



Medical Sustainability
– Why it is critical for our future and
What needs to be done

Il Hoon Do
University of Oxford Medicine

August 2011

I. Introduction

On March 23rd 2010, President Barack Obama of the United States signed into law the *Patient Protection and Affordable Healthcare Act*, an unprecedented new legislation, the passing of which he hailed as the “Call of History”¹. Then in January 2011, David Cameron, the Prime Minister of the United Kingdom, proposed the most radical changes to the National Health Service since its inception in 1948². The former is the first time that universal healthcare was promised to the whole American nation, whilst the latter attempted to reshuffle how spending decisions are handled for the NHS, likely involving increased privatization of the state-funded service. It is no coincidence that such unprecedented changes in healthcare are taking place, right now, in two of the world’s leading nations, the USA and the U.K. Their respective leaders both knew that healthcare needed to change, and it needed to change now. And amidst intense criticism, there is no doubt that the legacies of Barack Obama and David Cameron will be in large part defined by the success and failure of their healthcare reforms.

Thus, *medical sustainability* [as will be defined later: the ability of medical systems to provide adequate care to the present generation, without sacrificing the needs and well-being of future generations] simply cannot be excluded in any discussion of a *sustainable future*. Here are the reasons why:

First, healthcare systems all over the world are failing. Modern medicine has become incredibly expensive, and yet when the dilemma is between greater spending and losing lives, there can be no choice but to keep pouring in money. In the finite real world, this means that spending rises uncontrollably and when it can no longer keep up, lives suffer.

Second, medical sustainability is critical for the welfare of future generations. We all understand how important it is to be healthy. Possession of all the fortunes of the world would not carry any meaning without health. This is a given. However, what we often do not realize are the serious repercussions of an ailing healthcare system, as more and more government and personal money is poured into healthcare. Something has to sacrifice, and cuts to education spending, infrastructure and social welfare are inevitable. Such investments are vital for the welfare of future’s society and it is not right that these are impinged to fulfill the needs of the *now*. With an ever aging demographic, sacrificing our young generation is not the road to sustainability.

In this essay, I will analyze in greater depths the countless problems of modern healthcare. And while I cannot pretend to have the answer to this incredibly complex question, I shall propose that a complete *re-invention* and *re-definition* of medicine and its public perception must take place if sustainable medicine is to be fundamentally achieved.

In particular, I will discuss why Information Technology must play an essential role in revolutionizing healthcare and how it can be harnessed to improve medical systems, as well as to actively involve the public in their own health. Unlike many other industries which cannot afford

to stagnate, healthcare has ironically resisted change for decades. Thus, I also consider the challenges and risks that we will face in pursuing innovation.

Lastly and perhaps most importantly, I will argue that healthcare vitally needs interdisciplinary input, in order to find and implement the solutions. What the sick healthcare systems of the world need are not just doctors. Rather, we need economists to devise working market models; managers to help the system work more efficiently; policy makers to create a sustainable system of self-innovation, and the list goes on.

To this end, I hope that this discussion of the issues of medical sustainability at the EPIK Young Leaders Conference 2011 will be a significant first step in fulfilling our visions of a sustainable future.

II. What is medical sustainability and why we need to care.

Before we can discuss *medical sustainability* we need to define *sustainability*, a term very much like *liberty* and *equality* in that there is no single definition that does full justice to the vast relevance it holds in our world. Of many definitions provided in dictionaries, sustainability is often described as the capacity to *maintain*, *support* or *endure*. However, in light of the increasing awareness of humanity's irreversible impact on planet Earth, sustainability is often coined with respect to mankind's relationship with our finite environment. In this way, on March 20, 1987, the Brundtland Commission of the United Nations defined *sustainable development* as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"³. In this essay, I will further expand on the term *needs* by referring to the unreferenced Wikipedia definition, which reads: "for humans, sustainability is the potential for long-term maintenance of *well-being*⁴, which has environmental, economic and social dimensions"⁵.

One of the most fundamental *needs* of humanity is the need to be healthy and access to healthcare is an essential component of *well-being*. Thus, *medical sustainability* describes the ability of medical systems to provide adequate care to the present generation, without sacrificing the needs and well-being of future generations.

