Facts and ideas from anywhere

CESAREAN DELIVERY IN THE USA

Sachs and associates (1) from Boston, Massachusetts, reviewed the risks of lowering the cesarean delivery rate. In 1995, the rate of cesarean delivery in the USA was 21%. The goal of Healthy People 2000, a project of the Department of Health and Human Services, is to reduce this rate to 15% by the year 2000. The advantages of a safe vaginal delivery over a cesarean delivery are clear: the former is associated with lower maternal and neonatal morbidity and costs less. Sachs and colleagues contend that these advantages apply only to safe vaginal deliveries and that reducing the rate of cesarean deliveries may lead to higher costs and more complications for mothers and their babies. The reason is that 2 of the strategies to reduce the cesarean delivery rate, namely increasing the number of vaginal deliveries among women who have had cesarean deliveries in the past and increasing the number of operative vaginal deliveries, are associated with higher frequencies of uterine rupture and neonatal trauma.

In the USA, <400 women die each year from complications associated with pregnancy. The US rate of infant mortality, defined as deaths of live-born infants in the first year of life, is one of the lowest in the world (7.6 deaths/1000 live births in 1995). The main indications for a cesarean delivery are a prior cesarean delivery (accounting for 35% of all cesarean deliveries), dystocia or cephalopelvic disproportion (30%), breech presentation (12%), and “nonreassuring” fetal heart rate tracings (9%). From 1970 to 1995, the rate of cesarean delivery in the USA rose from 5% to 21%, with a peak of 25% in 1988. In 1995, the rate of primary cesarean delivery, i.e., cesarean delivery in a woman who has not had a previous cesarean delivery, was 15 of 100 births. For women with previous cesarean deliveries, the rate of vaginal delivery rose from 21% in 1991 to 28% in 1995. The rate of cesarean delivery also has risen considerably in Europe in the past decade so that now the differences between rates in the USA and Europe are small.

The reasons for the increased cesarean delivery rates in the past 25 years include a lower tolerance for taking risks; fear of malpractice litigation; increased use of epidural anesthesia; increased use of electronic fetal monitoring, which has a high false-positive rate for the detection of fetal hypoxia or acidosis; and the convenience of physicians. It can be quicker to do a cesarean delivery than a vaginal delivery during a difficult labor. A couple's expectation of a perfect baby as well as a woman's previous experience of difficult labor also play a part in the decision to perform a cesarean delivery. Although epidural anesthesia has afforded women relatively effective and safe analgesia during labor, it may increase the...
risk of dystocia and therefore the frequency of cesarean delivery in nulliparous women. Increased reimbursement also is often suggested as an explanation for the increased number of cesarean deliveries, but today most insurance companies reimburse physicians for cesarean and vaginal deliveries at the same rate.

In the USA, the number of pregnant women who have had cesarean deliveries is high (12% in 1995), and it is therefore difficult to reduce the overall rate of cesarean delivery without reducing the number of elective repeated cesarean deliveries. Trials of labor in women who have had previous cesarean deliveries have led to vaginal delivery in 60% to 90% of cases. A major risk of a trial of labor after previous cesarean delivery is that the uterus may rupture during labor, which may result in substantial hemorrhage and require hysterectomy. The risk of uterine rupture is approximately 1%. The risk for the fetus is hypoxic injury. When the trial of labor after cesarean delivery fails and a repeat cesarean delivery is performed, the rate of maternal morbidity, including infection and operative injuries, increases substantially, as does the cost.

Operative vaginal deliveries are accomplished by 1 of 2 methods: applying direct traction on the fetal skull with forceps or applying traction on the fetal scalp by means of a suction cup or vacuum extractor. Both methods provide alternatives to cesarean delivery for women in whom fetal descent ceases during labor, and both have proven safe for mother and fetus in most cases. Overall rates of operative vaginal delivery (with forceps or vacuum) are now 10% to 15%. Vacuum-assisted delivery has become more popular than forceps delivery, probably because of false assumptions that it requires less technical skill and is inherently safer. It is safer because the design of the vacuum extractors limits the amount of traction applied to the fetal scalp; with forceps unlimited traction can be applied. Nevertheless, the traction achieved by use of vacuum extraction is substantial (up to 35 pounds). The frequency of neonatal cephalohematomas with vacuum extraction is 3 times that for spontaneous vaginal deliveries (6% vs 2%). Five percent of neonates with cephalohematomas have hairline skull fractures, and 0.006% have subgaleal hematomas, a more serious complication.

The cost of childbirth, of course, includes both the professional fee and the cost of hospitalization. Many people assume that a cesarean delivery costs more than a vaginal delivery because of the charges for a longer hospital stay and the use of an operating room. This may not be true. Because the costs of a labor unit are similar to those of an intensive care unit, a prolonged and difficult labor, even when it results in a vaginal delivery, is more costly to an institution than a cesarean delivery.

These authors concluded that reducing the present US rate for cesarean delivery from 21% to 15% by the year 2000 may have a detrimental effect on maternal and infant health. These authors opined that there is no evidence at this time to support this target. Nevertheless, economic forces are reducing the cesarean delivery rate as reimbursement changes from a fee-for-service model to managed care and capitated payments. Vaginal delivery after cesarean delivery and vacuum-assisted vaginal delivery are relatively safe, but as their numbers increase, so will the number of complications. These complications must be weighed against the risk of cesarean delivery. Probably the best way to reduce the cesarean
delivery rate safely is to concentrate on reducing the number of primary cesarean deliveries.

**BREAST-FEEDING AND OVERWEIGHTNESS**

A study from Munich, Germany, assessed the impact of breast-feeding on the risk of being overweight (2). The authors collected data on height and weight of 134,577 children participating in obligatory health examinations at the time of entry into school in Bavaria. In a subsample of 13,345 children, early feeding, diet, and lifestyle factors were assessed, using responses to a questionnaire completed by parents. Overweight was defined as a body mass index >90th percentile of all enrolled German children; obesity, a body mass index >97th percentile. Exclusive breast-feeding was defined as a child being fed no food other than breast milk.

