

**American Healthcare in the 21st Century:
Business, Government, and Our Collective Health Futures
Ashwin Varma**

An Introduction to American Healthcare in the 21st Century

The recent implementation of the Patient Protection and Affordable Care Act, more commonly known and stigmatized as “Obamacare” has cast deep partisan and ideological divides across the citizens, media, and politicians of the country. However, as important as the law, which effectively tries to prevent a large number of uninsured populace, has been in both political and health delivery spheres, it clouds the true discussion of a broken healthcare system, the revisions to which are not discussed in the breakthrough act. To put it simply, we should collectively be aware of the truth that the ACA is not, nor should be, the end of health care reform.

To be sure, the ACA accomplishes one goal marvelously, that is, to reduce the overall number of uninsured individuals, by employer mandates and the imposition of penalties on those who do not sign up for private healthcare plans via healthcare exchanges if they decline to use employer sponsored health. As we attempt to evaluate the success of the law at stimulating young, new income earners in signing up for insurance, the American public, politicians, and to an extent Wall St. have forgotten about the next steps that need to be taken in improving a system that has not been magically cured by the passage of the ACA. There are a multitude of problems that still exist inside the healthcare system, but an extremely effective way of conceptualizing the problem is by comparing the sector to others in the international arena, such as the information technology sector. These comparisons demonstrate that the healthcare market does not resemble a “market” in the conventional sense, rather compiling a piecemeal monstrosity that exemplifies the worst elements of capitalism: (1) a lack of effective regulation encouraging entrepreneurship and value-driven profit, (2) opacity on the product-side that clouds effective decisions being made by patients regarding their health, (3) clouded decision making the profit side because of a complex and unnecessarily byzantine payment/insurance system that favors the status quo while dissuading more innovative business models. Competition, the hallmark of effective capitalism, is almost completely absent, with large hospitals, i.e. Partners in Boston, insurance companies, i.e. United Health, and pharmaceutical companies, i.e. Amgen forming a tripartite of status quo institutions that stamp out new entrants into the healthcare space, while continually raising prices, without offering a commensurate raise in the value of their services. These services often can be received at much lower costs at other health institutions or overseas, and often, indicators of good healthcare service are correlated not with an increase in the price of services, but a decrease.

The traditional model of commercial disruption, in which older companies, plagued with inefficiencies such as crippling prices, bad service, etc., are replaced by

newer technologies or business models, that can increase value for both the producer and the consumer, seems to be absent in the healthcare economy. Statistics support this view of the market; healthcare spending per capita forms over 15% of an average American's lifetime income, while value, as measured by clinical wait times as well as medical outcomes, is traditionally worse than many countries in the developed world, such as the Nordic Countries and the U.K. Insurance premiums can cost almost 60% of income set aside for other basic commodities such as rent and utilities. Although international corporations such as Amgen and Merck develop new and innovative drugs, they cost prohibitively large amounts compared to the average American's yearly income. The new Hepatitis C treatment Solvaldi costs a \$84,000 per treatment package-\$1000/pill, while new entrants into the healthcare market are driven towards pharmacology rather than more difficult agents of the future, such as genetic editing or increased immunotherapy. It is not difficult to understand why the most common form of bankruptcy in the U.S. is related to healthcare services. It is not an ideal situation, not only for entrepreneurship, as initial companies form the driver of increasing job growth and productivity, but also for the basic functioning of healthcare services. When functioning properly, the healthcare system is supposed to ensure a restoration of productivity, in which individuals who are unable to contribute to GDP production are restored to that ability. However, in the U.S., healthcare prevents individuals who could be inventing a new way of approaching data compression, or agricultural organization, or even living a normal life as a consultant, from contributing to the economy. Because of the arcane regulations and lack of competition in the market, those individuals who could be revolutionizing healthcare are more attracted to creating applications and video games in Silicon Valley, due to the ease of entrance into the market and lax regulation.

So what's to be done in the face of a seemingly endless problem? Well, instead of moving to pessimism, innovative doctors, scientists, programmers, and businessmen should be salivating at the lips. In other industries, technology, energy, agriculture, finance, much of the low-hanging fruit, those discoveries such as search engines, have been developed, gobbled by the Google, Microsoft, and Apple's of the world. But in healthcare, these seemingly initial innovations, i.e. specialization into specific services, such as dialysis, cancer, GI surgery, rather than a bulk commodity business, or wrap-around care for the geriatric to prevent hospital admissions, or even technological applications, such as providing effective health advice and data to patient-consumers, are all available for innovators to advance, if they can persevere. It will take extraordinarily educated, interested, and patient individuals to fight the system to implement these systems, but the ideas exist.

The health crisis is multifaceted, and can therefore be viewed from a variety of vantage points. This paper will attempt to focus on two areas, the emergence of new ways of organizing health providers, and the rapidly changing regulatory environment-surrounding healthcare. In short, this paper will attempt to provide insight into the business breakthroughs that will allow substantive changes to occur

in the system, and the regulatory implementations necessary such that potentially innovative methods of organization are allowed to flourish. Only a small amount of the paper will be assessing the various technological enablers of health in a vacuum. Rather, this paper will attempt to answer the question posed by the failed translation of potentially disruptive healthcare innovations into affordable healthcare. Ultimately, attending to the rapidly changing disease states that plague the country requires not only an analysis of novel breakthroughs in drugs, medical devices, and advanced diagnosis technologies, but a more multispectral approach that considers how companies and governments affect the outcomes of those technologies on our populations health.

The Business of Healthcare:

The Disruption Paradox and its Role in Transforming Industry

This focus on the ability to provide health insights in an affordable, populist manner can be generalized to a discussion of disruption. Critically, this term, “disruption” is not equivalent to “innovation”. Although novel technologies and ideas have been agents by which disruption of industries has occurred in the past, a newer, better, product does not always change or upset an industry, often reinforcing it instead. So what is disruption? Coined by noted Harvard Business School professor Clayton Christensen, disruption is defined as a process by which complicated, expensive products and services are transformed into simple, affordable ones that appeal to a broader set of individuals. It is critical to differentiate between an application of “disruptive innovations” and “sustaining innovations”. Sustaining innovations are breakthrough technologies that increase the speed, complexity, or performance of a product along the trajectory historically valued by customers. A plane model that flies longer with less fuel usage, televisions with greater resolution screens, or better batteries for mobile phones are all examples of sustaining innovations. Each uses very complicated scientific and manufacturing techniques to extract more value from an existing line of business. It is important to note that these innovations, while impressive, do not radically alter what the consumer expects to gain from a product. Respectively, a consumer still expects to fly from point A to B, or watch high-quality television, and make use of their phones for various tasks. However, occasionally a different type of innovation—a disruptive innovation—emerges in an industry. Instead of sustaining the trajectories of improvement in the original plane of competition, the product produced is not as advanced or complex as preexisting ones, but are rather simpler and more affordable, which allows them to take root in an undemanding application, as opposed to previous technologies, the increasing improvement of which makes access prohibitively expensive.

The theory of disruption has empirical precedent in almost every industry. However, in technology the term is used ubiquitously because of the close

relationship between disruption and the birth of the modern information economy. The Personal Computer (PC) was arguably the most impactful and famous example of the implementation of disruptive technologies and their relevant businesses. Initial mainframe computers, run by companies like the Control Data Corporation, had large marginal profits, up to \$800,000 per unit, and industry standards required that individuals who needed jobs done requiring computers would hire experts to understand and run tests. As PC's became more effective through technological advantages, and pioneering individuals realized how useful personal computers could be in improving the productivity of individuals of all types, rather than specific experts, novel companies used simpler personal computers to disrupt the large providers of mainframe computing power, charging only \$800 gross margins, but reaching to a much wider populace and therefore creating new markets that created Silicon Valley today. As with industry leaders in computing, those who have control of the healthcare institutions that exist in the status quo, insurance companies, large hospitals, even physicians to an extent, are always resistant to change and fight to crush it. More than any other sector, the backlash to change in the sector in health has received unprecedented backlash, and overcoming this backlash is critical to success in disruption.

