Medical Progress and Global Chronic Disease: The Need for a New Model

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Chronic illnesses have become the leading medical scourge of developed countries in recent decades and have now emerged in developing countries as well. What has been called the “demographic transition” has seen a global decline in recent years in deaths from infectious diseases and an increase in deaths from chronic diseases. By 2030, the percentage of those dying from chronic illnesses in low-income countries is projected to be about 59 percent of all deaths.¹ To make matters worse, there is now a double burden on poor countries: a high and rising rate of infectious disease as well as a rapid increase in chronic disease, most notably diabetes, cardiovascular disease, cancer, and chronic respiratory disease.

It is also common to find obesity—a major contributor to chronic disease—and malnutrition in the same families. Unlike in developed countries, chronic illness now typically begins about a decade earlier in low-income countries. Its causes are changing diets, particularly an increase in meat and processed food consumption, alcohol consumption, smoking, and less physical activity. At the same time, aging populations in developing countries guarantee that a rising proportion of the elderly as well as the young will die from chronic illness. One might then speak of a triple burden.

The projections for the potential economic impact of chronic illness are staggering. A 2011 study by the World Economic Forum and the Harvard School of Public Health projected “a cumulative output loss of $47 trillion over the next two decades…it also represents enough money to eradicate two-dollar-a-day

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poverty among the 2.5 billion people in that state for more than half a century.”

Poor countries already burdened by poverty, longstanding medical and public health deficiencies, and rampant infectious diseases clearly do not need this further complication. Most critically, these countries will have to determine how to apportion their limited health care budgets between preexisting needs and the arrival of a larger burden in the form of chronic illness. In 2007, less than three percent of $22 billion in global health funds—primarily from private donations, foundations, and the World Health Organization—went to chronic disease. No guess will be advanced here at how that allocation task can or will be accomplished, although many strategies, primarily focused on prevention, have been proposed.

Allocation and budget problems of health care are typically treated as management and organizational issues, with a focus on efficiency, good economic value, and equity. This is true of chronic disease as well. I will argue that there is now a great gap in that kind of health care thinking, heavily oriented to economic and policy issues. What that approach neglects to take into account is that it rests upon the art and science of modern medicine, which has embraced the values of unlimited research and technological innovation, rejected any limits to progress, and pursued an unrelenting war against death. Those values have created an economically unsustainable medicine that cannot adequately be dealt with simply by reform efforts that try to improve health care systems—as if the underlying values of the current medical model can be left untouched and inviolate. The increase of chronic diseases in both developed and developing countries represents a critical turning point, requiring not only improved health care systems but also a new model of medicine as its foundation.

The emergence of chronic disease in developing countries is a “turning point” because they are facing a confrontation with the same kinds of economic pressures that now bedevil developed countries. But addressing this problem will be even more difficult for the developing countries. At the least, the present increasing inequities between rich and poor will almost certainly be intensified. Those inequities now include poor access to health care, poverty and economic insecurity, and a lack of educational opportunities. Chronic disease will only add to the existing inequities. Chronic disease treatment is usually expensive, and the rich in poor countries are likely to have better access to it. Their care already diverts the services of the better-trained physicians and medical facilities from the population at large. The aspirations and goals of the dominant contemporary model of medicine will further threaten the prospect of any future form of equitable health care and create unrealistic medical aspirations. What
the affluent countries are now finding economically unsustainable will be even more so for poorer countries.

**THE GOALS OF MODERN MEDICINE**

The guiding premises of modern medicine, particularly its American manifestation, are that the possibilities of medical progress and technological innovation are essentially unlimited; that none of the major lethal diseases, chronic or infectious, are in principle incurable; that more research is the answer to curing those diseases and all the other assorted miseries that afflict our minds and bodies; and that progress is economically affordable if well managed. To constantly fuel this ambitious enterprise it is necessary to believe in the plausibility of those possibilities, but no less to inspire patients, researchers, and legislators never to give up the hope that they will be achieved. The ancient duty of physicians to instill hope in their sick patients is now matched by the necessity of inspiring constant public hope in the medical research enterprise.