The prevalence of obesity in children who had never been breast-fed was 4.5% compared with 2.8% in breast-fed children. The duration of breast-feeding also had an effect. The prevalence of obesity was 3.8% for those infants fed by breast for 2 months, 2.3% if fed by breast exclusively for 3 to 5 months, 1.7% for 6 to 12 months, and 0.8% for >12 months. Similar relations were found with the prevalence of being overweight. The protective effect of breast-feeding was not attributable to differences in social class or lifestyle. Thus, in industrialized countries, promoting prolonged breast-feeding may help decrease the prevalence of overweightness in childhood. Since overweight children have a high risk of becoming overweight adults, this preventive measure may eventually result in a reduction of many common diseases, such as atherosclerosis, systemic hypertension, diabetes mellitus, and osteoarthritis.

**PREVALENCE AND PREDICTORS OF SEXUAL DYSFUNCTION**

Laumann and colleagues (3) from Chicago, Illinois, and Piscataway, New Jersey, examined the prevalence of sexual dysfunction in 1749 women and 1410 men aged 18 to 59 years. The 3159 participants were believed to be representative of all adults in the USA. Seven response items were analyzed in 90-minute interviews to determine the likelihood of sexual dysfunction in the previous 12 months. These items included 1) lacking desire for sex, 2) arousal difficulties (i.e., erection problems in men, lubrication difficulties in women), 3) inability to achieve climax or ejaculation, 4) anxiety about sexual performance, 5) climaxing or ejaculating too rapidly, 6) physical pain during intercourse, and 7) not finding sexual pleasure. The last 3 items were asked only of respondents who were sexually active during the prior 12-month period. Sexual dysfunction was found to be more prevalent for women (43%) than for men (31%) and was associated with various demographic characteristics, including age and educational attainment. Women of different racial groups demonstrated different patterns of sexual dysfunction. Differences among men were not as marked. Sexual dysfunction was more likely among women and men with poor physical and emotional health and was highly associated with negative experiences in sexual relationships and overall well being. These results indicate that sexual dysfunction is an important public health concern in the USA, and emotional problems probably contribute to its frequency.
NEPHRON NUMBER AND ITS CONSEQUENCES

My interest in nephron number began by hearing Dr. Barry Brenner speak at Baylor University Medical Center 3 years ago at the invitation of Dr. Michael Emmett. The kidney contains an estimated 600,000 to 1,300,000 nephrons, each of which is an independent functional unit connected to a common collecting duct system. The number of nephrons is important in determining the functional capacity of the kidney, and permanent loss of nephrons is the main pathophysiologic feature of chronic renal disease. The number of nephrons is characteristic of a particular species and, among species, is proportional to body size from a few thousand in the pocket mouse to several million in the elephant. It is generally believed that the exact number of nephrons in humans varies considerably and that many persons have inadequate numbers of nephrons (oligonephropathy). Merlet-B?nichou and colleagues (4) from Paris, France, recently reviewed factors that influence the number of nephrons.

One factor is birth weight. Studies in nonhuman animals have shown that fetal growth retardation decreases nephron number anywhere from 15% to 65%. Human infants with birth weights below the 10th percentile have lower kidney weights and fewer glomeruli than do infants with appropriate birth weights for gestational age. Indeed, infants with birth weights between the 5th and 10th percentile have 30% fewer nephrons, on average, than infants whose birth weights are above the 10th percentile. There is a linear correlation between nephron number and birth weight. This fact suggests that nephron number is modulated mainly by exogenous factors acting on the fetus.

Several lines of evidence indicate that one of these factors is vitamin A, or retinol, and its main derivative, retinoic acid. Experimentally, both retinol and retinoic acid are potent stimulators of nephrogenesis. In experimental animals the number of nephrons of term fetuses correlates closely with the circulating vitamin A level. Small changes in vitamin A status are sufficient to modify the number of nephrons. The vitamin A intake and plasma retinol of pregnant women and women of childbearing age vary greatly. Inadequate intakes of vitamin A may be dietary in origin, even in developed countries. The resulting low vitamin A stores may not be sufficient to meet the increased demands of pregnancy. Although the plasma retinol concentration of the fetus reflects that of the mother, it is generally 50% lower, and this fact may explain why inadequate circulating vitamin A is much more frequent in the fetus than in the mother. Vitamin A levels also are lower in women of childbearing age who smoke cigarettes, abuse alcohol, or are on certain weight-reducing diets.

These authors hypothesize that the nephron deficiency found in fetuses with growth retardation results from a low vitamin A supply to the fetus. They found that administration of retinol palmitate to protein-deprived pregnant rats prevented nephron deficiency in growth-retarded pups. Although high circulating levels of vitamin A in utero may account for the upper range of nephron numbers, an excess of vitamin A can have adverse effects on nephrogenesis. There has been some concern that high intake of vitamin A from multivitamin preparations during pregnancy may increase the risk of congenital
malformations, including renal defects.

There is also some evidence in nonhuman experimental animals that some drugs widely prescribed during pregnancy may cause permanent deficits in nephron number. These drugs include the antibiotic gentamicin, some beta lactam antibiotics, ampicillin, amoxicillin, cyclosporine, and glucocorticoids.

Many experimental studies have shown that a reduction of renal mass causes adaptive increases in the size and function of the remnant nephrons. Nonhuman animal studies provide evidence that the age at which nephron reduction occurs is an important factor in the development of glomerulosclerosis. Whether unilateral nephrectomy in adults produces a decline in renal function later remains controversial. Patients with oligomeganephronic renal hypoplasia, the only human form of bilateral isolated inborn nephron deficiency, develop glomerulosclerosis and reach end-stage renal disease during childhood or adolescence.

It has been postulated that nephron reduction at birth may increase susceptibility to systemic hypertension by reducing the ability to excrete sodium. The data on the relation between nephron number and arterial blood pressure, however, are conflicting. Nephrectomy in childhood or adulthood, as well as unilateral renal agenesis, is associated with an increased risk of systemic hypertension. By contrast, only a small increase in systemic blood pressure is observed in a large number of patients nephrectomized as adults, and the prevalence of hypertension is not increased in a long-term follow-up of patients with 1 kidney. Finally, episodic or end-stage hypertension has been reported occasionally in patients with oligomeganephronic renal hypoplasia, but most of these patients have not had systemic hypertension. Several epidemiologic studies have shown that low birth weight is associated with increased blood pressure in childhood and adult life.

