

**Guest Editors : V.K. Bhutani, D. Vidyasagar and V.K. Paul**

## **Editorial : Care of Mothers and Infants**

I am delighted to address some issues in perinatal medicine. Before focusing on specific medical events, I would like to emphasize the overwhelming importance of societal events, some of which we can influence and many of which unfortunately we cannot.

Among the major changes has been the dramatic reduction in size and change in composition and structure of living arrangements of families in the United States. Out of wedlock births are an ever-increasing proportion of all births; now in the United States approximately 24% of children are living with only one biologic parent. Numerous studies have established that children who grow up with two parents have an increased chance of graduating from school and becoming employed thereafter. Those with one parent have an increasing likelihood of becoming teen parents themselves. Over 800,000 births/abortions were reported in the 15-19 year age group in the US in 1990, although the numbers are somewhat lower in 1992<sup>1</sup>. That number represents nearly 20% of live births.

Life expectancy for women approaches 80 years, which is of course a dramatic change in this past quarter century. Most women work because they wish to increase the income of the family or pursue a vocation. Sixty percent of pregnancies are unplanned in the United States at the present time despite the availability of many effective means of contraception or contraception.

### **The World's Children**

I would be remiss if at an International Congress I did not acknowledge the deep concern, in fact the moral outrage, that we as pediatricians must feel in the face of those seemingly uncontrollable circumstances namely, brutal wars that use starvation as a weapon and sometimes focus attacks on women and children. The bombing of children's hospitals is something that defies the imagination. Devastating events are taking place in this decade in Iraq, Somalia, Sudan, Cambodia, Rwanda and the former Yugoslavia (to mention just a few). A group of us met in Trieste with pediatricians and psychiatrists and surgeons from all the countries of the former Yugoslavia. Their needs are enormous, but overriding all is the urgency to find peace.

The recent Women's Congress in Beijing highlighted the plight of women and children in many parts of the world. Their resolutions to make changes for the right of all children to be wanted, and their rights to the pursuit of life, liberty and happiness deserve our continuing support.

### **Historical Changes**

Medical history records that the significant events that improved the well-being of chil-

dren have been public health measures and economic measures that provide safe water, adequate nutrition, and avoidance of injuries and war. The medical interventions of immunization have been a triumph particularly in the eradication of small pox and the elimination of polio from the western hemisphere and the possibility of a global elimination not only of polio but measles and other infectious diseases. Reports from India are most impressive, with an 83% reduction in reported polio cases from 1988-1994<sup>2</sup>.

The most important advance with respect to perinatal health was the seminal observation of Semmelweis about 1850 that hand-washing can save lives and in fact even now that message is not heard around the world. Postnatally acquired infection remains a significant problem in most countries. Infection remains the outstanding potentially preventable cause of death worldwide. For example, measles, now very rare in industrialized societies, is a major problem for refugees in all societies where routine immunizations are unavailable. HIV infection is out of control in many regions of the world, most significantly in northern Thailand and the Philippines.

Another significant and obvious statement is that the health of mothers is central to the reduction of the prematurity rate. Empowering women to control the timing and number of pregnancies will ensure their health and consequently their ability not only to carry an infant to term but to nurture their infant through breast-feeding thereafter.

The social changes that have taken place in many countries such as Japan, New Zealand, Taiwan, Singapore, and in many countries in northern Europe, especially Norway, Sweden, Finland and the lowlands have reduced fertility rates and infant mortality. In the United States we have continuing challenges to reduce racial disparities that persist and are associated with higher infant mortality rates among non-whites. The differences that are an embarrassment to us are not related to lack of medical knowledge, but rather the failure to guarantee access to it to all members of our society and the significant number of teen-age pregnancies which I am told are a rarity in some other societies.

Rather than review the therapeutic advances in the past 45 years, I have listed some of them in table 1. They consist of the new knowledge that has led to modern neonatology/perinatology. Significantly, interactions between obstetricians, pediatricians, and basic scientists have gradually increased, to the benefit of our small patients. Concurrently, neonatal research societies and journals have evolved to facilitate teaching and learning. For the younger readers, it may come as a surprise to hear that the first use of the word neonatology was by the pediatrician-author Alexander Schaffer in 1960. The evolution of the subspeciality depended on centers that could provide adequate laboratory services, imaging and individuals who became experienced with mechanical ventilators. Regionalization for surgical procedures had long been the rule, but regionalization for neonatal intensive care was not widespread until the late 1960s.

