

# Essays in Public Health and Preventive Medicine

---

COMMUNITY MEDICINE has long been a proud tradition at the Mount Sinai Hospital and the Mount Sinai School of Medicine. To signal the strong commitment of Mount Sinai to community health, the Department of Community and Preventive Medicine was established in 1967 with the founding of the Medical School. The Department was designated in the School's charter as a "third faculty" co-equal in status with the basic science and clinical faculties.

Vigorous teaching in community and preventive medicine is also a strong tradition at Mount Sinai. Since the Medical School's inception, we have taught an introductory core course in epidemiology and preventive medicine in the first year. Additionally, we have always sponsored a clerkship in either the third or the fourth year. In the early days, the clerkship consisted of community medicine field experiences, usually in East Harlem. More recently it has been combined with family medicine. We are very proud of the fact that Mount Sinai graduates have gone on to become director of the Center for Disease Control and director of CDC's Epidemic Intelligence Service program, and to occupy prominent positions in health departments nationwide.

From time to time it is important to refurbish old traditions. In that spirit, the Department of Community and Preventive Medicine made the

decision in the academic year 2004–2005 to introduce a new requirement for a public health essay in the first-year course in epidemiology and preventive medicine. Each student in the course was asked to write a short essay on a topic of interest in the field of public health and preventive medicine. Students were specifically instructed to first describe the problem and then to propose a remedy. Complaining without curing is never enough. Our students rose magnificently to the challenge. The range of topics considered was broad, the analytical skill impressive and the product superlative.

Choice is always difficult, but the faculty carefully reviewed the 120 essays that were submitted and chose the six that we considered to be the best. These six essays are presented here with the enthusiastic permission of their authors. We are delighted to give these outstanding students an opportunity to present their work in a peer-reviewed journal, in their first year of medical school. We congratulate them on their achievement.

Philip J. Landrigan, M.D., M.Sc.  
Chairman  
Department of Community and  
Preventive Medicine  
Mount Sinai School of Medicine  
New York, NY

## A Call to Pharms: The Need for Tighter FDA Regulation of the Neutraceutical Industry

JOE DOBRIN, B.A.

BEVERLY HAMES sought a natural remedy for her persistent backaches. She visited an acupuncturist, who gave her a list of Chinese herbal preparations, some of which contained aristolochic acid. Two years later her kidneys began to fail. She ultimately received a kidney transplant and must now take anti-rejection medication for the rest of her life. Only later did she learn that the sale of aristolochic acid has been banned in several European countries due to its carcinogenic properties and its association with kidney failure. The Food and Drug Administration (FDA) issued a consumer warning in 2001, but the product remains on the market in the U.S.

Unfortunately, Ms. Hames' experience, cited in the May 2004 edition of *Consumer Reports*, is not unique. Many people take herbal supplements (also known as "neutraceuticals") under the mistaken impression that they are safer than regulated pharmaceuticals because herbal remedies are "natural" and don't contain "chemicals." The herbal supplement industry exploits this ignorance by implying that substances derived from plants are safer than chemicals synthesized in a lab. In fact, however, the active ingredients in herbal supplements are chemicals.

Although most herbal supplements are benign, some of these chemicals induce dangerous reactions in the human body. Aristolochic acid is far from the only chemical in herbal supplements currently on the market that has been associated with serious morbidity. The sexual stimulant yohimbine has been associated with heart and lung disease. The muscle-enhancing steroid androstenedione (andro), made famous by the baseball slugger Mark McGwire, increases cancer risk and decreases HDL (good) cholesterol. And kava, commonly found in energy drinks, is associated with liver damage. Although the FDA has recently issued warnings about the use of all of these chemicals, none has been banned from the market.

Unlike prescription drugs regulated by the FDA, there are no standards of quality or purity for neutraceuticals. This is because they are considered food additives, and as such, they are not subject to the much stricter drug regulatory authority of the FDA. There have been periodic calls for reform from medical and consumer protection

groups. Unfortunately, these actions have achieved only a modicum of legislative success.