Thus, nephron numbers may be decreased by fetal environmental factors. Retarded fetal growth is associated with a deficit in nephrons in both humans and nonhuman animals. Exposure to certain drugs in utero alters nephrogenesis in nonhuman animals, but this has not been documented in the human fetus. Nephron number is closely modulated by vitamin A, whose circulating level in the fetus depends on the maternal diet and the placental blood flow. A low vitamin A status in the fetus may be a major cause of inborn nephron deficit. Fetal vitamin A status may prove to be responsible for most of the variations in nephron number found in the general population.

TREATMENT OF SYSTEMIC HYPERTENSION IN THE USA FROM 1950 TO 1989

Mosterd and associates (5) performed 51,756 examinations of 10,333 participants in the Framingham Heart Study from 1950 to 1989. When the participants entered the study they were aged 45 to 74 years. During this nearly 40-year study the percentage of participants taking antihypertensive medications increased from 2% to 25% among the men and from 6% to 28% among the women. The age-adjusted prevalence of systolic blood pressure \( \geq 160 \) mm Hg or diastolic blood pressure \( \geq 100 \) mm Hg declined from 18% to 9% among
men and from 28% to 8% among women. This decline was accompanied by age-adjusted reductions in the prevalence of electrocardiographic evidence of left ventricular hypertrophy from 4.5% to 2.5% among the men and from 4% to 1% among the women. These findings support the notion that the increasing use of antihypertensive medicines has resulted in a reduced prevalence of high blood pressure and a concomitant decline in left ventricular hypertrophy in the general population. Nevertheless, systemic hypertension continues to be undertreated in the USA, and the consequence of that undertreatment is a continued high prevalence of stroke, congestive heart failure, and left ventricular hypertrophy with its subsequent increase in ventricular arrhythmias and myocardial ischemia.

One of the better ways to prevent cardiac disease is to prevent the development of increased cardiac mass. A study of nearly 900 patients with fatal coronary artery disease disclosed that 80% of them had hearts of increased mass (6). Fatal coronary artery disease is therefore much less common in persons with hearts of normal mass, and congestive heart failure is nearly nonexistent in persons with normal cardiac mass.

**NEPTUNE'S POISONED CHALICE**

Graham MacGregor and Hugh E. de Wardener (7) have produced a 233-page book, costing $65, about salt and blood pressure. When I was in medical school I was taught that salt was bad for us and that in general the higher the salt intake the higher our blood pressure. Our blood pressure at birth is generally about 90/60 mm Hg, and in societies who eat no measurable salt it remains at that level throughout life.

The authors of this book postulate that humans were genetically programmed for a low-salt diet. Over the millennia, however, we have acquired a taste for salt and indeed an addiction to salt. Daily salt consumption was <1 gram in prehistoric times; it increased to a maximum of 18 grams in the 19th century and now averages 10 grams. Optimally, it should be <6 grams. Systemic hypertension is one of the consequences of high salt consumption. Like the tobacco industry when confronted with data on effects of smoking, the industries that manufacture and process salt have been reluctant to accept scientific studies that prove the detrimental effects of too much salt, and they continue to make high-salt foods.

Salt traditionally has been viewed favorably as a healthful substance and has played an important role in many cultures. Salting was used in Egypt to preserve foods as early as 2000 bc, and salt is mentioned in Greek and Roman literature and indeed in the Bible. It has been used as a substance for barter, a source of tax revenue, a component of religious ceremonies, and a source of superstition. The words *salary, salient, salute*, and others were derived from the word *salt*. Some 80 million tons of salt are used worldwide each year, one third extracted from the sea, the remainder from underground.

The second part of the book is devoted to blood pressure. On the relation of salt to systemic hypertension, the authors cite nonhuman animal studies, human experimental studies, and anthropological studies comparing various populations. The Yanomamo Indians, who consume little salt, have a low frequency of systemic hypertension, whereas the Japanese, who have a high-salt diet, have a high prevalence of high blood pressure. The book contains
an abundance of little known facts. Salt, for example, can contribute to osteoporosis in postmenopausal women by increasing calcium loss in the urine, and it can exacerbate asthma by increasing bronchial reactivity.

**THE FRENCH PARADOX**

In France mortality from coronary artery disease is about a quarter of that in the United Kingdom. The mortality rate (number of deaths per 100,000 from coronary artery disease in people aged 55 to 64 years) in 1992 was 128 in France and 487 in Britain. The number of cigarettes smoked per adult daily, the percent of adults who smoked, the consumption of animal fat as a percent of total energy intake, the consumption of fruits and vegetables as a percent of total energy intake, and the mean serum total cholesterol, high-density lipoprotein cholesterol, and systolic blood pressure levels were similar in the years 1985 to 1990 in French and British adults. Thus, the major risk factors are no more favorable in France than in Britain, and this has produced the so-called “French paradox.” The French paradox usually has been attributed to the higher consumption of alcohol in France, notably of wine, and some have suggested a specific effect of red wine.

Law and Wald (8) from London, United Kingdom, have come up with another explanation for the low rate of coronary artery disease in France, the “time lag” hypothesis. This hypothesis arises from the observation that animal fat consumption and serum cholesterol concentrations have been similar in France and Britain for a relatively short time, only about 15 years. For decades up to 1970, France had lower animal consumption (about 21% of total energy consumption vs 31% in Britain) and serum cholesterol (220 vs 243 mg/dL), and only between 1970 and 1980 did French values increase to those of Britain. There must be a time lag between the increase in serum cholesterol concentration and the resulting increase in fatal and nonfatal coronary artery disease.

The authors point out that the prevalence of smoking in men is similar in France (32%) and Britain (29%), but in women it is lower in France (9% vs 30%). These patterns have persisted for over 30 years and are reflected in mortality from lung cancer (similar in French and British men but lower in French than British women). The low prevalence of smoking in French women is consistent with the fact that the ratio of mortality from coronary artery disease in French to British women is lower than the equivalent ratio in men.

Several studies have shown a consistent reduction in coronary risk of about 20% in people who drink about 1 unit of alcohol (equivalent to “1 standard drink”) daily compared with people who drink no alcohol, but drinking >1 unit a day confers little or no further protection. The nonlinear dose response relation may reflect a summation of opposing effects of alcohol: the protective effects (mainly the increase in high-density lipoprotein cholesterol but also the favorable changes in hemostatic factors) are countered by the higher blood pressure, which increases risk. If all French men and no British men drank at least 1 unit of alcohol a day, other factors being equal, the difference in coronary artery disease frequency would be about 20%. The greater ethanol consumption in France than Britain (18.4 vs 5.7 liters per adult in 1965, 13.1 vs 8.5 liters in 1998) reflects a higher average consumption per drinker rather than a higher prevalence of drinkers and so does not further
reduce the incidence of coronary artery disease.