Elements of Disruption

Disruption must contain three broad elements to succeed in displacing a previous industry standard: 1.) A Technological Enabler 2.) Business Model Innovation and 3.) A Value Network, along with regulations and standards that facilitate instead of stunt change. Technological enablers are typically sophisticated pieces of technologies, but built in a way such that complex tasks are routinized and standardized. Complex understanding is not necessary to *use* technological enablers; rather experts are only required to *introduce* the novel technology. Business Models however, are arguably the least understood elements of the health crisis. While novel technologies have been developed and monetized almost consistently since the advent of modern healthcare in the 1950's, many times, even potentially disruptive technologies have failed to do so due to the lack of a separate business model that ensures the profitability and incentive structure of the novel technology that allows for profitable delivery of simplified solutions to consumers. Business models must begin with a value proposition, a product or service that helps customers do more effectively or affordably, a *job that they have already been trying to do*, and follow with a formula that can provide this disruptive innovation in a profitable manner. Even companies that seem to "create markets" such as Facebook, only allow individuals to connect more effectively, a job that individuals constantly attempt to improve at. Business models lie at the core of disruptive technologies. A Value Network consists of elements outside the particular line of business of one corporation itself. Rather a value network is effectively an ecosystem that rewards the disruptive innovation by creating a set of linking and mutually reinforcing economic relationships between institutions such that

profitability and flourishing of business lines becomes possible. While that definition is somewhat esoteric, it is much simpler to couch it in historical terms. Continuing with the personal computer revolution genealogy, Integrated Business Machines (IBM), one of the only companies to radically enter the PC business, would not have been able to single-handedly introduce the PC into widespread use. Rather it required the development of Microsoft's Operating System Windows (software), along with a consumer population that found needs for computing power. The ecosystem of technological companies flourished in providing all the possible needs of the consumer. Any one of the ecosystem's participants, much like Microsoft alone, could not reinvent or disrupt the field. A systemic overhaul is necessary.

Applying the Framework of Disruption to Healthcare

What does this analysis of business have to do with healthcare? As with other fields, healthcare, despite marketing a somewhat unique commodity, is a business. Therefore, the framework for disruption applies in broadly similar manners. In the following section, I will attempt to detail several important concepts in each of the 4 necessary compartments of successful disruption. However, it is important to note that healthcare, unlike industries like dining, electronics, etc., will likely not conform perfectly to the disruption theory, due to status quo bias as well as the nature of the commodity that is health. The last discussion in this section will attempt to understand how and where healthcare might buck the disruptive trend.

Technological Enablers:

Healthcare is replete with novel discoveries. Those keeping track of pharmaceutical deployments will note the high level of competition in the Hepatitis C market, with the trademark drug Solvaldi proving to be quite effective at ridding individuals of the disease. However, the treatment package, *despite competition* from various providers, costs a prohibitive \$85,000. This anecdote illustrates the nature of technology in status quo healthcare; novel technologies rarely adapted into disruptive innovations, rather, they are sustaining innovations, that which increases the "value" of the service of pharmaceutical drugs within the current framework for disease treatment. They sustain the current way of practicing medicine.

Technology in industry refers to any novel piece of machinery, like a novel imaging engine, production process, or body of understanding about a molecular pathway that converts complex intuitive processes into standard, rules based work. This technology, when disruptive, is followed by the gradual hand off of work involving these technologies from expensive, highly trained experts to less costly technicians. It is quite simple to see analogous elements in healthcare. Technologies can refer to novel drugs that exploit new academic understanding of molecular pathways, or new biomarker techniques that lead to standardization in diagnosis, or even a novel method of performing routine procedures like bone fracture surgery. The

implementation of these technologies then can be passed from experts, or physicians, who are highly educated, and therefore highly rewarded, to physician assistants and nurse technicians, who can perform the non-intuitive work necessary in these more standardized processes. The problem that critics will immediately point to, is positing medical practice as a scientific process. “Medicine is an art, not a science” is an oft-repeated aphorism in healthcare. Truly, the data seems to support this fact. Over 60% of Diabetes II patients have blood sugar levels that place them at significantly elevated risk of developing heart disease and kidney failure. Blood pressure medications have been available for decades, and yet over 58% of patients treated for hypertension do not conform to the recommended target blood pressure levels. Placebos routinely work effectively in over 30% of patient samples. Despite our increasingly complex and accurate understanding of the human body, our ability to standardize medicine on a large scale has failed.

Medical treatment is not simply one step, rather, involving a transition from accurate diagnosis to effective treatment. This can be done with varying levels of specificity. This spectrum turns out to be critical in determining standardized technologies that can be applied to disruptive business models. As coined by the team of Christensen, Grossman, Hwang in 2009, medicine at its most artful can be called “intuitive medicine” as defined by conditions that can be diagnosed only by symptomatic evidence and the therapy for which is contingent upon the skill of the physician. On the other end of the spectrum lies “precision medicine”, which makes use of precise methods of diagnosis and predictably effective therapy. This spectrum is obviously incomplete, with most medicine falling into the realm of “empirical medicine”, in which pattern recognition is used to predict conditions with relative probability instead of absolute certainty. However, what is critical in this progression from intuition to empiricism to precision is an accurate diagnosis method that can be used consistently. Watching an episode of “House M.D.” will allow some insight into the working of intuitive medicine, as prescient and talented physicians create theories on underlying conditions affecting patients based on differential diagnoses of symptoms. Symptoms are a remarkably cruel method of diagnosis, particularly because the lexicon of symptoms the body uses is quite small. For example, a fever could signal a variety of conditions, from a general flu to Hodgkin’s Lymphoma. Hypertension, originally thought to be a disease state, is rather a symptom of underlying conditions, such as cholesterol buildup (which itself can be a symptom of genetic conditions), and as such symptom management, a hallmark of intuitive medicine cannot resolve the underlying health crisis. Any technology that moves from intuitive medicine to precision medicine, first in the realm of diagnosis and following into therapy has the *potential* to be disruptive in nature. However, more than often, these technologies, such as the MRI, do not transform the field in such a way particularly because they are confined to obsolete business models (which will be discussed later). However, there is hope for healthcare. Just as cancer and chronic illness represent the greatest drag on healthcare value and increase spending in the status quo, various infectious diseases played the same role in the early-mid 20th Century. Tuberculosis, cholera,

malaria, measles, etc., all once accounted for the lions share of healthcare costs, but they are now quite simple to cure and relatively inexpensive. One of the critical elements of medical technology being currently developed surrounds the genome of the human disease state. Unlike the limited vocabulary the body uses to express disease urgency on a macro-scale, at the level of nucleic acids, various gene and RNA expression levels (and their relevant proteins), the body has a remarkably specific and contextual manner of expressing distress. Genome profiling technologies tailored to specific drug responsiveness represents an exponential leap forward in the move from empirical medicine to precision, as diseases such as cancer, which currently evade total eradication, could be made to be treated in a more systematic, patient specific manner. And similarly, the cost of providing such services, provided by companies such as Illumina Inc. and 23forMe, is projected to reach \$1000 dollars per test in recent years. Although they are currently in the “mainframe computer stage” of disruption, with experts required to read and interpret results, and experts to run the tests, these companies represent hope that disruptive innovation in early disease diagnosis could be possible.

Such shifts in the locus of care seem impossible to enact, and indeed, without the necessary compensation from business model changes, they will be. However, there are countless examples of shifts from high-complexity procedures to lower cost, simpler ones. From angioplasties to pregnancy tests, both of which are among the cheapest and most widespread healthcare procedures, there is evidence of disruption in healthcare. What remains curious and ultimately problematic however, is that while individual procedures, and even large-scale sectors of care have been disrupted, the healthcare industry as a whole has remained stubbornly stagnant. There is every reason to believe that gradually there can be a shift towards a value oriented healthcare service, but it will require a focus on developing innovative business models and value networks that can create an ecosystem of value oriented health.

