Facts and ideas from anywhere

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ATHEROSCLEROSIS: ITS CAUSE AND ITS PREVENTION*

I recently spoke at a university hospital and began the presentation by asking the audience to name the atherosclerotic risk factors. Various members of the audience spoke up, and the following was the order in which the risk factors were announced. I wrote them on the flip chart (easel) I used for the presentation: 1) family history, 2) diabetes

mellitus, 3) cigarette smoking, 4) high blood pressure, 5) inactivity, 6) overweight, 7) aging, 8) malism, and 9) increased serum cholesterol. I then asked if atherosclerosis was a multifactorial disease or a unifactorial one. The answer universally was multifactorial. I then went down the list of nine risk factors asking the same question of each, "Does this factor have to be present for atherosclerosis to occur?" The answer for each was "No" except for the last one, namely, hypercholesterolemia. But if that is the case, why was abnormal cholesterol not mentioned as #1 rather than #9? I have experienced the same scenario on many occasions. I believe a strong case can be made for there being a single absolute atherosclerotic risk factor and that atherosclerosis does not occur when that factor is missing. Of course, all of these factors are determined by how they are defined; therefore, the definitions of each are crucial.

Although present in many patients, a family history of cardiovascular disease, however that is defined, is certainly not necessary. When in medical school, I was taught that atherosclerosis was a degenerative disease, the consequence of living on planet earth. Certainly that is not the case. Although atherosclerotic events are more common in older people, young adults are not immune to them. And men do not have a monopoly on plaques. Cardiovascular disease is the most common cause of death in women residing in the Western world. Juvenile diabetes mellitus (type 1) is a genetic problem; type 2 diabetes is a consequence of excessive weight, and cholesterol numbers are virtually never

normal (to be defined later) in that situation. Cigarette smoking and/or elevated blood pressures are frequent in some societies where atherosclerotic events are rare. Exercise is quickly nullified by stopping at a fast-food outlet (meaning quick plaques) on the way home from the run. Although most patients with atherosclerotic events are overweight, an increased waist measurement is not a requirement for plaques to form.

Evidence that cholesterol causes atherosclerosis

If *dyslipidemia* is the cause of atherosclerosis, what evidence might be presented to the jury that indeed cholesterol is the villain? In my view, there are four facts supporting the proposition that cholesterol is the cause of atherosclerosis.

1. *Atherosclerosis is easily produced in nonhuman herbivores (e.g., rabbits, monkeys) by feeding them a high-cholesterol (e.g., egg yokes) or high-saturated-fat (e.g., animal fat) diet.* These studies initially were done by some Russian physiologists beginning nearly 100 years ago. And atherosclerosis was not produced in a minority of rabbits fed these diets. No, it was produced in 100% of the animals! Indeed, atherosclerosis is one of the easiest diseases to produce experimentally, but the experimental animal must be an herbivore. It is not possible to produce atherosclerosis in a carnivore, with one exception, and that is in carnivores who have hypothyroidism due to thyroidectomy. The only condition I can think of that is easier to produce experimentally than atherosclerosis is an endocrine deficiency. If the thyroid gland is removed, the consequence is hypothyroidism unless the thyroid hormone is replaced.

In contrast to feeding cholesterol and/or saturated fat, it is not possible to produce atherosclerotic plaques in herbivores by raising the blood pressure chronically or by blowing cigarette smoke in their faces for their entire lifetimes or by somehow raising their blood glucose levels without simultaneously feeding an atherogenic diet. Few audiences I speak to remember the absolute ease with which atherosclerosis can be produced experimentally.

Although presently it is commonly stated that "atherosclerosis is an inflammatory disease," I am unconvinced that inflammation or infection actually plays a role in the production of atherosclerotic plaques. Inflammatory cells are infrequent in plaques of coronary arteries studied at necropsy or in end-

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arterectomy specimens. When present, the few mononuclear cells, even giant cells, appear to be a reaction to the deposits of lipid (pultaceous debris) present in the plaque. "Inflammation" appears to be a surrogate for elevation of serum C-reactive protein or various cytokines (interleukins-1 and -6, tumor necrosis factor, etc.), not for inflammatory cells in plaques. Thus, it is a definition situation, and the morphologic definition of inflammation is not applicable.

2. *Cholesterol is present in the plaques.* Several studies in the 1930s nicely demonstrated that experimentally produced plaques in herbivores were similar to plaques in humans.

3. *Populations with relatively high serum cholesterol levels compared with populations with relatively low serum cholesterol levels have a much higher frequency of atherosclerotic events, a much higher frequency of dying from these events, and a much greater quantity ("burden") of plaque in their arteries.* This factor was nicely supplied by the Seven Countries study and the Framingham study, among others.

4. *Lowering serum total cholesterol and low-density lipoprotein (LDL) cholesterol levels decreases first and repeat atherosclerotic events and decreases plaque size.*

In my view, the connection between cholesterol elevation and atherosclerotic plaques is clear and well established. Atherosclerosis is a cholesterol problem! If one has elevated cholesterol and also has an elevated blood pressure, or smokes cigarettes, or has an elevated blood sugar, these additional factors serve to amplify the cholesterol damage, but they by themselves do not produce arterial plaques! Societies with a high frequency of systemic hypertension or a high frequency of cigarette smoking but low serum cholesterol levels rarely get atherosclerosis.

