Fact or Fiction?

Jack W. Dini
1537 Desoto Way
Livermore, CA 94550
E-mail: jdini@comcast.net

Healthier and Stronger Than Our Forebears

"New research from around the world has begun to reveal a picture of humans today that is so different from what it was in the past that scientists say they are startled. Over the past 100 years, says one researcher, Robert W. Fogel, Nobel laureate, Chicago professor, humans in the industrialized world have undergone a form of evolution that is unique not only to humankind, but unique among the 7,000 or so generations of humans who have ever inhabited the earth."[1]

Fogel uses this personal example from his own childhood. When he was six years old he came down with chickenpox. It was 1932. He left school feeling sick, and his mother summoned a doctor. "Two hours later," Fogel recalls, "the New York City Department of Health slapped a sticker on the door to our house: 'No one may leave or enter this apartment until this sticker is taken down.'" Fogel's older brother, not yet home from school, and his father, still at work, bunked in a neighborhood boarding house for two weeks. Each day his father would place a basket of groceries on the Fogel family stoop, then ring the doorbell and walk away. "And that's how we were fed," he says. "It was very traumatic." Two decades later, Fogel's son Michael, then six, came home with chickenpox. Still in New York and anticipating a similar tribulation, Fogel called the pediatrician. "He said, "Good! This is a very good year for chickenpox; it's very mild.'" Within days Fogel's son returned to school, covered in spots. "So an entirely different environment," Fogel says. Once a frequently fatal disease and a public-health menace, chickenpox had become, by the mid-1950s, an inconvenience. "The same was true of mumps and measles," Fogel adds. "They were all transformed," even before the widespread use of antibiotics and vaccines, "The question is: what happened?"[2]

The answer he has concluded after decades of research, is that the pathogens didn't get transformed. The people did. "Over the past 300 years" - and particularly during the 20th century - "Human biology has changed," Fogel says. People in the industrialized world are taller, heavier and stronger. They're more resistant to disease and more likely to overcome it when they do get sick. They live longer, their lives less fraught with chronic ailments. "We're just not falling apart like we used to. Even our internal organs are stronger and better formed." Along with colleague Dora Costa, Fogel has dubbed this process of improvement "technophysio evolution."[2]

Technophysio evolution is the result of a synergism between technological and physiological improvements that has produced a form of human evolution that is biological but not genetic, rapid, culturally transmitted, and not necessarily stable. This process is still ongoing in both rich and developing countries. Unlike the genetic theory of evolution through natural selection, which applies to the whole history of life on earth, technophysio evolution applies only to the last 300 years of human history, and particularly to the last century.[3]

Both environmental improvements and advances in biomedical technology have contributed to a striking decline in prevalence rates of chronic conditions in high-income countries during the course of the 20th century. At the beginning of the 20th century,

Table 1
People today have fewer chronic illnesses.*

White men ages 50-64	1860s	1994
Difficulty bending	44%	8%
Difficulty walking	29%	10%
Joint problems	45%	20%
Back problems	39%	32%
Paralysis	5%	1%
Deafness	3%	1%
Heart murmur	19%	2%
Decreased breathing sounds	12%	5%
Abnormal breathing sounds	20%	3%

**From surveys of Union Army veterans (1860s) and recent National Institutes of Health Surveys*[6]

older men were less able to walk, bend, see and hear than men today, and they were much more likely to suffer from respiratory problems, valvular heart disease, arteriosclerosis, and joint and back problems. This generation suffered from severely debilitating infectious disease, chronic malnutrition and heavy manual labor.[4]

To compare aging 100 years ago versus today, Fogel and his colleagues analyzed old Civil War records in the National Achieves. Instead of relying solely upon death certificates, they looked at the health of Civil War veterans over the course of their lives. Source documents included regimental daily logs, which showed who was sick and for how long, census documents, pension records and periodic doctors' reports on the pensioners. According to Fogel, the field has benefited enormously from computer technology, which makes possible the analysis of thousands of records with multiple variables. The results show people living dramatically longer than they did a century ago. In 1900, only 13% of 65 year olds would live to be 85. Today, nearly half will live that long. Moreover, chronic ailments like heart disease, lung disease and arthritis occur 10 to 25 years later in individuals today. American men are nearly three inches taller than they were 100 years ago and about 50 pounds heavier. The reasons for these rapid changes, according to Fogel, are a more healthful environment, *in utero* and up to maturity.[5]