The Obsolete General Hospital Business Model:

Before understanding the business models commonly seen in general hospitals, which are bafflingly complex, this paper will endeavor to demonstrate the basic principles upon which business models are divided and organized. Business writ large, and in healthcare specifically, businesses are divided into three types, depending on the method by which they make profit and the way in which they facilitate performing jobs that consumers are attempting to do (Note: This theme of aiding the customer to perform a job they are trying to do more affordably and effectively will become relevant). They are as follows:

- *Solution Shops:* These institutions are structure to diagnose and recommend solutions to unstructured and subjective problems via deployment of firms’ resources, including extremely effective employees. Examples include law firms, consulting firms, and research and development organizations. These

firms charge very high fees and with a Fee-for-Service (FFS) payment structure because the nature of their work is highly complex and success rates cannot be predicted with a high degree of accuracy. You will notice large similarities between the work done by lawyers, educators, and consultants to the “intuitive” medicine practiced by physicians in that it requires pattern recognition, expert knowledge, and potential trial/error. Diagnosis via MRI/CAT scans and symptoms by expert physicians and delivering various drugs/therapies in a hypothesis cycle are medical tasks that fall under this realm. Also take note of the FFS payment structure, which has become a large drain on the medical system’s efficiency and affordability

- *Value Added Process (VAP) Businesses:* These businesses transform inputs of resources, including people, energy, equipment, capital, etc., into outputs of higher value or usefulness. Most manufacturing businesses, including automobile and petroleum engineering firms, as well as retailing and dining, fall under this category, Work is traditionally done in a repetitive, sometimes monotonous ways using a proven excellent method, which allows them to consistently deliver high quality services and products at lower costs. Contrary to what many may believe about the “artful” nature of healthcare, there are many medical events and procedures that can be verified ahead of time and used to produce standardized therapy. Retail clinics such as MinuteClinic or RediClinic, specialty hospitals like Shouldice Hospital, and even certain units of larger hospitals like The Cleveland Clinic all classify as VAP businesses in the healthcare industry.

- *Facilitated Network Businesses:* In the advent of the Internet era, firms can provide services as part of a network, as opposed to simply selling defined goods like TV’s, cars, or software. Facilitated networks harness exponentially developed forms of communication and interconnection to operate systems in which customers buy and sell or deliver and receive things from other participants. Typically, these businesses turn a profit via consumer data based advertising, membership, or transaction fees. Retail giants such as Amazon, Alibaba, Ebay, and even companies such as Facebook all classify as facilitated networks. In healthcare these institutions represent the future of the industry, as aspiring venture capital funded firms like CareMessage and HealthGrades are beginning to create platforms to connect patients to care providers more directly, as well as aid physicians and hospitals in maintaining patient wellness, as opposed to responding to crisis. These businesses are exploding in the healthcare market as effective ways of responding and solving many of the problems facing medicine in the status quo.

Medicine rarely ever follows a business model that is confined to one of these models. While this may seem innocuous at first, an effective and homogenous business model is the critical step in ensuring that goods and services are provided at profit, and in a way that can reduce overhead costs to provide those goods at prices consumers are willing to pay. Because hospitals and insurance giants have leverage in the relationship with the patient, they are able to coalesce multiple businesses and yet create business models that are *not efficient* and therefore overcharge for almost every routine treatment. However, this may seem odd. The hospital is the staple institution in healthcare. Field hospitals have been used to treat general conditions since antiquity, and archeological excavation has demonstrated the existence of quasi-medical facilities dating back to the Mohenjo-Daro and Harappa city-states in the Indus Valley. It might be curious then, to criticize and argue for the substantial reorganization of a structure that seems to be conserved throughout history. Hospitals have effectively become large commodity businesses—they try to treat every possible conditions and in the process of doing so, lose specialty, a hallmark of good businesses, and acquire large overhead operating costs. This is compounded by the known fact that much of the capital necessary for operation in healthcare, such as MRI Machines, doctors themselves, lab tests, etc. is expensive and therefore makes the creation of commodity businesses that treat all possible ailments prohibitively expensive. “And by focusing on a single thing, overhead costs can be very low.”

However, the organizational paradigm of the general hospital, defined as institutions that attempt to cater to every patient need, coalesced in an age of purely intuitive medicine. The history of the hospital demonstrates that they were necessary to provide therapy for diseases in which there was no effective diagnosis or therapy. That is, the entire hospital was a solution shop. But the hospital has evolved as a business, and in a way that while has allowed it to become generalized commodity businesses, has covered that increase by charging crippling prices. Hospitals evolved with technological and scientific progress to include standardized processes and even facilitated networks into one institution. Amazon has recently learned how difficult it can be to add different business models into an existing company, with its hardware oriented division, producing the Amazon FirePhone, returning net losses across the board. Recall that business models are supposed to aid the consumer in a job they are trying to complete in the status quo, but do so in a way that is more convenient, more effective, and/or more affordable. While famously successful companies such as Coca-Cola and Starbucks have adopted lean business strategies that begin with one value proposition, one job, hospitals, unaffected by market forces that normally affect companies, have eschewed that logic. They have instead, as mentioned previously, “tried to do everything for everyone”. And while that seem desirable or even obligatory in the case of health, it is not what patients need. In addition, because healthcare has become so centralized into these hospitals, with a lack of viable alternatives in the market, large hospitals have used FFS payment structures for even routine procedures,

adding to the costs that must be passed to the consumer, either through higher deductibles, or through crippling up-front payments. In addition, this has given hospitals and physicians a perverse incentive to care by giving “more” care, as opposed to the “best” care. As you can see, this is not the ideal method by which healthcare ought to be structured.

So how should hospitals be restructured and disrupted? We must first acknowledge that there will always be a need for general hospitals. Even if lines of business that can be done more affordably by competitors do emerge, for emergency situations, and for terminally ill patients at the precipice of multiple conditions, an institution that acts as a solution shop and contains large emergency crews as well as a variety of testing equipment will be necessary. These individuals will firmly be ensconced in the regime of intuitive medicine intrinsically. However, large general hospitals will give way to community hospitals in cases of emergencies, as these hospitals will be specifically tailored to ameliorate conditions related to emergencies, strokes, heart attacks, etc. However, the general hospital, which serves all possible patients, must be reformed.

Hospitals must deconstruct their activities and separate different lines of business into separate units, each with a business model that is tailored to the particular value proposition in question. This can be done in a multitude of ways, either by the diffusion of these businesses away from large hospitals entirely, or by creating hospitals-within-hospitals. Cost accounting and profit formulas must be unique to the particular diagnosis and treatment in question. This, while allowing for standardization where possible, also breaks the monopoly on Fee-For-Service payment structures that are responsible for overarching high healthcare costs. Of course, there will be certain conditions, e.g. Alzheimer’s, ALS, etc., which will be beyond this move. Therapies and more importantly diagnosis for these conditions has yet to be developed, and therefore they remain firmly in the realm of intuitive medicine and experimental trials. However, the bulk of healthcare costs and inefficiencies in a hospital do not stem from these incurable plagues. Rather, they are derived from two main sources: elderly care management and childbirth, easily the two largest health expenditures in the average person’s lifetime. Therefore, it is possible for this specialization to occur. The delivery system, the payments system, and types of locations from which health services can be procured have to be knit together in a new and optimized way. This is still integration, but it is integration based on a single value proposition, a single, predictable method of progression from diagnosis to therapy for one or more conditions, as opposed to the amalgamations created by modern general hospitals.

Critics will immediately point to the inability to sustain pure solution shops without the tangled web of government programs and subsidies of the status quo. They will argue that in the status quo, the expensive equipment and treatments needed to perform intuitive medicine is subsidized by higher prices for all treatments. However, pure solutions shop clinics and hospitals are beginning to arrive. For example, The Cleveland Clinic has created institutes within the overarching structure of the clinic that are focused solutions shop. These include

heart and vascular institutes neurological institutes, each dedicated to a specific form of intuitive medicine conducted in the most efficient manner. For example, in the neurology division, neurologists, psychiatrists, neurosurgeons, and other necessary individuals form a team of individuals that can consider the multiple intersections of various conditions and therefore tailor the most effective course of therapy. There are multiple, effective minds working together in an intersectional manner to discern a solution to the problem plaguing the patient. This can be contrasted to the status quo, in which individuals see individual physicians one at a time, from general practitioner or primary care physician to surgeon to physical therapist, each offering potentially differing diagnoses and medications. Not only is this not efficient for the patient, but it is economically maddening. Not only are tests such as MRIs, CT Scans, and Lab work *repeated* for every individual physician practice or hospital, but the patient can be prescribed different modes of therapy that fail to aid his or her recovery and put an unnecessary cost burden on the patient. In coherent solution shops, procedures are knitted together across relevant organ system specialties and a singular and coherent diagnosis is put together, after which therapy can be tailored, either in an experimental basis if there is no definitive diagnosis, or on a standardized, fee-for-outcome basis. In the status quo, these coherent shops exist in a few locations only, and while some diffusion is inevitable, these intuitive businesses are less likely to coalesce into large-scale operations that can be available readily. But it is not too expensive for average individuals to travel to distant solutions shops. The two thousand dollars for a round-trip plane ticket are a pittance to the system compared to the thousands of dollars spent on wrong prescriptions and repeated test. In addition, some entrepreneurs such as Jonathan Bush of AthenaHealth argue that if individual solution shops can capture the majority of demand in a certain market, these travel costs could be subsidized by the companies themselves, lowering the cost per patient further. However, irrespective of these potential gains, an accurate diagnosis ensures that patients don't waste money and waste time solving wrong problem. Fee-for-service is to be expected in these institutions, but because of the dedicated effort to solving problems with one goal., the services needed an be reduced an hence the prices.