### **Current Issues in Perinatal Medicine**

The major problem in the 1990s has been the continuing prevalence of low birth weight in many parts of the world. The causes are multiple, and many of them preventable. The evidence that prevention is possible is clear from the low birth weight rates achieved in coun-

**TABLE 1. Diagnostic and Therapeutic Advances in Perinatology**

	Pediatrics	Obstetrics
<i>1950-1960</i>		
Infections	Nursery infection control Widespread use of antibiotics	Control of endometritis near elimination of maternal mortality in childbirth
Rh disease	Exchange transfusions	Serum antibody testing amnio- centesis for bilirubin pigments
Surgery	PDA, imperforate anus, the fistula repair	Avoidance of midforceps improved maternal anesthesia
Toxicology	Chloramphenicol, sulfonamides, oxygen, phototherapy	Avoidance of thalidomide diethylstilbestrol in pregnancy
<i>1961-1970</i>		
Rh disease jaundice	Phototherapy	Prevention of isoimmunization
Regionalization	High risk infants : neonatal intensive care units, intermediate care units	High-risk mothers : perinatal centers
Monitoring	Intra-arterial blood gases, blood pressure, continuous heart and respiratory rate monitoring	Fetal heart rate monitoring, fetal scalp pH, maternal estrogen excretion
Amniotic fluid testing	Improved genetic counseling	Detection of fetal genetic disorders
<i>1971-1980</i>		
Infection	Cord blood serologies for detection of chronic fetal infections	Rubella immunization
Respiratory disease	Ventilator support with continuous distending airway pressure Micromethods blood gases and chemistries Transcutaneous O <sub>2</sub> monitoring	Amniotic fluid testing for RDS risk Prenatal glucocorticoids to accelerate fetal lung maturation Improved suctioning techniques for removal of meconium in the upper airway
Genetics	Neonatal screening : PKU, hypothyroidism, and other metabolic diseases	Heterozygote definition (Tay Sachs) Fetal diagnosis of hemo globinopathies
Imaging	CAT scanning and ultrasonography	Fetal ultrasonography
Prematurity	Intravenous hyperalimentation	Suppression of premature labor, improved tocolysis
<i>1980-1989</i>		
Respiratory disease	Surfactant replacement selective use of extracorporeal membrane oxygenator for severe cardiopul- monary failure	

(Continue Table 1)

	Pediatric	Obstetrics
Cardiac disorders	Indomethacin for closure of ducts total correction of heart malformations in infancy. O <sub>2</sub> saturation monitoring	
Genetics		Expanded molecular diagnosis Percutaneous fetal blood sampling. Expanded use of fetal ultrasonography
Prematurity	Cryotherapy for retinopathy of prematurity	Improve access to prenatal care
1990-1995 Respiratory disease	High frequency ventilation Permissive hypercapnia to prevent barotrauma	
Prematurity	Hearing screening laser therapy for retinopathy. Molecular probe for diagnosis Rh	Fetal reduction after <i>in vitro</i> fertilization isoimmunization
Vascular disorders	Trans-thoracic ligation of patent ductus. Inhaled nitric oxide for pulmonary hypertension	
Infection	Increased emphasis on prevention; Universal precautions	Prenatal AZT for prevention of fetal infection with human immunodeficiency virus (HIV)
Other	Blood bank screening for HIV I/II, ITLV I, CMV syphilis, hepatitis core antibody, Hb surface antigen, HbC antibody, irradiate blood to reduce risk of graft vs host disease; Blood outdated after 14 days. Periconceptual folic acid 0.4 mg/day to prevent neural tube defects	Liberalization of indications for C. section, less use of foreps

Throughout the above decades, a gradual evolution of collaboration with other disciplines has occurred. Perinatology is now an obstetric subspecialty; birth defects centers focus on prenatal diagnosis, prevention and treatment of malformations; and close collaboration of pediatric surgeons and neonatologists has enhanced care. Severity of illness scores, clinical trials and systematic follow-up are major advances in assessing outcomes and evaluation of interventions.

**Modified from :** Taeusch HW, Ballard R, and Avery ME. *Schaffer and Avery's Disease of the Newborn*. Sixth edition. WB Saunders, Philadelphia 1991.

tries with a high standard of living and relatively low fertility rates. In a thorough review of the problem published in the Spring of 1995, the main recommendations included emphasis on eliminating smoking during pregnancy (which clearly reduces birth weight and is associated with more preterm birth as well)<sup>3</sup>. Prenatal care should include adequate maternal nutrition, including folate in the perinatal period to reduce neural tube defects. Medical care for hypertension, diabetes, infections and other illnesses is essential. Anemia is especially important in Indian women, over 80% of whom are anemic according to a WHO survey 1985-1990<sup>4</sup>. A reduction in teen pregnancies, and optimal spacing (at least 2 years) between pregnancies is associated with fewer preterm births<sup>5</sup>. Moderate exercise, and avoidance of long-duration standing is advised.