Differences between herbivores and carnivores

Because humans get atherosclerosis, and atherosclerosis is a disease only of herbivores, humans also must be herbivores. Most humans, of course, eat flesh, but that act does not make us carnivores. Carnivores and herbivores have different characteristics. 1) The *teeth* of carnivores are sharp; those of herbivores, flat. (Humans have some sharp teeth, but most are flat for grinding the fruits, vegetables, and grains we are built to eat.) 2) The *intestinal tract* of carnivores is short (about 3 times body length); that of herbivores, long (about 12 times body length). (Since I am 6 feet tall my intestinal tract should be about 60 feet long. As a consequence if I eat bovine muscle [steak], it could take 5 days to course through those 20 yards.) 3) *Body cooling* for carnivores is done by panting because they have no ability to sweat; although herbivores also can pant, they cool their bodies mainly by sweating. 4) *Drinking fluids* is by lapping them for the carnivore; it is by sipping them for the herbivore. 5) *Vitamin C* is made by the carnivore's own body; herbivores obtain their ascorbic acid only from their diet. Thus, although most human beings think they are carnivores or at least conduct their lives as if they were, basically humans are herbivores. If we could decrease our flesh intake to as few as 5 to 7 meals a week, our health would improve substantially.

Conditions uncommon in human non-flesh-eaters

Some extremely common conditions in the Western world are relatively uncommon in purely or predominantly vegetarian and fruit-eating societies. These include 1) *severe atherosclerosis* and its devastating consequences (heart attacks, brain attacks, etc.); 2) *systemic hypertension*: in societies that eat minuscule amounts of salt, the systemic arterial blood pressure is usually about 90/60 mm Hg, a level near what it is at birth but a level in the Western world often associated with shock; 3) *stroke*; 4) *obesity*; 5) *diabetes mellitus*; 6) *some common cancers* (colon, breast, prostate gland); 7) *constipation, cholecystitis, gallstones, appendicitis, diverticulosis, hemorrhoids, inguinal hernia, varicose veins*; 8) *renal stones*; 9) *osteoporosis and osteoarthritis*; 10) *salmonellosis and trichinosis*; and 11) *cataracts and macular degeneration*.

Cholesterol numbers needed to prevent and arrest atherosclerotic plaques

The guidelines for cholesterol-modifying therapy published in 1988, 1993, and 2001, and modified subsequently, brought some rationale into the arena of who should and who should not be treated with "lifestyle changes," lipid-lowering drugs, or both. These guidelines, however, were based exclusively on the concept of "decreasing risk" of events, not decreasing the formation of plaques. Because atherosclerosis is rarely genetic in origin (1 in 500) and because the pharmaceutical industry has provided us with truly miracle drugs for lowering serum LDL cholesterol levels, it is time to switch gears from the concept of decreasing risk of atherosclerotic events to actual prevention of atherosclerotic plaques. To make this change, the guideline-recommended numbers must be lowered substantially.

According to the published guidelines, initiation of lipid-modifying drug therapy should be based on the serum LDL cholesterol level and the presence or absence of other atherosclerotic risk factors. Lipid-lowering drug therapy is recommended in persons with only one or no non-LDL cholesterol risk factors if the LDL cholesterol is >190 mg/dL with a goal of <160 mg/dL. But, the most common LDL cholesterol number in people with heart attacks is about 140 mg/dL, so this recommendation is not "preventive." If more than one non-LDL cholesterol risk factor is present, then the LDL cholesterol drug treatment number is >160 mg/dL with the goal of <130 mg/dL. If a patient has a coronary event, however (or is at high risk of an atherosclerotic event, such as having diabetes mellitus or a previous noncoronary atherosclerotic event), the LDL cholesterol goal is <100 mg/dL (with an "option" of <70 mg/dL).

If it is useful for the LDL cholesterol to be <100 mg/dL *after* a heart attack, surely it must be useful for the LDL cholesterol to be <100 mg/dL *before* a heart attack! Therefore, in my view, the goal for all populations—not just those with heart or brain attacks or diabetes mellitus or noncoronary atherosclerotic events—needs to be LDL cholesterol <100 mg/dL and ideally <70 mg/dL. If such a goal were created, the great scourge of the Western world would be essentially eliminated, "primary" and "secondary" prevention would be the same, and >100 million Americans—rather than the present 13 million—would need

Table. Statins and their equivalent efficacious doses, their effects on total cholesterol (TC) and low-density lipoprotein (LDL) cholesterol, and effect on LDL cholesterol by ezetimibe alone and in combination with a statin

Statin (mg)						↓ TC [‡]	↓ LDL [‡]	↓ LDL by ezetimibe 10 mg	Total LDL ↓ by statin + ezetimibe 10 mg [‡]
Rosuvastatin (Crestor)	Atorvastatin (Lipitor)	Simvastatin (Zocor)	Lovastatin (Mevacor)	Pravastatin (Pravachol)	Fluvastatin (Lescol)				
1.25*	5	10	20	20	40	22%	27%	18%	45%
2.5 [†]	10	20	40	40	80	27%	34%	18%	52%
5	20	40	80	80	—	32%	41%	14%	55%
10	40	80	—	—	—	37%	48%	12%	60%
20	80	—	—	—	—	42%	55%	10%	65%
40	—	—	—	—	—	47%	60%	10%	70%

*Not available.