However, these "pure" solution shops represent arguable the smallest change that could be enacted in the modern healthcare economy. Critically, expenses, both for businesses, and for patients, can be reduced through the exporting of basic, standardized medical processes to VAP businesses, either started by hospitals themselves, or created by external companies. These "specialty hospitals" have traditionally been seen as negatives for healthcare, opposed by the lobbying efforts of the American Hospital Association. But this classification is a faulty one. Concerns that primary care physicians would direct patients to those private specialty chains in which they had financial interests, as opposed to that which benefited the patient, dominated the discussion. It is important to note that these concerns have not been completely remediated. Regulation encouraging the formation of these specialty clinics by restricting the financial stakes physicians

takes in external institutions might be necessary. On balance however, these institutions can put processes into place that integrate the work of multiple specialists in a way that optimizes delivery of the value proportion. These clinics are healthcare's equivalent to the factory in the industrial revolution. Stunningly, healthcare, for all its high-technology developments, has yet to implement a process analogous to the assembly line, the most basic task in the formation of modern industry. Surgery centers, both inpatient and ambulatory, centers that conduct many types of surgery or just one: all are examples of standardized VAP businesses. As long as the diagnosis is standardized, and the surgical or treatment method has been standardized such that costs can be paid for outcome, these centers are viable. The job-to-be-done in these businesses is usually treatment. Diagnosis has usually been made, or is made in-house, and the patient is looking for the problem to be fixed as effectively conveniently and economically as possible. These VAP hospitals would have to optimally integrate the entire treatment (and possibly diagnosis) process, from preadmission preparation to surgery to the rehabilitation to discharge. These specialty hospitals may seem to be "elitist", and certainly, it is understandable, given that these institutions are brazenly for-profit, and private. However, a hernia repair at the privately owned Shouldice Hospital entails a four-day visit in a country club-like setting, but can be done for lower cost than CPT #49560, the standard insurance reimbursement for hernia repair. In addition, complication rates, normally around 5-10%, are 0.5%. Unlike many private institutions catering to the wealthy, these institutions, because of their specialization in providing one service, must axiomatically offer their services at prices that a large amount of the populace can afford. These clinics likely do not get the benefit of large reimbursements from insurance companies, and therefore they are incentivized to offer their services at lower prices. Ultimately, as you will notice, the reimbursement system *must be* reformed in order to institute a modern healthcare system (consider the necessity of a value network ecosystem to allow new business ideas to flourish), but this separation of business models into focused firms is possible and desirable.

Ultimately, the hospital will no longer occupy the center of our healthcare experiences as patients. Disruption, at its ultimate forms, uses standardization and simplicity to decentralize previously expensive and complex technologies. This move towards decentralization has taken place in almost every industry, particularly sectors reliant on high technology. However, unlike the technology sector, in which we can all use laptops, smartphones, and GPS, health is much more dangerous. The commodities in question are life and health, things that patients, while desiring a greater role in controlling, will never be able to interpret without physicians, physician assistants, and nurses, those individuals who have put in the education and training to interpret results of MRI's. So while the hospital will be disrupted, the number of physicians will decrease, and the number of assistants/technicians increases, the field of health will always be expensive and its pioneers well paid. The doctor is an indomitable figure. No matter how much control and how decentralized our interactions with health are, be it in physician practice chains, or

even our own homes through the upcoming telemedicine and mobile medicine revolutions, the patient will revert to an expert to give counsel and direction. However, the cost of health is critically not dependent on the payment of doctors. The vast majority of costs in healthcare are associated with business inefficiencies and the positively arcane payment systems and companies that populate the healthcare landscape. Therefore, we can be sure that displacing the hospital will not threaten our health experts and health outcomes. However, it is true that esoteric procedures will become more expensive, as they cannot be cross subsidized by overcharging FFS payments on routine treatments and are therefore forced to carry their own overhead cost weight. Ultimately, it might be required for the government to collectively bargain down prices for the few esoteric procedures that remain fixed in intuitive medicine. In addition, if large institutions form chains and conglomerates, the cross-subsidization is still somewhat possible. After all, the Cleveland Clinic, while organized into several different businesses, is still one organization that can move profits around to ensure that intuitive medicine for completely unsolvable conditions like ALS do not remain prohibitively expensive. And hospitals will fight. The instinct of every leader is to frame disruption as a threat, and rightly so. Expecting expensive hospitals to become more cost efficient is hoping for the best when empirical evidence denies that optimism. Affordability will come from disruptive innovations not from the status quo.

The Age of Big Medicine and Chains

Medicine has long resisted the productivity revolutions that transformed other industries, particularly the advent of the Internet and information technology. Although the previous section of the paper explored ways of disrupting the various hospital models, particular the general, community, hospital model, this trend towards disruption of the status quo by new, unknown players, similar to the way Google emerged is not the only one. In fact, many argue that there is an opposing trend, towards the creation of healthcare chains*. These chains aim to achieve many of the goals set out previously in this paper, but focus on the synthesizing the advantages of standardization and enormous size to improve quality and reduce prices.

Throughout this paper, a comparison has been drawn between the development of healthcare and other industries, particularly the technology industry. In understanding the mergence of chains, a comparison to the dining industry, particularly dining chains like the Cheesecake Factory, which eighty million people per year, is useful. Clearly the experience at these restaurants is not “elite” or worthy of “five-stars”, but they run consistently at capacity and have captured the imagination of the nation because the chain is reasonably fancy, produces “good” food that appeals to a variety of interests, and critically, because no entrée costs much more than \$15. Hospitals in the status quo, are attempting to provide the range and quality of healthcare services analogous to the Cheesecake factory, but charges prices similar to a five-star restaurant. In every one of the

restaurants, waiters are efficient, friendly, and obsessed with good service. Doctors are often overworked and impolite, and a recent survey of the health profession found that individuals almost unanimously recommended against joining the professions. The highly sacred relationship between doctors and patients has been eroding under the façade of increased paperwork and casework a product of the FFS system. These contrasts in critical areas of service highlight the problematic nature of healthcare in the status quo and how the move towards massive chains can paradoxically resolve them.

These chains quite obviously engage in mass-production, but despite the huge shipping lines, sacks of potatoes, and shipped ingredients, etc., nothing smacks of processing. The food is not pre-made, although it is constructed in a factory line mechanism, standard, but also monotonous, and without creative flair. In medicine, too, doctors and their retinue are trying to deliver a range of services to millions of people at a reasonable cost, and with a consistent level of quality. Unlike many other fields, medicine has been unable to deliver upon this promise. Every clinician has his or her own way of performing even the most basic of medical procedures, and the rates of failure and complication for a given service routinely vary by a factor of two or three, even within the same hospital. In addition, patients, especially in low-income communities, are not aware of the schedule for seeing a doctor, whether the doctor is reasonably good, or whether there is a cheaper option in a reasonable area. . Even physicians have yet to elucidate a way to determine whether a doctor is “good” or not beyond intuition and personal knowledge. In short, there is much negative variability in the quality and cost of healthcare.

