Health Care Policy Redux

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Terrence P. McGarty

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1 EXECUTIVE SUMMARY

The Healthcare issue has been a growing problem which now appears to have the capability to continue unbounded. It requires a fresh look and a new assessment of what can reasonably be achieved within the confines of what exists and what can be changed. Unlike many of the approaches which assume that the demand is a given and a continually growing given and all one focus on is to determine how to pay for this, otherwise rationing will be required as was proposed by the Hillary Healthcare proposal of 1993, we believe that both demand and supply can be adjusted. We further believe that free market mechanisms function and that technology can play a significant role in this approach proposed herein.

In 1993 in response to the Hillary Healthcare Plan we prepared a Healthcare Policy paper which presaged many of the current issues. That was sixteen years ago, and in many ways nothing much has changed except then Healthcare was going on $900 billion now it will approach $2.5 Trillion!

One is always reminded of Kahn's law, "what we expect tomorrow frequently never occurs, and what we anticipate in the distant future frequently occurs tomorrow".[1] Thus anyone who prognosticates the future will inevitably bear the burden of totally missing the target. The prognosticator may be focusing on all of the things which never come to be. The strength of any guesser in the future is one who has keen insight into the obvious that is also the strength of the securities trader, focus on the next step, chess games are not always the rules of life, and Brownian motion is a more likely model!

Yet what we thought was going to take a while is now at our doorstep, exploding Healthcare costs and their impact on quality of care and what we though sixteen years ago was readily achievable, namely technology to reduce the costs and expand the access has never gotten there.

1.1 THE PROBLEM

There are many who purport to know the problem and the solution. We start by assessing the facts and their impact on the Healthcare system. From these facts arise sets of the problem. The problem is not just simply inefficient systems and a patch quilt of plans and a mass of uninsured. The problem stems from the individual and then works outward.

THE HEALTHCARE SYSTEM IN THE UNITED STATES IS NOT BROKEN; IT IS JUST A SIMPLE PROBLEM OF SUPPLY AND DEMAND COMPOUNDED BY A PLETHORA OF COMPLEX GOVERNMENT REGULATIONS WHICH ADD TO COSTS RATHER THAN ACHIEVING EFFICIENCIES AND QUALITY OF CARE.

We strongly believe in supply and demand. To some degree this is a free market concept but since the Government has such a strong role to play here and since good health at reasonable

[1] The author hear Bob Kahn, the key player when at ARPA in creating what is now the Internet and also not at the Center for National Research Initiatives.

costs, in what already is a universal delivery system, is a Government problem, it must be looked at from a fully economic basis and demand is as important as supply.

THE SUPPLY-DEMAND ANALYSIS CLEARLY STARTS WITH THE PATIENT-CITIZEN WHERE DEMAND CAN BE MODULATED BY LIFESTYLE MANAGEMENT AND PREVENTATIVE CARE AND MANAGEMENT RATHER THAN DEALING WITH EXACERBATED PROBLEMS DUE TO NEGLECT RESULTING FROM FEAR OF COSTS AND CONSEQUENCES. SECONDLY SUPPLY COSTS MAY BE MODULATED AND REDUCED BY MORE EFFECTIVE CONSOLIDATION OF OVERHEAD AND MANAGEMENT COSTS THROUGH PROPER LEGISLATION AND THE UTILIZATION OF EFFECTIVE AND ACCEPTED INFORMATION TECHNOLOGIES.

There has always been a debate as to the existence of demand modulation in Healthcare. The answer is quite simple, any economic entity where there are costs associated with usage and those costs are by the purchaser results in decisions being made. In our proposals the costs relate to things which improve health, thus rather than having a patient choose between medical procedures and in turn quality of care, the patient in an a priori manner makes the choice via a lifestyle costs decision.

THERE ARE SIMPLE AND STRAIGHTFORWARD COST METRICS WHICH ALLOW FOR THE OPTIMIZATION OF DELIVERY WHICH MINIMIZING THE COSTS OF DELIVERY OF HEALTHCARE. THESE MUST BE APPLIED TO THE CURRENT SYSTEM AND USED TO DRIVE DOWN AND MANAGE COSTS MORE EFFECTIVELY. IN MANY CASES THIS MEANS SHEDDING BURDENSOME COSTS REQUIRED BY OUTDATE LEGISLATION.

The details must be considered and only from the analysis of what drives demand and supply costs can one seek to obtain a rational policy.

1.2 THE DEMAND

Demand is driven by two simple elements; the population and the diseases incident in that population. There is a third subtler element which is the actual "demand" by the patient or the physician to certain procedures, medications and the like. Two simple examples explain this phenomenon. First, a trial performed almost twenty years ago showed that if a physician was presented with costs for procedures, such a lab work, then frequently the physician became more judicious in selecting what they needed and there was a reduction in excess procedures. Second, patient demand for medications driven by pharmaceutical advertising has dramatically increased the demand for non-generic pharmaceuticals to treat common ailments.

We have reached the following conclusions regarding demand:

DEMOGRAPHIC FACTORS ARE SUCH THAT THE TOTAL POPULATION, THE PERCENT OVER 65 AND THE NUMBER OF NEW IMMIGRANTS AND THEIR OFFSPRING ARE GROWING AT DRAMATIC RATES. THIS GROWTH WILL BE THE PRIME DRIVER FOR DEMAND.

The population will exceed 450 million in 2050, the percent over 65 will approach 40% and the number of Hispanic will exceed 30%, In addition Hispanics generally have 33% with no insurance and are the predominant users of ER care. This will place a tremendous load on healthcare.

THERE ARE CERTAIN DISEASE WHICH ARE POTENTIALLY CONTROLLABLE AND PREVENTABLE AND OTHERS WHICH ARE CONTROLLABLE AND REMEDIABLE. THE PREVENTABLE CLASS IS DRIVEN BY LIFESTYLE CHOICES SUCH AS SMOKING AND EATING. THE REMEDIABLE ARE THOSE WHICH IF DETECTED EARLY CAN BE MANAGED OR CURED.

We already know what behavior causes what diseases and what diseases are amenable to remediation by early examination and care. This just requires acting on these and then obtaining the reductions in incidence.

THE CLASSIC DEMAND MODEL FOR HEALTHCARE ASSUMES A FIXED UNCHANGEABLE DEMAND. WE OBTAIN A MODEL WHERE DEMAND CAN BE MODULATED THROUGH THE MEANS OF CONTROLLING THE PREVENTABLE BY TAXATION AND THE REMEDIABLE BY PREVENTIVE CARE. WE ALSO PROPOSE THE REINSTITUTION OF PUBLIC HEALTH FACILITIES TO REPLACE THE EXCESSIVE AND HIGHLY COSTLY DEMAND FOR ER SERVICES.

Gov Patterson of New York has suggested a "carb" tax on sweetened sodas and the like. Mayor Bloomberg demanded that polyunsaturated fats be removed from restaurants. These are current example of Government intervention in the market by taxing or preventing. They are happening now and will have a lasting effect.

1.3 THE SUPPLY

HOSPITALS ARE THE MOST SIGNIFICANT ELEMENT IN THE SUPPLY CHAIN. THEY HAVE BEEN REDUCING IN NUMBER BUT INCREASING IS SIZE OVER THE PAST TWENTY YEARS AND IT IS ANTICIPATED THAT THEY WILL CONTINUE TO DO SO. THEY ARE CONTROLLED BY ARCHAIC COMPENSATION SYSTEMS WITH CURRENTLY MORE THAN 50% PAID BY MEDICARE AND MEDICAID AND ANOTHER 25% BY PRIVATE INSURANCE. THIS LEAVES A SIGNIFICANT PORTION OF UNINSURED. THERE IS EXCESSIVE PRESSURE ON HOSPITAL THEREFORE TO "PLAY THE REIMBURSEMENT GAME" AND ADD ADDITIONAL STAFF TO FIND WAYS TO OBTAIN REIMBURSEMENT. THIS BECOMES A VICIOUS CYCLE AND AGAIN INCREASES COSTS. THE IMPLEMENTATION OF A UNIVERSAL COVERAGE, NOT SINGLE PAYER, WILL ELIMINATE THIS PROBLEM.

1.4 TECHNOLOGY

The Obama Administration is pushing many billions for Electronic Medical Records. This is conceptually an attractive approach but it also is one rant with many unanswered structural questions. As was done in the formation of the Internet and the IETF committee, a users group, a similar effort should be the catalyst not what some third party software and networking company can provide.

ONE OF THE GREATEST CAUSES OF COST INCREASE IN THE PRACTICE OF MEDICINE HAS BEEN THE ADDED BURDEN OF BILLING, RECORD KEEPING, DRUG PRESCRIPTIONS, PRIVACY CONCERNS AND THE LIKE. TECHNOLOGY CAN DRAMATICALLY SOLVE THIS PROBLEM. IF THE PHYSICIAN HAS THE INFORMATION REGARDING COSTS OF PROCEDURES, OF MEDICATIONS, AS AN INTEGRAL PART OF THE PRESCRIBING PRACTICE THEN FREQUENTLY THE DEMAND IS REDUCE BUT BALANCED WITH QUALITY CARE. IN ADDITION THE REDUCTION IN BILLING COSTS AND CASH FLOW DELAY CAN BE REDUCE WITH A COMMON SYSTEM RATHER THAN THE CURRENT PATCHWORK OF MULTIPLE HEALTHCARE REIMBURSEMENT SYSTEMS. A GOVERNMENT MANDATED STANDARDS OF ELECTRONIC BILLING IS ESSENTIAL

The billing problem has been around for over thirty years. It has become explosive in terms of overhead and in terms of bad debt. It is a major cost in the provision of health care. Secondly the lack of portability of health care records results frequently in multiple procedures and more importantly the data is seen as a point in time not as a process over time. Ocular pressure, blood pressure, HbA1c, LDL, and they like should be viewed over time, not as a point sample. Thus the systems to allow that are critical, not just a system which records general facts.

THE EMR HAS SUBSTANTIAL VALUE. IT IS ESSENTIAL THAT IT FOLLOW THE PATIENT AND THAT IT UTILIZE A NATIONAL IF NOT GLOBALLY ACCESSIBLE NETWORK. HOWEVER WE BELIEVE THAT IT'S IMPLEMENTATION WILL TAKE SUBSTANTIALLY LONGER THAN MOST BELIEVE AT CURRENT DUE PRIMARILY TO THE COMPLEXITY OF MULTIMEDIA MEDICAL RECORDS. WE BELIEVE IT IS ESSENTIAL TO START BUT ONE MUST CAREFULLY PACE THE EFFORT SO AS NOT TO ADD ADDITIONAL BURDENS TO THE ALREADY COMPLEX PRACTICE OF MEDICINE.

The EMR is essential but it is an evolving process. It is patient focused but it is a complex set of multimedia data objects correlatable over time. This is no mean task and it is not akin to building a bridge, a process well known since Roman times but still subject to errors. There is no blueprint for this since it involves some many human factors.

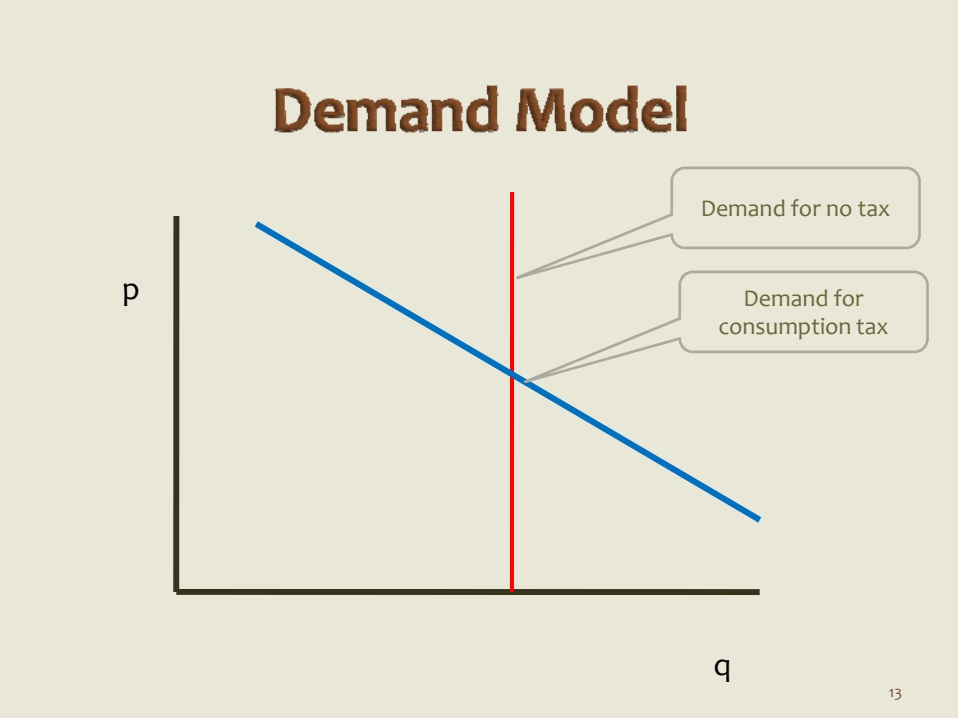
THE REINSTITUTION OF PUBLIC HEALTH FACILITIES TO SUPPLANT THE EXCESSIVE DEMANDS ON THE ER CAN BE ACHIEVED WITH THE USE OF REMOTE MEDICINE USING BROADBAND. IN THE EVENT OF A CONSULT, THIS MAY BE ACHIEVED REMOTELY VIA BROADBAND NETWORKING AND THE ACCESS TO THE SPECIALIST, WHETHER IT IS A RADIOLOGIST, CARDIOLOGIST, OR EVEN DERMATOLOGIST, VIA THIS SYSTEM.

The old Public Health system provided local clinics for those who could not afford more expensive health care or for other reasons could not get access to it. The Public Health clinics provided to inoculations and pediatric care, general health checkups, and care for common ailments and then referrals to the appropriate secondary locations. If one cannot afford a higher level of care then these clinics will provide a core set of services. Here technology can play a dramatic role of improving quality while reducing costs. Telemedicine and teleradiology via broadband is a major player here and these have evolved so that they can apply in the current environment.

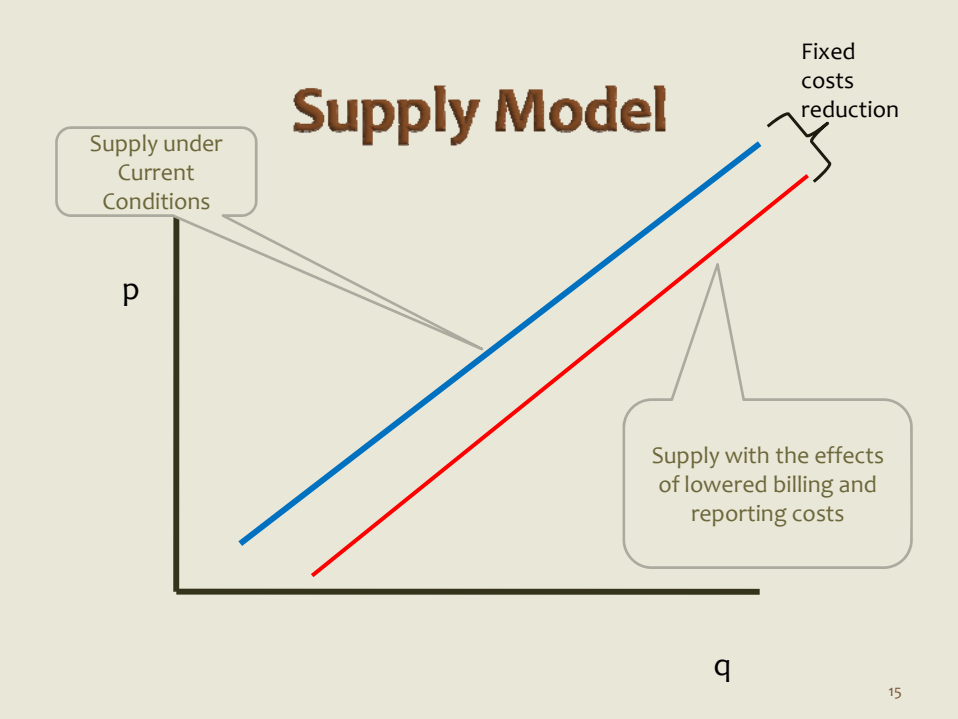
1.5 THE ECONOMIC IMPLICATIONS

We can now examine in simple economic terms what the impact of the proposal will be. We proceed through five steps; demand, supply (three steps) and market stability.