There is a strong association across countries between higher consumption of wine (but not beer or spirits) and lower mortality from coronary artery disease. This association encouraged the view that the protective effect of alcohol was specific to wine. Wine consumption in France is high, and it was natural to invoke this as an explanation for the paradox. Epidemiological evidence, however, shows that the protective effect of wine is no greater than that of beer or spirits. All alcoholic drinks produce the changes in serum high-density lipoprotein cholesterol and hemostatic factors that reduce risk, and randomized crossover studies have shown that ethanol produces them. Large cohort studies that have included people who drank only red wine or only white wine have shown no difference in their risk of coronary artery disease. Although red wine contains more phenolic compounds (with antioxidant activity) than other drinks and increases the proportion of polyunsaturated fatty acids in platelet phospholipids, there is no evidence to support an important role for either of these factors in the causation of coronary artery disease.

Thus, the time lag hypothesis appears reasonable. Simply stated, there is a delay between an increase in serum cholesterol concentration and the resulting increase in mortality from coronary artery disease, and current death rates from coronary artery disease relate better to past levels of dietary fat intake and serum cholesterol levels than to present-day levels. Mortality from all causes in French men is similar to that in British men despite their lower mortality from coronary artery disease. The excess mortality from alcohol-related causes is so large in France that it abolishes the survival advantage from the low mortality from coronary artery disease. French women, in contrast, have a third lower all-cause mortality rate than that in British women, a consequence of their moderate alcohol consumption, diet, and relatively low rate of smoking. The high mortality from coronary artery disease in Britain and the high mortality from alcohol-related causes in French men are both preventable. It may be only a matter of time before the “French paradox” resolves itself.

**CHOLESTEROL AND DEMENTIA**

Individuals with relatively low levels of low-density lipoprotein (LDL) cholesterol (the bad one)—the “L” stands for “lousy”—have a higher frequency of atherosclerotic events than individuals with lower LDL cholesterol levels. The statin drugs not only decrease the frequency of first and repeat atherosclerotic events, but they also decrease by approximately 30% the frequency of stroke when matched with similar age-sex individuals not on statin drugs.

A recent study from New York City found that older persons with elevated levels of LDL cholesterol had an increased risk of dementia with stroke compared with persons with lower LDL cholesterol levels (9). The authors studied 1111 nondemented patients aged >=65 years and followed them from 1 to 8 years (average, 2.1 years): 286 (26%) of the 1111 subjects developed dementia during follow-up; 61 (21%) were classified as having dementia with stroke and 225 (79%) as having probable Alzheimer’s disease. Serum levels of LDL cholesterol were significantly associated with an increased risk of dementia with stroke. Compared with the lowest quartile, the highest quartile of LDL cholesterol was associated
with a 3-fold increase in risk of dementia with stroke. The levels of LDL cholesterol were not associated with the development of Alzheimer's disease. Thus, lower levels of LDL cholesterol are good for the brain as well as for the heart.

**EARLY MORTALITY RATES AFTER ACUTE MYOCARDIAL INFARCTION IN MEN VS WOMEN**

Investigators for the National Registry of Myocardial Infarction 2 Participants (10) analyzed data on 384,878 patients (155,565 women and 229,313 men) aged 30 to 89 years at the time of acute myocardial infarction. The overall mortality rate during hospitalization was 16.7% among the women and 11.5% among the men. Among patients <50 years of age the mortality rate for the women was more than twice that for the men. The differences in the rates decreased with increasing age and was no longer significant after the age of 74. Thus, after acute myocardial infarction younger women, but not older women, have higher rates of death during hospitalization than men of the same age. The younger the age of the patients, the higher the risk of death among women relative to men.

**SOY MILK**

Soy milk is now being offered in regular milk cartons (11). Although it is more expensive than cow's milk, it reduces serum cholesterol levels and therefore the risk of atherosclerotic events, and it can also help prevent certain cancers and menopausal symptoms. Many soy milk producers now flavor it with chocolate, vanilla, or strawberry to mask the soybean taste. Some advocates who have grown used to the soy milk taste now find regular milk “terrible.” Soy milk has a reputation for causing intestinal gas, but at least one major supplier of soy to the beverage industry says its product solves the problem by removing gas-fermenting carbohydrates from the soy.

**CARDIOLOGY IN HERMOSILLO, MEXICO**

Baylor University Medical Center has an affiliation with the CIMA Hospital in Hermosillo, Mexico, and I was invited to visit that hospital on May 28 and 29, 1999. Hermosillo is located in the state of Sonora, which is adjacent to Arizona. It is a city of approximately 800,000 persons and is located about 50 miles from the Pacific Ocean and the city of San Carlos, which is one of the finest beaches in Mexico. Hermosillo is flat and desert-like, but nevertheless farming is its major industry. It also contains a Ford plant and a number of smaller manufacturing plants. It is hot and dry. In the summer it commonly reaches temperatures up to 46°C (115°F). Its airport is modern, and its major thoroughfares are wide. I stayed at the Americana Hotel, which is superb.

The CIMA Hospital is modern (3 years old), private, for profit, well equipped, well staffed, and usually about 60% filled. About a third of the patients in Mexico go to state or government hospitals. Those eligible to go to these hospitals are employees of the state or federal government and their families. The public or charity hospitals are for the indigent, and about a third of the population uses those hospitals. The private hospitals, which also are used by about a third of the population, are used primarily by individuals with more than
adequate income and/or those who have private medical insurance. Many patients at the private hospitals pay their bills in cash. Some insurance plans are a bit unusual. Vaginal delivery, for example, is not underwritten by private health insurance, whereas cesarean section is. As a consequence, 70% of the deliveries at the CIMA Hospital are by cesarean section. I met a number of the staff physicians while there, as well as David A. Felix Swanson, the enormously impressive 33-year-old bilingual director general of the hospital.