Almost every item in the list of major aspirations guiding the belief in medical progress should now be questioned. Some unpleasant realities exist, beginning with infectious disease. Forty years ago, it was commonly assumed that infectious disease had all but been conquered, with the eradication of smallpox as the great token of this victory. That assumption has been proven false. The public health burden of HIV/AIDS, the failure to find cures for malaria and other tropical diseases, and the dangerous increase in antibiotic-resistant microbes illustrate this falsity. We are nowhere near finding a decisive solution for any one of these problems. It is only reasonable now to assume that infectious diseases can never be altogether eliminated but only at best ameliorated; and if history is any guide, new ones are likely to emerge. The absence of an HIV vaccine despite a nearly 20 years search and the difficulties in maintaining economic support for expensive treatments do not bode well for the large number of those who are or will become infected. AIDS, still infectious in origin, has now become an expensive treatable chronic disease as well.

Chronic disease was initially the scourge of industrialized nations, but these countries also took the lead in research on them. If the hope for the eradication of infectious disease was misdirected, the hope for curing chronic diseases is misplaced as well. Richard Nixon’s 1970 declaration of a war on cancer, accompanied by widespread predictions of an imminent cure, have been matched by

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the present hope for a cure for Alzheimer’s disease, for which even a solution to delaying onset of symptoms is elusive.\(^5\) Mortality rates from cancer have only declined slowly over the past few decades, but the costs of treatment and the prevalence of the disease continue to rise at an alarming rate. A National Cancer Institute study projects a 39 percent American increase in cancer costs between 2010 and 2020.\(^6\) Even though a cure for heart disease has not been predicted, we continue to invest in expensive medical methods that keep those with the disease alive longer and longer. Similar trends could be noted for almost every chronic disease. Some 64 percent of American health care costs are incurred by 20 percent of the population with chronic disease, primarily the elderly.\(^7\) Kenneth Thorpe and colleagues, summing up some Medicare data, note “more than half of all beneficiaries are treated for five or more chronic conditions each year, with 75 percent making at least one out-patient hospital visit.”\(^8\) But that struggle has begun to look like the trench warfare of World War I: little real progress in taking enemy territory but enormous economic and human losses in trying to do so. In that war, we can recall, it was the duty of officers to get their soldiers to climb the ramparts and go forth to battle. Medical researchers, industry, and patient advocates play that role in the war against cancer and other chronic conditions.

One of the hardiest hopes in the chronic disease wars has been that of a compression of morbidity—a long life with little illness followed by a quick death. First developed by Dr. James Fries in 1980, the concept presented a persuasively utopian view of the future of medicine.\(^9\) It has always been possible to identify some very old people who seem to have the good fortune of living such a life and then dying rapidly. A recent study, however, has determined that this idea has no empirical support. Most of us in developed countries will contract one or more chronic diseases later in life and die from them, slowly.\(^10\) The authors present evidence that between 1998 and 2006 at each age “over the eight years there is an increase in life expectancy with disease and a decrease in the years without disease. The same is true for functioning loss, an increase in expected years unable to function and a decrease in years able to function.”

“Health,” the study concludes, “may not be improving with each generation…. compression of morbidity may be as illusory as immortality. We do not appear to be moving to a world where we die without experiencing disease, functioning loss, and disability.”\(^11\) In a 2006 article, the Harvard economist David Cutler and colleagues wrote “that the increase in life expectancy beginning at 65 years of age showed the incremental cost of an additional year of life rose from $46,800 in the 1970s to $145,000 in the 1990s. If this trend continues
in the elderly population, the cost-effectiveness of medical care will continue to decrease at older ages.” Moreover, in considering the multiplicity of chronic conditions that can afflict the elderly as they become even older, the longitudinal costs of their care must be taken into account—that is, the costs not just of one condition in isolation at a given moment in a person’s life but the cumulative cost of multiple illnesses in his remaining life span. It is now possible, and not uncommon, for someone to have cancer pushed into remission at 65, to persist with well-managed heart disease at 75, and then to acquire Alzheimer’s at 85. The cure of one disease is of course not the cause of the next disease. The process of aging ensures there will be a next disease. Of course, the same phenomenon presents itself with younger people who survive a bout with a chronic disease, and this will also be the case in developing countries. We do not get out of this world alive. Many of us would probably accept that tradeoff in our personal lives, but it is, at least in economic terms, a socially expensive one.