[†]The 2.5-mg tablet is available in Japan but not in other countries.

[‡]These reductions are ±3%.

to be on a statin drug with or without ezetimibe or be pure vegetation-fruit eaters.

Thus, although it is not clearly established at this time, to prevent atherosclerotic plaques, the serum LDL cholesterol needs to be <70 mg/dL, the serum total cholesterol certainly <150 mg/dL, and the high-density lipoprotein (HDL) cholesterol >20 mg/dL. The latter—surely a surprise to most readers—is in patients with a serum total cholesterol level of about 130 mg/dL and an LDL cholesterol level about 60 mg/dL. Exactly what HDL cholesterol level is required to prevent plaques is unclear at this time, but clearly if the LDL cholesterol is very low (e.g., 50 mg/dL) then a low HDL cholesterol—as long as it is >20 mg/dL—appears not to be dangerous. Ideal may be equal serum HDL and LDL cholesterol levels or an HDL cholesterol greater than LDL cholesterol. In summary, the recommended guideline numbers—particularly those for primary prevention—are those for decreasing the risk of atherosclerotic events, not for preventing formation of atherosclerotic plaques.

The rule of 5 and the rule of 7 in lipid-lowering therapy and the goal for all

The statin drugs, in my view, are the best cardiovascular drugs ever created, in that they have the greatest potential to prevent atherosclerotic plaques and their complications, and they also have the greatest potential to arrest plaque formation and therefore to prevent additional atherosclerotic events. The statin drugs are to atherosclerosis what penicillin was to infectious diseases. Despite their being truly miracle drugs, they are terribly underutilized and underdosed.

The average serum LDL cholesterol level in American adults is about 130 mg/dL. Therefore, if we want to prevent plaque formation in the USA, most of us will need a 50% LDL cholesterol reduction! As shown in the *Table*, that goal can be achieved by three doses of statin monotherapy (rosuvastatin 20 and 40 mg daily or atorvastatin 80 mg daily) or by adding ezetimibe 10 mg to all statin doses except the lowest level of recommended statin doses. Because titration is often neglected, starting the dose from

the beginning that achieves the preventive goal (LDL cholesterol <70 mg/dL) appears reasonable. When a statin dose is doubled, the total cholesterol on average falls an additional 5% and the LDL cholesterol, 7%. These percent falls with doubling of the doses constitute the rule of 5 and the rule of 7.

Most American adults have life insurance, which, in actuality, is death insurance. The insured pays for the policy, dies, and then someone else gets the money. The statin drugs—with or without ezetimibe—represent true life insurance. The taker of the drug lives longer and is able to provide for his/her family longer. Statins are safe. (Myopathy occurs in 1 in 10,000 persons.) The risk of taking the drug is far less than the atherosclerotic consequences that might occur from not taking the drug! Of course, a vegetarian-fruit diet is the least expensive and safest means of achieving the plaque-preventing LDL goal, but few in the Western world are willing to live on the herbivore diet. If we did so, however, we would prevent the daily killing in the USA of 100,000 cows, of 300,000 pigs, and of 15 million to 20 million chickens!

Conclusion

Thanks to the pharmaceutical industry, we now have the armamentarium to change our cardiovascular health. We will not do so by waiting to treat our serum LDL cholesterol levels until an atherosclerotic event occurs or by using guidelines such as LDL cholesterol >190 or >160 mg/dL before lipid-lowering drug therapy is initiated. The blowing up of balloons or the placing of stents in our arteries or the performing of bypass operations (with all of their damaging incisions [e.g., median sternotomy]) can be prevented or their need enormously reduced if the statin drugs ± others (ezetimibe, niacin, fibrate, etc.) are utilized in proper doses to produce serum LDL cholesterol levels low enough so that atherosclerotic plaques do not form. Life insurance policies often are purchased by individuals in their 20s. Statin drugs ± ezetimibe can be started at the same time because they—along with antihypertensive drugs—represent true life insurance. And to smoke cigarettes or to eat excess calories

or not to put on a seat belt in an automobile or airplane or to ride a motorcycle or not to control our cholesterol numbers is simply not to use our brain as it was intended to be used!

HUMAN ACCOMPLISHMENTS AND GIFTED MINDS

In 2003, my son Charles sent me a book by Charles Murray entitled *Human Accomplishment: The Pursuit of Excellence in the Arts and Sciences, 800 B.C. to 1950* (2). Many have heard of Charles Murray from his other books, particularly *The Bell Curve*, which appeared in 1994 and was coauthored with Richard J. Herrnstein. It became one of the most widely debated works of social science in recent decades. In *Human Accomplishment*, Murray provides lists of the top 20 in astronomy, biology, chemistry, earth sciences, physics, mathematics, medicine, technology, and the arts and literature. Deciding whether specific achievements belonged to the medicine inventory or to the biology inventory was a chronic problem for him. His general rule was to classify an accomplishment under medicine only if it was related to the identification, etiology, or treatment of disease. In the appendix he lists the top 100 in each of the 10 categories.