Dr. Jesús Canale is professor of cardiology at the CIMA Hospital. Dr. Canale is about 45 years old and speaks fluent English. He supervises the echocardiography laboratory in the hospital and assists Dr. Ricardo Quintero Orci with cardiac catheterizations. I asked Dr. Canale about his typical day, which usually goes as follows: he arises at 6:00 am and arrives at the hospital about 7:00 am. There he sees patients in the hospital and does 2 or 3 echocardiograms before going to his office to see private patients. Although I did not see his private office, he has 1 secretary/nurse assistant and is in solo practice, as are virtually all physicians in Hermosillo. As a consequence, he has both a beeper and a telephone on his belt 24 hours a day. There are no group practices in Hermosillo! All physicians are on call all the time, and they do not sign out to other physicians when they're out of town. When they are out of town, an emergency in one of their patients is simply handled by another physician, who can keep that patient permanently if the patient is willing to switch physicians, which apparently is not infrequent.

At his office Dr. Canale has an electrocardiogram machine but no echocardiogram. If a patient needs an echocardiogram, he does that at the CIMA Hospital. He leaves his private office about 2:30 pm to go home for lunch with his beautiful wife and 7 children. The lunch is the feast of the day. Following lunch he takes a 10-minute nap and then returns to his office about 4:00 pm. He then sees patients until about 8:00 to 8:30 pm. He occasionally returns to the hospital to see 1 or 2 patients but more frequently goes home. After a light meal and some activities with his children, he retires to sleep about 11:30 pm or midnight. On Saturdays, he visits the hospital and sees private patients again until about 2:00 pm, when he goes home. On Saturday afternoon he typically works on his biweekly nonmedical newspaper column or reads medical writings. On Saturday night the family typically does some activity together, and on Sundays they go to Mass and then visit with relatives. Vacations are infrequent and generally no more than 2 weeks annually.

C. WALTON LILLEHEI, MD

Dr. C. Walton Lillehei died from cancer in July 1999 at age 80 (12). He was often referred to as the “father of open-heart surgery.” At the University of Minnesota he first introduced cross-circulation, in which a blood vessel of the patient undergoing cardiac surgery was linked by tubes to that of a healthy kin donor. It worked but at risk to the donor. In 1955 with Dr. Richard A. Wall he succeeded in producing a practical heart/lung machine called a helix reservoir bubble oxygenator, which revolutionized cardiac surgery. He also was instrumental in producing a battery-powered pacemaker. He was involved in the design of 4 prosthetic heart valves, including the St. Jude Medical prosthesis, the most commonly used mechanical heart valve today. Dr. Lillehei participated in the training of some 1000 physicians in heart surgery, including Dr. Christiaan N. Barnard, the South African who in
1967 performed the first heart transplant, and Dr. Norman E. Shumway, who devised the technique for such transplants.

HANDGUNS

Nearly 2 million new handguns were purchased in the USA in 1998. In the past decade gun sales in the USA have fluctuated between 2.1 and 3.5 million annually. A recent study in *JAMA* found that the cost of treating gunshot wounds in the USA in 1994 was $2.3 billion, and of that amount $1.1 billion was paid by American taxpayers (13). A round of bullets costs a few dollars. A single name-brand handgun costs a few hundred dollars. The cost of hospitalization and follow-up care for a nonfatal gunshot injury is about $36,000 a year (14). The cost for fatal wounds is about $12,000. The more expensive the injury, such as wounds to the spinal cord, the more likely the government has to pick up the cost. Only 18% of the cost for gunshot wounds is picked up by private insurance. Taxpayers pay 49%. The other 33% falls under a category called “self-pay,” a dubious category since so many gunshot victims are poor. Self-pay patients are nearly 6 times as unlikely as other patients to pay their medical bills, and thus they increase charges for other patients. A 1995 study at Charity Hospital in New Orleans found that the average cost of gunshot injuries was $19,000 and that gunshot victims took up a third of the orthopedic beds and consumed 25% of hospital resources. Because 51% of gunshot victims were uninsured, the hospital had to eat $6 million in cost during that year.

The risk of unregulated handguns far outweighs the occasional legitimate need for personal defense. Physicians need to take a stand on gun control. There is no place for assault weapons and semiautomatic firearms on our streets or in our homes. Handguns must be regulated nationally or equally from state to state. Some headway is being made. Tougher licensure requirements have decreased the number of federally licensed firearm dealers from 244,000 in 1993, when the USA had more licensed firearms dealers than gas stations, to fewer than 90,000 in 1998.

We have eliminated lead from paint because of the dangers to children. We require airbags and restraints in our cars to prevent motor vehicle fatalities and injuries. We have created safety codes for the construction industry to reduce accidents in the home. But we are unable to control handguns even though it has been conclusively shown that they are responsible for increasing numbers of accidental injuries and deaths. Our legislatures are unable to stand up and be counted because of the corrupting influence of powerful lobbies and special interest groups. A gun costs no more than a TV set. Bullets cost no more than a can of soda out of a machine. But their carnage has emergency rooms across the nation expending resources beyond reason.

MORE KILLINGS

The spring massacre at Columbine High School in Colorado, the bullet spray in a suburban high school outside Atlanta, the murderous July 4 hate spree in the Midwest by a crazed white supremacist, the killing of 12 people by an irate day trader in Atlanta, and the shooting at the North Valley Jewish Community Center in California all provide examples
of a nation besotted with murder and mayhem. Although the USA remains one of the most violent societies in the world and there have been some high-profile rampages recently, crime, especially violent crime and especially violent crime against whites, has been decreasing for years, and Americans are less likely to be victimized now than at any time in the last few decades. Even the eruptions of school shootings that have received so much attention obscure the fact that violence in schools has been steadily decreasing. Nevertheless, we tend to deny the downswing in violence and prefer instead to believe in an upswing. Maybe Americans like to be afraid even when the facts don't warrant it.

Sociologist Barry Glassner in his new book, *The Culture of Fear*, suggests that we are enamored with fear even when fear is contradicted by fact (15). He believes that there are forces in government and industry that have a great deal to gain by making us fearful. Charities like the American Cancer Society, which depend on fund raising, have a stake in creating a fear of disease. Companies that profit from security devices have a stake in creating a fear of crime, as do conservative politicians trying to cash in on voters' disgust with soft-hearted liberals. Flight insurers have a stake in creating a fear of airlines. The media, which subsist on drama, have a stake in fear of all shapes and sizes so they willingly let themselves be exploited by other fearmongers. When it comes to violence, media coverage has increased even as violence itself has decreased, creating the impression of a society gone mad.