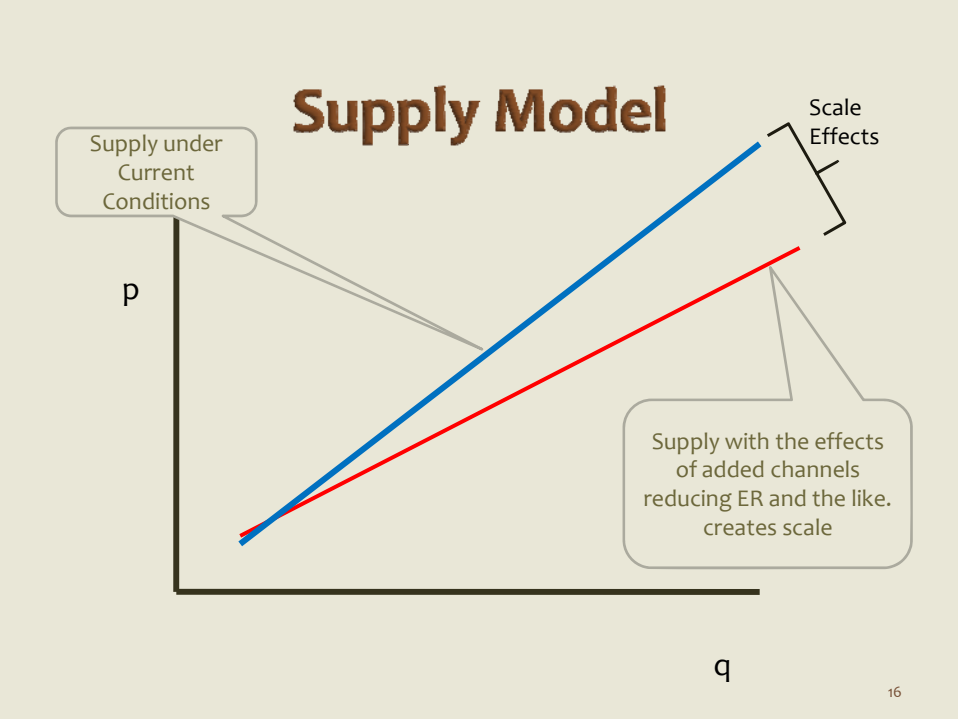
Consider first the demand. Here we plot demand on a price, p, and quantity, q, and diagram common to all economics. Currently demand is independent of price. The current demand is a vertical line that is fixed and independent to any costs. This is more than simplistic since we generally accept anyone into the ER and in states like California illegal immigrants are provided care independent of any status. Now if we apply to the system some "tax" for bad foods or behavior and also provide costs incentives for excessive use then we get a more normal demand curve, namely price or cost sensitivity.



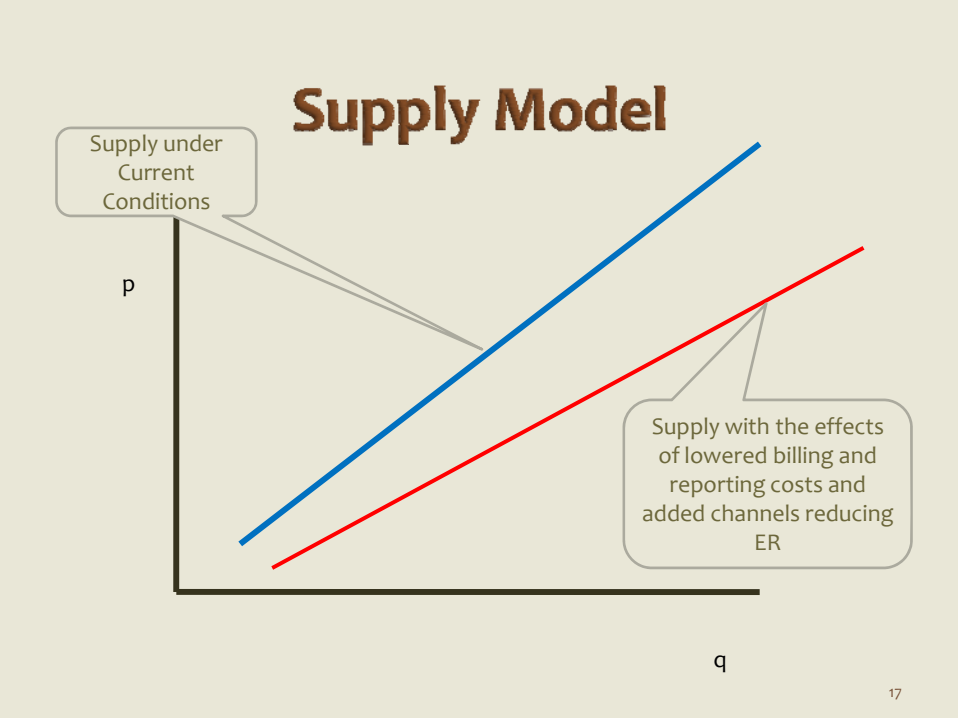
Now the first step in the supply curve will be to drive out costs which are overhead costs. Thus is we reduce the cost of billing and that of report management on a per patient basis this would represent a shift in the supply curve downward as shown in the following. This is the first step in cost reduction.



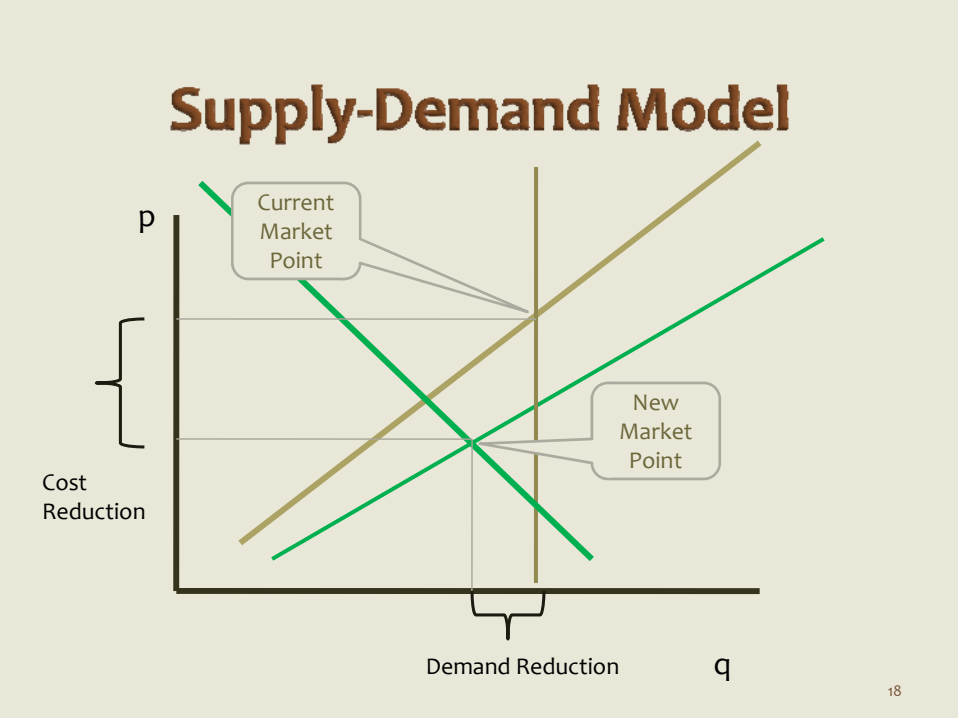
The alternative would be to create scale economies in the delivery, namely making it less costly the more service that are delivered. We argue herein that using a Public Health delivery system would do so by alleviating other more costly means such as the ER. There are many more examples of such an approach. The following Figure depicts what would happen in this event. Namely we see a decline of the supply curve the larger the demand becomes, clear scale effects.



We can then combine the two effects of reducing overhead and achieving scale to create a compound new supply curve as shown in the following Figure



Finally we can combine the Demand and the Supply curves to show what the total effect would be. This is done in the following Figure.



We note that we reduce the costs significantly while have a small but measurable decrease in the supply by means or reallocation while keeping the overall quality high. This above graphic is in essence what we propose in the plan.

1.6 POLICY OPTIONS

The Plan proposed herein is built upon the following principles:

1. **CATASTROPHIC COVERAGE: THERE SHOULD BE COVERAGE OF CATASTROPHIC INCIDENTS SUCH AS CANCERS, STROKE, AND LONG TERM DISABLING DISEASES SUCH AS MS, ALS, PARKINSON'S AND ALZHEIMER'S**

2. **EVERY ONE IN: LIKE THE MASSACHUSETTS PLAN, IT MUST REQUIRE ALL TO PARTICIPATE.**

3. **CHOICE: THE PLAN(S) MUST ALLOW CHOICE SO THAT A PATIENT MAY CHOOSE THEIR HEALTH CARE PROVIDER AND HOSPITAL.**

4. **REWARD GOOD HEALTH: THERE MUST BE A SYSTEM WHICH INCENTIVIZES GOOD HEALTH PRACTICES AND DIS-INCENTIVIZES BAD ONES.**

5. **ESTABLISH PUBLIC HEALTH FACILITIES: UTILIZE PUBLIC HEALTH CLINICS IN PLACE OF THE ER AS A MEANS OF DEALING WITH THOSE IN NEED OF NON-URGENT CARE. FACILITATE THIS BY STAFFING WITH MEDICAL SCHOOL GRADUATES WITH TUITION REPAYMENT.**

6. **EVOLVE ENABLING TECHNOLOGY: MANDATING TECHNOLOGY SOLUTIONS MEANS THE GOVERNMENT IS CHOOSING WINNERS AND LOSERS AND THIS ALWAYS LEADS TO INCREASED COSTS AND REDUCED QUALITY OF CARE.**

These are basic principles which are common across many plans. They allow choice, mandate universality, and include quality. The key issue however will be the management of demand and the effective improvement in supply costs,

2 OVERVIEW

Healthcare has become a massively growing problem for the US economy and those involved in it in any way, which includes everyone. It will cost the US in excess of $2.5 Trillion in 2009 and this will account for over 18% of the GDP. It continues to increase at a rate in excess of annual inflation.

The approach to "solving" the problem has been one on finding ways to pay for the costs and to make it inclusive. However, very little has been focused on reducing the demand by effecting policies which reduce disease states which are amenable to such control.

There are two major categories of disease which can and must be addressed; preventable and remediable. Preventable are those due to lifestyle. Remediable are those which if detected early can be intervened and where detection is now generally accepted as being achievable.

2.1 PREVENTABLE

Consider two simple disease states, Type 2 Diabetes and the problems of smoking. Both result in circulatory, coronary, kidney, and other problems. Both are readily controllable by reducing their known causes.

Type 2 Diabetes is a simple carbohydrate problem, lower the carbs and lower the weight, along with exercise, and the problem goes away, if done so early enough. From the CDC the following is a summary of Type 2 Diabetes impact.

Table 1. TYPE 2 DIABETES STATISTICS

Total prevalence of diabetes in the United States, all ages, 2002	Total: 18.2 million people — 6.3% of the population — have diabetes. Diagnosed: 13.0 million people Undiagnosed: 5.2 million people
Prevalence of diagnosed diabetes among people under 20 years of age, United States, 2002	About 210,000 people under 20 years of age have diabetes. This represents 0.26% of all people in this age group. Approximately one in every 400 to 500 children and adolescents has type 1 diabetes.
Total prevalence of diabetes among people aged 20 years or older, United States, 2002	Age 20 years or older: 18.0 million; 8.7% of all people in this age group have diabetes. Age 60 years or older: 8.6 million; 18.3% of all people in this age group have diabetes. Men: 8.7 million; 8.7% of all men aged 20 years or older have diabetes. Women: 9.3 million; 8.7% of all women aged 20 years or older have diabetes.
Cost of diabetes in the United States	Total (direct and indirect): $132 billion Direct medical costs: $92 billion Indirect costs: $40 billion (disability, work loss, premature mortality)

The issue of controlling smoking will reduce lung cancer rates by orders of magnitude and will also dramatically reduce COPD, circulatory problems, a variety of other cancers, kidney, pancreas, larynx, oropharyanx, and others[2].

Average Annual Smoking-Attributable Mortality (United States, 2000-2004)[1, 2]

Table 2. AVERAGE ANNUAL SMOKING MORTALITY US 2000-2004

Disease Category	*Male*	*Female*	*Total*
Malignant Neoplasia			
Lip, Oral Cavity, Pharynx	3,749	1,144	4,893
Esophagus	6,961	1,631	8,593
Stomach	1,900	584	2,484
Pancreas	3,147	3,536	6,683
Larynx	2,446	563	3,009
Trachea, Lung, Bronchus	78,680	46,842	125,522
Cervix Uteri	0	447	447
Kidney and Renal Pelvis	2,827	216	3,043
Urinary Bladder	3,907	1,076	4,982
Acute Myeloid Leukemia	855	337	1,193
Subtotal	104,472	56,376	160,849

[2] https://apps.nccd.cdc.gov/sammec/five_yr_sam.asp

Disease Category	*Male*	*Female*	*Total*
Cardiovascular Diseases			
Ischemic Heart Disease	50,884	29,121	80,005
Other Heart Disease	12,944	8,060	21,002
Cerebrovascular Disease	7,896	8,026	15,922
Atherosclerosis	1,282	611	1,893
Aortic Aneurysm	5,628	2,791	8,418
Other Circulatory Diseases	505	749	1,254
Subtotal	79,139	49,358	128,494
Respiratory Diseases			
Pneumonia, Influenza	6,042	4,381	10,423
Bronchitis, Emphysema	7,536	6,391	13,927
Chronic Airway Obstruction	40,217	38,771	78,988
Subtotal	53,795	49,543	103,338
Average Annual Total	237,406	155,277	392,681

Table 3. SMOKING ATTRIBUTABLE PRODUCTIVITY LOSSES ($000, US 2004)

Disease Category	Male	Female	Total
Malignant Neoplasia			
Lip, Oral Cavity, Pharynx	$1,688,872	$367,657	$2,056,529
Esophagus	$2,589,475	$462,886	$3,052,361
Stomach	$598,695	$164,244	$762,939
Pancreas	$1,213,664	$945,544	$2,159,208
Larynx	$883,833	$188,214	$1,072,047
Trachea, Lung, Bronchus	$23,851,960	$14,350,500	$38,202,460
Cervix Uteri	$0	$295,837	$295,837
Kidney and Renal Pelvis	$995,889	$71,613	$1,067,502
Urinary Bladder	$794,495	$188,602	$983,097
Acute Myeloid Leukemia	$282,374	$106,085	$388,459
Subtotal	$32,899,257	$17,141,182	$50,040,439
Cardiovascular Diseases			
Ischemic Heart Disease	$18,314,652	$5,965,867	$24,280,519
Other Heart Disease	$3,339,574	$1,271,135	$4,610,709
Cerebrovascular Disease	$3,030,005	$2,843,401	$5,873,406
Atherosclerosis	$136,142	$39,554	$175,696
Aortic Aneurysm	$1,273,025	$435,256	$1,708,281
Other Arterial Disease	$133,059	$132,905	$265,964
Subtotal	$26,226,457	$10,688,118	$36,914,575
Respiratory Diseases			
Pneumonia, Influenza	$867,991	$536,478	$1,404,469
Bronchitis, Emphysema	$1,327,885	$983,201	$2,311,086
Chronic Airway Obstruction	$6,554,599	$5,915,617	$12,470,216
Subtotal	$8,750,475	$7,435,296	$16,185,771
Total	$67,876,189	$35,264,596	$103,140,785

Economic Costs and Years of Potential Life Lost Associated with Cigarette Smoking[3]

[3] See: Centers for Disease Control and Prevention. Annual Smoking-Attributable Mortality, Years of Potential Life Lost, and Productivity Losses—United States, 1997–2001. Morbidity and Mortality Weekly Report [serial online]. 2005;54:625-628 [cited 2007 Mar 13]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5425a1.htm.