However, healthcare systems around the world are beginning to fail on both counts. At the forefront of this universal observation is that healthcare costs are rising uncontrollably. The most startling numbers come from the USA where in 1970 healthcare spending accounted for roughly 7% of the Gross Domestic Product, but which increased to 17% by 2009⁶. This is showing no signs of slowing, with predictions of almost 20% of GDP by 2017⁷. To put this into some sort of perspective, total US healthcare spending in 2009 was \$2.5 trillion⁸, a gigantic amount comparable with the US Defense Budget that year of \$680 billion, or an estimated \$54 billion

that could feed every child in the world for a year⁹. What is much more worrying, however, is that in spite of such enormous spending, access to healthcare is yet a disparate reality; with the top 5% of the population accounting for 49% of total health expenditure and the bottom half of the population only accounting for 3%¹⁰. Hence, the consequence of rapidly rising spending is not increased accessibility and quality of care, but rather that an increasing proportion of the US population simply cannot afford adequate healthcare.

Of course, the American example is the most extreme of cases, perhaps due to its free-market system, which is harder to regulate centrally. At the other end of this spectrum are nationalized systems, such as that of Canada and the U.K. Because healthcare is state-run in these cases, spending does not excessively spiral up to the same extent as that of the US. However, most OECD countries, including the U.K., still exhibit significant growth rates of healthcare spending, and attempts at limiting overall costs, especially in such nationalized systems, have led to reduced accessibility of care and increased waiting times for the whole cohort of patients. This phenomenon is perhaps best summarized by a famous quote from the Supreme Court of Canada in 2005 that “access to a waiting list is not access to health care”¹¹.

On the other hand, the Korean medical system is an interesting case, as at least on face value, it appears to be much more affordable (only around 6.5% of GDP compared to ~10% in EU and ~17% in US) at the same time as providing easily accessible care. The Korean healthcare system is a unique hybrid between a nationalized system and a private market one. Whilst most practitioners (excluding a few public hospitals) are private contractors, the government provides national health insurance to all its citizens, as well as regulating the fee that physicians and hospitals can charge. This leads to an efficient single-payer system, which allows most to access healthcare quickly and cheaply.

However, in reality this system manifests its problems in other ways. Firstly, the Korean national health insurance is highly limited in what it covers, and whilst this is not a problem for day-to-day medical issues, patients find themselves facing massive bills when they encounter life-crippling conditions such as cancer. Secondly, the low state limits for physician charges means that doctors in Korea seek ways to maximize their income, at the sacrifice of quality of care. For example, physicians will attempt to see as many patients as possible, leading to the famous “Korean 5 Minute Diagnosis”, and this phenomenon is seen all the way from local practices to the top hospitals. Further, physicians become more inclined to order procedures that are not covered by health insurance even if they are not strictly necessary, leading to more expensive MRI and CT scans and over-prescription of drugs.

Another related phenomenon that impinges on the long-term quality of medical care is that many top medical graduates elect to enter into specialties that are not affected by the regulated limits, such as dermatology and cosmetic surgery, which allow physicians to charge as much as they wish. This is the irony of many market-orientated healthcare systems, and especially the current

Korean one, that the best doctors are moving away from fields that are most intimately related to saving lives, the core value of medicine. In these ways, the Korean healthcare system is also far from perfect, and with lower healthcare spending, there is a sacrifice in quality of care as well as extra financial burden placed on patients when life does present devastating circumstances¹².

Simply put, modern medicine – worldwide, regardless of system – is struggling to even fulfill the needs of the present generation. And yet, pouring more and more money into healthcare has serious repercussions to our future generations. For instance, last year, 26% of the Californian State Budget was spent on funding federal-state healthcare programs, including Medicaid and Medicare for low income families and the elderly, respectively. By 2040, this proportion is predicted to rise to 42%¹³. Considering that most nations provide a greater level of state/federal funding into healthcare, a similar trend is likely in time for other US states and governments globally. This is a serious problem that cannot be ignored. Such increases in healthcare costs will encroach on other vital government spending on infrastructure, social welfare, and vitally, education. Perhaps, this is already being exemplified by the massive cuts across the whole public sector by the U.K. Conservative Government in recent months. Many social benefits have been cut; many public sector employees have been laid off; the tuition fee for higher education was increased 3-fold!; and although the NHS has escaped the harshest cuts, it is shrouded in a cloud of uncertainty amidst incredibly unpopular reforms.

The vast majority of healthcare spending is for the 50+ age group, where complicated and debilitating chronic diseases abound. Hence, healthcare spending is essentially a cost for the *now*, for the leaving generation; and sacrificing the *well-being* of future generations, sacrificing the education of our young – increasing class sizes, laying off teachers, cutting funding for universities – and diverting investment from the functional infrastructure of tomorrow's society, is not a sustainable vision of the future. Healthcare as it stands is not sustainable.