Neal Grabler suggests that a lot of people simply like to be scared even though they may not like the things that scare them. One can abhor supremacists, cancer, teenage violence, and airline accidents and still embrace the fear these engender. Fear sharpens the edges of life. It heightens the senses. It shakes one from complacency. This is the principle on which amusement-park thrill rides, bungee jumping, haunted houses, and horror films are predicated. They all inspire the joy of fear.

And some movies (*The Blair Witch Project*, for example) simply produce terror in audiences. The reason, however, that audiences can indulge and enjoy their terror is that they know they are not really endangered. It is only a movie. If we really thought we were threatened, we would not relish the fear. Half the fun is being scared, the other half knowing we are perfectly safe. Of course the difference between terror movies and the shootings in California, Colorado, and Georgia is that the first are fiction and the others are real. It may be precisely because we hear that the crime rate is dropping and precisely because Americans, or white Americans at any rate, feel safer even if the feeling is subliminal, that we can embrace the fear as if we were watching a horror movie. Put another way, the more secure we feel, the more we can enjoy the fear.

**ANOTHER KENNEDY TRAGEDY**

I remember well walking out of a meeting in State College, Pennsylvania, on October 11, 1985, with Dr. Michael DeBakey. Dr. Andrias Gruenzig had just given a talk, and Dr. DeBakey commented to me: “You know that Gruenzig is an awfully nice guy, very smart, but I wish he would not fly. It's too dangerous.” Two weeks later Gruenzig crashed his newly acquired plane with his newly acquired beautiful wife on board. JFK Jr.’s mother
would not allow him to fly during her lifetime, but after her death he began taking flying lessons. He had <300 hours total flying time and relatively little of it at night and no instrument flying instruction. Not only was JFK, Jr., on board but so were his beautiful wife, Carolyn Bessette Kennedy, and her lovely and accomplished sister Lauren Bessette. Often money can be dangerous. It takes money to buy complicated machines, and certainly JFK, Jr., had both, but he had no business flying at night or flying over the ocean or carrying 2 additional passengers. We all owned a little piece of JFK, Jr., and we have all lost by this tragedy.

**DISEASE IN THE AMERICAN CIVIL WAR**

Frank R. Freemon in his book *Gangrene and Glory: Medical Care During the American Civil War* described medical care available during the war and whether disease and its treatment or lack thereof played a significant role in influencing the ultimate outcome (16). The exact number of battlefield deaths, wounded survivors, and infections and disease during that war is uncertain. The estimates are that the soldier deaths due to battle in the Confederate and Federal armies were 95,000 and 110,000, respectively, and that the deaths due to infection and disease were 165,000 and 250,000, respectively.

The thousands of injuries seen in single days of battle were worsened by lack of plans for evacuation of the wounded, which resulted in many seriously wounded lying on the field of battle for days intermingled with their dead comrades. When the war began, neither side had devised an ambulance corps to evacuate the wounded. As the war progressed the corps improved on both sides. When the war began, an estimated 12,000 physicians were called up for the North and 3,000 for the South, and, of the latter group, only 24 had previous military medical training. Even men without any medical training whatsoever received state appointments as regimental surgeons. It was customary to call all army physicians “surgeon,” even though most were woefully unqualified to practice surgery.

Chloroform, ether, and opiates were available when the war began in 1861, but the supply was variable for the South. Pasteur's discovery of bacterial causes for a variety of diseases and Lister's similar work on antisepsis had yet to emerge. Wounds during the war *always* became infected. For the survivors, the memories of ghastly battle wounds, piles of amputated limbs (approximately 60,000), pain, and misery would be a constant reminder that there was little glory for the soldier and for the wounded who awaited the specter of gangrene. Disease rather than combat produced by far the most debility.

Inserted throughout the book are tables and charts listing the numbers afflicted with each disease. Each army had its share of yellow fever, smallpox, other infections, diarrhea, and malaria. The last 2 were the major disabilities for both armies. Both armies also had problems with nutritional diseases such as pellagra and scurvy since it was difficult to bring fresh vegetables to the troops. It has been estimated that there were thousands of subclinical cases of vitamin C deficiency producing side effects of lassitude and night blindness.

The author poses the question of whether medical care made a difference in the conduct of the war. The medical resources of the South progressively diminished over time while those
of the North progressively improved and were better distributed. These features contributed
to the shrinking away of the Confederate forces from sickness and excessive medical
furlough. Though the North delivered better medical care and nutrition, the author believed
it made no difference except in 2 pivotal battles: the Siege of Vicksburg and the Battle of
Atlanta. These 2 battles were crucial to the final outcome and were won by the North when
the Confederate forces were at their lowest strength, having been decimated by disease.

LANCE ARMSTRONG, METASTATIC CANCER, AND THE TOUR DE FRANCE

The 2300-mile, 27-day Tour de France is believed by many to be the most physically testing
of all athletic events. The average cyclist consumes about 10,000 calories each day during
this event and nevertheless loses about 10 to 15 pounds, including bone and muscle mass.
The Tour de France, which has been an annual event since 1903, includes 21 stages through
all types of terrain—extreme heat, extreme cold, high altitude (Alps), etc.

The 1999 event was won by 27-year-old Lance Armstrong, who grew up in Plano,
graduated from Richardson High School, and now lives in Austin, Texas (17). Americans
are not supposed to win the Tour de France, particularly one who had nearly died 3 years
earlier from testicular cancer that had spread to his abdomen, lungs, and brain. He was
coughing up buckets of blood. He had a dozen golf-ball–sized tumors in his lungs and also
metastases in the brain. Before his 12-week chemotherapy session he underwent 2
operations, including craniotomy. But between rounds of chemotherapy he rode his bike 30
to 50 miles each day.

After his cancer treatment, no European team would hire Armstrong. His French team fired
him after seeing how awful he looked after his first chemotherapy treatment. Thus, he was
the first American to win the Tour de France on an American team. The only previous
American winner was Greg LeMond, who won in 1986, 1989, and 1990, the latter 2 after he
nearly died from shotgun hunting accident wounds after his first victory. By 1998
Armstrong was fourth in the Tour de Spain.