It is not unreasonable to now conclude that our physical nature is not as open to endless improvements in health and life span as the research enthusiasts would like us to believe. In fact, one could say that nature seems to be striking back: first by shattering our belief in the end of infectious disease and then by paralleling that dismaying defeat with the sturdy biological resistance to the cure of chronic diseases. The great biologist René Dubos wrote many years ago in his book *The Mirage of Health* that “complete and lasting freedom from disease is but a dream remembered from imaginings of a Garden of Eden.” Had he lived into the present he may well have updated that observation by changing “complete and lasting freedom” to “even incomplete and transient freedom from disease.” That is what the historical record is beginning to show. The recent decline in new drug development raises at least the possibility that some hitherto hidden natural limits may also be appearing.

Moreover, although average life expectancy has been steadily increasing for many decades, it now shows signs of leveling off. S. Jay Olshansky, a leading figure in longevity studies, has for some years expressed skepticism about the prospect of an indefinite increase in life expectancy. He calls his position a “realist” one, particularly in contending that it will be difficult to increase the average beyond 85. He also writes that it is “biased” to assume that “only positive influences on health and longevity will persist and accelerate.” That view encompasses a belief that medical technologies and science will surely continue on a positive track. This is not necessarily the case.

I have used the United States as my model of modern medicine, but its leading role in research on chronic disease and the deployment of innovative
technologies make it a plausible case study—and a cautionary tale as well. One might object that American medicine is notoriously more expensive than that of other countries and controlled more heavily by costly private medicine and a profit-oriented medical drug and device industry. Every developed country, however, is beginning to feel the pinch of aging societies and the high cost of medical technology, even if their health care systems are better able to hold down annual cost increases. Even so, it is hard to find any developed country that has escaped the impact of the cost of care for the chronically ill and none that do not worry about it.

The poor countries of the world should not try to adopt the progress-and innovation-driven model of modern medicine. It will surely be attractive to many, particularly those who are well-off in those countries. In developed countries it has brought longer lives and many fine ways of reducing morbidity, relieving pain, and rehabilitating the disabled. But those advances come with steadily rising economic and human costs (particularly in end-of-life care), and we now are struggling to find a way out. Those of us in affluent countries no longer need that kind of model, and neither do countries that do not have it.

**Reshaping the Goals of Medicine**

A new set of goals for medicine could constitute a single model applicable for both rich and poor countries. I call it “sustainable medicine,” one that is (a) affordable for a country in the long run; (b) no longer open-ended in its life-extending aspirations, aiming instead for a limited but acceptable population-based average length of life; (c) able to keep annual health care costs at the level of country’s annual gross domestic product (GDP) growth; and (d) can be equitably distributed. The following are seven objectives that will contribute to such a comprehensive overall goal.

*Objective 1: Devise a fresh concept of medical progress.*

Health care progress, like the exploration of outer space, is an endless frontier and will always be open to progress. But we understand that the dream of putting humans on Mars is not economically sensible. We have settled instead for a space station and the Hubble telescope. A similar sober conclusion is necessary for medical progress. That sobriety will mean lowering research aspirations in developed countries, aiming not for continued improvement in average life
expectancies but rather for acceptance of a finite life span and a focus on improvement of the quality of life within that span. For developing countries it will mean aiming to modestly improve life expectancy, but balancing off that aim with improvements in the quality of life—for instance, understanding that serious mental health problems are as much a threat to a good human life as lethal diseases. Most critically, “progress” should be thought of more in terms of population health rather than just as individual health, while also making due allowance for individual variation.

A key component of the economic engine of medical progress has been the endless issuing of promissory notes by scientists and the medical industry, which are then broadcasted and amplified by the media. In recent years, the human genome project and embryonic stem cell research, highly touted “breakthroughs” and “promising” new research leads, all have continued the rhetorical legacy of Nixon’s declaration of a war on cancer. The saved lives projected due to those advances would run, it was claimed, in the hundreds of millions. That does not appear likely to happen. A more realistic rhetoric is necessary, one that places a heavier emphasis on caring for the sick and not just aiming to cure them as its defining mission.

Objective 2: Set Research Priorities.