The medicine list included the following: Pasteur, 100; Hippocrates, 93; Koch, 90; Galen, 74; Paracelsus, 68; Ehrlich, 59; Laënnec, 54; McCollum, 49; Fleming, 47; Paré, 46; Behring, 44; Lister, 43; Kitasato, 42; Sydenham, 40; Vesalius, 38; Domagk, 36; Carrel, 36; Freud, 34; Hunter, 34; and Semmelweis, 34. Louis Pasteur was an unsurprising winner of first place. Hippocrates and Galen were founders of medicine as a profession, although they were wrong in most of their medical pronouncements. Robert Koch, active in the last quarter of the 19th century, isolated the bacilli that caused tuberculosis, cholera, and anthrax and transformed the study of infectious diseases. He also introduced important public health practices and steam sterilization of medical instruments. “Koch’s postulates” are still used as a guide for research into the causes of infectious diseases. Freud showed up for his contributions to the clinical description of mental illnesses and his introduction of the use of cocaine as an anesthetic, both of which were classified under medicine. His writings on psychoanalysis were classified under psychology and are not part of his indexed score for medicine.

Murray’s leader in the biology inventory is Charles Darwin. The biology inventory includes a native-born American among the top five, the only American to climb so high in the hard sciences. His name is Thomas Hunt Morgan, whose seminal work in the first 3 decades of the 20th century established much of our knowledge of genes and chromosomes in the era preceding electron microscopy and the discovery of the structure of DNA.

I was stimulated to reexamine *Human Accomplishment* after a 3-year hiatus by the appearance of three articles by Charles Murray in the *Wall Street Journal* in January 2007. In “Intelligence in the Classroom,” Murray makes the point that many social and economic problems are disproportionately found among people with low education, but the culprit for their educational deficit is often low intelligence (3).

In his piece entitled “Aztecs vs. Greeks,” Murray discusses the “intellectually gifted,” defined as people who stand out in almost any profession and usually with an IQ ≥ 120 (4). That number demarcates the top 10% of the IQ distribution in the USA and includes about 15 million people. In professions screened for IQ by educational requirements—medicine, engineering, law, the sciences, and academia—most, by the nature of the selection process, have an IQ ≥ 120 . People with IQs ≥ 120 also occupy large proportions of positions in the upper reaches of corporate America and in the senior ranks of government. These top 10% produce most of our books, newspaper articles, and television programs and movies. They are the ones who invent new pharmaceuticals, computer chips, software, and every other form of advanced technology.

As Murray indicates, “The top 10% of the intelligence distribution has a huge influence on whether our economy is vital or stagnant, our culture healthy or sick, our institutions secure or endangered. . . . Our future depends crucially on how we educate the next generation of people gifted with unusually high intelligence.”

But, he asks, does our federal government work to see that this top 10% is properly developed? In 2006, the Department of Education spent about \$84 billion, and <\$10 million was utilized to improve the education of the gifted.

Although the USA has many children with IQs > 120 and most seek higher education, the gifted cannot be treated as special because doing so acknowledges inequality of ability and of responsibility, both of which are elitist. Consequently, few tell high-IQ children explicitly, forcibly, and repeatedly that their intellectual talent is a gift, that they are not superior human beings, just lucky ones. Possessing that gift brings with it obligations, the most important of which is not only to achieve academic accomplishment but also to acquire *wisdom*. Acquiring wisdom, however, requires a special kind of education, namely recognition of one’s own intellectual limits and fallibilities—in other words, *humility*. According to Murray, this is perhaps the most conspicuously missing part of today’s education of the gifted. Many high-IQ students, especially those who avoid serious science and math, go from kindergarten to an advanced degree without ever having a teacher dissatisfied with their best work and without ever taking a course that truly challenges them. “Humility requires that the gifted learn what it feels like to hit an intellectual wall, just as all of their less talented peers do, and that can come only from a curriculum . . . designed especially for them.” The gifted need to have classes with other gifted, not to be coddled but to be challenged and confronted. In short, Murray calls for preparing the elite to do its duty: to meet its obligations. We in the medical profession possess that high intellectual ability, and we must always use it in the most responsible way.

GLOBAL WARMING

The Intergovernmental Panel on Climate Change was established in 1988 by the World Meteorological Organization and the United Nations Environmental Program, and since then it has issued climate assessments in 1990, 1995, 2001, and now

2007 (5). The reports are the work of more than 2000 scientists, whose drafts were reviewed by scores of governmental, industrial, and environmental groups. The 2007 document is based on research published in the 6 years since the 2001 report. The latest report supports the previous claims that the environment is clearly getting warmer; the certainty of that has shot up from 66% certainty in 2001 to 99% certainty in 2007. Unfortunately, even if today we stopped using the fossil fuels that release carbon dioxide, the heat-trapping gas blamed for most of the warming, the effects of higher temperatures—deadlier heat waves, coastal floods, longer droughts, worse wildfires, and higher energy bills—would not go away in our lifetime. Most of the carbon dioxide in our atmosphere will still be sitting there in 2100. The latest report projects the following by 2100: the global average temperatures will rise by 2.7° to 8.1°F; heat waves will become more severe in southern and western North America; rain and snow will increase in the nation's northern states and decrease in drier regions; fewer days will reach the freezing point; and sea levels will rise up to 20 inches.