And yet, this is the dilemma that governments around the world face. It is easy to put away healthcare spending as being excessive and unnecessary, but in the here and now, when faced with decisions that deal with life and death, there is no choice but to do what can be done – even if this means spending big. The following quotation from David Walker¹⁴, the previous US Comptroller General (the nation's head accountant), firmly but simply summarizes why an urgent, collective effort is required in innovating healthcare and making medicine sustainable:

"What's going on right now is we're spending more money than we make...we're charging it to a credit card...and expecting our grandchildren to pay for it. And that's absolutely outrageous"

III. Why is modern medicine so unaffordable?

Much debate surrounding medical systems around the world are often focused within their respective national contexts – with good reason as each system is unique. However, the fact that even two apparently different systems of the USA and UK are facing major challenges, tells us that there are more fundamental problems with the common core of modern medicine. (And indeed, even the best of healthcare systems, such as that of France, which topped the list compiled by WHO in 2000¹⁵, suffer the same financial difficulties.) In fact, there are so many different problems facing medicine – at every level of healthcare and in every system – that it is important to look beyond these individual problems. So far, too much effort has focused on these separate issues and thus, without much success.

Rather, in order to fundamentally understand why medicine has become so unaffordable, it is helpful to conceptualize healthcare as one big service that relies on very simple economic conditions. Broadly speaking, healthcare costs are determined by two factors: one, the supply and demand ratio of healthcare services; and two, ever-increasing operating costs of modern healthcare.

Demand for Healthcare far outstrips its Supply.

Healthcare is unique amongst many industries in that the demand for it is almost infinite. Its target client base is the whole population, as being *healthy* is a fundamental need for all humanity. Ironically, however, healthcare is a highly specialized sector without external competition and correspondingly, the supply of healthcare is highly limited. Then, it is perhaps only natural that in a free-market system as in the US, healthcare costs are greatly driven up. The difference for other state-funded systems is that the cost-hike due to supply-demand market conditions is limited by the government. Aside from the cost issue, such an extreme supply-demand ratio impinges on the access to and quality of care, as the supply simply cannot keep up with the overwhelming demand. Thus, whilst in the US access to healthcare is largely governed by wealth, in many other countries access to healthcare is still limited by the availability of shared resources and time.

Healthcare suffers from overwhelming Operating Expenses.

The second factor that leads to the cost-intensive nature of medicine is the massive operating expenses of healthcare. For any company to continue to function, it must be able to recover at least its operating expenses, regardless of supply and demand. Unfortunately modern medicine is terribly mal-adapted in this aspect. Firstly, physicians form a highly qualified workforce and the cost of their long training must be recuperated from their charges. Moreover, the incredibly complex nature of medical science requires that correspondingly large amounts of money are needed for medical research as well as for the development and deployment of medical equipment. Another highly controversial debating point in medicine is the pharmaceutical industry, whose main players are often accused of exaggerating “research costs to justify absurd

profits”³². Although the true extent of such activities cannot be known, the observation that pharmaceutical spending is the fastest-growing part of healthcare spending, suggests it to be a significant factor in increasing overall expenditure.

Healthcare delivery is seriously outdated and no-longer optimal for modern medicine.

Mainly due to the reasons briefly discussed above, the minimal cost of healthcare is very high and coupled with unending demand, it is no surprise that the overall cost of healthcare is so overwhelming. However, the ultimate problem to this conundrum is that the delivery of healthcare is still frozen in two archaic business models of the general hospital and the physician’s practice, a system that was designed over a century ago and optimized for healthcare at that time. Such stagnation is unthinkable in any other industry, and yet, medicine has resisted fundamental change for decades.

Ever since the advent of modern medicine in the 19th century, medicine has always been constantly changing, as new discoveries are made and new technologies developed. In the early stages, when we did not have the scientific understanding that we do now, medicine was often termed *intuitive medicine*²⁴. Our human body only has a limited number of physical symptoms, perhaps a couple dozen. However, there are countless different diseases, most of which exhibit similar sets of symptoms. Thus, highly trained and expensive clinicians used their intuition and pattern recognition to diagnose and treat diseases that were often grouped together. As experience and data from treating diseases accumulated, healthcare became evidence-based *empirical medicine* where repeated observations are used to make better informed judgments. Much of current healthcare lies here, with many diseases yet grouped together as ‘syndromes’ or ‘disorders’.