Armstrong took command of the 1999 Tour de France by winning the opening 4.5-mile
prologue. The following week he won in the 35-mile time trial, and he capped the next stage
with an aggressive attack up the Alps. Armstrong's 6:16-minute advantage is equivalent to a
30-point halftime lead in basketball. Armstrong is a better rider now than he was before his
cancer. In 2 of his 3 previous Tour de France performances he failed to finish, and in the
only one he did finish, he was well back in the pack. The 1999 victory is worth >$1 million
in bonuses and another $2 million in endorsements.

In October 1999 Armstrong will also became a father. Because of his chemotherapy he
cannot produce enough sperm for at least 3 years. His wife, Kristin, was impregnated in
vitro by sperm banked by Armstrong before his therapy began.

THERAPEUTIC WRITING

Periodically through the years when I have been bothered by one thing or another, I have
written down my thoughts, and the simple act of doing so has often calmed me down and in a way brought closure to the problem. James W. Pennebaker, a professor of psychology at The University of Texas in Austin, has conducted studies on this topic (18). He writes: “People who write for 20 minutes a day about traumatic events reduce their doctor visits, improve their immune systems, and, among arthritis sufferers, use less medication and have greater mobility.” When patients with rheumatoid arthritis audiotaped (writing was considered too physically painful) their feelings about stressful events for 15 minutes a day for 4 days, after 3 months their moods and physical functioning—climbing stairs, buttoning clothes—had improved compared with the control group (19). Asthmatics have had improved lung function 2 weeks after similar writing exercises (19). Mark A. Lumley, an associate professor of psychology at Wayne State University in Detroit, suggests that suppressing negative emotions can weaken the immune system and arouse the fight-or-flight system, increasing blood pressure and heart rate (18). Releasing these emotions may help the body stop preparing for battle. Writing or talking about stressful events may relieve the emotional part of pain. The point is to vent honestly. Writing about conflict or trauma helps organize the experience. The net effect is that this exercise is helpful in moving beyond the stressful event.

IN A SINGLE MINUTE

According to the July/August 1999 issue of *World-Watch* magazine, the following changes occurred every minute in the world in 1998 (20): the net amount of forest in Australia, which has very little forest to begin with, was reduced by an area the size of a soccer field; the net amount of tropical forest in the world was reduced—mostly by burning—by an area the size of 60 football fields; in the USA, suburban sprawl spread over another 2.5 acres of land; almost one-half square kilometer of good land turned to desert; 570 people were driven from their homes by weather disasters, many of which had been greatly worsened by global warming, deforestation, and other human actions; 23 children died of starvation or malnutrition; 50 people died of pesticide poisoning; 245,000 gallons of raw municipal sewage were dumped into the Ganges River in India, which is regarded by Hindus as a holy place, where millions bathe to be “purified”; $19,000 worth of endangered animals or their parts were sold on the global black market; and the global economy burned up an amount of energy (mostly fossil fuels) that the planet took 10,000 minutes to produce through solar energy collection and photosynthesis. These changes, multiplied by 525,600, the number of minutes in each year, greatly affect our health and, assuming our present habits continue, will only get worse.

FIRST FEN-PHEN TRIAL

The first trial in the nation to reach jury among the 4000 lawsuits against American Home Products by fen-phen users reached a verdict in East Texas on August 6, 1999 (21). Ms. Debbie Lovett, who took fen-phen for about 7 months and who was known to have valve disease before starting to take the drug combination, was awarded $3.4 million for her past and future medical bills, lost wages, and pain and suffering, and another $20 million in punitive damages, a figure intended to punish American Home Products. Because Texas law
caps punitive damages the total judgment is unlikely to top $7.5 million.

At the moment, Ms. Lovett apparently is asymptomatic and works daily in addition to caring for her 2 children. She lost 45 pounds when taking fen-phen beginning in October 1995 and has subsequently regained the entire amount. If jurors award these types of verdicts to essentially asymptomatic persons with preexisting valvular heart disease, just imagine what the verdicts will be for patients who took phentermine and later underwent cardiac valve replacement, fortunately a very small percent of the total number.

American Home Products manufactured fenfluramine under the brand names Pondimin and Redux. Millions of dieters combined the pills with phentermine to suppress their appetites. Phentermine, made by several companies, has not been linked to any problems and is still available.

The fen-phen saga began in July 1997 when The New England Journal of Medicine published a Mayo Clinic report of 24 fen-phen users with cardiac valve damage. The FDA then sent a “Dear Doctor” letter to physicians requesting information about heart valve disease among fen-phen users. A month later the FDA had collected 92 reports of valve disease among 291 patients tested. Within days the FDA called for a halt in fen-phen use and persuaded American Home Products to pull fenfluramine from the market “voluntarily.” Two years after the FDA’s action, we still do not know for certain whether fen-phen causes harm to cardiac valves. One recent study reported no significant increase in heart valve problems in those who used fen-phen for <6 months, and another study reported no increase for those who took the drug for <3 months (22). An expert committee of the American Heart Association says it is too soon to tell whether fen-phen causes significant valve damage.

THE FIRST WEEK OF THE MONTH

Using computerized data from all death certificates in the USA between 1973 and 1988, Phillips and colleagues (23) from La Jolla, California, compared the number of deaths in the first week of the month with the number of deaths in the last week of the preceding month. The average number of deaths was about 5500 per day, or about 165,000 in a 30-day month. There were 100.9 deaths in the first week of the month for every 100 deaths in the last week of the preceding month. This was equivalent to about 4320 more deaths in the first week of each month than in the last week of the preceding month in an average year. Between 1983 and 1988, for deaths involving substance abuse and an external cause (such as suicides, accidents, and homicides), there were 114.2 deaths in the first week of the month for every 100 in the last week of the preceding month. There were significant increases in the number of deaths in the first week of the month for many causes of death, including substance abuse, natural causes, homicides, suicides, and motor vehicle accidents. Thus, be careful the first week of each month.

GARBAGE

The USA produces more garbage than any other nation, and disposing of it is becoming a
progressively larger problem (24). Some landfills are running out of room, and some exude toxic substances. The Environmental Protection Agency estimates that on average we each produce 4.4 pounds of garbage a day, for a total of 271 million tons in 1997. Our garbage consists of paper and paper board (39%), yard wastes (13%), food wastes (10%), plastics (10%), metals (8%), glass (5%), wood (5%), and other materials such as rubber, leather, and textiles (10%). The cost of handling garbage is the fourth biggest budget item—after education, police, and fire protection—in many cities.