- For 1997–2001, cigarette smoking was estimated to be responsible for $167 billion in annual health-related economic losses in the United States (**$75 billion in direct medical costs**, and $92 billion in lost productivity), or about $3,561 per adult smoker.

- The total economic costs associated with cigarette smoking are estimated at $7.18 per pack of cigarettes sold in the United States.

- Cigarette smoking results in 5.5 million years of potential life lost in the United States annually.[13]

The total cost of just these two is $92 plus $75 billion or $167 billion, or 8.4% of the total Health Care budget for the sample period.

One simple way to effect this is via an aggressive tax. Tax carbs and tax nicotine. The carb tax has been proposed by Governor Patterson of New York, a superb try of eliminating the problem via an economic channel.

The taxing approach is an elegant approach. If people do not reduce the demand then the taxes pay for its costs. If the taxes reduce demand and thus reduce the tax revenue then the reduction in the related diseases are reduced. It becomes a zero sum game.

A second class of disease is amenable to early detection and remediation thus dramatically reducing costs. The most obvious of late are prostate, breast and colon cancers, each of which can be detected in many if not most cases, well before the time they become invasive. The costs per remediated disease can be kept lower than the cost of dealing with an un-remediated disease.

2.2 REMEDIABLE

The second major thrust is at remediable disease, those which can be detected early using available techniques. The following is a list of such and their incidence in cases in 2008.

Centers for Disease Control and Prevention. Cigarette Smoking Among Adults—United States, 1998. Morbidity and Mortality Weekly Report [serial online]. 2000; 49(39);882-4 [cited 2007 Jul 6]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4939a1.htm.
Centers for Disease Control and Prevention. Number of Adults Who Were Current, Former, or Never Smokers, Overall and by Sex, Race, Hispanic origin, Age, and Education: National Health Interview Surveys—United States, 1965–2006 [chart online]. Atlanta, GA: Centers for Disease Control and Prevention, Office on Smoking and Health; [updated 2007 Feb 28; cited 2007 Jul 6]. Available from: http://www.cdc.gov/tobacco/data_statistics/tables/adult/table_3.htm.
Centers for Disease Control and Prevention. Cigarette Smoking Among Adults—United States, 2000. Morbidity and Mortality Weekly Report [serial online]. 2003; 51(29);642-645 [cited 2007 Jul 6]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5129a3.htm.
Centers for Disease Control and Prevention. Annual Smoking–Attributable Mortality, Years of Potential Life Lost, and Economic Costs—United States, 1995–1999. Morbidity and Mortality Weekly Report [serial online]. 2002;51:300–303 [cited 2007 Mar 13]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5114a2.htm.

Table 4. REMEDIAL DISEASES

		Incidence			*Mortality*			*Survival 5 Year*	
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Colon & Rectum:	153,854	180,003	133,178	57,163	69,022	48,345	195,814	196,119	195,510
Breast	208,281	3,649	383,419	42,872	912	76,015	269,701	258,755	269,701
Cervix uteri	13,379	-	25,541	3,953	-	7,601	216,491	-	216,491
Prostate	218,923	495,617	-	30,710	81,184	-	300,715	300,715	-
Melanoma of the skin	58,988	74,799	47,433	8,210	11,858	5,169	277,302	270,917	284,904
Total	653,424	754,068	589,572	142,908	162,976	137,131	1,260,023	1,026,506	966,606

Removing the Lung from this Table because it was accounted for above we find we have a total of 653,242 cases per year at the base population of 304 million. This a bit more complex since the incidence is for every year and during the five year survival period we treat the new incidents plus the remaining survivors. Costs per incident can vary but estimates between $50,000 and $100,000 are reasonable. Thus at the upper end we can see $65 billion spent on these remediable diseases.

Added to the preventable we have a total of almost $250 billion which can be addressed immediately, well in excess of a 12% reduction.

2.3 THE PROBLEM

The actual problem can be laid out in a few terms:

1. Total Cost Healthcare 2007 is $2.1 Trillion
2. GDP was $11 Trillion; Healthcare was 19% of GDP!
3. Total Population is approximately 300 Million
4. Cost Per person, whether it is used or not, $7,000
5. Health Insurance per person in healthy family is $9,000 per year, $2,000 more than it costs!
6. Approximately 18% are uninsured, or a total of almost 54 Million
7. If 82% are paying for the remaining 18% then the 82% are paying the cost of the uninsured already!
8. Therefore there is NO COST to fixing the system, just fairness.
9. AND, if costs can be reduced by proper allocation, the current costs can be reduced!

The question is, however, is this a cost and allocation problem or is it a demand control problem, preventable and remediable, or is it a combination of both. We believe it is clearly both.

2.4 THE PROBLEM ELEMENTS

We present here the problem element in some structured detail. Specifically we see this as a problem in supply and demand and in the supply side one readily amenable to significant cost reductions. The logical structure we apply is based on the current mindsets which are as follows:

1. The current primary focus is on how to pay for the services not at all on why they cost so much.

All of the current approaches are ones which assume an exogenous demand. One which is fixed and not subject to change. In many ways it is akin to the Marshall model of economics before the advent of Keynes. We believe that demand can be modulated by market means as well as lifestyle modification.

2. The critical issue is how to improve the current poor health conditions and thus reduce demand for service.

The demand modulation is a combination of lifestyle as well as the delivery mechanism. The use of medications in place of lifestyle change and proper healthcare management just exponentially drive up the costs which increasing demand. The Type 2 Diabetes patient, by not losing the weight, uses Metformin, then insulin, then has retinopathy, then renal failure and then on and on.

3. Then the issue is how to reduce each cost element associated with those service delivery elements.

The delivery systems are archaic to say the least. There are overhead costs which can be saved and scale economies which can be achieved.

4. Then determine a way to provide them on a universal basis.

Universal care is essential. That means care before disease sets in and the proper application of healthcare facilities at the proper time. The ER is not the location for chronic care nor for care which should not have resulted in an emergency.

The analysis in this Report then looks at the following:

1. Disease Incidence and Prevalence: A detailed assessment of the current incidence and prevalence of the major cost drivers in the delivery of healthcare.

2. Cause of Incidence: Exogenous and Endogenous, Preventable and Unpreventable. This requires both an initial assessment and an ongoing process to assess what is controllable and what measures are useful in its control.

3. The Elements and Processes of provisioning of healthcare services. A bottoms up analysis and continuing cost improvement process must be effected in the provision chain of healthcare. What are the processes and why are they done in the manner currently used. We provide several key examples but a broader analysis is clearly required.

4. The cost elements of provisioning. What does it cost and why. What are the costs of all the processes, current and proposed? Are all of these costs required and are they controllable and is there scale.

Then the focus is on the following set of simple questions:

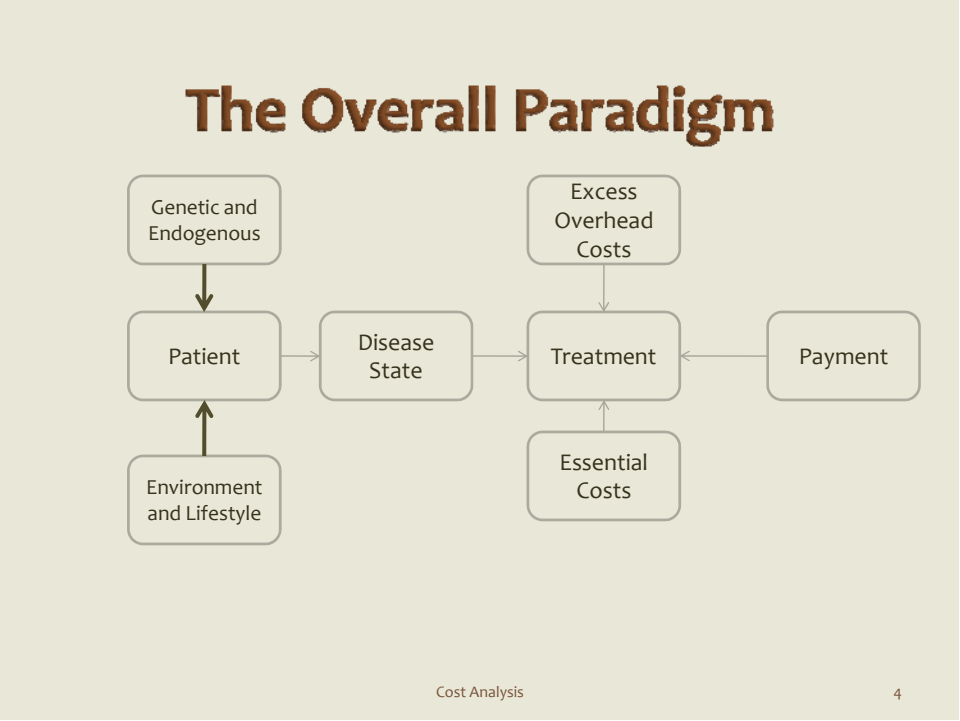
1. What can be done to reduce incidence? Ultimately everyone dies but the path between birth and death can be ameliorated in such a manner that the plethora of chronic diseases can be reduced.

2. What can be done to reduce costs? Costs are a combination of what is provided and what the unit costs are as to what constitutes those provisions.

3. What can be done to provide coverage? Universal coverage has become a mandate. This is driven by the fact that there is de facto universal coverage now. Thus we must find a way to institutionalize that in a cost effective manner.

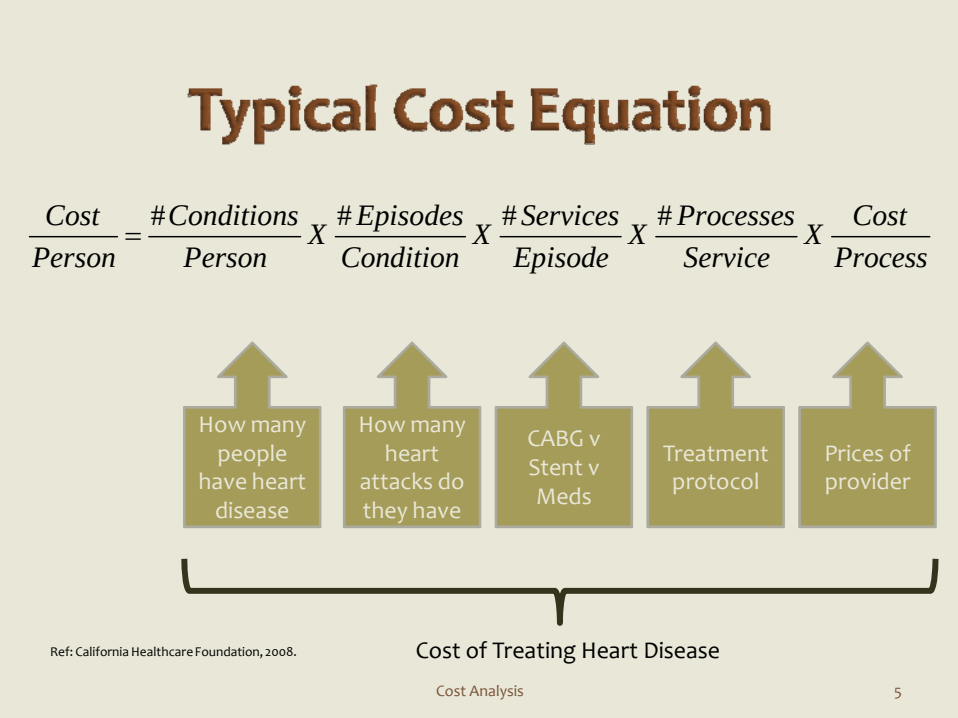
4. Who can effect these the best delivery? The current delivery systems are a patchwork of ancient practices and systems which have evolved in a regulatory framework which does not function efficiently. The single practitioner may soon be a thing of the past and the hospital as an organism that maximizes billable charges must also change.

Let us consider first a basic paradigm for what occurs in the provision of Healthcare. We first use the Figure below and an example.



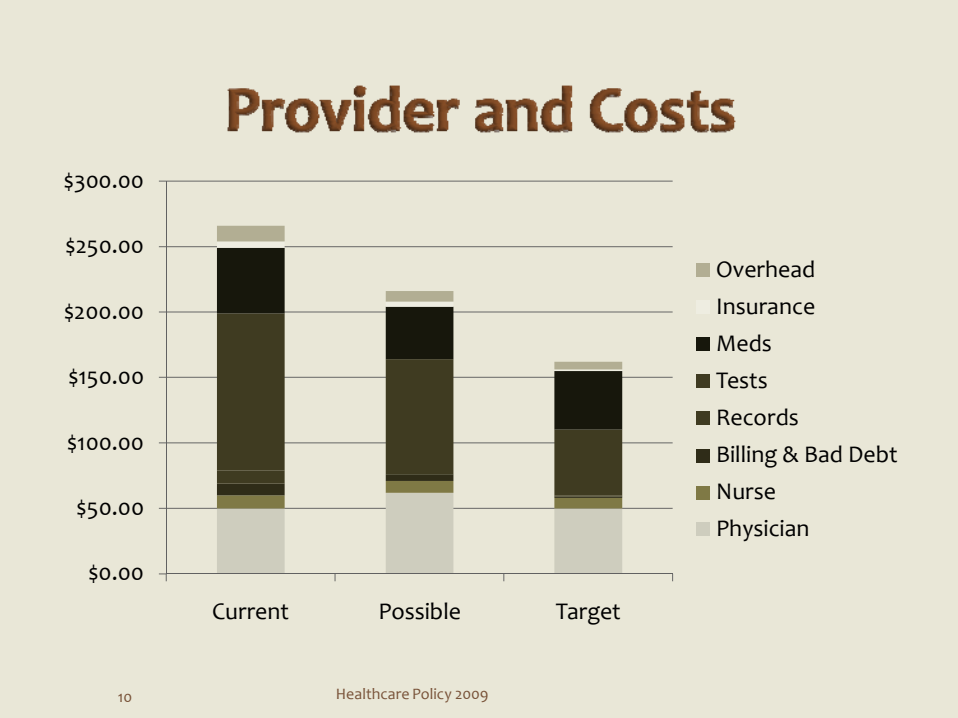
The Patient is the source of the demand for Healthcare and there are two drivers for that source, lifestyle and endogenous causes (such as genetic processes) which result in disease states. Once the patient enters into one or more disease states then treatment of some form may apply. In the treatment process we have essential costs related to the direct providers of services and overhead costs associated with the slack inherent in such a massive system. Finally we have a payment mechanism which provides a distribution of moneys collected from patients and others to be distributed to the essential providers and overhead providers.