Recently, however, certain technological innovations are allowing care to become *precision medicine*, where it is possible to precisely identify the disease and hence give precise treatments. High resolution MRI and CT Scanners are examples of such innovations, allowing clinicians to visualize the interior of the human body and reducing the amount of intuitive guesswork that was previously required. Moreover, many medical technology firms and ventures are attempting to employ genetics and molecular medicine for precise diagnostics, such as for specific cancers. In this way, medicine has been evolving to rely less on the problem-solving ability of doctors.

However, these changes in medicine have not been translated into less expensive and more accessible healthcare, with the hospital and practice structure optimized for practicing intuitive medicine²⁴. In fact, even medical schools and doctor trainee programs are still geared towards producing good problem-solvers, and whilst this in itself is no bad thing, it leads to the inevitable high fee-for-service charged by highly trained physicians. Considering that 31% and 21% of total US health expenditures are for hospital care and physician services respectively²⁵, this is a major aspect of excessive healthcare spending.

In this section, we have dealt with the fundamental issues of healthcare, but there are many other relevant issues, some of which are discussed in more detail in the Appendix.

IV. Routes to sustainable medicine

For medicine to become sustainable, it needs to become *affordable*, *efficient* and *accessible*. So far, there have been many attempts at achieving this aim, but none have been truly successful. I believe that this is because these reforms have only been dealing with individual manifestations, instead of tackling the core issues that they stem from. As discussed in the above section, the fundamental problem of healthcare is that the two-tier delivery system of hospitals and physician practices is severely outdated and limiting. And yet even now, reformers are only conversing about how to re-organize the current system or how to re-pool the available resources; changes which are mostly bureaucratic in nature. For example, the Health Maintenance Organizations that were designed a few decades ago in the USA, were on the surface very good ideas. In fact, as the name suggests, focus on the maintenance of health in community-like patient groups is exactly what we currently need. However, the HMO scheme never ended up saving significant amounts of money – it was limited by the hospital and practice structure.

Instead, I propose that the delivery of healthcare needs to take place through novel business models, that are better adapted for the nature of *precision medicine* and *chronic diseases* and that tackle the *supply-demand mismatch* of healthcare. Further, in order to truly solve the latter, I believe that a complete re-definition of healthcare and its public perception must occur.

Ideas for novel business models of delivering healthcare.

It is safe to say that the demand for healthcare will never go down. If anything, as populations age, the immediate demand will increase. Thus, in order to achieve easily accessible healthcare, we need to drastically increase supply. This cannot be achieved through increasing hospitals and physician's practices, which are expensive fee-for-service arrangements run by highly-trained physicians. Moreover, although hospitals and clinics are well-adapted to diagnose complicated and multi-disciplinary disorders, they are extremely inefficient at tackling chronic diseases, which patients often live with until death. This is especially ironic, as an increase in chronic diseases, such as diabetes, arthritis and Parkinson's, are hallmarks of our aging societies. For many such diseases, they need to be *managed* rather than *treated*²⁸. Hence, a fee-for-service system is simply unsuitable and these older patients add unnecessary extra burden to the already overwhelmed systems, reducing accessibility for others who do need a discrete, problem-solving service.

Thus, it will be necessary for new services specialized in the *management* of each specific chronic disease to be created. For example, instead of diabetics going into hospital every few

weeks or months for checkups, they can rather visit diabetes clinics more frequently; those with hypertension can visit centers that specialize in circulatory disorders. Such specialist centers will be able to handle a much larger cohort of patients, hence helping balance the supply-demand ratio, as well as allowing those with the same conditions to lend advice and moral support. As these novel *care delivery models* would be specialized for managing a specific condition, they can then move away from the traditional fee-for-service to a membership-based service, which can satisfy a larger demand at a fraction of the cost, whilst delivering a higher quality of care. Accordingly, reducing this burden of chronic patients on general hospitals will subsequently allow them to function more efficiently.