The critical mechanism by which chains facilitated the move from the “upscale dining” market to a middle-class area, tailoring to a large group of individuals, was size. Size is the key. Larger size, beyond allowing the chains to access a larger market, give the companies greater buying power, allows them to centralize common functions, and allows them to adopt and diffuse innovations faster than they could if they were a bunch of small, independent operations. This is analogous to the development of large technology firms, Microsoft, Apple, etc., and before that Intel, IBM, etc. Atul Gawande states: “One can bristle at the idea of chains and mass production, with their homogeneity, predictability, and constant genuflection to the value-for-money god. Then you spend a bad night in a “quaint” “one of a kind” bed-and-breakfast that turns out to have a manic, halitoxic innkeeper who can’t keep the hot water running, and it’s right back to the Hyatt.” This principle, known as building “**economies of scale**”, has yet to be implemented in healthcare delivery (although it should be noted, that the practice has been used in healthcare manufacturing, such as the creation of pharmaceutical drugs and medical devices). Physicians are usually self-employed, working out of many private practices, making communication between various specialties difficult. The move away from a focus on acute injuries and towards complex, multifactorial, and chronic conditions associated with an aging population has made the ability of seamless communication even more important to generating affordable healthcare. This size is important in centralizing that communication between different

specialties of medicine. The concerns of an aging population will eventually make companies that can provide holistic solutions profitable.

The move towards chains has already begun. Hospitals used to be very regional, particularly contextualized to a given community within driving distance. However, they are now combining into large conglomerates. As noted surgeon Atul Gawande states in his New Yorker piece “Big Medicine”, “According to the Bureau of Labor Statistics, only a quarter of doctors are self-employed—an extraordinary turnabout from a decade ago, when a majority were independent. They’ve decided to become employees, and health systems have become chains”. Examples of this phenomenon include the synthesis of Partners Health in Boston (A combination of Brigham Young’s Women’s Hospital and Massachusetts General) and its competitor Steward Health Care System.

Steward’s model of business model is an interesting case study for modern healthcare trends. The company was built when a private-equity firm named Cerberus bought 6 failing catholic charity hospitals in Boston in 2010, and has begun to (it has continued to buy distressed hospitals) build the Southwest of Medicine: a “network of high-quality hospitals that would appeal to a more cost-conscious public”.

But the question remains. Is this good? Is it desirable? There is a large debate over whether chains as a vision of our collective health futures are a positive one. After all, in the midst of increasing inequality, the specter of “too big to fail” banking, and dispossession of the poor in society, there is much rightful skepticism directed towards the ability of “big business” to result in social good. In one sense, the answer is a resounding “yes”. As mentioned previously, there are advantages to size: efficiency, access to a large markets such that even expensive items or services can be offered in a relatively cheap manner, quality of standardization, etc. However, there are disadvantages as well. Size is one reason why our healthcare system is effectively locked to entrepreneurs and innovators. Large firms can employ lawyers and clerks to master the stunningly complex payments systems considered by most insurers. Insurance companies often won’t even pay for the services offered by newer entrants to the market, which makes it such that individuals cannot access new disruptive companies even though it might be cheaper and/or more effective to do so. In addition, as firms command more power in the market, there is no incentive to maintain the lower prices and affordability of size. Large research hospitals such as MD Anderson and Partners have no incentive to decrease prices, because large prices, although a problem with the healthcare system writ large, will not discourage individuals from buying healthcare—even if you don’t have insurance, or don’t have the bank to afford care, you will be treated, because life is so unlike any other commodity. In addition, the phenomenon known colloquially as the “top-corner” pricing effect could ensure that large healthcare players, as their market share increases, charge more for their services due to the lack of competition that arises from domination in the market. Any firm that attempts to offer services in a more affordable way will be crushed by the size of the system necessary to survive.

But there are other trends that also occur as a result of the move to chains, but also as a result of governmental implementation systems such as the ACA. The first is a move away from the “Fee for Service” payment method. The Fee-For-Service payment system is one in which doctors are paid per good and service provided to the patient. Every packet of saline and every tip of a syringe, to every procedure performed, is charged. This system contains some obvious flaws. It rewards unnecessary treatments and fails to price procedures appropriately. Cost is neither coordinated nor holistic, much like the care we receive. The consequence is the system we have, with plenty of individual transactions—procedures, tests, specialist consultations—and uncertain attention to how the patient ultimately fares. It also creates a perverse incentive for treatment, with hospitals rewarded for provided volume of treatment not quality of treatment. This is beginning to change. Large insurers, pressured by growing health consciousness and the ACA, are attempting to link clinical performance to compensation. The more the hospital exceeds its cost-reduction and quality-improvement targets, the more money it can keep. If it misses the targets, it will lose tens of millions of dollars. This is a radical shift. Accountable Care Organizations are attempting to set targets for clinical indicators which physicians and providers have to meet in order to be reimbursed (This will be discussed in-depth). This radical shift is only one of many.

Noted healthcare thinker, Atul Gawande, often uses the analogy-comparing healthcare to the Cheesecake Factory. The restaurant has worked out a staff-to-customer ratio that keeps everyone busy but not so busy that there’s no slack in the system in the event of a sudden surge of customers, using 97.5% efficiency of ingredients. This is a juncture in which data analytics becomes extremely important, and another technology, which has been adapted to maximize production and profits in many businesses, but is alien to the world of medicine. He states, “We don’t have patient forecasting in my office, push-button waste monitoring, or such stringent, hour-by-hour oversight of the work we do, and we don’t want to.” The Cheesecake Factory employs individuals to calculate the given demand for a certain day and order only enough materials to cover that demand, within reasonable bound.

These failures of medicine contribute to an unstandardized, and disjointed healthcare system that even insiders cannot fathom. Rankings of hospitals or institutions don’t usually mean anything. Even doctors don’t have information necessary to making a choice. A place may have a great reputation, but it’s hard to know about actual quality of care, and more critically the cost. MD Anderson provides world-famous cancer therapy, but for less affluent patients with non-specialized cancer conditions, there are more affordable local hospitals that provide relatively equal therapy. Unlike some countries, the United States doesn’t have a monitoring system that tracks annual statistics for various procedures. Even within an institution, surgeons and other practitioners take strikingly different approaches to conditions that do not lie in the realm of precision medicine. From cancer to joint replacement procedures, they use different makes of artificial joints, different kinds of anesthesia, different regimens for post-surgical pain control and physical

therapy. Absence of information is devastating to objective performance and standardization. Patients and doctors tend to go with choices we are familiar with or by reputation that may or may not be correct. This is not efficient for the patient, who may be sacrificing money as well as value. There is a simple, but difficult to implement method by which companies implement change: Study what the best individuals or groups do, figure out how to standardize it, and then try to get everyone to follow suit. This change has not been applied to medicine. Good and novel ideas still take excessive amounts of time to trickle down and achieve saturation rates in medicine. One example comes from heart attack prevention. The average time for even beta-blockers to reach a state in which nearly all practitioners prescribed them, known to increase the rate of survival after heart attacks, was 15 years according to a New England Journal of Medicine study. Scaling good ideas has been one of our deepest problems in medicine. All of these seemingly disjointed problems interact with the move to chains. Chains formed in other industries are able to integrate the analogous concerns and propose solutions to them because of their size.

But what of the art of medicine, some will ask. There are founded concerns that size will have negative effects on the doctor-patient relationship. These concerns mirror the conundrum healthcare is experiencing writ large. We as a nation reflect that surgery is fast, efficient, and healing times are decreasing overall. Nurses are variable, intelligent, and physicians impressive, dedicated, and involved. And then we ask, “so what’s wrong? Doctors are wary of “size” being the solution to the healthcare crisis. Ethnography of the opaque field has revealed that many doctors see and recognize this problem. A recent survey by the Commonwealth Fund demonstrated that 8/10 physicians are “somewhat pessimistic or very pessimistic about the future of the medical profession 2008, and only 6 percent “described their morale as positive”. Beyond just the concerns about the performance of healthcare systems, it is the concern that medicine is not responsive to patient’s needs. Experience of patients rarely enters the equation of healthcare reform. Atul Gawande states, “This absence [of discussion of deeper reality of disease] matters, because how patients feel about their medical interactions really does influence the efficacy of the care they receive, and doctors’ emotions about their work in turn influence the quality of the care they provide”. These concerns however, cannot be remedied without a move to chains. Our current system prevents those individuals who were drawn to medicine because of morals and ethics, the desire to help people, from exercising this empathy, and makes them technocratic. The solution to this equation, therefore, may be counterintuitive. The solution will require fewer doctors, and more integration that allows doctors to spend time with patients, not paperwork. Disruption of a system that has made this loss of empathy possible is critical to establishing a new one that can resuscitate it. Think back to the example of the Cleveland Clinic. Because the business units of these hospitals are separated, with dedicated lines for each condition, physicians are able to devote their attention to one patient and create the best service

conditions for that one individual. It is paradoxical that our healthcare futures should be entrusted to faceless chains, but at their heart is a framework for allowing the best practices and most efficient care to work.