In order to work toward a population-based goal, the present open-ended model of medical research should give way to a new goal: aiming to bring everyone up to an average age of 80 (which is already being approached in developed countries) and shifting emphasis toward improving the health and quality of life of those under that age. In my own experience, and watching those in my age group (I am now 83), by age 80 most people will have lived a full life. They will have had the opportunity to have most (even if not all) of the goods of life—to raise a family, to work and have a career, to travel, and to gain knowledge and the experience of a long life. This is not to say that they have a very short life expectancy after that (they may or may not) or that they may not want to live longer. But by 80 they will have lived a “full life,” to use an expression I have heard many times. Death after that point is not ordinarily considered a societal evil (much less a tragedy), even if families and friends may mourn the death. For resource allocation purposes, I would contend that the highest priority should be given to the health of children, the next highest to those in their adult years responsible for managing society and caring for the young, and the lowest priority to those over 80. Expensive innovative treatments to keep alive those who have reached that point should neither be sought nor welcomed in
Daniel Callahan

rich or poor countries.

Objective 3: Change health delivery priorities.

The future delivery of health care might best be envisioned as a pyramid. At the lowest and broadest level would be public health (health promotion and disease prevention); at the next level would be primary care medicine and emergency care; the level above that would be short-term hospital care for acute illness; and the top level would be high technology care of the chronically ill. In developed countries, the primary aim of health delivery should be an effort to push health care down from the highest (where the most money per capita is spent) toward the lower levels. The standards for access to care at the highest levels should be severe, marked by a reasonable certainty of a good outcome with some years of life remaining at an affordable cost. Cancer drugs with costs that range from $50,000 to $300,000 are now common but provide only a few additional survival months, and thus they do not meet that cost-benefit test. Cost-effectiveness research and gatekeeping will be necessary to implement that standard.

The priorities for developing countries should be just the opposite. Instead of pushing downward from the highest level to lower levels, it should be to push upward from lower to higher levels but without only aiming to reach the most expensive level. Ideally, with this set of health care delivery goals, in 50 or 75 years from now, all countries will be more or less equal in terms of equity and affordability.

Objective 4: Change the education and acculturation of physicians.

Medical education traditionally begins with anatomy; learning from a dead body how it functioned while alive. The main message of a medical education is to keep people from dying. Yet what if the main message learned from an anatomy class were that every patient will die, and that the task of medicine should be to avert only an untimely death before 80? It will no less be the goal to make the time between birth and death as healthy as possible.

That kind of emphasis will of course privilege the primary care physician, the public health worker, the nurse, and the social worker. Higher pay for them and lower pay for specialists will be necessary along with gatekeeping between primary care and specialist referral. There is nothing new or radical in such a proposal, but the disincentives in American medicine for doing that are enormous; and some of them are likely to be repeated in poorer countries. Medicine must be taught, once again, not only as a science but also as an art. It is time to
place emphasis on population health in addition to individual health. A medical education that began with the inculcation of the knowledge and skills needed for level 1, and then moving upward from there, would in the future put doctors from rich and poor countries on a parallel and eventually converging track of goals and aspirations.

**Objective 5: Change industry incentives.**

Powerful international pharmaceutical and device manufacturers dominate modern medicine. This gives great power to the private sector in determining what medicines and technologies to develop and sell, and in determining the price of these products. That power provides those manufacturers a great role in shaping the de facto goals of medicine. Those industries cater overwhelmingly to individual needs and desires, much more at the top end of the pyramid than at the lower end. The least profit is to be found at the lower end.

European health care systems have long recognized that the only way to control the commercialization of medicine is by strong government price controls. No other option seems feasible in controlling costs, and certainly not competition among suppliers of drugs and devices. For the suppliers, innovation is the most basic necessity for continuing profit. That innovation has undeniably brought great benefit, but if a progress-driven (and often commercially fueled) innovation is itself one of the leading problems of modern medicine, then there is all the more reason to impose price controls in all countries. Innovation that raises health care costs in an already costly system is becoming more of a threat than a blessing, even when it extends life.