In his book *Complications*, Atul Gawande explores specialist centers that are beginning to arise in the US²⁷. These centers are small with only a few doctors, and focusing only on a very limited set of procedures, such as a hip replacement. Interestingly, many of these physicians do not have the full training in surgery, but have instead trained in the specific technique from an earlier stage. And perhaps surprisingly (at least within the old mindset of long programs of expensive medical training), these specialist centers often produce the best results in the country over even the top hospitals. Yet, the prices that they charge are much more reasonable, partly because these physicians are not as “highly-qualified” and also because these specialized centers can operate much more efficiently, in a similar way to specialized factory production lines. Such examples illustrate that in the realm of *precision* medicine, where physicians become more and more specialized, a traditional full-length medical education may be unnecessary. We do not need as many “problem-solvers” as in the past, but rather need more technicians and specialists. Becoming free from the dogma that doctors need to undertake a long training may be the first step in making healthcare affordable. Similarly, the *supply* of healthcare can be increased in this way by increasing the numbers of specialized *healthcare professionals* (this term was coined here to distinguish from the traditional highly-trained physician).

Re-definition of health and healthcare goes hand-in-hand with novel care delivery models.

The ultimate aim of healthcare is to safeguard the *health* of the *patient*. Hence it is another irony that modern medicine is designed to react to *illness* and is structured with physicians, not patients at its centre. We seek a doctor when we are ill, when we have symptoms, when we are supposedly *unhealthy*. However, this is not an accurate perspective on health and needs to change. As early as 1948, the World Health Organization defined health as “a state of complete physical, mental and social *well-being* and not merely the absence of disease or infirmity”²⁶. Even though this definition has been maintained for over 60 years, it has not yet been truly applied to healthcare systems. Most of us still regard the “absence of disease” to be health, which it is not. In fact, health is not a discrete description of state, but rather a continuous spectrum. Such a change in perception is essential for a whole generation of new care delivery models to become main-stream in healthcare. For example, diabetes is an illness. However, would it be fair to say that a diabetic who is managing his/her condition perfectly is still *unhealthy*? Hence, the

aim of the chronic disease centers mentioned in the above section would not simply be to treat *ill* patients, but rather to manage the *health* of a cohort of people who share a similar condition.

Patient centered healthcare would be truly sustainable healthcare

One of the problems with demand outstripping supply in healthcare is that patients have had to put up with poor value-for-money, long waiting lists, inconvenient and life-disrupting schedules, and perhaps most importantly, a system that is not so much interested in the patient's overall *well-being* but more so on treating an individual disease and moving on. However, as the supply-demand ratio begins to balance through novel delivery pathways, modern medicine will be more capable of providing adequate care at a more affordable price.

In recent years, the term *personalized medicine* has entered into the healthcare arena. This is in reflection of our newfound understanding that the degree of individuality in healthcare is startlingly great. Our knowledge of genetics is beginning to show that even for the same disease, there may be dozens of different causes, and that each individual may only respond to a specific treatment. Even now, with our limiting knowledge, medicine employs trial-and-error to solve problems. One treatment is attempted; if it does not work, the next known one is tried; then the next one and so on. This is obviously very inefficient, both financially and with respect to the medical outcome. Hence, for modern medicine to become more affordable, new models for delivering patient-centered, personalized care need to become prevalent.

The catch with personalized medicine is that it requires the gathering and processing of large amounts of data specific to each patient. At the current stage, such a project would be very costly, but with subsequent IT advancements, as well as careful ethical considerations, this will become a possibility. Perhaps, this may be achieved via "health management centers" whose objective is not to treat disease, but rather to monitor the health of each patient, discussing and identifying the patient's specific needs and taking relevant preventative measures. Moreover, such a "health managerial" service may become more and more important as healthcare begins to be delivered by a much greater variety of pathways, and patients would need a first port of call to direct them to their personalized needs. With respect to the Korean medical system where patients often direct themselves to specialist practices already, such a service will be of use in structuring their healthcare.

V. Strategies and challenges for solution implementation

The irony of healthcare innovation is that it has been attempted time and time again. Healthcare systems worldwide have been facing extensive criticism and scrutiny for decades and yet progress has been shallow. Perhaps, it is easy to be resigned to the expectation that healthcare is expensive and will remain so, especially concerning that it is an incredibly complex and essential

service and hence the demand will only ever rise. However, we should not forget that many other services and products that we take for granted today each had a phase where they were simply unaffordable²⁴. Air travel and automobiles were initially only for the rich; when first invented, computers were owned by a handful of institutions and could only be operated by highly-qualified, and thus expensive personnel. However, in each of these cases, there was a tipping point where suddenly they became much more accessible and affordable, such as the mass-production line of Ford and the invention of the microprocessor that kicked off the personal computer revolution. Likewise, once healthcare reaches its tipping point, healthcare can become much more affordable.