Where does the garbage go each day? Some is recycled, some is incinerated, but most is placed in the >2300 landfills in operation today in the USA. And they are the main problem. Landfills produce leachate (“garbage juice”), which can contaminate ground water. It is only a matter of time until even the best engineered landfills with state-of-the-art design will leak. Items in landfills do not decompose and degenerate. Things in landfills become mummified, including hot dogs that can be recooked and newspapers that after years may be perfectly legible. Landfills apparently are like giant Tupperware bowls preserving the trash.

The idea of burning waste to create energy makes a lot of sense, but in practice it has not worked because of the very high cost and environmental pollution. According to the Environmental Protection Agency, 110 plants in the USA burn 16% of the country's garbage to get rid of it or use it as fuel to generate power. Some believe that the plants that burn municipal garbage to create steam and electricity are one of the cleanest sources of power in the world. The process destroys bacteria, pathogens, and other harmful elements usually found in garbage, and burning cuts the volume of garbage by about 90%. But incinerators produce bottom ash, which sifts through the grate at the bottom of the furnace, and fly ash, which is toxic and escapes from the air pollution control devices.

Some garbage systems—the best ones—sort trash into recyclables, compostables, and disposables, and these systems keep about 65% of what was trash out of landfills and incinerators. Texas is the number 2 garbage-producing state in the Union, with 34 million tons generated in 1998, second only to California's 56 million tons. New York produced 30 million tons in 1998. Without garbage collectors medicine would be in serious trouble.

WATER SCARCITY

In 1776, Adam Smith described the apparent paradox that water is vital to human existence but sells for a pittance. Two hundred years later we can refill an 8-ounce glass with tap water 2500 times for less than the cost of a can of soda. Under these conditions, it is hardly surprising that we have little incentive to conserve. Yet a number of studies have demonstrated that water demand is responsive to price changes (25). Our water is not only underpriced, it is also inappropriately priced. A 1998 survey by the American Water Works Association indicated that 39 of the 60,000 public water systems in the USA charge uniform rates, meaning that consumers pay the same rate per gallon no matter how much they use each month. A few systems encourage waste by offering volume discounts.

Although water scarcity typically develops gradually during seasons of low rainfall and low
accumulation of snow, pronounced droughts are usually felt in the summer months when demand is greatest. It would make economic sense to charge more at these times, but <2% of utilities practice seasonal pricing. And virtually no utilities have adopted systems that would allow water rates to rise automatically as reservoir levels fall. Efficient water use will take place only when the price reflects the additional cost of making that water available. In the next century water will be far more expensive than it is presently. It is usually the healthiest liquid we can drink and one of the few without calories.

**MOTIVATION**

*The Wall Street Journal* recently started an occasional series of interviews with chief executive officers about motivation. The first was with Jack Welch, who as chief executive officer of General Electric for nearly 2 decades has reshaped the company through >600 acquisitions and record earnings (26). Yet he says his most important job, the one he devotes more time to than any other, is motivating and assessing his 85,000 managers and professionals. He grades them annually on a curve and fires those with the lowest scores. As he says, “You have to go along with a can of fertilizer in one hand and water in the other and constantly throw both on the flowers. If they grow, you have a beautiful garden. If they don't, you cut them out. That is what management is all about.” The following are Jack Welch’s 5 lessons on motivation: 1) Tell people to never allow themselves to become victims. They should go somewhere else if that is how they feel. 2) Constantly refine your gene pool by promoting your best performers and weeding out your worst. 3) Grade on a scale. If I get 10 people, 1 is a star and 1 won't cut it. 4) Instead of giving people specific operating goals, challenge them to give you every growth idea they've got. 5) Don't just reward people with trophies. Reward them in the wallet.

**PRENATAL FAMINE AND ANTISOCIAL PERSONALITY DISORDER IN EARLY ADULTHOOD**

From October 1944 to May 1945, the German army blockaded food supplies to the Netherlands, subjecting western Netherlands first to moderate and then to severe nutritional deficiency. Neugebauer and colleagues from New York and the Hague, the Netherlands, examined Dutchmen born during this period of World War II in the nutrition-deprived area by giving them psychiatric examinations when they were inducted into the military at age 18 years (27). The men exposed prenatally to severe maternal nutritional deficiency during the first and/or second trimesters of pregnancy had a 2.5 times increased risk of having an antisocial personality disorder compared with the men exposed to severe nutritional deficiency during their third trimester and prenatal exposure to only moderate deficiency. These data suggest that severe nutritional insults to the developing brain in utero may increase the risk for antisocial behaviors in the offspring. The implications of these findings are obvious for both developed and developing countries where severe nutritional deficiency is widespread and often exaggerated by war, natural disaster, and forced migration.
BEST HOSPITALS IN THE USA

The July 1999 issue of *U.S. News & World Report* published its tenth edition of “America's Best Hospitals” (28). This analysis is the only rigorous assessment of all 6299 US hospitals. This year's key change raises the number of hospitals that appear in most of the 16 specialty lists to 50 from 42. That boosts to 188 the number of hospitals ranked, almost half again as many as were ranked in 1998. To be eligible for ranking, a hospital first had to meet at least 1 of 3 standards: membership in the Council of Teaching Hospitals, affiliation with a medical school, or having >=9 items of medical technology from a master list of 17.

Rank is based on a hospital's overall score, which is made of 3 equal parts: reputation, mortality rate, and a set of other data such as technology and nursing care. Each year *U.S. News* surveys 2400 board-certified specialists, 150 per specialty, chosen at random from the American Medical Association's database of 684,000 physicians. The physicians are asked to name the 5 hospitals they consider the best in their specialty, regardless of location or expense. The death rates are adjusted to reflect a patient's principal diagnosis as well as comorbidities. The “other data” information comes largely from annual surveys by the American Hospital Association.

Baylor University Medical Center was ranked among the 50 best hospitals for cancer (37/50), digestive diseases (17/50), otolaryngology (44/50), geriatrics (31/50), gynecology (25/50), endocrinology (35/50), neurology and neurosurgery (30/50), orthopedics (43/50), pulmonology (20/50), rheumatology (25/50), and urology (34/50). No other hospital in Texas received rankings in such a large number of medical specialties.

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References