**Objective 6: Change the public’s perception of medicine.**

The institution of medicine is enormously popular with the public. No one likes being sick or threatened with death. Modern medical technology has brought many benefits that have enhanced the prestige and social power of medicine. How can the public be persuaded to lower its expectations of medicine, to more willingly forego expensive chronic care medicine, particularly in old age, and to cast a skeptical eye on the supposed benefits of continual medical progress? The public must first be persuaded to accept something like the six steps already discussed. That strategy will require researchers and the media to repeatedly call attention to the economic and social realities of the endless war on disease: it cannot be won and can only achieve small victories. If we are not careful, we can harm ourselves trying. The most important need is to begin a public and
professional dialogue in all countries on what a new model of medicine should look like—the one we will need in the future in rich and poor countries alike.

This model should be modest in its research aspirations, have health care delivery more heavily financed at the lower end of the pyramid than at the top, be dominated by primary care and neighborhood clinics staffed mainly by paramedics for routine health needs and organized teams for acute care, and have many evidentiary barriers to expensive critical care medicine, especially at the end of life. Those who are well must understand that much of their health will over their lifespan depend upon their health-related behaviors, that the types of expensive late-life rescue medicine that are now available will be much harder to get in the future, that the elderly do not have an unlimited claim on help from the young for expensive medical care, and that the government emphasis will be on stronger social and economic security even at the expense of medical care. Physicians and all allied health professionals will have to take the lead in disseminating this information.

Objective 7: Shape a health care system.

It is fair to say that the most successful health care systems in the world—measured in terms of life expectancy, equity, and costs—are either government financed and run (called tax-based programs) or government and privately run (called social health insurance). While most countries’ health care systems will permit a private sector apart from government financing and permit some room for market competition, few are dependent upon free market mechanisms to control costs. By and large, those side market practices only allow people to purchase some amenities outside of the public sector. The worst systems from the viewpoint of efficiency and equity are those with with weak public sectors—India and China at present, though they are attempting reform—and the United States, where a strong private sector has helped keep costs high and has made the public sector options, Medicare and Medicaid, more costly by buying the services it pays for in the private sector. Most notably, the United States has a long and expensive resistance to government price controls as well as to serious and effective technology assessment, and it is suffering for that. Only a government-managed system can stifle the virus of commercialization, which uses the provision of medical care as a vehicle for individual and corporate economic gain. Medicine cannot provide affordable health care while also trying to turn a handsome profit for its private purveyors and providers. That kind of system works against the pyramid model.
THE NEED FOR A REVOLUTION

Nothing less than a revolution, one that overthrows the tyranny of an economically and socially unsustainable model of medicine based on a vision of endless progress and technological innovation, is increasingly needed. It will seek to institute a more modest vision, one that accepts the inherent finitude of human life. It will not allow health care to trump all other human goods.

It is not coincidental that I speak of “sustainable medicine” at a time in human history when there is an urgent call for a “sustainable environment,” one threatened by global warming. I borrowed the concept of sustainability from environmentalism to shape a fresh vision of medicine and health care. Both modern medicine and modern industry have been inspired by the dream of untrammeled progress, in the case of medicine for an ever longer life, and in industrialized countries by an ever growing GDP. The environmental movement does not want to utterly overthrow the use of GDP as a measure of human welfare but to downplay its dominance, to balance it off with standards for the quality of life that are social and not just economic.

I do not want to suggest that either revolution will be easy. Each requires that we rethink deeply embedded values and ways of life that are cherished and praised. Each requires us to ask the oldest and deepest human question: how should we think about and live a good life and help create a good world? In the instance of medicine, this requires reconsidering the place of medical progress and health in such a life. In the instance of the environment, it means reconsidering the value of economic growth and boundless affluence. In both cases there are some difficult ethical and policy dilemmas to be confronted. Millions of people around the world still live in poverty, the relief of which requires a growth of GDP in their countries. Millions of people in rich and poor countries alike die prematurely of infectious and chronic illnesses, and many need medical progress to give them a chance for a healthy life. But every revolution to be just and humane requires sorting out the good and the bad in the old order. Most of our modern problems and dilemmas force us to find that point (though it may be hard to discern) when what was once sweet begins to turn sour. A longer life is not always a better life any more than an ever more affluent society is a better one. That task of discernment must now be taken on.

NOTES

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11. Ibid.