The following Figure depicts the cost paradigm in some detail. This may be a bit simplified but it can be a useful tool in addressing each element.



The above chart then divides the costs into five categories; (i) the first is the basic driver of a disease state, such as heart disease, or colon cancer, (ii) then there is the issue of how many separate presentations of this disease state need addressing such as an MI or a colon resection, (iii) then there are the specific actions to address the presentation such as a stent versus a graft or a resection versus some form of palliative care such as radiation, (iv) then there are all of the steps involved such as anesthesiologist, surgeon, pathologist, internist, nurses and the like, and (v) finally the unit costs for each of these. There should on the cost element also be a break out of direct and overhead costs.

In the following we show several cost breakouts for such unit costs and this is also descriptive of what some of the issues are; it is not the cost of the physician, it is all the other costs that drive up the overall costs of healthcare.



The above does reflect ways to reduce costs in addition to what has been presented. Specifically cost reduction can be effected by reducing overhead via electronic medical record keeping, billing, and coordinating tests and medications. We will discuss that latter.

2.5 KEY ISSUES

The improvement in the overall Healthcare system can be effected by addressing the following set of issues:

1. Controlling Reimbursement without understanding and coming to grips with the detailed cost elements will result in rationing.

2. Mandating unfunded actions atop a controlled reimbursement scheme will exacerbate the process. Thus the mandating of an EMR system, a delayed reimbursement system, multiple reimbursement methods and the like.

3. Adding regulation, administration and overhead adds to costs. Such laudable regulatory elements such as HIPPA for privacy have costs. Billing is a massive cost element not only due to the issue of labor but more importantly due to the need for working capital, receivables frequently in excess of 180 days on Medicare alone and a year or more on Medicaid.

2.6 REFORM ELEMENTS

Healthcare reform must include the participation of four elements; patient, providers, processes, and payments. Specifically:

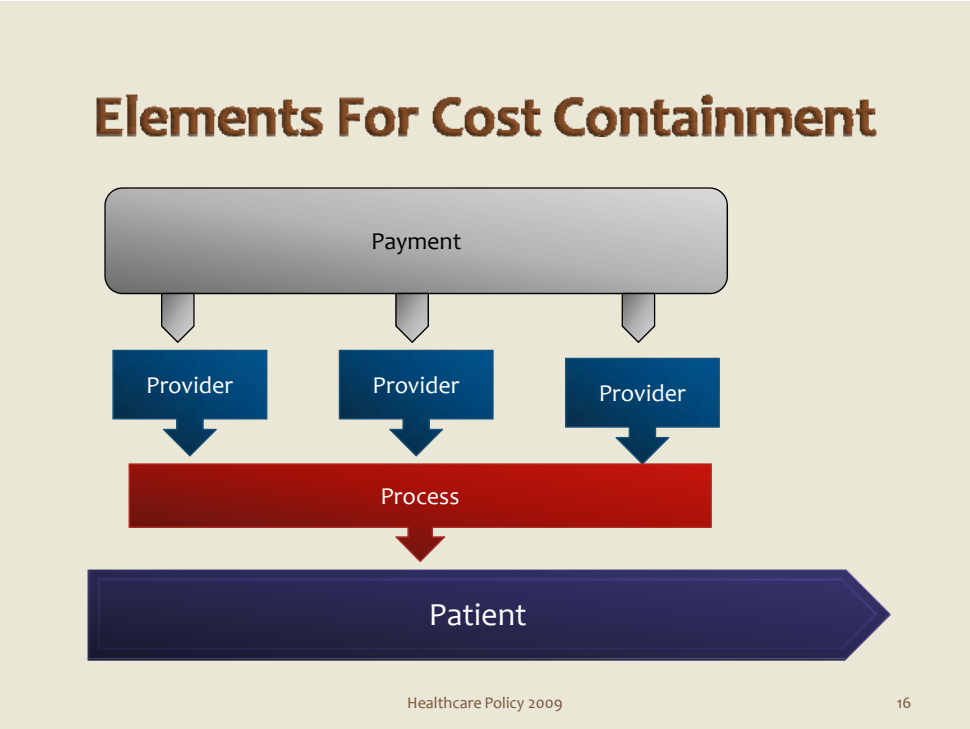
1. Patient: The Patient's predisposition to a disease state, the Patient's management of the health-disease state and the Patient's pattern of care.

2. Provider : What are the costs and who are the people and entities required to support the Physician in the delivery of the care

3. Process: The set of Processes that are used to treat the disease states and their effectiveness and efficacy

4. Payment: Who pays what to whom and for what and how and how much

We depict the relationship amongst these elements in the following Figure.



For each of these four elements we present some key issues we will focus on:

2.6.1 Patient

1. Patient's Lifestyle is a key to maintaining good health and reducing costs
2. Patient must take responsibility for controllable disease states as well as addressing uncontrollable in a timely manner.
3. Patient must be covered for any and all catastrophic problems in a quality manner.
4. Patient must "contribute" to payment and select what the pay for.

2.6.2 Provider

1. Provider includes all participants who act in the delivery of the Patients care

2. Providers have been alleged to have indiscriminately been the cause of increased costs
3. Key Provider participants are the Physicians, Pharmaceuticals and Hospitals.
4. Provider cost element analysis is a key to understanding cost maintenance

2.6.3 Process

1. Allow flexibility to ensure innovation
2. Assess the implementation of a EBM process
3. Maintain overall Quality of Care
4. Permit Patient Choice

For example the use of the ER is a high costs process for what a Public Health System could provide.

2.6.4 Payment

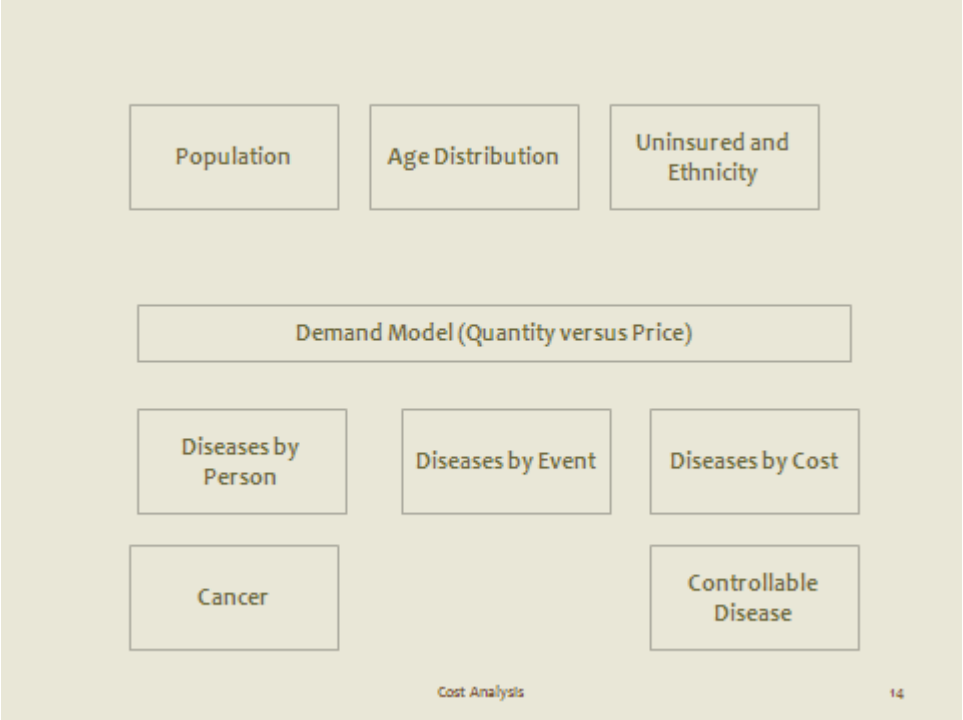
1. Target Universal Coverage
2. Target catastrophic coverage
3. Allow choice
4. Require payment
5. Mandate portability
6. Issue “Individually”
7. Control nationally
8. Insure due process and remedies from Payers

The above a but a few of the payment issues which need focus. Nationalizing healthcare was rejected under the Hillary Healthcare proposal. Perhaps the rejection may have been as much a rejection of the way it was done as what was done. The Obama Plan, vague and uncertain in its current incarnation, is expected to change as it flows from the Senate, most likely the Kennedy office.

3 THE DEMAND MODEL

We first examine the healthcare market from the demand side and then we will look at the supply side. The demand portion is driven by the population and the disease rates. The assumption by many is that the demand is given and unalterable. We will argue that demand may be reduced as well as the cost associated with supply. Demand is driven by the incidence and severity of disease as well as the growing prevalence. It is also driven by simple demographics, namely total population and any aging phenomenon which may exist in that population. We begin with those basics and then continue on to examine the separate disease states.

In this section we address the elements of a demand model for healthcare. The elements are shown in the following figure:



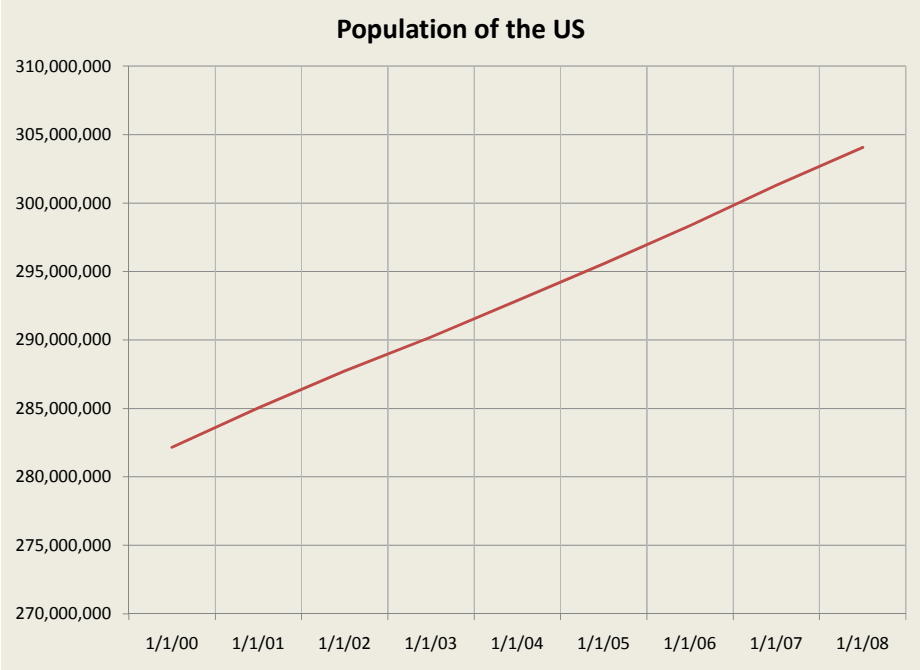
We first look at the underlying numbers of demographic factors, the people and their distribution. In addition we look at the specifics of the distribution in terms of propensity to pay, namely the uninsured. Then we examine the disease states, those controllable and those not, those catastrophic and those chronic. The output is a simple demand model.

3.1 DEMOGRAPHIC FACTORS

There are two major demographic factors which we want to consider. The first is population growth and the second is aging.

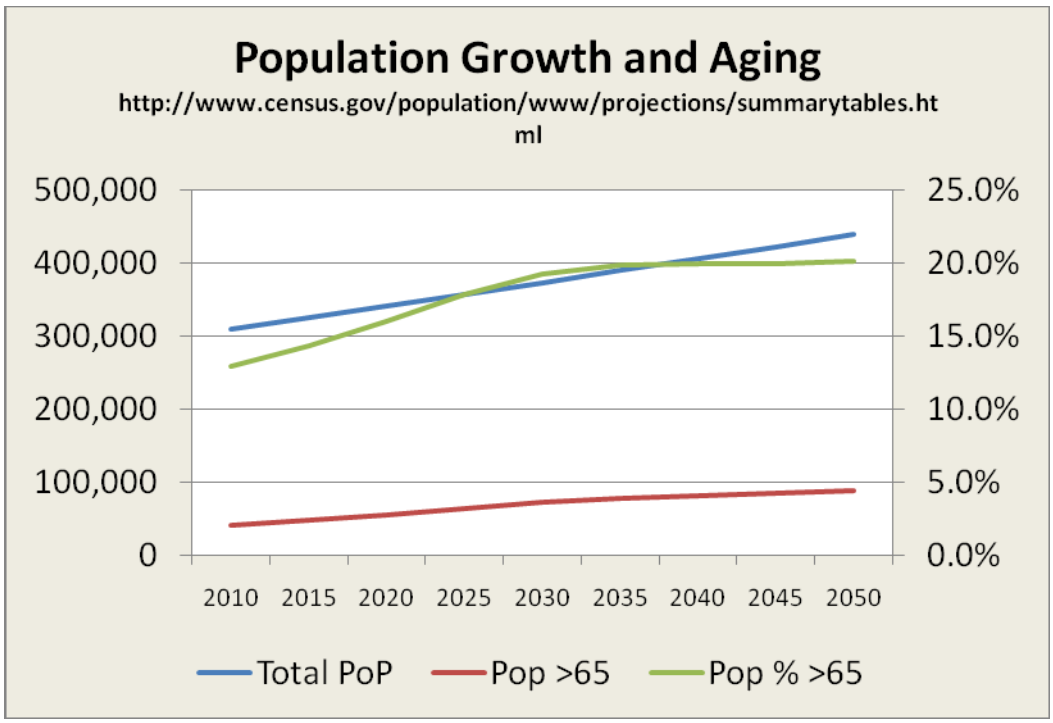
3.1.1 Population

The following Figure shows the unending growth in population in just the last 8 years. We now exceed 300 million and by 2050 we anticipate 450,000,000 population. Details under these demographics also show an expansion in a population with less skills and more demands on healthcare. This means a potentially lower income base to draw upon for support of this system.



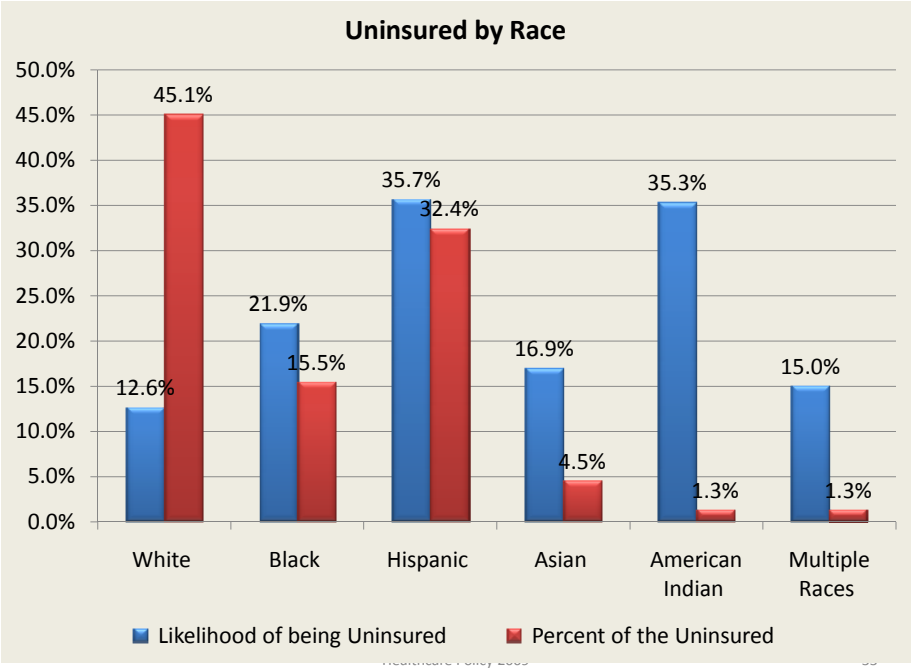
3.1.2 Aging

The aging of the population is a more significant driver. The following Figure depicts this trend. It shows a growth from 12% in 2010 to 20% in 2035. That means one in five would be on Medicare if we retain the current system. In addition since Medicare currently handles almost 35% of the Hospital Admissions and this is at a 11% over 65 rate then by doubling this we would expect to see Medicare handling more than 60% of Hospital costs. This is a dramatic change. The burden of aging is then on Hospitals and much less on Physicians office visits.