Whatever the industry, an increase in size and control creates the conditions for monopoly, which could do the opposite of what is wanted and necessary: suppress innovation and drive up costs over time. But we cannot remain stagnant. We've allowed healthcare to provide us one-star service at a four-star price. Many see danger of a move towards faceless corporations controlling our healthcare. And yet, when we consider our health future, we gaze towards auto-manufacturing and dining for our solutions. How soon will these new business models effectively work? It is difficult to say. But there is hope that a move to chains will facilitate the healthcare that we as a society need.

The Government Question:

On The Role of Government

“What of the government?” some will ask. Truly, the debate over healthcare has devolved into lazy narratives, that is, “Big Government vs. Crony Capitalism”, in which politicians and even healthcare professionals either bemoan the interference of the government in their healthcare practices, or complain that the government has not completely taken over healthcare a la the Nordic countries. The government has an important role to play in healthcare markets, simply because health is unlike any other commodity, food, or technology, but rather, our lives themselves, but also because the government can be an impressive force to fix several of the problems ailing the healthcare system. Although this will sound like sacrilege to those prescribing a healthy dose of laissez-faire capitalism to the healthcare system, government policies such as collective bargaining with healthcare companies to reduce prices, as well as fixing several arcane minutia that exist in the regulatory system arguably the most important steps that need to be taken in revolutionizing health care, more so than any of the individual business ideas mentioned above. Medicare can often access the lowest prices for those individuals under those plans due to the power the government wields to affect businesses' prices and effectiveness, in this case in a positive way. However, the government often get's in its own way so to speak, and begins to uphold practices that kill innovation and create gridlocked competition, in much the same way it promotes competition and reduces prices under some plans. We can't simply allow the government to assume all of the healthcare services, but it should, as a framework in which value can be promoted, not detracted. Doing no harm, the fabled Hippocratic oath, has failed to keep up with the times, and is simply preserving the status quo. In medicine, this is the ideal by which health decisions are governed, but the time in which we can use it as an excuse to prevent change has passed; we don't have a choice, now.

In most highly industrialized democracies individuals do not derive healthcare from employers like in the U.S., because the system produced far too many individuals who did not have coverage, especially in times of economic hardship. Many of these democracies transitioned to primarily government organized, or nationalized, healthcare systems, most famously in Canada, the United Kingdom, and France. The U.S. however, has resisted these trends, primarily due to the influence wielded by the formative years of American healthcare. In the 1950's, nationalized healthcare was seemingly not needed, but was also opposed by a coalition of hospitals, businesses, and physicians invested in a system of employer-based healthcare. This healthcare system, in which employers provided privately delivered insurance of varying benefit (preventive care, prescription drugs, inpatient care, etc.) to employees, was based on an industrial America in which full employment and stable hierarchies from which individual actions could be organized were the norm. An image of a highly unionized, high-wage, General Motors workforce comes to mind. In addition, employers actively desired the ability to provide health benefits, as they were (and remain) a critical incentive for hiring skilled and talented workers. It is important to note that while a move to a nationalized healthcare system (in which care would be financed and/or provided by the government) was popular with the public, it was not needed desperately. A variety of factors that held unemployment levels low and allowed employees to collectively bargain for health-related benefits allowed a primarily privately financed and delivered system to flourish with some input from government financed programs such as Medicaid and Medicare. However, these forces did not persist. Although this paper will not actively address the reasons why these conditions deteriorated, from 1970-Present, much of the U.S. workforce transitioned to a lower-wage, non-unionized, base, with much higher unemployment rates, undermining the thesis of the post-war healthcare system. In addition, higher technology, along with generally higher healthcare costs, charged by hospitals and physicians ensured that even if individuals were employed, especially those in low-wage sectors, there was no guarantee of coverage. The government, via the Medicare program, filled the gap in private insurers for elderly individuals initially, due to the simultaneous conditions of retirement, removing their eligibility for employer-based insurance, and high proclivity for illness, which disincentivized private insurers from even offering these individuals coverage. Eventually, in the 1960;s, the government, via the Medicaid program expanded care to those in extreme poverty, those likely to be both unemployed and unable to pay the insurance premiums required by private insurers. These programs, set base rates for reimbursement of physicians and hospitals for certain procedures, and paid for an actuarial value, covering around 47% of expenses. Therefore, while there was increasing government input in financing healthcare, the U.S. system remained, by the onset of the 21st century, the most heavily privatized healthcare industry in the world.

How does the Affordable Care Act fit into this historical genealogy? The ACA attempted to use several core concepts to reduce the overall level of uninsured

individuals in the populace. The main issue intrinsic to the employee-based model of healthcare delivery remained its tendency to produce a high number of uninsured individuals. Private insurers were not required to insure many broad ranges of individuals, including those with a pre-existing condition, and therefore were very risk-averse in extending coverage to these individuals. The ACA introduced the concepts of “Individual Mandate” (all individuals were required to enroll in an insurance plan or pay a penalty), “Employer Mandate” (businesses that employed 50+ individual were required to provide access to a health insurance plan), and requirement that insurance companies provide coverage irrespective of pre-existing condition to address these problems. It did so without abandoning the market or transitioning to a nationalized system, because even though individuals are required to purchase insurance, private insurers still finance care, and provide it. In addition, built to address the post-globalization death of the “employment for life” economy of the U.S., health insurance is now portable, able to be accessed without ties to an employer, through the use of “Healthcare Exchanges”, in which insurance plans can be bought from private insurers. The ACA effectively removed the opportunity cost between health and economic productivity, by ensuring that unemployed individuals would not have to choose between health and producing a valuable good or service. However, these efforts are neither perfect nor beyond criticism. And while these efforts have begun to address the health crisis, they have left several areas woefully incomplete, including improving competition, streamlining Medicare/Medicaid reimbursement systems to allow new entrants into the market, and generally have failed to create a system that encourages affordability. The following sections will attempt to address those questions.

The Singapore Model compared to the Affordable Care Act

Because the U.S. healthcare system charges more and receives less stellar results than international competitors and because its highly privatized service contrasts ideologically with more nationalized systems in other industrialized nations, one of the first steps in analyzing a comparatively broken U.S. healthcare system is often to compare to that of other countries. However, one country that is usually not used in these analyses is Singapore, often because it is very similar to the U.S. healthcare organization. The curious ability of a system that is uniquely similar to that of the U.S. to function in a more cost-effective and effective manner makes this comparison useful in concocting solutions to our own health crisis.

The basic health statistics in Singapore are a testament to its efficient and flexible organization. In the U.S., 18% of the national Gross Domestic Product (GDP) is spent on healthcare, along with an average of \$7000 per person per annum. Singapore on the other hand spends only 4% of GDP and its citizens dole out less than \$3000 per person per annum. Life expectancy is 2-3 years longer than in the U.S., and its Infant Mortality Rate is lower than all “developed” nations, including the U.K., Canada, and Germany. Singapore accomplishes that through a nuanced and flexible system that combines private and public inputs. The

government funds programs analogous to Medicare and Medicaid, but also encourages individuals to provide for their own health costs through savings accounts. The leaders of the country have recognized the value of market forces in dropping the core prices charged per procedure by encouraging innovative organization and performance, but have also intervened directly in the healthcare sector when that market failed to keep overall healthcare costs down. Ultimately, this system combines a lack of ideologues; focus on empirical performance and competition, and nuance that is sorely needed in the U.S. governmental approach to the healthcare sector. Although there is a debate about whether a similar system would work in a nation as large and heterogeneous as the U.S. (quite opposed to the small, compact, and homogenous population of Singapore, many of whom share the same values and ideals). However, irrespective of whether the exact nuances of the system can be replicated, government leaders, presidents, policymakers in congress, public health officials responsible for healthcare systems planning, finance and operations, as well as those working on healthcare issues in universities and think-tanks, even nascent businessmen, should understand how this system works to achieve affordable excellence.