The central piece of legislation regulating herbal supplements neutraceuticals is the 1994 Dietary Supplement Health and Education Act (DSHEA). Although this law aimed to reduce the number of unsafe herbal supplements on the market, in practice it has had very little effect. Standing the drug regulation paradigm on its head, this act requires the FDA to demonstrate that a supplement is *unsafe* before it can ban it from the market, rather than placing the burden of establishing safety and efficacy on the supplement makers. As a result, the FDA takes on only the most demonstrably dangerous products, and even then the process often takes years.

Inadequate regulatory authority is not the only problem. Enforcement is hamstrung for two major reasons. First, authority is split between the FDA, which is charged with maintaining the safety of neutraceuticals, and the Federal Trade Commission (FTC), which ostensibly prohibits manufacturers from making unsupported claims of efficacy when advertising their products. In practice, lack of communication between these agencies has allowed many manufacturers to imply their products are effective without rigorous scientific testing to back up their claims. Second, neither of these agencies is adequately staffed or funded to achieve its mission. For example, the FDA's supplement division has a budget of \$10 million and employs 60 people to regulate a \$20 billion-a-year industry (*Consumer Reports*, May 2004). By contrast, Congress recently appropriated \$515 million to fund nearly 3000 employees of the FDA's Center for Drug Evaluation and Research (*Drug Industry Daily*, Sept. 26, 2005) to regulate the pharmaceutical industry, whose annual sales are only 12 times the amount of supplement sales. It is little wonder that only a few dozen actions have been brought against supplement makers over the last decade.

The FDA's 2005 *Dietary Supplement Labeling Guide*, promulgated in April of 2005, has largely been a disappointment to reformers. The *Guide* intends that health claims made by herbal manufacturers be subject to much stricter standards. In theory, a neutraceutical manufacturer that wants to claim its product cures cancer must get prior approval

from the FDA, and the claim must be supported by a consensus of the scientific literature. However, there is a large loophole. The FDA allows manufacturers to make “qualified claims” that require neither FDA approval nor a scientific consensus. They must merely cite *any* scientific study that supports their claim, and add a disclaimer (perhaps in fine print) that there is no scientific consensus about this finding. It is not difficult to imagine manufacturers citing obscure studies, potentially even from industry-funded labs, to meet this requirement.

Lest the industry miss the message that nothing has changed, the new guidelines are voluntary. As the guide says, “This guidance represents the Food and Drug Administration’s (FDA’s) current thinking on the topic. It does not create or confer any rights for or on any person and does not operate to bind [the] FDA or the public. You can use an alternative approach if the approach satisfies the requirements of the applicable statutes and regulations.”

It is time to change the way the FDA regulates herbal supplements. We must acknowledge that herbal supplements are drugs and should be regulated as such. The risks of not doing so will only increase.

Regulatory reform would place the onus on nutraceutical manufacturers to establish the safety and efficacy of their products. Only after subjecting these products to rigorous clinical trials to substantiate their claims should these products be allowed on the market, and then only with clear labeling of appropriate dosing and contraindications. To maximize compliance, enforcement should be centralized in only one agency—the drug regulatory division of the FDA, with significantly higher staffing and funding levels than the supplements division. By placing regulatory authority under the aegis of a division with teeth, the prognosis for future Beverly Hameses should be much brighter.

## Dying in an Age of Specialists

BEN HARRIS, B.A.

I’VE BEEN WORRYING about my personal safety lately. I live only a couple of blocks away from Mount Sinai, where the directory lists seven faculty members who are certified by the American Board of Obstetrics and Gynecology to practice gynecological oncology. You might think that my fears are unfounded. After all, I am a male and cancer-free (to the best of my knowledge) so odds are that none of these people will ever be in a position to compromise my personal safety, right? Right, but it’s the statistics that have been worrying me.

In the United States, the American Medical Association estimates there is one gynecological oncologist per 700,000 people in the general population. The last time I checked, there weren’t 4.9 million people living in Manhattan, let alone the Upper East Side. Also, rumor has it that there are more gynecological oncologists practicing two miles away at Sloan Kettering. This preponderance of gynecological oncologists worries me because, according to the latest research, living in a county or state with a high concentration of specialist physicians can be hazardous to your health.