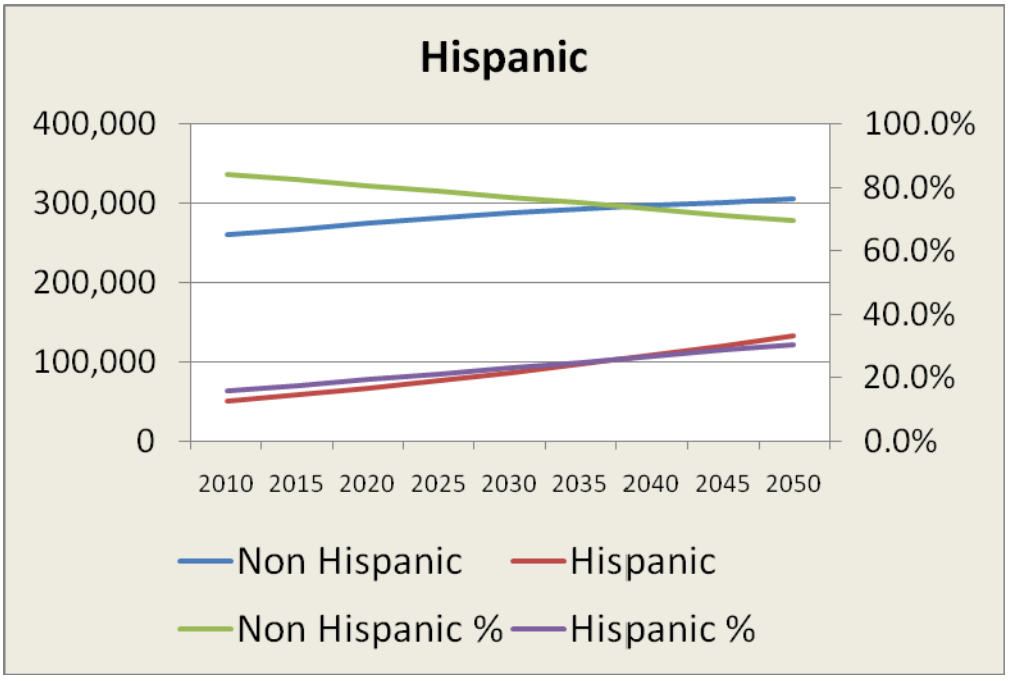


3.1.3 Uninsured and Ethnicity

The issue of who is and is not uninsured and how the demographic long term factors will be impacted by this can be seen in the following Figure. Currently 12% of whites are uninsured whereas 36% of Hispanics are uninsured. This is a 3 to 1 variation. Although 45% of the total uninsured is white, 34% are Hispanic. The growth of the Hispanic population is well beyond the growth rate of the white, and it will double in the next thirty years and if this trend continues then we can expect the total uninsured to also almost double. The affect of aging and the percent uninsured then will place the burden much more heavily on the back of those few paying.

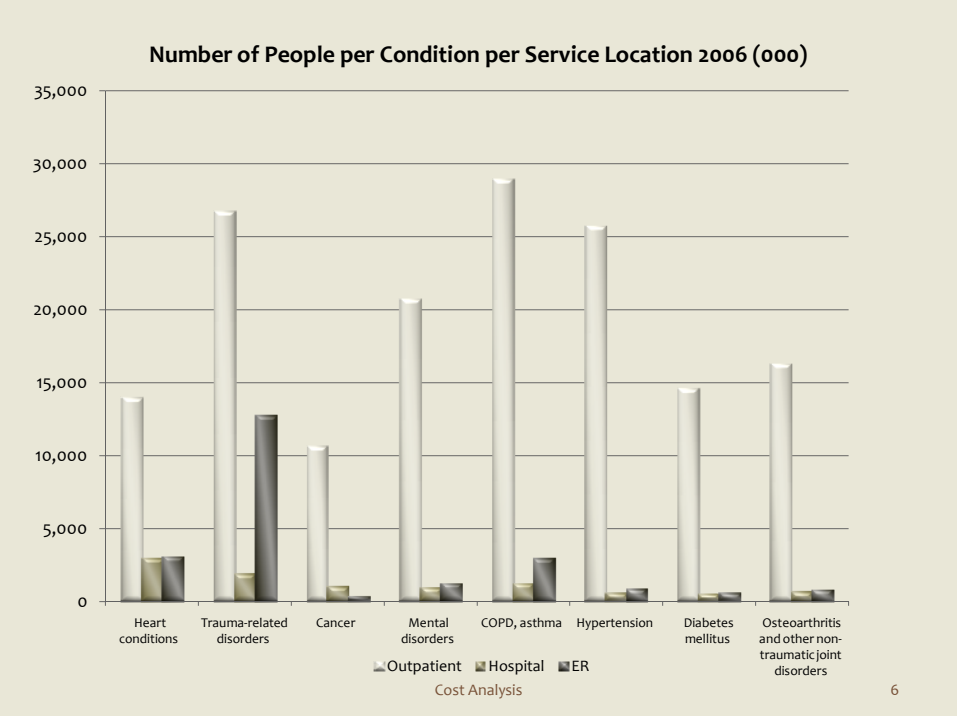


The following Figure shows the growth of the Hispanic population. It grows from just over 10% to almost 35% by 2050. This is the fastest growing segment and the least uninsured segment. If it is just less than 50 million now with 15 million uninsured and it grows to almost 150 million with possibly 55 million uninsured. That by itself exceeds all we have in 2009!

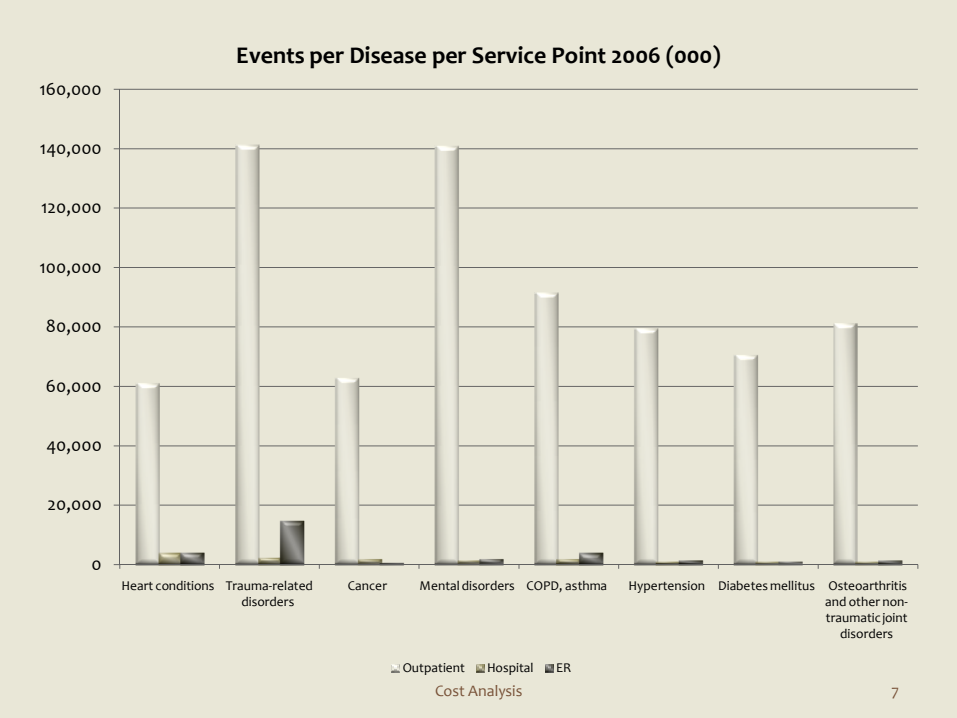


3.2 DISEASE STATES

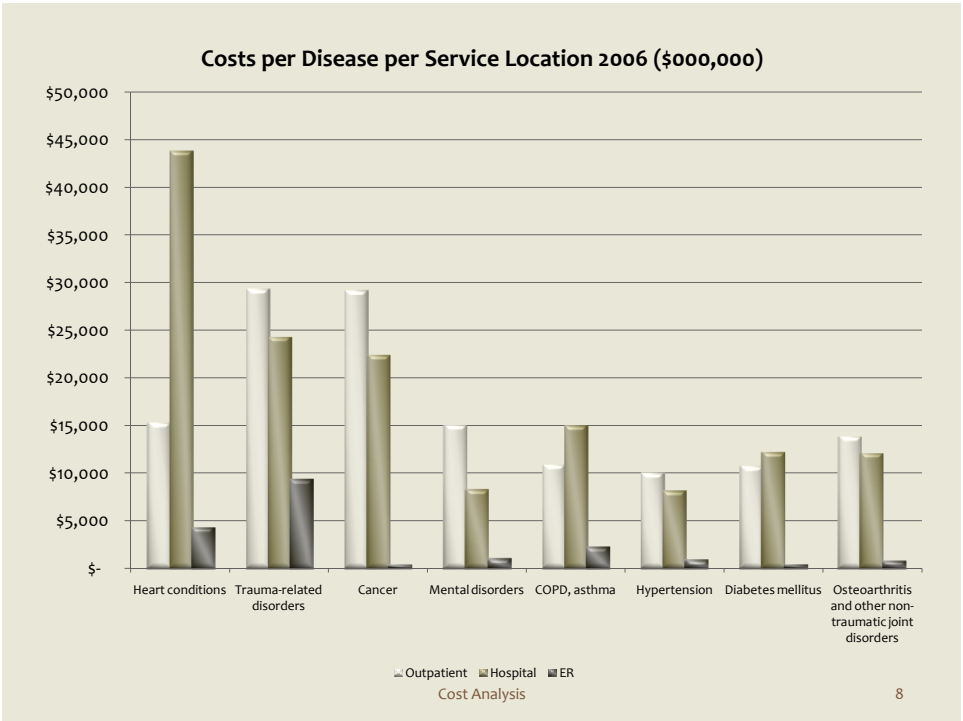
We now will details the specifics regarding a collection of important disease states and where they are handled in the current healthcare system. The next Figure shows the top disease states and the number or people and where they are handled; hospital versus outpatient. The largest states are trauma, COPD and hypertension.



The next Figure presents the number of events for each of the aforementioned disease states.



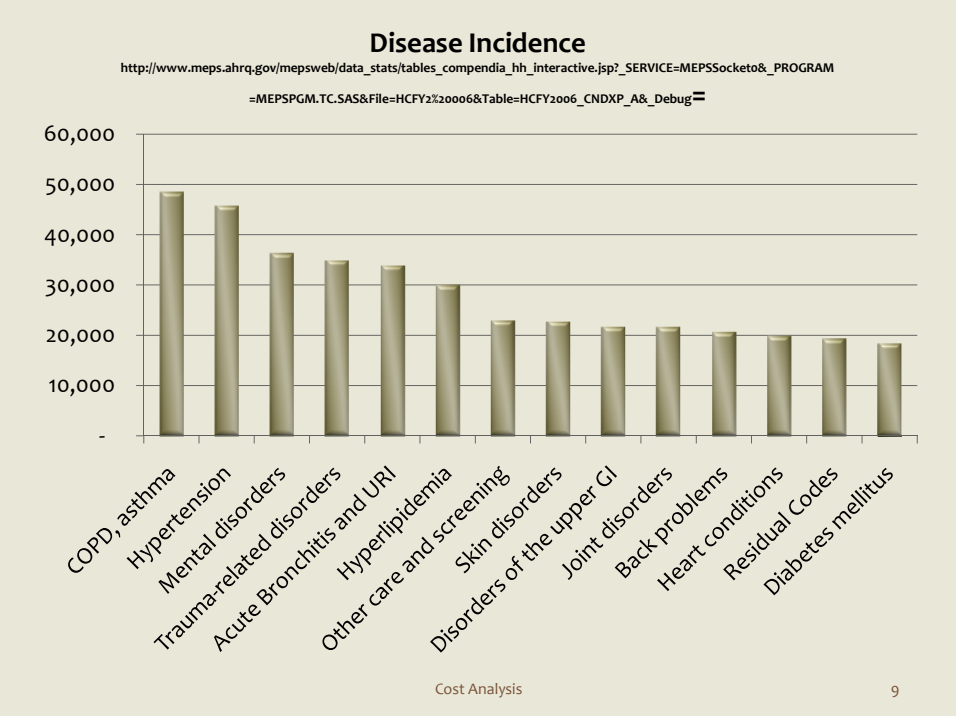
Finally the following Figure depicts the costs for each of these disease states per location of service.



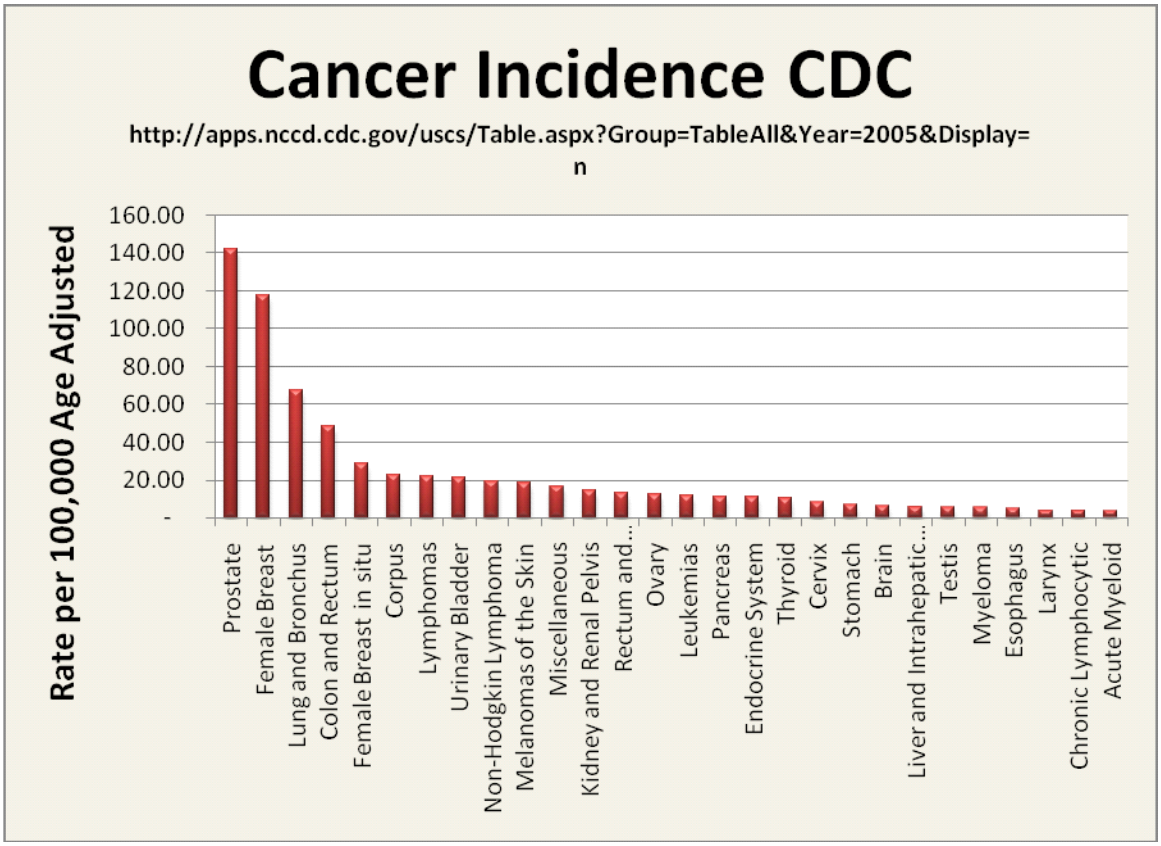
The interesting observation from the above are:

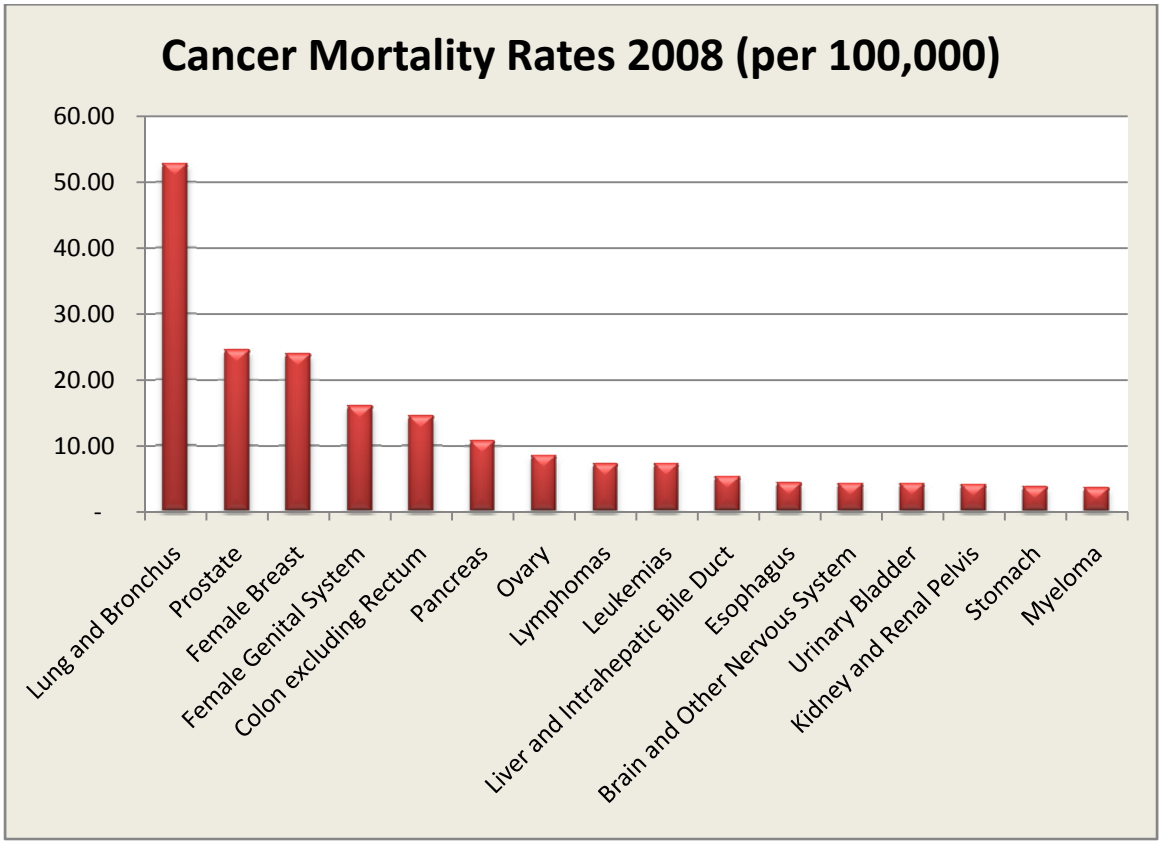
1. Heart disease is the dominant state. As we have stated earlier, smoking and Type 2 Diabetes are major causes of heart disease and are also exacerbaters of the state. In addition hyperlipidemia and hypertension, independent of the prior two exacerbaters, are in themselves major causes. Thus there is a great deal of potential if we can control this behavior via market mechanisms that the drivers making these increase can be reversed.
2. Trauma is a second factor. This means accidents and crime. To some degree the crime side has been handled in a reasonable manner in many metropolitan areas. More work can still be done. Accidents are all too frequently less controllable and are not amenable to exogenous financial drivers. However it can be prudent to add accident insurance coverage to any catastrophic plan.
3. Cancer is the third and it too has many elements which we have already presented to mitigate its effects.

Another view is to rank these disorders by total contacts including; Outpatient, Hospital, ER, Prescriptions, Home, as compared to just one. The difference in ordering is significant since cancer has few but costly contacts whereas COPD has many contacts across the board. This shows that we have disease states which require costly "repair" and others with "constant maintenance". There are varying ways to optimize the delivery of each.

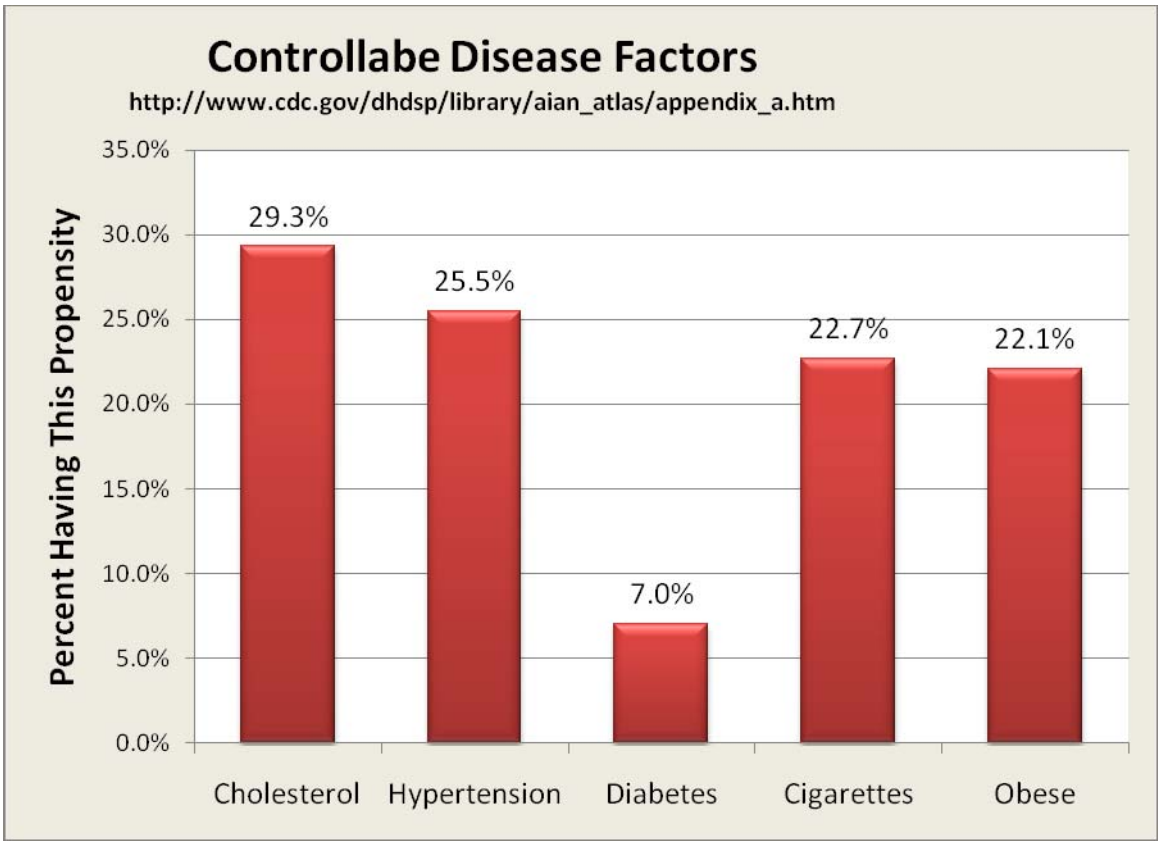


The following Figures returns to the specifics of Cancer incidence and mortality. We discussed this earlier and the remediable cancers are seen as looming large on this chart. However there are scores of others which will still need both significant hospital care and ongoing patient care. Some of this ongoing care, such as the use of chemotherapeutics with CML are quite costly but are efficacious in both morbidity and mortality effects.


Cancer Incidence CDC
http://apps.nccd.cdc.gov/uscs/Table.aspx?Group=TableAll&Year=2005&Display=n
Rate per 100,000 Age Adjusted
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
-
Prostate
Female Breast
Lung and Bronchus
Colon and Rectum
Female Breast in situ
Corpus
Lymphomas
Urinary Bladder
Non-Hodgkin Lymphoma
Melanomas of the Skin
Miscellaneous
Kidney and Renal Pelvis
Rectum and...
Ovary
Leukemias
Pancreas
Endocrine System
Thyroid
Cervix
Stomach
Brain
Liver and Intrahepatic...
Testis
Myeloma
Esophagus
Larynx
Chronic Lymphocytic
Acute Myeloid


Cancer Mortality Rates 2008 (per 100,000)
60.00
50.00
40.00
30.00
20.00
10.00
-
Lung and Bronchus
Prostate
Female Breast
Female Genital System
Colon excluding Rectum
Pancreas
Ovary
Lymphomas
Leukemias
Liver and Intrahepatic Bile Duct
Esophagus
Brain and Other Nervous System
Urinary Bladder
Kidney and Renal Pelvis
Stomach
Myeloma

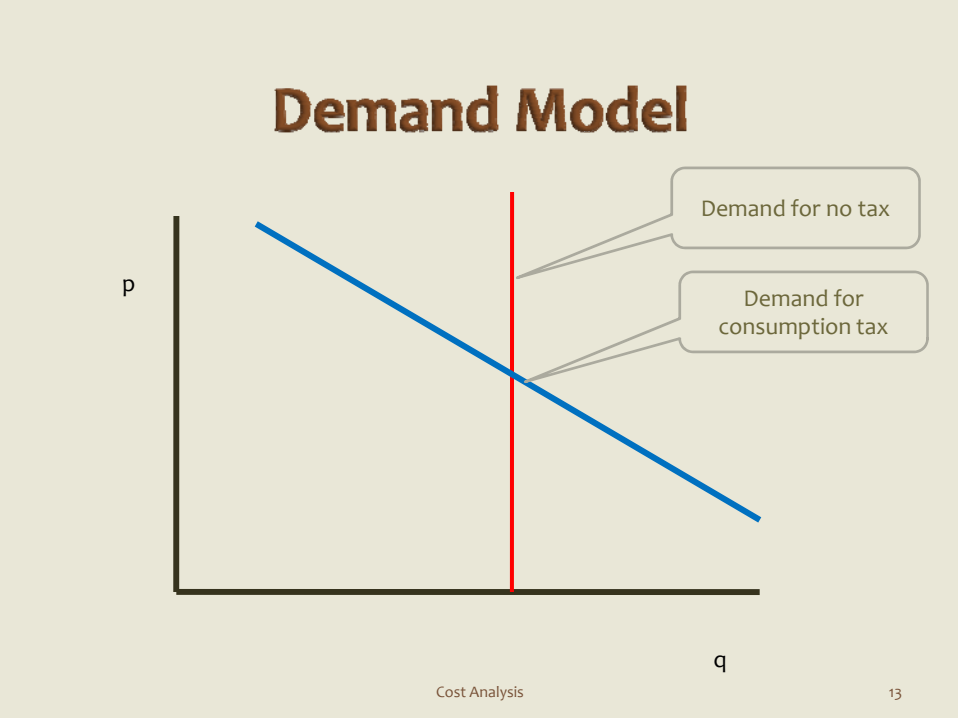
The following Figure details the Remediable or Controllable disease factors.



The above shows the percent of the population having one of the major controllable disease drivers. Many have multiple drivers. Clearly Diabetes, obesity and cigarettes are controllable by economic means. Cholesterol is a bit more problematic but it correlates well with the first three as doe s hypertension. The high cholesterol and hypertension a have few idiopathic causes and few pure genetic causes, most are secondary resulting from the first three. Thus we believe that addressing the first three will also have a dramatic impact on the remaining two.

3.3 IMPLICATIONS OF THE DEMAND MODEL

We can now look at the demand model for healthcare. Since there is no limitation of demand then demand is simply fixed and is exogenous. It is a vertical line in the following. If however we introduce some consumption tax then the higher the tax the lower the demand since we actually reduce incidence and thus demand.

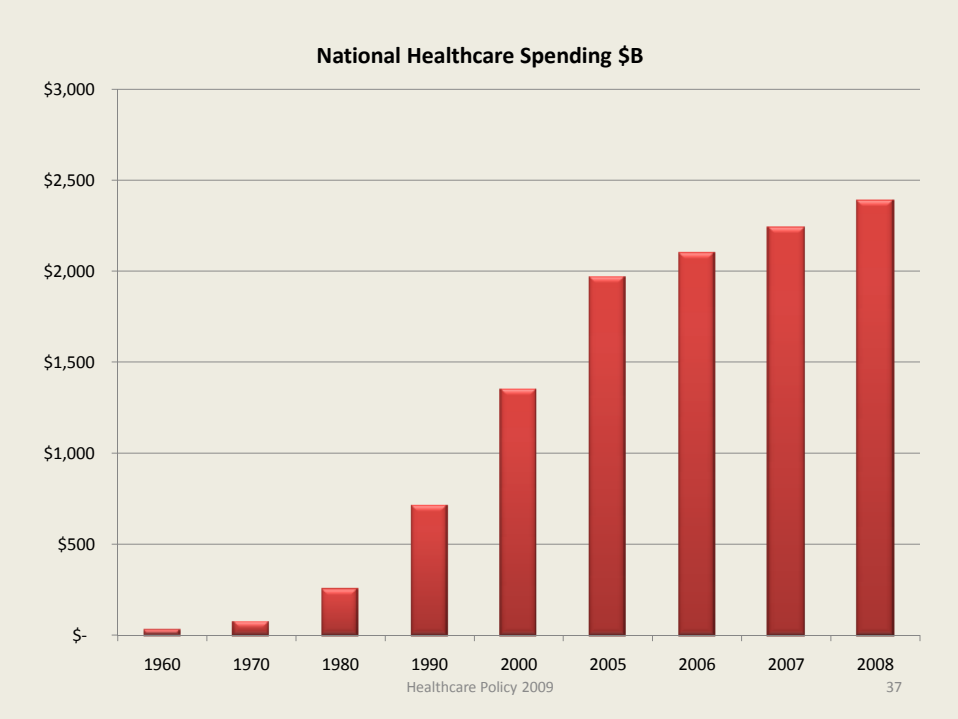

Demand Model
Demand for no tax
Demand for consumption tax
p
q
Cost Analysis
13

4 THE SUPPLY MODEL

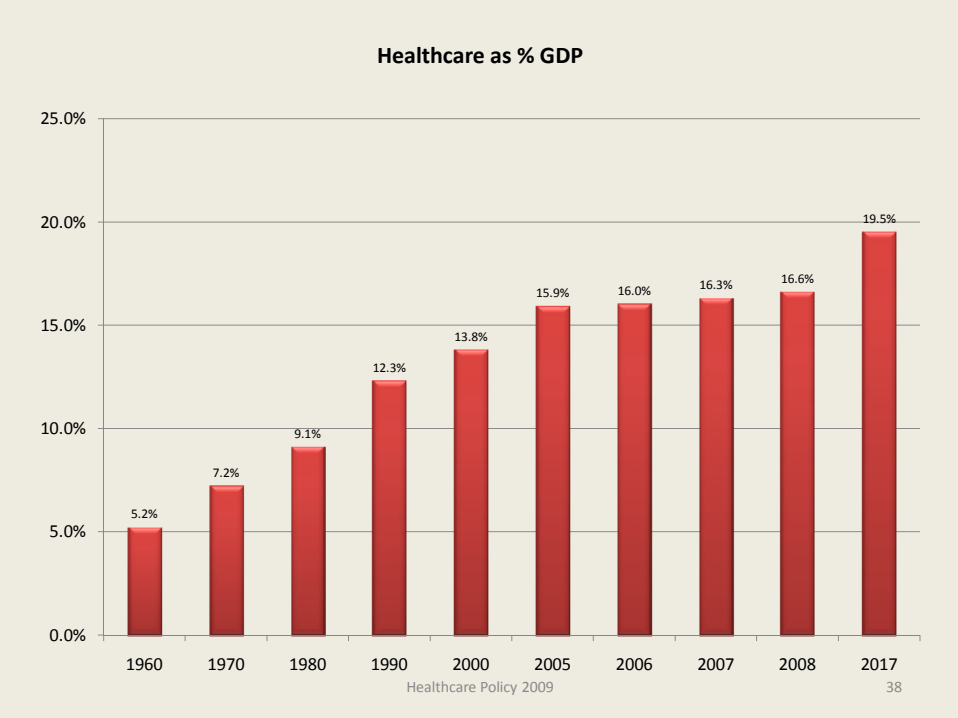
We now consider the supply side. This looks at who supplies the services, in what amounts and at what costs. We further look in details at specific costs related to hospitals.