It is all easy and well claiming that something needs to change. However, in reality change is incredibly difficult, even more so in healthcare. Moreover significant policy changes in healthcare are not only unyielding, as evidenced by the prolonged political struggle of Barack Obama and David Cameron, but perhaps even dangerous²⁹. Rather, I feel that fundamental innovation requires the universal and disrupting power of Information Technology.

As the global population increases and as the western demographic shifts to the upper end of the population pyramid, demand for healthcare will only rise exponentially. Even with significant progress, supply will never be able to match demand for healthcare. Hence, it is simply too much to ask any healthcare system to successfully handle the health of the whole nation, without drastically increasing funding. Thus, the only real solution is for *health* to be put in the hands of the public. Just as the personal computer revolution allowed people without any expertise to start using computers, a “health revolution” needs to occur, where every member of society can themselves start managing their own health.

As discussed earlier, health management services would be an attempt at initiating such a patient-focused system. However, that system would not be truly accessible by the *whole* public. In this regard, IT has the potential to bring to every home, the medical expertise that was previously exclusive to those with years and years of training. Moreover, a universally compatible system of Electronic Medical Records is an essential step so that patients can be in awareness and control of their own medical history³⁰. Further, IT advancements could not only increase efficiency in hospitals and practices, but also provide the link between healthcare providers and patients. For example, through creative ideas for transferring information, such as interactive blood test results that would be much more accessible for the public without medical expertise³¹. Most importantly, IT has the power to go around the traditional barriers that prevent healthcare from innovating. It does not require difficult political movement, nor does it require significant financial investment as for other medical technologies, that end up adding to the cost burden of healthcare. Therefore, by harnessing the universal nature of IT, and as disruptive innovations begin to occur, sustainable medicine will become much closer to reality.

VI. Conclusions

As we have discussed in this essay, this topic of medical sustainability is incredibly complex. Not only are there many factors (each one complex enough to warrant a paper in its own right!) to why medicine does not function efficiently, there are no simple solutions, as only a change of the whole system will result in real, tangible improvements. Thus, the implementation of these solutions is another struggle in itself. Therefore, the aim of this essay has not been to provide answers. Rather, it has been to bring to this interdisciplinary table, the discussion on medical sustainability.

A search on Google for “medical sustainability” brings up several results on the environmental impact of healthcare. However, as defined by the UN World Summit in 2005, sustainability critically involves not only the *environmental* but also *economic* and *social* factors. Thus, this essay has aimed to bring a new understanding to the term *medical sustainability* and to explain why medicine crucially needs to be discussed in these terms. Medical sustainability is not simply a matter relevant for healthcare but for the whole of society. And this is why medical sustainability needs to be tackled not only by medical professionals but by professionals of all different disciplines. Therefore, it is critical for the young leaders of tomorrow to be aware of the massive lasting impact that the current unsustainable healthcare systems will have. The biggest social advancements following the Industrial Revolution of the 19th Century are often regarded to be universal education for all and the development of hygiene and social infrastructure. If nothing is done about healthcare, we will end up socially digressing.

However, with a combined effort, medicine can become affordable and sustainable; there is indeed a sustainable vision. With the help of the future scientists, IT innovators, politicians, economists, management professionals, and of course doctors, we can transform healthcare. I firmly believe that tackling healthcare is one of the great challenges for mankind in the 21st century. Already lives are suffering both in the developing and developed worlds, and societies await healthcare that is truly functional. I sincerely hope that this discussion of medical sustainability has been a significant first step in creating a sustainable vision of our future.

VII. Appendix

Other factors that lead to the expensive nature of healthcare

i) Demand for healthcare is increasing at an incredibly rapid pace.

Today, there are more than twice as many people in the world as in 1960, and this year, the global population is set to hit 7 billion¹⁶. Such exponential growth of populations will naturally strain healthcare. What is happening now especially in developed countries is that the Baby Boom generations of the post-war prosperity are now beginning to age and enter their senior

years. Thus, we are facing a greatly increasing cohort of patients with chronic diseases that are expensive to treat. As even developed countries are struggling with healthcare, unless working solutions are devised in due course, a humanitarian crisis will occur (or arguably already has) in developing nations with an uncontrolled population expansion and far less money than their western counterparts.

ii) Too much spending for end-of-life care.