What will be the possible effects of this warming? The latest report suggests the following: higher air-conditioning bills; relocation of ski resorts further north; relocation of the wheat belt and other crops further north; more heat-related deaths and blackouts as power grids overload; droughts and flash floods; more and larger wildfires; a longer growing season; relocation of many crops to match plant needs and the new climate; inundation of the barrier islands in New Orleans and South Florida; and inability of owners of coastal homes to obtain flood insurance. Because more than half of the US population lives within 50 miles of the coastline, rising sea levels are a huge concern for the USA. Yes, it will be a different planet.

CANCER DEATHS

More than 3000 fewer Americans died of cancer in 2004 than in 2003 according to the American Cancer Society (6). The trend was driven by drops in deaths from three of the four major cancers. The biggest drop occurred in colorectal cancer, with 1110 fewer fatal cases in men and 1094 fewer fatal cases in women. In addition, 666 fewer women died of breast cancer, and 552 fewer men died of prostate cancer. For lung cancer, 333 fewer men died, but 347 more women died. While the number of Americans found to have cancer appears to have plateaued, cancer will be diagnosed in >1.4 million Americans in 2007, and about 560,000 will die, keeping cancer the second leading cause of death in the USA after cardiovascular disease. Since 1991, the death rate from cancer has been dropping about 1% a year in the USA, but the total number of deaths continues to rise because of increases in the total population and the number of older people.

NICOTINE IN CIGARETTES

There is some evidence that some tobacco companies have increased the amount of nicotine in their cigarettes in recent years. As Michael Siegel (7) indicates, the problem is not whether nicotine levels in cigarettes are increasing but that this deadly addictive product is available in cigarettes in the first place!

Several groups have lobbied in the past 2 years for passage of legislation that would grant the Food and Drug Administration (FDA) the authority to regulate tobacco products. It's not enough, however, to regulate the varying amount of nicotine in cigarettes. Ultimately, as Michael Siegel opines, there is only one way to deal with the addictive effects of nicotine: grant the FDA the authority to get nicotine out of cigarettes altogether! Why not? It's the right thing to do.

AIR POLLUTION AND HEART DISEASE

Joel Kaufman and colleagues (8) studied 3 dozen US cities and nearly 66,000 postmenopausal women and found that those residing in the most polluted cities had just over a 75% greater chance of dying of heart ailments than those in less polluted cities (9). The investigators used data collected by the Women's Health Initiative, a long-term national health study that focuses on strategies for preventing heart disease, breast and colorectal cancer, and fractures in postmenopausal women. Unfortunately, people in Dallas County are exposed to higher particulate pollution levels than most of the women in the study. The county's air has averaged nearly 14 micrograms of particulates per cubic meter in recent years. The Environmental Protection Agency (EPA) in 2006 adopted the most protective new standard recommended by its external science advisors, namely no more than 13 micrograms per cubic meter. Dallas and Harris Counties would have been designated as particulate violators. However, to prevent triggering an intensive effort to lower the counties' soot levels by reducing particulate pollution from industries and vehicles, the EPA left the limit on the areas' annual average at 15. Thus, the two counties' particulate levels were designated as legal, eliminating requirements to cut particulate pollution, even though based on the new study and a host of others, the local levels are decidedly unsafe.

Fine particles, often appearing as smoke or haze, are emitted by a variety of sources, including power plants, industrial factories, fires, and automobile exhaust. The fine particles are ≤ 2.5 micrometers in diameter, or about 35 times smaller than a fine grain of beach sand. Because they are so small, these fine particles can enter the lungs and blood vessel walls. The precise mechanism by which these fine particles harm human health remains debatable.

Fine particles pollution also has been linked, of course, to respiratory problems. It is unclear whether the small particles themselves, be they dust or diesel exhaust, or toxic metals that attach themselves to the particles are causing the most havoc within our bodies. Because most of us cannot directly control our local pollution levels—at least without moving away—we all need to focus on things we can control, like our body weight, blood cholesterol levels, and blood pressure.

PARKLAND HOSPITAL 53 YEARS LATER

Parkland Hospital opened in 1954 and is now worn out (10). In 2006, it had 968 licensed beds, 42,682 patient admissions, 8102 employees, 16,489 newborn deliveries, 870,000 outpatient visits to clinics, 146,210 emergency room visits, and a \$926.6 million operating budget. It wasn't built for this

many patients. The bill for a few days in Iraq would pay for a beautiful new hospital.

USE OF LIVE ANIMALS FOR MEDICAL SCHOOL TEACHING

I remember in medical school sacrificing a dog during most physiology laboratory classes. That is all changing. Of the 125 US medical schools, 110 have stopped the use of nonhuman animals for educational purposes (11).