4.1 COST FACTORS

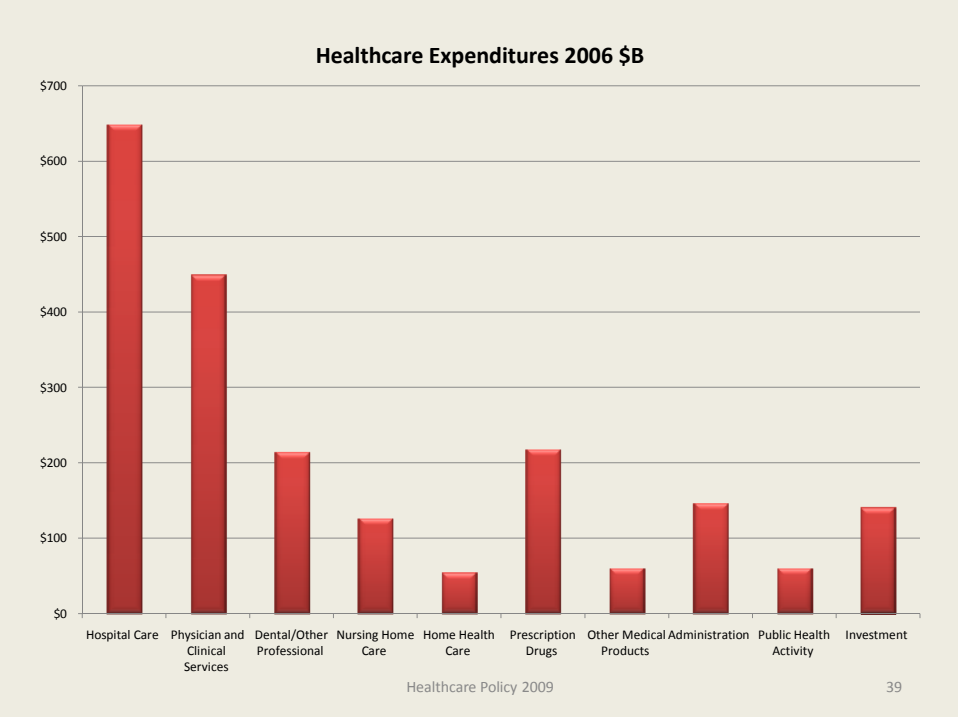
The following Figure depicts the growth in healthcare costs over the past decades. The growth rate has well exceeded inflation for a variety of reasons, one being the aging population and another being the increased in uninsured who in turn utilize the ER facilities at much higher rates. A third factor is the one we have discussed again and again which is a deterioration in lifestyle as regards to good health.



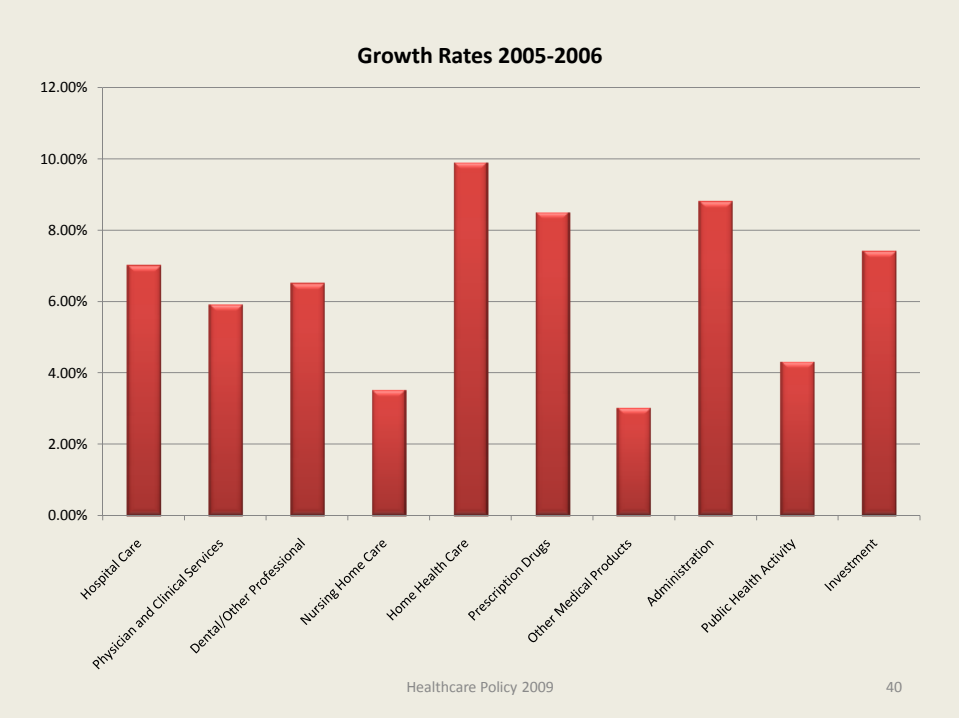
The following Figure is one which can be truly disturbing. It plots healthcare costs as a percent of GDP. From 1960 t0 2015 we have gone from 5% to 20% as anticipated. This is a fourfold increase in healthcare relative to the underlying size of the economy. Healthcare will exceed any and all other sectors of the economy, well eclipsing Defense and other more classic elements.



If we then look at where the costs are spent, in 2006 the following Figure depicts that Hospital dominate the amount of money spent and physicians, with their associated overhead costs are a mere second. Prescription drugs are the third largest. Public Health is well down on the scale of expenditures.



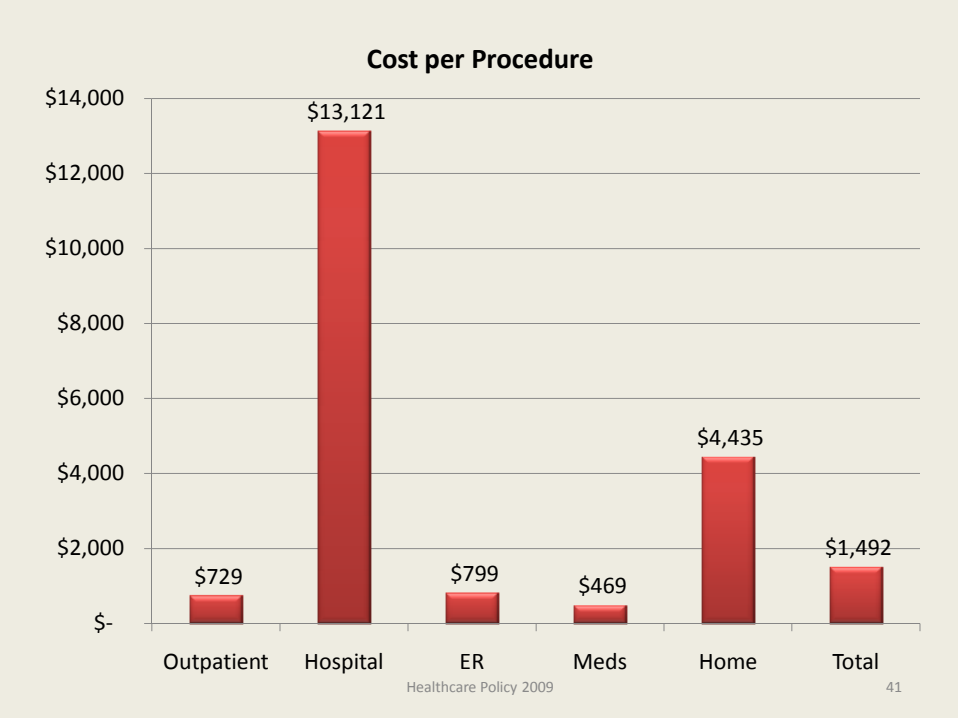
The following Figure now shows the growth rates in each of these sectors.



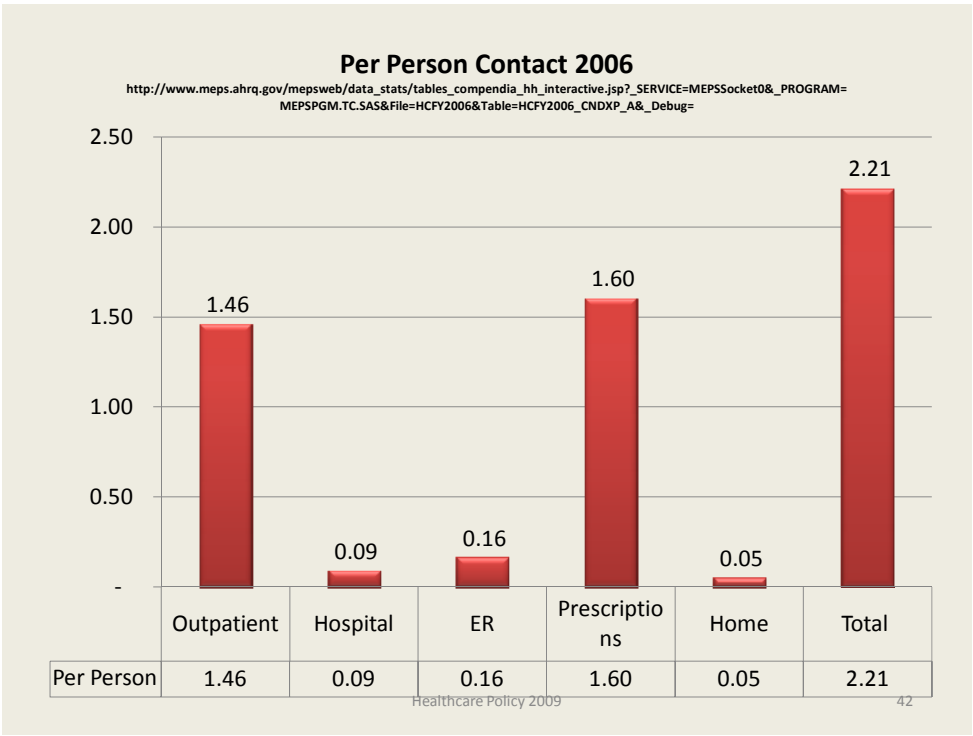
Note that Home Health Care is the largest growth rate, apparently due to the intent to get patients from the hospital to home care, but that prescription drugs is a strong second or third tied with administrative overhead. The physician services are growing slightly ahead of inflation due mainly to the increased demand on overhead from mandated processes and procedures. For example, the costs of implementing HIPPA in many Family Medical practices are costly.

4.2 INCIDENTS AND UNIT COSTS

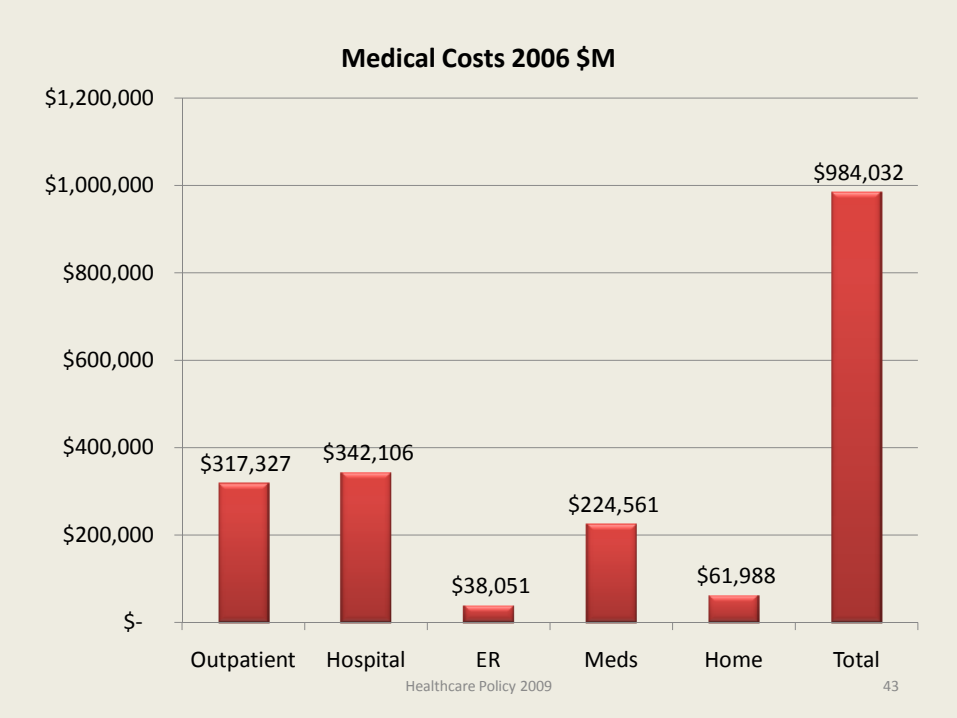
We now proceed to analyze the detail costs by disease and location of service. The following Figure depicts several of the major cost elements. As expected the costs of hospital care dominate. On a procedure basis the hospital costs are orders of magnitude higher but their incidence is generally lower.



The next Figure shows the annual per person contact with each of the provider entities. The highest is prescription provisioning and then outcare support. As we noted the hospital albeit high has a lower contact unit.



The following Figure depicts the overall costs accruing from each point of supply. We will examine these in more detail in the next section when looking at the supply function.