In a recent report in *Health Affairs*, Barbara Starfield, a University Distinguished Professor at the Johns Hopkins School of Public Health, reports

that even after controlling for such variables as income, education, employment, ethnicity and population density, Americans are more likely to die if they live in a state or county with a high concentration of specialists (1). By contrast, living in a county or state with a high concentration of primary care physicians makes an American significantly less likely to die. As an illustration, imagine two hypothetical areas of a million inhabitants, identical except that one area has one hundred more practicing primary care physicians than its counterpart. Starfield’s data suggest that the area with the additional hundred primary care physicians would have 346 fewer deaths per year.

These findings suggest that regardless of my fears of living among specialists, we as a society face a much bigger problem: the urgent need to train primary care physicians and raise the proportion of American medical students entering primary care. In a recent journal article, the American Academy of Family Practitioners (AAFP) expressed concern about the declining trend in family medicine residency positions filled with U.S. senior medical students (2). The AAFP is concerned because international students often return to their country of origin following training, and

those who stay in the United States are less likely to practice in rural, underserved areas. Between 1998 and 2005, the article points out, the number of U.S. seniors entering family medicine residency programs has declined by 1,047.

There is no secret about the cause of this decline. In 1998, the average annual salary offer to a radiologist was only \$57,000 more than that to a family practitioner. The latest figures show radiologists being offered \$190,000 more than family practitioners. Small wonder, then, that diagnostic radiology has been one of the most sought-after residencies for American medical students in the past few years. This salary differential is only "one side of the coin." The other is the rising cost of medical education: one in twenty medical students has a graduating debt load exceeding \$250,000.

As citizens concerned about limiting our own mortality, we need to dismiss our stereotypes of primary care physicians as the "gatekeepers" of '90s-era HMOs and accept the reality that many medical conditions are best diagnosed and treated by generalists. We need to recognize that the best way to keep from dying of gynecological cancer is early detection via annual pap smears and pelvic exams performed yearly by the same person, not by getting second and third opinions from gynecolo-

logical oncologists after an emergency medicine doctor detects an end-stage symptomatic cancer.

Once we understand the value of having a good primary care physician, we need to use our power as consumers to choose health care plans that provide us with easier access to them. We need to let our elected representatives know that we support legislation subsidizing medical education and offering debt forgiveness to primary care doctors. If we recognize what's in our own interest and use our power as consumers and voters to influence the complexion of tomorrow's health care system, then there is hope for improvement. For my part, I'm hoping that some of Sinai's gynecological oncologists will find so much rewarding work providing female primary care that they won't bother renewing their specialty certifications. Then things may get a little safer around here.

#### References

1. Starfield B, Shi L, Grover A, Macinko J. The effects of specialist supply on populations' health: assessing the evidence. *Health Aff (Millwood)* 2005 Mar 15; [Epub ahead of print].
2. Match Day 2005: family medicine gains positions, loses U.S. seniors. *Fam Pract Manag* 2005; 12(4):37.

## History and Health Care in Angola

ALEXANDRA LEADER, B.A. AND ALEXANDRA SNYDER, B.A.

HEALTH WORKERS WEAR WHITE, a symbol of witchcraft to Angolans in the area of Uige, where the Marburg virus ran rampant between early March and mid-July of 2005, killing a reported 312 people. This fact is symbolic of the problems in treating the disease, whose viral vector and reservoirs are unknown, but a clue to whose severity may be found in Angola's history. The failure of health care workers' efforts at controlling the virus' spread is unrelated to their herculean efforts, but seems rooted instead in Angola's history of subjugation to foreign interests and the devastating consequences of this history for Angola's people.