LOOKS: SURGEONS, INTERNISTS, FILM STARS

Trilla and colleagues (12) from Barcelona, Spain, gathered photographs and heights of 12 male internists, 12 male surgeons, and 4 male film stars (Harrison Ford, George Clooney, Patrick Dempsey, and Hugh Laurie) and showed the pictures of each to an independent group of 8 women—3 physicians and 5 nurses. The average age of each group was 51 years. The “good-looking score,” or the degree of handsomeness, was classified by each of the ladies on a 7-point Likert scale (1 = ugly; 7 = very good looking). They discarded the highest and lowest scores (outliers) for each participant and used the 6 remaining scores for the study. The film stars (external controls) had significantly higher good-looking scores than surgeons (5.96 vs 4.39) and internists (5.96 vs 3.65). Surgeons had statistically significantly higher good-looking scores than internists (4.39 vs 3.65). A higher proportion of baldness was noted among the internists than the other two groups. The study showed that on average senior male surgeons were significantly taller and better looking than senior male internists, and those film stars who played doctors were significantly better looking than real surgeons and internists.

BECOMING A FATHER YEARS AFTER DEATH

Second Lieutenant Byron Smith was killed in Iraq on July 2, 2004 (13). Before leaving for that nation he banked his sperm to produce his son, Benton, who was born July 14, 2006, just over 2 years after his father was shot by a sniper in Iraq. How many children have been artificially conceived after their father's death in war is unclear. According to a piece by Greg Zoroya, about 100 US troops have banked their sperm, a technology that did not become available until 1971, so the conflicts in Iraq and Afghanistan are the first US wars in which combat troops have been able to take advantage of the technology. Byron Smith's widow, Kathleen Carroll-Smith, had urged her husband to deposit his sperm in a cryobank facility in Fairfax, Virginia, about a month before he went to Iraq. The couple's efforts of conceiving during the previous 18 months had failed, and Carroll-Smith wanted the option of continuing to try via in vitro fertilization during her husband's deployment. The first attempts—in October 2004 and June 2005—had failed. Each effort at in vitro fertilization—a process in which the egg is fertilized outside the body and implanted in the woman's uterus—costs \$10,000 to \$15,000. It's an interesting world.

COMPANY CLINICS

Company clinics were experimented with about 30 years ago but fell out of favor amid questions about their cost-effectiveness. Within the last 2 years, however, companies in-

cluding Toyota, Sprint Nextel, Florida Power & Light, Credit Suisse, and Pepsi Bottling Group have opened or expanded on-site clinics, and many other employers are adding or planning to add even more clinics (14). The motive, of course, is employers' desire to reduce health insurance premiums by taking care of workers before they need to see outside physicians. More than 100 of the nation's 1000 largest employers now offer on-site primary care or preventive health services—a number forecast to exceed 250 by the end of 2007.

These new in-house corporate medical clinics go well beyond traditional occupational health clinics. They now offer check-ups, allergy and flu shots, pregnancy tests, and routine monitoring of chronic diseases like diabetes mellitus and asthma. When drugs are needed, some employers arrange for the pills to be delivered the next day at the office or plant while others maintain fully stocked pharmacies. The goal at these newer corporate health centers is to help solve the employees' health problems without the need for additional outside care. For employers, on-site clinics can mean gains in worker productivity and lower health insurance outlays.

The biggest primary care clinic so far opened on January 2, 2007, in San Antonio for Toyota's workers and their families. It cost \$9 million and occupies 20,000 square feet. This clinic has two full-time physicians, one part-time physician, a blood testing laboratory, and an x-ray facility. Nissan and BMW assembly plants in the USA recently announced plans to provide similar clinic services at three existing plants. Toyota currently has on-site pharmacy or prescription drug services at 11 plants in the USA. The new San Antonio clinic is meant to serve the 2000 Toyota employees and 2100 people working for suppliers as well as their families. The physicians will also emphasize preventive care.

SUICIDE RATES AMONG POLICE OFFICERS

It appears that the suicide rate for law enforcement officers is higher than that for other groups in our population. The suicide rate per 100,000 people is 18 for law enforcement officers, 15 for people in the USA aged 25 to 50, and 11 for the total US population, according to the Centers for Disease Control and Prevention (CDC) (15). The International Association of Chiefs of Police is circulating a proposal to make suicide-prevention tools available to all of the nation's nearly 18,000 state and local police agencies. Some believe that law enforcement suicides in the past were often ruled accidental deaths and according to some are still underreported. Police bear the same stress from work, family, and illness but additionally have the stress of the street and access to a gun. The availability of firearms and comfort with firearms increase suicide rates.

TEENAGE SUICIDES

The suicide rate for Americans <20 years of age climbed 18% from 2003 to 2004 according to the CDC (16). The increase coincided with the placing of a warning on antidepressant packages cautioning that they could cause suicidal behavior in children.

ACCIDENTAL DEATHS

The number of unintentional fatal drug overdoses in the USA nearly doubled from 1999 to 2004 according to the CDC, overtaking falls to become the nation's second leading cause of accidental deaths after automobile crashes (17). The number of deaths from accidental drug overdose rose from just over 11,000 in 1999 to just under 20,000 in 2004. Although the report was based on death certificates, which do not clearly detail which drugs played the greatest role, CDC investigators believe sedatives and prescription painkillers like Vicodin and OxyContin were the chief causes of the increase. OxyContin has been blamed for hundreds of deaths in the USA in recent years, becoming such a scourge in Appalachia that it is known as "hillbilly heroin." About 50% of the overdose deaths in 2004 were attributed to narcotics and hallucinogens, a category that includes heroin, cocaine, and prescription painkillers like Vicodin and OxyContin. Deaths from falls climbed between 1999 and 2004 from just over 10,000 to just under 19,000. Motor vehicle crashes accounted for nearly 41,000 fatalities in 1999 and nearly 43,500 in 2004.