In crafting the healthcare sector, Singapore's government relied on 5 core principles that when analyzed holistically, provided a blueprint for understanding long-term sustainable healthcare:

1. Ensure good and affordable basic medical services for the entire population
2. Promote individual responsibilities to avoid dependence on state welfare
3. Encourage competition and use market forces to improve service and raise efficiency
4. Intervene directly in the sector when the market fails to keep healthcare costs from ballooning
5. Promote good health practices in the population to reduce rates of admission

These goals were matched by national unity and purpose in establishing clear objectives in managing the care of a ballooning population affordably, notably lacking in the passage of the Affordable Care Act.

Initially Singapore was focused more economic development rather than the stabilization of its health system, but, in 1983, with the passage of the National Health Plan, the country demonstrated its forward looking focus on preventing the economic impact that soaring healthcare costs could have. The plan was comprehensive, meaning that it provided healthcare to all individuals, but complemented the government's goal of encouraging Singaporeans to live healthy lifestyles. To introduce market competition into the market place, large governmentally organized hospitals were gradually corporatized in the 1990's. - These unsubsidized wards were meant to serve as a benchmark in terms of quality and price for the private sector. This action helped stabilize prices throughout the system. Simultaneously, public hospitals were given a freer hand to implement management practices for improving effectiveness and efficiency, and much more freedom in their day-to-day decisions regarding staffing, compensation, deployment of resources, and some user fees. Although the government financed much

healthcare, the delivery of healthcare was privately organized. Even the public hospitals were owned by the government only through a holding company called the Ministry of Health Holdings Private Limited, for which the government appoints CEOs, Board of Directors, thereby holding officials accountable to the government, but also maintaining the flexibility to maintain constant and flexible standard operating procedures and effective pricing schemes. But the most important part of the plan was arguably the creation of “Medisave”, a health savings account in which individuals deposit a given percentage (currently 20%) of their income into, matched by a certain percentage given by employers (Currently 16%). This has prevented the growth of government healthcare spending by shifting costs to the individual, and by making individuals accountable to their own healthcare costs. But while these changes presented an important first step, the true blueprint for the organization of a modern healthcare system arises from the 1993 Paper written by the government titled, “Affordable Health Care”, which outlined the 5 goals detailed above.

Promote individual responsibilities to avoid dependence on welfare but also ensure good and affordable basic medical services for the entire population:

Singapore espouses a philosophy of individual responsibility. This effectively means that the government desires individuals to strive towards avoiding preventable health conditions and critically, save to ensure their own solvency in paying for healthcare. It would thereby, control both the demand for healthcare services and overreliance on welfare services, both of which drove healthcare costs higher. Without demand, private corporations could not charge excessively large amounts for services, and the government would have to pay less aggregate totals in insurance. Additionally, because individuals were responsible for a greater percentage of costs, the government’s burden of health costs grew at a slower rate. Singapore’s health goals explicitly reject the entitlement mentality.

This rejection of comprehensive medical packages also rejected private insurance programs that guaranteed first-dollar coverage (coverage of an entire loss without a deductible), and those that, in their opinion, incentivized the overconsumption of care, over-delivery of services by doctors (neither group is incentivized to efficient costs if private insurers will pay).

Singapore creatively uses the Central Provident Fund to meet these needs. The CPF is the main fund that all health savings made by individuals is translated into. At first it was made primarily to make housing available to individuals but, it was eventually pivoted to allow individuals to use the savings for healthcare, approved insurances, etc. Think of it almost as mandatory banking. Payments intended for healthcare purposes are put into a program called **Medisave**. It contained a simple and powerful idea: help the people of Singapore save for their healthcare expenses, but do so in a way that makes individual financially accountable for their own care. Although healthcare is subsidized, the government does very little for ordinary citizens in ways of insurance; rather, individuals pay for their own healthcare after the products/services are subsidized. The Medisave

program requires that individual's deposit 20 percent of their wages, and their employers add another 16 percent for a total contribution equaling 36 percent of their pre-tax wages. As individuals age beyond 50, that percentage is lowered, sometimes down to 14% for those older than 65. This may sound like "taxation", but truly, it is not considered that way. Rather it is more akin to a mandatory 401k account. Critically, the savings are tax-exempt, both at withdrawal and before deposit, while earning a fixed interest rate usually indexed to inflation, allowing it to act simply, as any other financial account. This might seem similar to schemes used in Argentina, however, this fund is not invested in financial markets, as done by pension funds, etc., thereby insulating savings from drastic market downturns. The government effectively guarantees the money injected into Medisave accounts. There is a maximum amount of income that the individuals can inject into their Medisave account, set by the government, with other contributions usually distributed to other Central Providence Fund accounts, either for home purchasing, or retirement accounts. It also requires minimums, in order to ensure access to basic care. Although it may be seen as promoting individual responsibility, the government itself has strict rules that determine when funds can be withdrawn. However, it must be noted that the government has adapted to emerging trends extremely successfully. It has made changes to the law quickly when problems were discovered. For example, initially, Medisave did not cover outpatient costs. As the level of those medical incidences increased, the law was changed. Most childhood vaccinations are free-of-charge, without any co-pay, so that basic health for poor individuals. The government also intervenes in times of surplus to "top up" the Medisave accounts of poor and elder individuals, especially those learning low wages. Any and all investment in this fund is encouraged. Companies, for example, are given tax-exemptions for funds accrued in the Medisave funds beyond the required minimum. It is also critical to note that these measures would NOT work if the industry overall charged larger costs for basic healthcare services. For example, the amount of money injected into these accounts for minimum-wage earners in the U.S. would not provide support to afford the expensive healthcare delivered by the U.S.'s exponentially more expensive system. Businesses and government must work synergistically reduce the costs of healthcare services such that individuals can afford it (this will be discussed in-depth in the future). But there is little doubt that this individual savings program has dramatically reduced costs. Over-consumption and over-prescription of medicine, two factors in dramatically higher costs of healthcare in the developed world, are reduced when the individual is bearing the burden of costs, as opposed to the government or a third-party insurance platform. Even if there is aid from the government as described above, through subsidization and "top-offs", the perception that one must be financially prudent in making healthcare decisions, has allowed the cost of the system to remain low, which in turn has expanded access to a system that must charge lower costs. One mechanism, by which this system does influence the costs of goods and services on the "supply side", is by reducing the elasticity of patients' ability to afford expensive healthcare. This may sound perverse at first, but because patients must spend their

own incomes to service health, instead of paying a monthly charge for health insurance, is that providers must therefore lower the costs of their services such that individuals can provide the demand. Singapore has also taken advantage of the relatively high economic standing and low measure of inequality in the country to implement such a system. Because Singapore has a smaller amount of individuals who simply cannot pay for healthcare Singapore's government has received a reduced burden of social safety nets and also has limited the amount of the government's finances must be devoted to healthcare. These environmental factors cannot be ignored when considering the applicability of Singapore's healthcare system as a blueprint for developed nations.

Mentioned above was the fact that Singapore's citizens do not usually rely on an insurance scheme, private or public. However, Singapore does maintain almost universal coverage. How does it go about this? Subsidization. The government provides a access to basic health facilities, although patients can use their own money (Medisave, or other) to access levels of care above this basic level. Singapore's public health hospitals are divided into class, based on the amenity level, but also on the level of subsidy received by the government. There are five ward classes (in order): A, B1, B2+, B2, and C. While A class, in which patients have a private room and access to private doctors of their choice, receives no subsidies, Class C, receive up to 80% subsidy for all manner of healthcare needs, including prescription drugs and on physicians' fees. But more importantly, ensuring that all individuals can access healthcare is achieved thorough Medifund and Eldersshield, the programs that allows poor and elder individuals to access healthcare. They are broadly similar to Medicaid/Medicare program in the United States. Private insurers run Eldersshield, although the government sets payouts, and they are paid for in an analogous manner to insurance payments, with premiums. Medifund on the other hand is a centralized fund that provides healthcare coverage to those who cannot afford payments after Medisave and other private accounts have been considered. As with other programs, in times of surplus, the government adds to the endowment, but the country benefits by a substantially lower amount of citizens who need access to this fun. This is a result of dually, the Medisave accounts and emphasis on personal responsibility, but also because healthcare is cheaper even without taking into account subsidization/aid programs, with services costing substantially less than international benchmarks. However this safety net is one reason why there is no documented case in Singapore of a patient being forced into bankruptcy due to the inability to pay for his or her healthcare bills.