Angolans have reason to be suspicious of the arrival of foreigners. From the 15th century until 1975, Angola was under Portuguese control. For some 300 of these years, it served as a source of

slaves for Portugal's principal colony, Brazil. The slave trade existed until the end of the 19th century, ending only in 1888. The slave trade era was characterized by constant armed conflict between native Angolans and the Portuguese colonialists; the Portuguese did not completely secure power until 1902. Following Angolan independence in 1975, most Europeans living in Angola left the country, taking their investments and technological knowledge with them, and leaving a collapsing local infrastructure in their wake. To compound matters, the Cold War powers filled the political vacuum in the 1970s and '80s, when the Soviet Union supported one political faction and the US, its opponents. The role of these powers subsided with the end of the Cold War in 1989, but fighting between the factions continued through 2002. This civil war

has resulted in the deaths of an estimated one million Angolans, and refugee status for another million, out of a population of only 10.5 million (as of 2002).

Given this terrible population loss, superimposed on a lack of infrastructure and widespread poverty, it comes as no surprise that the Marburg virus went unrecognized, and was able to take hold in Angola, where infectious disease leads to the death of one in four children before the age of five.

Since local health care resources are inadequate, initially the task of fighting the virus fell to foreign health care workers, who, despite their best intentions and often the sacrifice of their lives, were unable to defeat the mysterious virus. Making their task even more difficult was the Angolans' fear of the health care workers themselves, which seemed in many cases to exceed their fear of the virus.

The Marburg virus has no treatment or vaccine, and no vector or reservoir has been established. All that is known is that it is spread via bodily fluids and can remain contagious for several days on contaminated surfaces outside the body. According to the international media, a deeply rooted and understandable suspicion of foreign intervention among many Angolans proved even more endemic than the disease. This fear may have been rooted in part in perceptions of bad patient outcomes: patients identified as infected were isolated and subsequently died 90% of the time, unable to contact their families. To health care workers, this process represents a successful step in preventing further spread of the virus. To the families of the deceased, this same procedure comes across as the death of a loved one at the hands of foreigners. Representative of this disjunction in interpretation, foreign health care workers noted that locals frequently hid sick relatives, and health care vans were attacked by angry townspeople armed with sticks, forcing health care surveillance teams

to reluctantly designate certain neighborhoods as unsafe and their populations untreatable.

What should have been done and what can be done now about this tragedy? In stark contrast to Angola's past, the foreign presence, in this case health care teams, seem to have done everything possible to alleviate the epidemic, including efforts to identify the source of the disease, detect and prevent new cases through surveillance, care for the infected, and safely bury the dead. Sadly, in this case and others such actions may not be enough to overcome prevalent fear, a lack of resources and government inaction, all of which carry the weight of history. In theory, the Angolan government should have done more; it should have communicated information about the disease and about the vital efforts of the foreign health care workers to help the local population. Given Angola's troubled history and fragmented society, however, the government may have done all it could.

What can be done now? Perhaps the best solution would be for the foreign health care workers to begin training local Angolans in the detection and treatment of infectious diseases. Ultimately, these Angolans would provide basic health care to their own people, who would be more likely to trust them. The trainees would also be able to help foreign relief workers fight epidemics—and overcome the troubled legacy of the past. One positive outcome of the horrifying experience of the Marburg virus has been to set this process in motion. According to the World Health Organization, cooperation has occurred between local and international organizations, including education efforts involving traditional healers and community members. Ideally, such cooperation should be continued, and emulated in other locations where similar outbreaks are considered likely to occur, putting in place the informational infrastructure to prevent the transition from endemic to epidemic disease.

## The Dangerous Betel Nut

JOYCE LO, B.S.

IMAGINE THE SCENE: very young women wearing only lingerie perched on high stools in small glass booths that are peppered with flashing neon lights. The setting is not the red-light district of some city, but rather a busy road in Taiwan, where one may find many such booths intermingled with schools,

businesses, and restaurants. Along with the flashing neon lights, these young ladies are intended to attract the attention of passersby and sell them boxes of betel nuts, an addictive stimulant similar in ways to chewing tobacco. Many of these "betel nut beauties," some of whom are minors, are abo-

rigines who have been brought from their villages to the city to make money in this lucrative betel nut business.