Using Fogel's work, Gina Kolata provides a comparison between an 1862 person and his great-great-great-grandson, noting this family illustrates what may prove to be one of the most striking shifts in human existence - a change from small, relatively weak and sickly people to humans who are so big and robust that their ancestors seem almost unrecognizable.[1]

Certainly cleaner water and other public health advances, changes in personal habits and strides in medicine have all contributed to the positive changes in aging. Since these developments have happened simultaneously, one of the challenges of the ongoing research is determining the relative weight of these factors.

The difference does not involve changes in genes, as far as is known, but changes in the human form. It shows up in several ways, from those that are well known and almost taken for granted, like greater heights and longer lives, to ones that are emerging only from comparisons of health records.

The biggest surprise emerging from the new studies is that many chronic ailments like heart disease, lung disease and arthritis are occurring an average of 10 to 25 years later than they used to. There is also less disability among older people today, according to a federal study that directly measures it. And that is not just because medical treatments like cataract surgery keep people functioning. Human bodies are simply not breaking down the way they did before.

More recent times

According to the latest federal health statistics from the Centers for Disease Control and Prevention, the average adult weighed nearly 10% more in 2003 than in the 1980s. Males grew from 168 to 180 pounds, females from 142 to 152.[7]

Food is certainly much more plentiful these days:[7]

- The total U.S. food supply provides 500 more calories per day per person than it did in the 1970s, an increase of 24%, according to the Department of Agriculture.
- In fast-food restaurants, portions are two to five times larger today than in the 1980s.
- Even the animals we eat have grown in size: In the 1960s, the average chicken at slaughter weighed about three and a half pounds. By the mid-1990s, it had gained a pound. In 1966, a commercial cow at slaughter averaged 1,011 pounds. By 2006, it weighed 25% more, or 1,275 pounds.

Summary

Longer life. Less disease. Less disability. The trends have continued for more than a century as humans have become bigger, stronger and healthier. But can they - will they - keep going? Or is there some countertrend, obesity or an overuse of medications, perhaps, that will turn the statistics around?[1] Certainly, the way things are going these days obesity is a strong factor not only on the horizon but at present times. P&SF

References

1. Gina Kolata, "Living Large and Healthy, But How Long Can It Go On?" *The New York Times* (July 30, 2006); http://www.nytimes.com/2006/07/30/health/30ageside.html, last accessed 08/31/10.
2. "The Human Equation," *The University of Chicago Magazine*, **99** (5) (May-June 2007); http://magazine.uchicago.edu/0726/features/human.shtml, last accessed 08/31/10.
3. Robert W. Fogel, "Biotechnology and the Burden of Age-Related Diseases," Presented at Washington University Department of Economics, St. Louis, MO, November 21, 2002: http://cniss.wustl.edu/workshoppapers/FogelBiotechnologyLecture.pdf, last accessed 08/31/10.
4. Dora L. Costa, "The Economics and Demography of Aging," *Proceedings of the National Academy of Sciences*, **104**, 13217 (August 14, 2007); http://www.pnas.org/content/104/33/13217.full, last accessed 08/31/10.
5. "Professor Robert W. Fogel: A New kind Of Historian," Alliance for Aging Research, Washington, DC: http://www.agingresearch.org/content/article/detail/1366; accessed 08/31/10.
6. Gina Kolata, "So Big and Healthy Grandpa Wouldn't Even Know You," *The New York Times*, (July 30, 2006); http://www.nytimes.com/2006/07/30/health/30age.html, last accessed 08/31/10.
7. Jess Blumberg, Katy June-Friesen & David Zax, "Livin' Large," *Smithsonian*, **38** (9), 128, September 2007.