudden infant death, but there is a need to learn more.

Extensive research now under way should refine our ability to identify high risk infants and effectively prevent their deaths.

#### Accidents

More than 1,100 infants died in accidents in 1977. The principal causes were suffocation from inhalation and ingestion of food or other objects, motor vehicle accidents, and fires. Many deaths reflect failure to anticipate and protect against situations hazardous for developing infants. Child abuse may also account for some deaths.

### Inadequate Diets and Parental Inadequacy

Although they are not major causes of death, problems related to infant care have significant impact on infant health.

Even in a society of considerable affluence, many infants are not receiving appropriate diets and suffer from deficiencies of nutrients needed for development. Frequently, it is overnutrition rather than undernutrition which is the problem setting the stage for obesity later in life.

Recognition of the extent to which parental attitudes are important to a child's development--and, with it, the need to bring parents and babies together psychologically--is receiving increasing attention.

Even when an infant must be kept in the hospital because of low birth weight, early contact between parents and child may be helpful to a good start in life and sound emotional development. Breast feeding is to be encouraged not only for its nutritional benefits but also for the contribution it can make to psychological development.

The fact is that growth of a "sense of trust" has been identified as a significant aspect of healthy infancy. Intimate, enjoyable care for babies fosters that growth and the building of sound emotional and mental health.

Moreover, recently, there has been growing recognition that certain disorders occur when there is neglect or inappropriate care for an infant. One is "failure to thrive" or developmental attrition--with the child losing ability to progress normally to more complex activities such as standing, walking, talking, and learning. Other disorders linked to neglect or inappropriate care include abnormalities in eating and digestive functions, sleep disorders, and disturbances in other activities.

All of these problems underscore the need for regular medical care during the prenatal period and early months of infancy. Such care should be sensitively designed to enhance the relationship between parents and child as well as to ensure sound nutrition, appropriate immunizations, and early detection and treatment of any developmental problems.

As programs have expanded to provide better services to pregnant women and newborn babies, the health of American infants has steadily improved. These recent gains to infant health are indeed heartening.

Moreover, more can be done to a greater extent than ever before, we have a clearer understanding of the factors important to ensuring healthy infants.

Section III discusses in greater detail the actions we can take.