Betel nut use remains a major, unresolved public health issue in Taiwan. While Taiwan may be unique in the way that betel nut is sold, betel nut is in no way unique to Taiwan. Derived from seeds of the areca palm, betel nut is chewed regularly by at least 10% of the world population, and is the fourth most commonly used drug. Although betel nut (and its additives) is well-known to be carcinogenic and is a key risk factor for the development of oral cancer, esophageal cancer, and a myriad of dental and oral hygiene problems, the government and general public have done very little to curb its wide use and availability. Moreover, there is a major lack of action and interest in educating the public, as compared to the efforts made in educating them about the dangers of other addictive drugs such as tobacco, alcohol, marijuana, and ecstasy.

The inaction of the Ministry of Health and other government health agencies leads one to believe that they assume the betel nut issue to be unimportant. This, however, could not be farther from the truth. Case-control studies carried out by medical universities in Taiwan have demonstrated that those who chew betel nuts have a 24-times greater risk of developing esophageal cancer and a 28-times greater risk of developing oral cancer than non-users. Within Taiwan, oral cancer is the fifth leading cancer in incidence and the sixth in mortality among males, and at least 80% of these deaths are associated with betel nut use. Experts have estimated that about 88% of oral cancer and 96% of mucous membrane fibrosis patients in Taiwan are habitual betel nut chewers. Furthermore, recent studies at Kaohsiung Medical University, in Taiwan, indicate that betel nut use also increases the risks of miscarriage, stillbirth, and infant underweight birth by three to five times.

Perhaps government officials are willing to overlook the dangers of betel nut use because of the extensive lobbying by betel nut farmers to prevent more government involvement in the prevention of sales. Even though betel nuts are also imported from Southeast Asia, they are Taiwan's second largest agricultural crop, and many farmers subsist on it alone. At the American Association for Cancer Research, it was reported that from 1981–2000, a huge increase in oral cancer among

Taiwanese men paralleled a nearly sevenfold increase in Taiwan's production of betel nut.

While betel nut usage is most common among middle-aged and elderly men, today's aggressive marketing techniques are appealing to adolescents. And although the image of betel nut chewing is considered unattractive by some young people because of the discolored teeth and gums that result and the spitting of red juices into the street, the latest trend of using sex to sell it is beginning to attract more and more young adults and teenagers to the product. In the eight years that I have been living in Taiwan, the audacity of betel nut sellers has increased dramatically, culminating in the marketing strategy that creates a highly visible, roadside "strip show." Even more alarming is that data from case-control studies have showed that adolescents who use betel nuts are much more likely to begin experimenting with methamphetamine and other drugs than are non-users.

I believe that government and health officials need to take a more active role in informing the public of the dangers of betel nut use, and also help restrict its availability to young people. Strategies now being used to decrease smoking, underage drinking, and recreational drug use should also be employed to cut betel nut use. These strategies should include both public education and support services. In addition, stricter laws need to be passed and implemented to prevent minors from purchasing betel nuts and to penalize adults who purchase them for minors. Action should also be taken on the side of the betel nut farmers and distributors. The Taiwan government should consider offering incentives to encourage farmers to diversify their crops and to decrease their reliance on betel nut as a crop. Betel nut sellers should be required to modify their current marketing campaign so as not to exploit women or use the image of sex to sell a harmful drug. Sellers should also be required to identify on their packaging the risks associated with use of their products.

Government and general societal tolerance of the aggressive sales techniques employed by betel nut sellers gives people the dangerous idea that betel nut use is an acceptable part of Taiwanese culture. If that idea could be changed and if Taiwan's farmers were encouraged to begin planting other crops, Taiwan could become a much healthier place.

## They Suffer in Silence

LEIGH MARTINEZ WRIGHT, B.A.

THEY SUFFER IN SILENCE, sometimes before our eyes. People who once cared for us, educated us, guided us along life's difficult path are now on a difficult journey of their own. In a society obsessed with youth, it is not surprising that our elderly population is often overlooked, forgotten and—in too many cases—abused.