Somewhat ironically, even on a micro-scale, healthcare spending distribution is lopsided. By this I mean that far too much is spent in a futile attempt to extend a patient's life for a few months, instead of on basic access to primary care that will have far greater preventative long-term consequences for far greater people. For example, 25% of US Medicare (public health program for senior citizens) spending is spent for 5% of patients who are in their last year of life¹⁷. What is worse, evidence suggests that such higher spending does not necessarily lead to higher quality of care¹⁸. This is not to say that we can disrespect the importance of the last few months of a terminally ill patient. Rather, it is that by re-thinking what is most important for the patient in end-of-life care, we can break away from the current dogma of extending their lives by any means, which are usually highly expensive and often physically and emotionally difficult for the patient¹⁹.

iii) Imperfect science and limitations of care delivered by fallible humans

One of the fundamental difficulties in medicine is that it is a system delivered by humans inevitably with a limited body of knowledge. In his book *The Checklist Manifesto*, Atul Gawande, Professor of Surgery at Harvard Medical School, discusses human fallibility with respect to medicine²⁰. In particular, there are three reasons why we may fail at what we set out to do. First, necessary fallibility dictates that there are some things that are simply beyond our capacity as humans – we simply cannot be perfect. However, even when things are within our realm of control, we may still fail due to ignorance, perhaps because there are gaps in our personal knowledge, but just as often because medical science can only give us a partial understanding of what is going on. In reality, there is *always* more to be learnt in medicine²¹. Moreover, there are many cases when what is observed in healthcare simply does not fit the current body of knowledge and leaves clinicians dumbfounded²². These cases lead to uncertainties within the medical system. Lastly, ineptitude is also prevalent when medical care fails. We may have all the knowledge that is required but we may fail to apply it correctly. These failures and inefficiencies in the system build up, often leading to unnecessary costs, due for example to incorrect diagnoses and mistakes even in routine procedures. And startlingly, a study late last year estimated the cost of such medical errors to be \$19.5 billion in 2008 in the US alone³³.

iv) Medical innovation is not leading to real cost-savings

One of the main causes of rising healthcare spending is ironically medical innovation and a perhaps misplaced public faith in technological innovation. In line with the complexity of medical science, both development and deployment of many high-tech medical products entail high costs. And many of these do significantly improve life expectancy and quality of life. Unfortunately, however, innovations that both increase the quality of care and decrease cost are incredibly rare, in contrast with many advances that only increase cost, without any significant effects on medical outcomes²³. Hence, the “medical arms race” is not the answer to healthcare’s problems, but rather often a detractor from what is more important, such as access to primary care.

VIII. References

¹The New York Times, *Obama Hails Vote on Health Care as Answering ‘the Call of History’*, March 21, 2010. <http://www.nytimes.com/2010/03/22/health/policy/22health.html?hp>. Note that ‘Affordable’ in the name of this legislation is from the perspective of patients, not healthcare as a whole.

²Health and Social Care Bill was first read to the House of Commons on January 19, 2011. <http://services.parliament.uk/bills/2010-11/healthandsocialcare.html>

³United Nations General Assembly, *Report of the World Commission on Environment and Development: Our Common Future*, March 20, 1987. <http://www.un-documents.net/ocf-02.htm>

⁴Wikipedia, *Sustainability*. http://en.wikipedia.org/wiki/Sustainability#cite_note-4

⁵United Nations General Assembly, *2005 World Summit Outcome*, October 24, 2005. http://data.unaids.org/Topics/UniversalAccess/worldsummitoutcome_resolution_24oct2005_en.pdf

⁶Organization for Economic Cooperation and Development, *OECD Health Data*, 2009

⁷National Health Expenditure Accounts Projections Team, *Health Spending Projections Through 2017: The Baby-Boom Generation Is Coming To Medicare*, Health Affairs 2008. Vol. 27 No.2

⁸USA Today, *Medical Expenses have ‘very steep rate of growth’*, February 4, 2010. http://www.usatoday.com/news/health/2010-02-04-health-care-costs_N.htm. Note of this \$2.5 trillion, roughly \$650 billion is government spending on Medicaid and Medicare, whilst the rest is accounted by insurance companies, employers and personal spending.