TRAFFIC DEATHS

The number of traffic deaths dropped substantially in 16 states in 2006, in most cases reflecting stepped-up enforcement and education campaigns (18). The number of highway fatalities fell by 8% to 23% in those 16 states, but unfortunately in 9 other states deaths rose by at least 5%. In Illinois, road deaths have been dropping every year since 2003, when the state enacted a law that allows police to stop motorists solely for not wearing seat belts (19). Three other states enacted such laws in 2006, bringing the number to 25. Other factors cited in states that have drops in traffic fatalities include stiffer drunken-driving laws, police checkpoints aimed at aggressive driving, improved highway design, and graduated license programs and other safety efforts targeting young drivers. It amazes me that there are not more traffic deaths each year, with 243 million registered passenger vehicles on the road and each driving about 10,000 miles a year.

DALLAS WATER AND TEMPERATURE

In 2005, Dallas received 18.97 inches of rainfall and in 2006, 29.75 inches (20). The normal annual rainfall for Dallas–Fort Worth is 35 inches. Robin Morris, the chief executive officer of the Homebuilders Association of Greater Dallas, has been stressing the consequences of a continued severe drought in North Texas and the consequences of not obtaining a predictable water supply. Fewer building permits and a decrease in new home construction will devastate the home building and real estate industries and their supporting businesses. For every 1000 new homes built, Morris estimates that nearly 3500 jobs are created to construct those homes and \$82 million in federal, state, and local taxes and fees are created. Morris estimates that for every 1000 new multifamily units built, 1300 new jobs and nearly \$31 million in taxes and fees are collected. His association joins others advocating the piping of surplus ground water from the Panhandle to North Texas. This new water supply could be

operating within 5 years and protect our region from a water shortage for maybe the next 100 years.

The year 2006 was the warmest on record in the Dallas–Fort Worth area (21). The annual average temperature increased for the fifth consecutive year, with 43 days (including 19 consecutive days) at $\geq 100^{\circ}\text{F}$. The highest temperature in 2006 was 107°F on July 18. The average temperature in 2006 was 69.3°F ; the 100-year average (1906–2006) was 65.8°F .

FOOD SAFETY

The Government Accountability Office (GAO) in February 2007 added food safety to its list of critically flawed federal programs, leaving the USA more vulnerable to outbreaks of foodborne illness or a terrorist attack (22). The GAO, the non-partisan investigative arm of Congress, indicated that the federal food safety system is out-of-date, often unscientific, and lacking in accountability. The system is a collection of 15 agencies trying to administer some 30 laws. The result is an inefficient use of resources, inconsistent oversight, and overlap and duplication. The FDA and the US Department of Agriculture (USDA) split most of the responsibility for food safety; the USDA oversees meat, poultry, and processed egg products, and the FDA oversees nearly everything else. The FDA and the USDA operate under different laws. While the USDA is required to continually inspect slaughterhouses, for instance, FDA inspections are infrequent. And food poisoning is no minor matter. Each year about 76 million people in the USA contract a foodborne illness. Although most get better on their own, about 325,000 are hospitalized and 5000 die. The FDA's entire annual budget for food safety is about \$450 million. I am surprised actually that foodborne illnesses are not more frequent.

THE SURGE

Nicholas D. Kristof opines that sending more troops (21,500) into Iraq may have three consequences: inflame Iraqi nationalism, bolster both Shiite and Sunni extremists, and kill more young Americans (23). A US military study in 1999, recently declassified in the National Security Archive, concluded that even 400,000 more troops might not be able to stabilize a post-Saddam Iraq. The study emphasized the importance of diplomacy to engage Iraq's neighbors. The recent Iraq Study Group emphasized similar political engaging of neighbors and a move toward withdrawal of troops. An increase of 20,000 troops in a country of 21 million puts more Americans at risk in Iraq's civil war. As Kristof suggests, "We invaded Iraq, thinking that we would get a pro-American bulwark, cheap oil, long-term military bases, and the gratitude of liberated Iraqis. Instead, we fought Iraq and Iran won." The reward for the cost in lives (>3000) and treasury ($>\$400$ billion) appears invisible. Doctors try to prevent death and heal while government officials seem at times to work against us.

According to Kristof, in 2003 Iran sent the USA a detailed message offering to work together to capture terrorists, to stabilize Iraq, to resolve nuclear disputes, to withdraw military support for Hezbollah and Hamas, and to moderate its position on Israel in exchange for the USA's lifting sanctions and

warming up to Iran (24). Some diplomats liked the idea, but the administration rejected it. Of course, Iran's offer might have led nowhere, but the alternative has led nowhere.