Elder abuse can take many forms and may manifest itself as physical abuse, psychological abuse, financial exploitation, or mere neglect. It can be active—physical harm to the elderly individual—or passive: withholding medications or hygienic care. While often brought to the public's attention as a problem confined to nursing home residents, in reality elder abuse is a sustained pattern of maltreatment that often occurs between the elderly individual and a person with whom they have an ongoing relationship—son, daughter, neighbor, spouse, caregiver—anyone may be a perpetrator. Frequently, the victim is isolated, intimidated, ashamed and fearful of retribution. It is estimated that only one in fourteen incidents of elder abuse is reported to the authorities and—more disturbingly—that between one and two million of our parents, grandparents, friends and neighbors become victims each year.

As a public health issue, elder abuse should be a growing concern to all of our citizens. In August 1998, the *Journal of the American Medical Association* described the first study that compared the mortality of mistreated elderly individuals with those who had not been mistreated. Even when confounding factors such as chronic disease and socioeconomic status are taken into account, abuse victims in similar populations were three times more likely to die than their non-abused counterparts. The most rapidly growing demographic in the United States consists of older Americans. By the year 2050, it is expected that more than 20% of the American population will consist of older individuals; the number of abused citizens is expected to grow in proportion to this increase. Victims of elder abuse make twice as many visits to medical facilities, have higher outpatient expenses and are more dependent on federal health care programs than their non-victimized

counterparts. Thus, their increasing numbers can be expected to place added strain on an already overburdened American health care system.

The federal government's response to this issue can only be characterized as one of inaction. Despite a robust response when the issue was first raised in congressional hearings twenty-five years ago, to date no federal regulations have been promulgated that deal with what was once described as a "disgrace" and a "burgeoning national scandal." State agencies were quick to respond to the issue, enacting numerous laws and programs to identify and combat the problem. However, chronic underfunding of state elder abuse programs has led to an inconsistent patchwork of statutes that vary by state and, more important, authorize limited resources to assist the victims. To see an example of federal legislative neglect of the issue, one need look no farther than the Elder Justice Act (Senate Bill 333). Introduced by the now-retired Senator John Breaux in 2003, this bill aimed to coordinate the activities of the Department of Health and Human Services, the Department of Justice and other federal, state, local and private agencies, to deal with the problem of elder abuse, neglect and exploitation and provide federal leadership and guidelines for state agencies dealing with elder abuse issues. If passed, this bill would have provided \$650 million a year for seven years to fund adult protective service agencies. Yet, despite bipartisan support, the Elder Justice Act was not passed by the close of the 108th Congress last year. (No further action has been taken this year.) State and community agencies are struggling to care for the elderly victims who are reported to them each year, but it may be up to the federal government to pass the legislation that will effectively coordinate and adequately fund their efforts.

No truly ethical person approves of elder abuse, but it is a problem we often—for various reasons—find easier to overlook than to solve. Our lack of action to protect these vulnerable members of our society may be a manifestation of how we as a society treat our elders. It is a problem that we—socially and morally—will eventually have to deal with.

## Breastfeeding Makes for Better Health

LAUREN SCHIFF, B.A.

HEALTH CARE PROVIDERS in the United States are struggling to contend with an overwhelming number of health epidemics: obesity, type II diabetes, hypertension, and cardiac disease, among many others. These health conditions are causally intertwined with one another and dependent on American cultural and socioeconomic factors. Preventive health care offers a hope of reducing the risk factors that lead to these systemic diseases. And among these risk factors is the use of infant formula for newborns. It is imperative that new mothers be strongly advised to breastfeed for at least the first six months, to protect their infants from the possible harmful effects of formula feeding, and provide them with the long-lasting health benefits of mother's milk.

In 1981 The World Health Organization (WHO) issued "The International Code of Marketing of Breast Milk Substitutes," which outlined strict restrictions on formula companies' marketing strategies, including "no promotion of products in health-care facilities," and "no...idealizing [of] artificial feeding." Underlying these restrictions was conclusive medical research that breast milk substitutes lack the necessary nutritional elements for proper infant growth and development and can contain contaminants such as aluminum, lead, and iodine.