⁹Information is Beautiful, *The Billion Dollar Gram*, 2009. <http://www.informationisbeautiful.net/visualizations/the-billion-dollar-gram/>

¹⁰Steven B. Cohen and William Yu, *The Persistence in the Level of Health Expenditures over Time: Estimates for the U.S. Population, 2002–2003*, MEPS Statistical Brief #124, Agency for Healthcare Research and Quality, May 2006

¹¹CBC News, *In Depth: Health Care*, August 22, 2006. <http://www.cbc.ca/news/background/healthcare/>

¹²This is a Korean-language article from donga.com that reports the lower quality of Korean Intensive Care Units compared to other Asian nations, and gives financial deficit as the causal factor. Especially startling is the analysis by the Korean medical association that if Korea was to match the Japanese ICU regulations of 1 nurse for 2 beds and for fully qualified consultants to provide treatment, it would cost over 80,000,000 KRW per bed per year. January 12, 2010. <http://news.donga.com/Economy/New/3/01/20100112/25348307/1&top=1>

¹³Bill Gates, *How state budgets are breaking US schools*, TED 2011.
http://www.ted.com/talks/bill_gates_how_state_budgets_are_breaking_us_schools.html

¹⁴CBS News, *U.S. Heading for Financial Trouble?*, October 8, 2009.
<http://www.cbsnews.com/stories/2007/03/01/60minutes/main2528226.shtml?tag=contentMain;contentBody>

¹⁵World Health Organization, *The world health report 2000*.

¹⁶National Geographic, *Population 7 Billion*, January 2011. <http://ngm.nationalgeographic.com/2011/01/seven-billion/kunzig-text>

¹⁷Atul Gawande, *Letting Go*, The New Yorker, August 2, 2010.
http://www.newyorker.com/reporting/2010/08/02/100802fa_fact_gawande?currentPage=all

¹⁸Fierce Healthcare, *Study: Higher spending for end-of-life care doesn't offer higher care quality*, May 21, 2009.
<http://www.fiercehealthcare.com/story/study-higher-spending-end-life-care-doesnt-offer-higher-care-quality/2009-05-21>

¹⁹Robert Martensen, *A Life Worth Living: A Doctor's Reflections on Illness in a High-Tech Era*, (Farrar, Straus and Giroux, 2008)

²⁰Atul Gawande, *The Checklist Manifesto*, (Profile Books, 2010)

²¹Atul Gawande, *The Velluvial Matrix*, Commencement Speech to Stanford's School of Medicine, June 16, 2010.
<http://www.newyorker.com/online/blogs/newsdesk/2010/06/gawande-stanford-speech.html>

²²Atul Gawande, *Complications: a surgeon's notes on an imperfect science*, (Profile Books, 2008)

²³Bijan Salehizadeh, *De-escalating the Medical Arms Race: Why Lower Tech Is the Future of Medicine*, August 10, 2010. <http://thebij.com/2010/08/10/de-escalating-the-medical-arms-race-why-lower-tech-is-the-future-of-medicine/#comments>

²⁴Clayton Christensen, *Innovator's Prescription: a Disruptive Solution for Health Care*, (McGraw Hill, 2009)

²⁵KaiserEDU, *U.S. Health Care Costs*, <http://www.kaiseredu.org/Issue-Modules/US-Health-Care-Costs/Background-Brief.aspx>

²⁶World Health Organization, *WHO Definition of Health*, 1948. <http://www.who.int/about/definition/en/print.html>
The descriptions of *healthy* and *unhealthy* simply cannot be applied to many chronic diseases. For example, can a diabetic who is in good control of his condition still be described as *ill*, just because he has diabetes?

²⁷ Atul Gawande, *Complications: a surgeon's notes on an imperfect science*, (Profile Books, 2008)

²⁸ The Guardian, *NHS must reform around long-term conditions, says John Oldham*, June 14, 2011.
<http://www.guardian.co.uk/healthcare-network/2011/jun/14/nhs-reform-around-long-term-conditions-john-oldham>

²⁹ The Guardian, *Health chiefs issue stark warning over damaging effect of NHS reforms*, January 15, 2011.
<http://www.guardian.co.uk/society/2011/jan/15/nhs-confederation-attacks-reform-plans>

³⁰ How such development of Healthcare IT can take place successfully is another question altogether, as seen by Google recently withdrawing from its attempt at EMR. http://www.massdevice.com/news/goodbye-google-health-software-giants-emr-platform-shuts-down?utm_source=twitterfeed&utm_medium=twitter

³¹ Information is beautiful, *Visualizing Bloodtests*. <http://www.informationisbeautiful.net/2010/visualizing-bloodtests/>

³² Slate, *The Make-Believe Billion*, March 3, 2011. <http://www.slate.com/id/2287227/>

³³ The Wall Street Journal Health Blog, *Study Puts Cost of Medical Errors At \$19.5 Billion*, August 9, 2010.
<http://blogs.wsj.com/health/2010/08/09/study-puts-cost-of-medical-errors-at-195-billion/>