TOP MISTAKES THAT MAKE HOMEOWNERS PRIME TARGETS FOR BURGLARS

The newsletter *Bottom Line* listed seven mistakes homeowners make (25):

1. *Leaving the alarm off when running out for a few minutes.*
2. *Posting detailed alarm signs.* Those signs identify the alarm company and give the burglar the information needed to disable the alarm. The burglar can buy a diagram of how that particular system is wired. It is better to buy a generic sign that says, "This house is protected by an alarm system."
3. *Hiding valuables in the bedroom.* The bedroom is the first place burglars look. Burglars spend ≤ 15 minutes in each house they rob, and more than half that time is spent in the bedroom. Keep money or rarely worn jewelry in a safe deposit box. Hide valuables in different places in the house and garage.
4. *Getting a big dog.* Most big dogs are not barkers. What is needed are small dogs that make a lot of noise, like Chihuahuas.
5. *Leaving the lights on.* A light that stays on all the time is no more a deterrent than a dark house. In fact, it helps burglars see better once they are inside. It is better to use timers that turn lights on and off in different parts of the house at different intervals.
6. *Having the newspaper and mail stopped when leaving home for trips.* Who is getting the information besides the newspaper and mail deliverers is unknown. Keep travel plans quiet.
7. *Hiding windows with landscaping.* Tall bushes and shrubs allow burglars to jimmy windows without being seen. Keep bushes trimmed below window levels.

MARRIAGE AND MONEY

Relationship experts cite money as the top problem newlywed couples face, and it is often the source of broken relationships (26). *MarketWatch* urges engaged couples to talk about finances before the wedding: 1) *Are you financially honest with one another?* Does your partner pay bills on time? Is he or she in debt? 2) *Who will manage the money once you're married?* It is important that both partners have a clear sense of how the financial work will be divided. 3) *Is our money "his and hers" or "ours"?* Some couples lump all of their money together, while others maintain separate checking accounts for some of their money. Discuss how the money will be handled and who will be responsible for what expenses if opting for individual accounts. 4) *Do you have similar ideas about spending, saving, and investing?* 5) *What are your long-term financial goals?*

RETIREE DEBT

We all know that debt in the USA continues to worsen, but it may not be known that seniors (aged ≥ 65 years—the Medicare group) are falling into debt in record numbers. Older seniors (aged ≥ 75 years) are the fastest-growing group in debt. The aver-

age amount of debt and percentage of those ≥ 75 in the USA who have it are as follows: 1992, just under \$8000 (32%); by 2004, just over \$20,000 (40%). In 2004, 35% of Americans aged ≥ 65 had credit card debt, and the average amount was nearly \$5000. As described by Kathy Chu (27), unmanageable debt is forcing some older people to delay retirement and is bringing some out of retirement back into the workforce. It's also causing a record number of seniors to seek bankruptcy-court protection. Indeed, seniors ≥ 65 represent the fastest-growing group seeking bankruptcy protection, though they make up only 5% of all bankruptcy filers.

Seniors' debt levels began surging in the 1990s as health care, housing, and energy costs rose. Their incomes failed to keep up with higher consumer prices. Amid the soaring housing market of recent years, many seniors have piled up record amounts of mortgage debt. They have refinanced their homes and cashed out equity. They also have turned to reverse mortgages, borrowing from home equity to receive a stream of income. Rising mortgage debt poses a serious threat to seniors' financial well-being. Worse, a growing number of seniors with mortgage debt also carry credit card debt. Some seniors use one creditor to pay off another. In desperation, some seniors pay off their bills at the expense of their health and well-being.

SATELLITES

Now 845 active satellites orbit the planet: the USA owns or operates 443 (52%) and China, 34 (4%) (28). In January 2007, China conducted its first successful test of an antisatellite weapon, shooting down one of its own weather satellites orbiting 540 miles above earth. China became the third country (after the USA and Russia) to test an antisatellite weapon successfully. That means China could hit >300 satellites owned and operated by corporations and governments, including many military imaging satellites that orbit earth at lower altitudes. Maybe it would be better to fight the next war in space rather than on earth. We had better start loving or at least liking our neighbors or we will be arming the heavens in a continuing arms race now occurring mainly on earth.

GIRAFFES

In the wild giraffes live up to 25 years, but in zoos they can live much longer because they are cared for and protected from predators (29). The longest-living giraffe in captivity lived to be about 40. Dallas' reticulated giraffe, called "Hildy," is now 33 and believed to be the oldest one living in a zoo or the wild at the moment. She has 6 children, 39 grandchildren, 46 great-grandchildren, 13 great-great-grandchildren, and 3 great-great-great-grandchildren. That's pretty good for being 14 feet high and weighing nearly 1600 pounds and standing up nearly all of those years. The zoo recently installed rubber floors in her pen to soften her steps.

BUSH, CLINTON, BUSH, CLINTON?, BUSH?

As Michael Barone says, "There is something bizarre—something royal—about the vision of the wife of a former president becoming president herself" (30). But this royalism is not just

an American phenomenon. India, for 37 of the 42 years after independence, had members of one family as head of government. Indonesia elected as president the daughter of a former president. So did the Philippines. At any rate, it appears time for the USA to have a female president. The ladies have done well as heads of state in India, the United Kingdom, Germany, and soon probably France. What I am looking for is a female secretary of defense, and maybe we wouldn't have so many wars. Then we could provide health insurance for all Americans, improve all of our schools, repair our bridges and roads, clean up our rivers, lakes, and cities, and help provide better for those who cannot provide for themselves.

—WILLIAM CLIFFORD ROBERTS, MD
27 February 2007

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