The 1990s have been marked by improved survival of low birth weight infants, which accounts for most of the reduction in under 28-day mortality (table 2). Currently, nearly all babies are delivered in hospitals. Now more than 90% of infants of 1000 gm birth weight are discharged from the hospital, and over half of those born from 600 to 1000 gm are survivors. The likelihood of infants under 600 gms surviving is increasing, but so too are the serious morbidities that accompany extreme prematurity.

Helpful interventions in the case of preterm labour include antenatal glucocorticoids given to the mother 12 to 24 hours before birth to accelerate fetal lung maturation, and early postnatal surfactant replacement therapy to lessen the severity of hyaline membrane

TABLE 2. Infant, Neonatal, and Postneonatal Mortality Rates, US : Selected Years

Year	Total	Under 28 days	Postneonatal
1950	29.2	20.5	8.7
1960	26.0	18.7	7.3
1970	20.0	15.1	4.9
1975	16.1	11.6	4.5
1980	12.6	8.5	4.1
1981	11.9	8.0	3.9
1982	11.5	7.7	3.8
1983	11.2	7.3	3.9
1984	10.8	7.0	3.8
1985	10.6	7.0	3.7
1986	10.4	6.7	3.6
1987	10.1	6.5	3.6
1988	10.0	6.3	3.6
1989	9.8	6.2	3.6
1990	9.2	5.8	3.4
1991	8.9	5.6	3.4
1992	8.5	5.4	3.1
1993	8.3	5.3	3.0

disease<sup>6,7,8</sup>. These interventions have greatly reduced the severity of the disease, and its complication of chronic lung disease (bronchopulmonary dysplasia). Moreover, glucocorticoids accelerate maturation of gastrointestinal epithelium, and are associated with hastening of closure of the ductus arteriosus. (See Consensus Development Statement, attached).

The transfer of new knowledge from the laboratory to the bed side requires evaluations of safety and efficacy in suitable animals (often mice) and sometimes in primates such as baboons. The introduction of new medicines requires carefully designed clinical trials. The licensing of pulmonary surfactants for clinical use in the US required nearly 10 years from the first use by direct instillation into the trachea, by the Food and Drug Administration<sup>7</sup>. During that interval several preparations were evaluated in North America and Europe. Several thousand low birth weight infants were assigned (with permission) into prospective, randomized clinical trials. Careful records were kept and analyzed by statisticians who paid careful attention to possible confounding factors. With meta-analyses of many clinical trials, the evidence of benefit was established.

Of continuing concern to all who take care of preterm babies is when to resuscitate and mobilize intensive care, and when to view such interventions as futile and withhold them. Although no rules can be written, guidelines evolve in the context of what is available for intensive care, and importantly, what is available for continuing care. We try to involve parents in decision-making, and have them present when further care is discontinued, as in the case of mechanical ventilation.

The outlook for survival can be known from recent experience in a given setting. The outlook for a reasonable quality of life is an individual judgement based on local experience. Early educational intervention in the first few years of life in an appropriately stimulating environment can be helpful. Of course surgical correction of deformities is likewise helpful, but not universally available.

In conclusion, a cascade of advances in perinatal medicine, and in the standard of living have led to the lowest infant mortality rates in recorded history. These results apply only to the technologically-advanced regions of the world, sometimes referred to as the industrialized or developed nations. However, within those nations some women do not have adequate education or medical care, and as a result continue to have adverse outcomes of pregnancy.

The essential goal of perinatal medicine should be to make available to all women, the new knowledge that is currently restricted to a minority of the world's population.

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#### ***ETHICS, EQUITY AND RENEWAL OF WHO'S HEALTH-FOR-ALL STRATEGY***

The health-for-all movement began with the International Conference on Primary Health Care at Alma-Ata, in Kazakstan (at that time called the Kazakh Soviet Socialist Republic) in 1978. 1998 will mark the 50th anniversary of WHO as well as the 20th anniversary of that conference.

Though health for all is a timeless ideal, changes in the world and in health problems necessitate new strategies for translating vision into reality.

In August 1996, a WHO inter-regional meeting on this subject outlined the following seven areas to be taken into account in designing the new strategy;

- (a) *determinants of health*, which include political, economic, social and environmental factors that are outside the health sector;
- (b) *health patterns in the future*, projected on the basis of current and foreseeable trends;
- (c) *intersectional action* to uphold the principles of equity and sustainability in health care;
- (d) *essential public health functions* in relation to primary health care;
- (e) *partnerships in health*, in terms of long term cooperation between WHO and other entities involved in health, with special attention to the community level;
- (f) *human resources for health*, whose training has to change in accordance with changing needs and changing options for meeting them;
- (g) *the role of WHO* in fostering global health development, drawing attention to dangers, setting standards, monitoring, and taking concerted action with relevant partners as necessary.

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