Encourage competition to improve service and raise efficiency but intervene directly in the sector when the market fails to keep healthcare costs from ballooning:

For purposes of simplicity, this paper will treat these two goals as intertwined, both concerned with the proper use of the free market system in healthcare. This area has sparked many debates in the U.S. with detractors arguing that more nationalized health systems are better for ensuring access to healthcare,

while proponents bemoan that “access to a waiting list is not access to healthcare” healthcare system and point out socialized medicine’s inability to provide access to high-technology applications of medicine. Singapore’s system is a blend of these two ideologies, a quasi-free market within which the healthcare system must function. This has general resulted in a flexible system that is able to respond to emerging healthcare trends. The government is not overwhelmingly concerned with the ideology of its policy, but rather, whether the policies accomplish stated goals. However, it must be stated that Singapore has always generally preferred a free-market based system in all endeavors, using government intervention in select places with the primary goal of *improving competition*. Public and private hospitals coexist in the system, with health goals intentionally directed towards the public side, due to the subsidies and help given by the government, which can only be used in public hospitals. In these public hospitals, the government primarily sets (1) The prices charged (2) The overall number of public hospitals in the system (3) The number of doctors and other amenities of the system to shape the market. Within this framework, the government allows market forces to regulate the private sector, which must not price itself out of the market, therefore capping the prices private health providers can charge. They do not have to charge lower prices, but they cannot exceed the government set prices by a substantial degree to preserve market share. But the government does not arbitrarily set these prices, rather coordinating with private sector forces to determine acceptable levels that will not strain Medisave accounts. The government employs scrupulous micro-managing principles, which according to a study by Gauld, “uses funding (and hospital ownership) in a calculated manner to control service costs and subsidize care, in turn limiting expenditure from insurance accounts and providing incentives for private providers to keep costs down.” In short, it uses the financing of health as the *a priori* concern to regulate the costs public hospitals charges, thereby dragging the private sector with it. In the opinion of many Singaporean officials, especially, Former Health Minister Khaw Boon Wan, the public sector must take on much of the burden of health, primarily because healthcare cannot be reduced to a drive for profits. However, while the public sector can establish standards of care and cost that inject a certain ethic to the system, there must always be a substantial private sector to challenge the public sector. Private sector innovators can provide a level of nuance and specificity necessary in treating a percentage of medical cases that exceed the level of public hospital standards, and in providing new insights into health practices that can reduce costs. The government, in turn with providing standards for micro-managing the standard of public costs, must also be aware of new developments from the private sector and allow those members to compete in the market. As seen in the U.S., once a private sector becomes dominant in medicine, pockets of vested interests can exert power to maintain the status quo, preventing newer and more effective modes of medicine to emerge. The Affordable Care Act was changed to prevent public options for insurance specifically because large insurance companies did not want to compete with a public option. Because Singapore did not want one player to be able to drastically change the healthcare

market according to its whims, it instituted a practice of allowing the private sector to influence, but not dominate a public sector.

How did it know that this system would work? Empirically, it is difficult (but not impossible) to argue with Singapore's success, but before the implementation of this system, Singapore's government did have an insight into the failures of a pure market system. To put it bluntly, when left unregulated, the market failed. In the 1980's, as the government loosened its' now famous "micro-management" system, giving even public hospitals more leeway to decide management decisions, recruitment decisions, staff compensation, etc., in order to allow public hospitals to compete and bring costs down. However, and critical to notice, this did NOT occur. Competition did not create a "race to the bottom" in costs. Hospitals did compete, but rather attempted to attract affluent patients by buying expensive technology, offering new and expensive services, recruiting prominent physicians, and decreasing the number of subsidized ward classes. Given time, the system began to look much the like the U.S. healthcare system prior to 2014: high-tech, but expensive and unequal. Healthcare eluded the performance of many other sectors, like technology, which did indeed reduce the prices of goods substantially when allowed to compete. The recent work of Nobel-prize winning economist Jean Tirole offers some context to explain why regulations cannot be broken into a spectrum of "more to less", but must be contextualized to the business in question.

Singapore focuses on two main areas of regulation, financial, and managerial.

Financially:

- Singapore mandates certain proportion of ward classes for hospitals, i.e. hospitals cannot only carry A-class, unsubsidized wards.
- Hospitals must apply for the purchase of new, expensive technology. Hospitals can apply for one-time grants for equipment, but most acquisition of novel technologies is highly regulated. This does not mean that hospitals are working in developing standards, but rather, the novel technology must be vetted as a method to produce benefits for patients without producing large degrees of cost inflation
- Hospitals are given annual budgets for subsidies they will receive, so they are aware of the reimbursement rates for patient expenditures. Critically, though, there is transparency in these rates, and the payment system is centralized, such that private entrants into the market have clear understanding of what expenditures will be necessary.
- The government sets cost-recovery targets for each class, thereby regulating the amount of excess profit able to be reaped from induced demand. This regulation is limited to the public sector. For-profit hospitals are able to reap all profits from their charged price, but will not be reimbursed via Medisave, Medifund, or Eldersshield, etc.
- The Ministry of Health publishes hospital bills on its website for medical conditions, procedures, and ward classes. Transparency is critical to consumer

choice that is a hallmark of Singapore's system. Because patients are aware of the costs (and they must be, given their Medisave accounts hold them financially accountable for their own health), and firms/hospitals are as well, there is an incentive to lower costs among the private sector, to attract patients.

Managerial:

The only reason why Singapore can maintain its public-dominated, yet-free-market based system is because it maintains a meticulous public health system. Primarily it does this by maintaining strict standards of care systems. Both public and privately owned hospitals are required to participate in quality control studies that measure clinical standards and benchmark them to international equivalents. These standards include: inpatient mortality; perioperative mortality; unscheduled return to the operating theater; unscheduled readmission within 15 days; unscheduled admission following ambulatory procedure; inpatient admission following unscheduled returns to the accident and emergency department; and device utilization and device associated infection in the intensive care unit. These standards make it possible to institute programs effectively, but also, critically, allow for the government to correct inefficiencies in the healthcare system. The Health Safety Authority replicates the role of the Federal Drug Administration, ensuring product safety. This list of minutia may seem meaningless and disjointed, as sometimes government policy can, BUT it is critical to note that the Singaporean system allows even public hospitals to compete. They are told to compete, but compete in a fashion that allows prices to drop across the board. Competition in the Singaporean healthcare market place is defined very closely to the disruption model described in the initial section, providing services more efficiently and simply, as opposed to providing more complexity and technology. In short, the government holds the hospitals and other healthcare companies responsible for disruption innovation, not sustaining innovation.

The Future of American Healthcare:

Can Singapore's healthcare model be used as a blueprint for the American one? Will these new business models arise? It is easy to say "yes", but the drives towards sustaining the status quo are powerful. From insurance corporations to large hospitals, to obstinate politicians clinging to ideology, there are powerful impediments for entrepreneurs, change minded public health officials, and nascent businessmen to overcome. It is doubtful we will be able to replicate systems like Singapore completely, given the variable population and variety of inflexible components of the government. But the move to value-oriented healthcare has been brewing for a decade. Established hospitals like Partners have been changing and adapting, with new entrants like Steward Health, threatening to disrupt the entire system. New technological enablers have emerged, as startups and entrenched components are attempting to translate genome sequencing, health monitoring,

tissue engineering, and a variety of other new technologies into the field. Entrepreneurs who have changed the healthcare system for years, like Jonathan Rothberg, and emerging ones have introduced new ideas. Dr. Devi Shetty has introduced Ford-esque consistency and assembly line techniques to his healthcare systems in India, with an eye towards expanding into the U.S. The world is replete with innovative individuals who are attempting to imprint the healthcare system, and bring value to the customer. But one should also carry a cautious pessimism. These innovators have turned heads towards healthcare before, but like a weed the sector has resisted change and reared its head. Despite owning the most expensive and technology laden sector, with new drugs being marketed every day, and new imaging technologies allowing doctors to peer into the human system like never before, 60% of bankruptcies in the U.S. are still caused by health related expenses. Ultimately, reflecting on that sad fact demonstrates the difficulty, and yet opportunity that exists at the heart of healthcare.