Since the WHO's initial campaign, continued medical research has found further negative correlations between formula use and desirable health outcomes. Of primary interest, in light of the obesity epidemic plaguing the United States, is that multiple cohort studies have found that formula feeding is associated with increased adiposity both during the first two years of life, and throughout adolescence. Conversely, breastfed infants show an increased adiposity within the first four months of life followed by a marked decline through adolescence and adulthood.

In addition, a number of studies have shown that infant formula use is correlated with a significantly increased risk of allergy and infection in infancy. It is well known that breast milk confers immune antibodies to a suckling infant for the first three months of life, during which time the infant's own immune system is not yet sufficiently active. Therefore, as these studies demonstrate, lack of

maternal antibodies results in increased opportunistic infection, including otitis media, pneumonia, bacteremia, urinary-tract infections, meningitis, bronchitis, and respiratory infections. Furthermore, because colostrum acts to stimulate neonatal gastrointestinal maturation and high levels of IgA (the antibody responsible for gut immunity), formula-fed infants have been shown to have a high incidence of gastrointestinal infection. A number of studies have also suggested that early exposure to cow's milk and substitute products may cause increased risk for allergies such as eczema, asthma, rhinitis, and food allergies. On the contrary, breastfeeding has been shown to have a protective effect against the onset of chronic illnesses such as type I diabetes mellitus, cancer and lymphomas, Crohn's disease, and celiac disease.

It must be noted, however, that in the majority of studies in which these correlations were found, the best health outcomes were seen in babies who were breastfed continually for the first 6–13 months, without intermittent substitute with solid food or formula. Increasingly improved health outcomes were similarly seen with increasing reduction in formula and solid food feeding. Therefore, there appears to be a dose-response scale of improvement.

An important effect of the marked decrease in these formula-associated health risks is an overall reduction in hospital admissions among breastfed children. This may significantly reduce health care costs to both health care providers and insurers as well as to the individual mothers. Breastfeeding is a low-cost feeding method that reduces health care utilization. Moreover, it has been shown that breastfeeding enhances the mother-baby bond and thus may decrease the mother's risk of depression and anxiety. Just as with most preventive health care strategies, encouraging breastfeeding among new mothers does require preliminary education by health care staff; it also requires a home support system to help the mother maintain prolonged breastfeeding practices.

Despite the convincing evidence in support of breastfeeding, the advertising power of formula companies has proven that preventive health care must vigorously promote the breastfeeding initiative: Several formula companies, including Nestlé, have been found to be in violation of the WHO

code, and many new mothers continue to opt for formula feeding due to the influence of corporate advertising. Of particular note was Nestlé's advertising campaign within developing countries; it touted formula feeding as a healthier alternative to breastfeeding. Although Nestlé has since withdrawn that particular advertising message, they continue to ignore the WHO code, and as recently as 2000, were cited for improper marketing practices. The effects of their practices are not insignificant. Mothers throughout developing countries were found to be mixing Nestlé powder formula with the (only available) contaminated water. Furthermore, in order to save money, mothers diluted the formula, thereby unintentionally malnourishing their children. Although it may be argued that companies such as Nestlé are not responsible for educating the public about their products' proper uses and indications, I would suggest that the AIDS epidemic has indeed made this an obligation: Since breastfeeding is contraindicated for HIV positive women, the onus is upon formula companies to provide widely accessible, low cost, sufficiently fortified formulas with ex-

tensive bottle feeding instructions, a measure that may curtail such high transmission of HIV from mother to infant in developing countries. Incorrect use of infant formula, however, is a significant problem not only in developing countries. Because companies such as Nestlé simply equate infant formula with natural breast milk without providing sufficient education on its proper use, mothers in Western countries incorrectly reconstitute formulas, overheat formula in the microwave, inflicting mouth and throat burns, and may induce aspiration by incorrect bottle positioning.

In light of the overwhelming body of literature that illuminates the health-protective benefits of breastfeeding and the significant health risks associated with formula feeding, it is crucial that new mothers resist the enticing advertising of formula companies and adhere to the much healthier regimen of breastfeeding. If a significant increase in uninterrupted breastfeeding practices can be achieved in the United States, perhaps we will also see a reduction in childhood obesity, opportunistic infection, and acquired allergies.