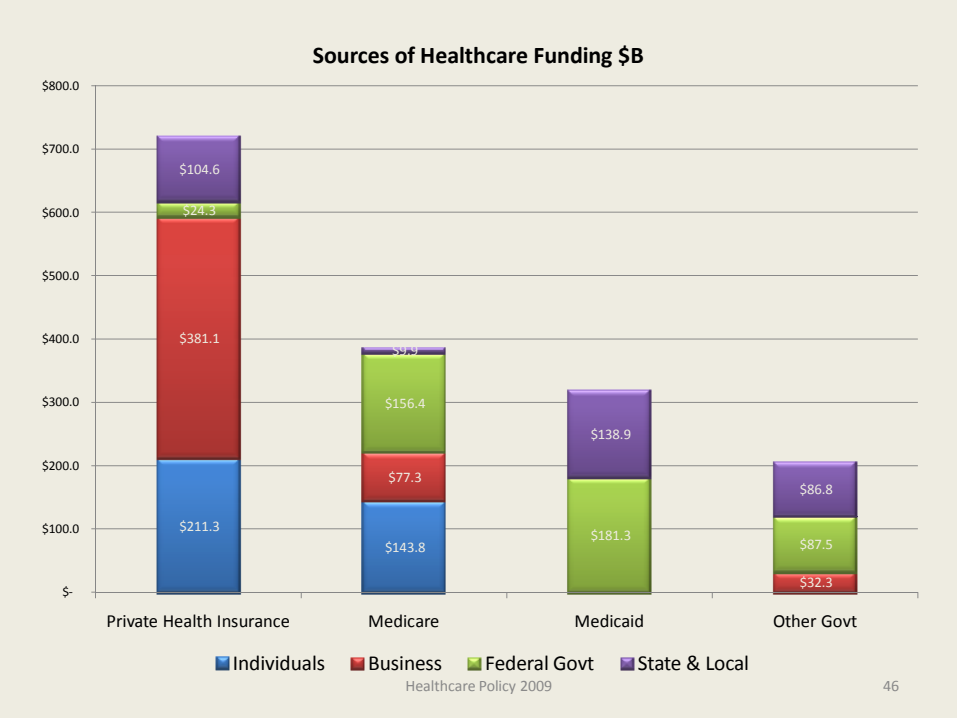


4.3 PAYERS AND PROVIDERS

The supply side of healthcare consists of the Providers and the Payers. The Providers consist of physicians, hospitals, pharmaceuticals, laboratories, hospices, nursing homes to name a few. In this section we focus on the physician and hospital elements. The payers consist of the major ones; Medicare, Medicaid, Private Plans, Government plans and other third party players. We briefly review the Payers in the next

4.3.1 Payers

The following Figure depicts the current structure of the Payers of healthcare.

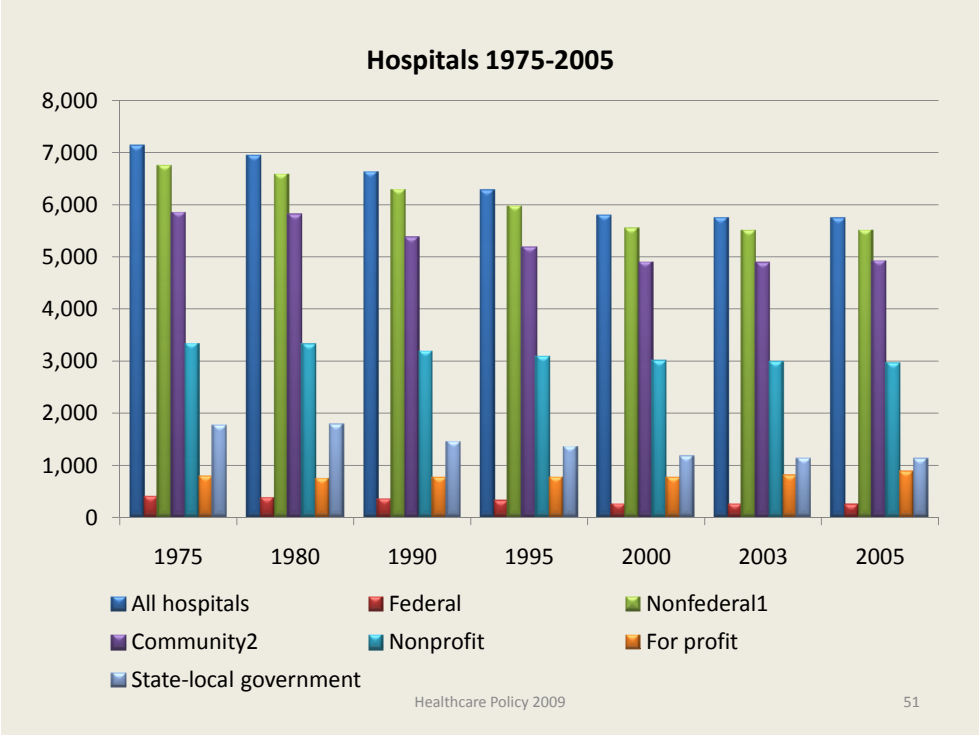


4.3.2 Providers

We focus on two of the providers; hospitals and physicians. The reason for this is that hospitals are the most complex in their operations and cost structure and physicians are generally accused as being the major cost element. We reach the conclusion that the first assertion has substantial merit and the second is lacking total merit.

4.3.2.1 Hospitals

As of 2005 there were 5756 hospitals in the US and declining. The Figure below shows this decline. The hospitals also dominate the healthcare costs. They are institutions which for the most part receive their compensation from Medicare and Medicaid.



Hospitals receive:

1. 31% from Medicare[4]. Approximately 88% of the payment is for inpatient services.
2. 17% from Medicaid.
3. 33% from Private Insurers

The hospitals have a significant staff as exemplified by the following Table which is from Roger Williams Hospital in Rhode Island. This is a 150 bed hospital, small by most measures but eh salary for staff exceeds $50 million.

[4] See Reinhardt, U., The Pricing of US Hospital Services, Health Affairs, Vol 35 Jan 2006.

Table 5. STAFF SALARIES AND RELATED SALARIES, ROGER WILLIAM HOSPITAL RHODE ISLAND 2006

Element	*Salaries*
TOTAL SALARIES	$63,281,375
PHYSICIAN - PART A	$152,385
TEACHING PHYSICIAN SALARIES	$24,607
PHYSICIAN - PART B	$1,433,810
INTERNS & RESIDENTS (IN APPR PGM)	$4,160,069
CONTRACT SERVICES, I&R HOME OFFICE PERSONNEL	$216,704
EXCLUDED AREA SALARIES	$10,080,628
CONTRACT LABOR: PHYSICIAN PART A	$1,554,034
TEACHING PHYSICIAN UNDER CONTRACT	$1,347,564
WAGE RELATED COSTS (CORE) WAGE RELATED COSTS (OTHER)	$12,810,721
EXCLUDED AREAS	$2,226,949
PHYSICIAN PART A	$14,163
PART A TEACHING PHYSICIANS	$2,287
PHYSICIAN PART B	$133,261
INTERNS & RESIDENTS (IN APPR PGM)OVERHEAD COSTS - DIRECT SALARIES	$364,593
EMPLOYEE BENEFITS	$309,141
ADMINISTRATIVE & GENERAL	$7,741,422
MAINTENANCE & REPAIRS	$904,111
OPERATION OF PLANT	$902,306
HOUSEKEEPING	$597,931
DIETARY	$569,295
CAFETERIA	$183,267
NURSING ADMINISTRATION	$1,076,735
CENTRAL SERVICES AND SUPPLY	$216,625
PHARMACY	$1,173,354
MEDICAL RECORDS & MEDICAL RECORDS LIBR	$666,357
SOCIAL SERVICE	$769,627
OTHER GENERAL SERVICE	$54,138

The following is a summary for Roger Williams. The expense per patient is $3,400 and the salary portion of that is $1,200. The physician's costs are added on to that as additional costs.

Table 6. COSTS AND COST PER BED, ROGER WILLIAMS HOSPITAL

Item	*Total*
Salaries	$51,937,372
Beds	154
Patients	40,488
Expenses	$137,650,592
Expense per Patient	$3,400
Expense per Bed	$893,835
Salary per Patient	$1,283
Salary per Bed	$337,256

The next step is to look at the charges per procedure. We have data for California hospitals and one is shown below. These costs are by DRG.

Table 7. AVERAGE CHARGES FOR TOP 25 DRG IN CALIFORNIA HOSPITAL 2008[5]

DRG Description (By Hosp)	*# of Discharges by Hospital*	*Average Charge by Hospital*	*Average Charge Statewide**
RESPIRATORY SYSTEM DIAGNOSIS W VENTILATOR SUPPORT	99	$208,865	$177,927
CARDIOVASCULAR DX	58	$101,375	$71,431
SEPTICEMIA AGE >17	92	$99,613	$76,815
MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY	690	$82,001	$68,773
RENAL FAILURE	154	$57,153	$45,295
INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION	142	$52,343	$45,919
SIMPLE PNEUMONIA & PLEURISY AGE >17 W CC	167	$44,281	$37,489
HEART FAILURE & SHOCK	268	$42,773	$36,694
ESOPHAGITIS, GASTROENTERITIS & MISC DIGEST DISORDERS AGE >17 W CC	124	$42,031	$29,982
CHRONIC OBSTRUCTIVE PULMONARY DISEASE	266	$41,376	$32,905
GASTROINTESTINAL HEMORRHAGE W CC	110	$41,155	$35,507
CELLULITIS AGE >17 W CC	49	$36,143	$30,278
KIDNEY & URINARY TRACT INFECTIONS AGE >17 W CC	100	$36,058	$30,568
CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS W CC	64	$31,184	$30,004
NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC	145	$29,739	$27,917
CESAREAN SECTION W CC	178	$28,718	$29,196
UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	182	$28,650	$28,660
PSYCHOSES	7	$26,086	$18,956
CESAREAN SECTION W/O CC	479	$22,602	$21,291
CHEST PAIN	481	$22,210	$16,943
VAGINAL DELIVERY W COMPLICATING DIAGNOSES	193	$17,166	$16,010
VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	1,536	$12,428	$11,511
NEONATE W OTHER SIGNIFICANT PROBLEMS	249	$9,203	$7,775
NORMAL NEWBORN	1,994	$4,144	$3,038

The above list shows that the total charge for certain DRGs can be quite considerable, the greatest being in excess of $200,000. The lowest in this example is $4,000 for a simple new born birth support. That is just for the birth support procedure and does not include any delivery costs which are $12,000 without any complications. Thus a simple newborn without complications including the infant and delivery, without any stay is $16,000. This is also growing at 6% per annum.

[5] http://www.dameronhospital.org/documents/Top_25_DRGs.pdf

The outpatient costs are shown in the following Table. Note that the cardiac cath is upwards of $36,000 and this is a procedure commonly used in MI cases. A simple ER visit is $625. This is in sharp contrast to a simple Family Physician visit of $95. The ER is used to treat many of the uninsured and migrants and these costs then gets passed on. If there were an open Public Health system with facilities than one could anticipate that the ER charges would drop dramatically.

Table 8. OUTPATIENT PROCEDURE COSTS CALIFORNIA HOSPITAL 2008[6]

Evaluation & Management Services (CPT Codes 99201-99499)	2008 CPT Code	Average Charge
Emergency Room Visit, Level 2 (low to moderate severity)	99282	$625
Emergency Room Visit, Level 3 (moderate severity)	99283	$984
Emergency Room Visit, Level 4 (high severity)	99284	$1,458
Outpatient Visit, established patient, 15 minutes	99213	$381
Laboratory & Pathology Services (CPT Codes 80048-89356)	**2008 CPT Code**	**Average Charge**
Basic Metabolic Panel	80048	$270
Blood Gas Analysis, including 02 saturation	82805	$544
Complete Blood Count, automated	85027	$131
Complete Blood Count, with differential WBC, automated	85025	$141
Comprehensive Metabolic Panel	80053	$335
Creatine Kinase (CK), (CPK), Total	82550	$192
Lipid Panel	80061	$306
Partial Thromboplastin Time	85730	$120
Prothrombin Time	85610	$93
Thyroid Stimulating Hormone	84443	$264
Troponin, Quantitative	84484	$228
Urinalysis, without microscopy	81002 or 81003	$51
Urinalysis, with microscopy	81000 or 81001	$87
Radiology Services (CPT Codes 70010-79999)	**2008 CPT Code**	**Average Charge**
CT Scan, Abdomen, with contrast	74160	$3,564
CT Scan, Head or Brain, without contrast	70450	$2,934
CT Scan, Pelvis, with contrast	72193	$3,564
Mammography, Screening, Bilateral	77057	n/a
MRI, Head or Brain, without contrast, followed by contrast	70553	n/a
Ultrasound, Abdomen, Complete	76700	$941
Ultrasound, OB, 14 weeks or more, transabdominal	76805	$939
X-Ray, Lower Back, four views	72110	$1,042
X-Ray, Chest, two views	71020	$537
Medicine Services (CPT Codes 90281-99607)	**2008 CPT Code**	**Average Charge**
Cardiac Catheterization, Left Heart, percutaneous	93510	$35,546
Echocardiography, complete	93307	$1,076
Electrocardiogram, routine, tracing only, w/o interpretation and report	93005	$125
Inhalation Treatment, pressurized or nonpressurized	94640	$597
Physical Therapy, Evaluation	97001	$207
Physical Therapy, Gait Training	97116	$85
Physical Therapy, Therapeutic Exercise	97110	$82

The conclusions we can reach on hospitals are as follows:

1. They are massively overstaffed and have in many if not all cases bloated overhead.
2. The ER is used as a replacement for insurance by a significant portion of the population and the ER costs 8 to 9 times a regular Family Practice visit and in excess of what a well staffed Public Health facility could provide.

[6] http://www.dameronhospital.org/documents/25CommonOPProcedures2008.pdf

3. Costs per DRG and costs per procedure are continuing to increase at rates which exceed inflation. The costs are dominated by salaries and overhead that extend well beyond the physician.

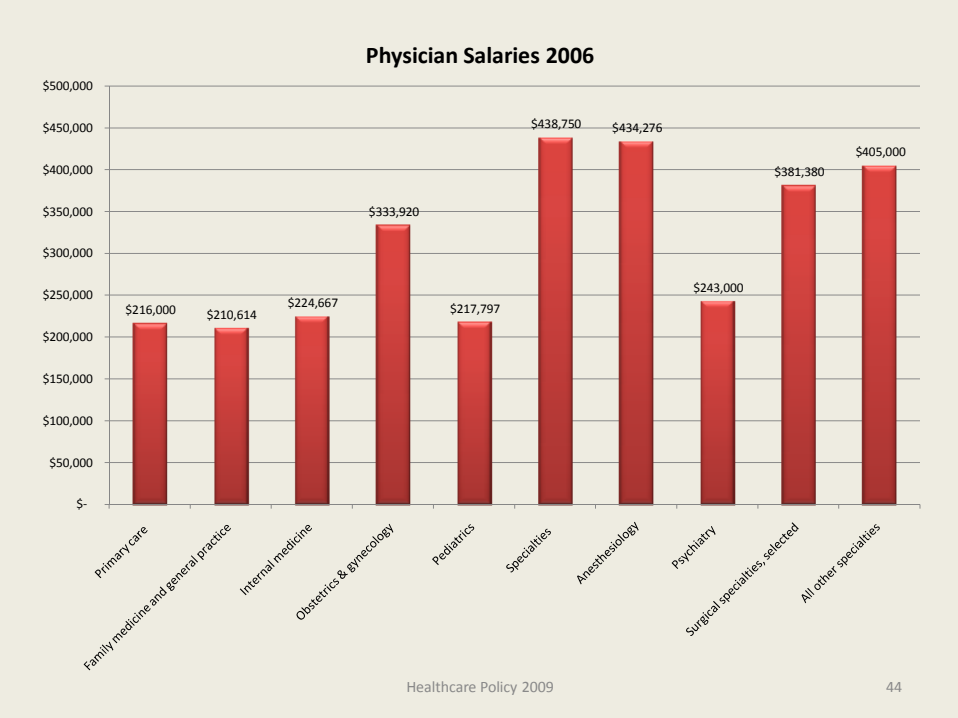
4.3.2.2 Physicians

The physicians are a second element in the supply side, and an essential element. They are more manageable in terms of costs because they charge separately and there is substantial transparency in their charges. The Table below depicts the allocation by specialty and includes their compensation.

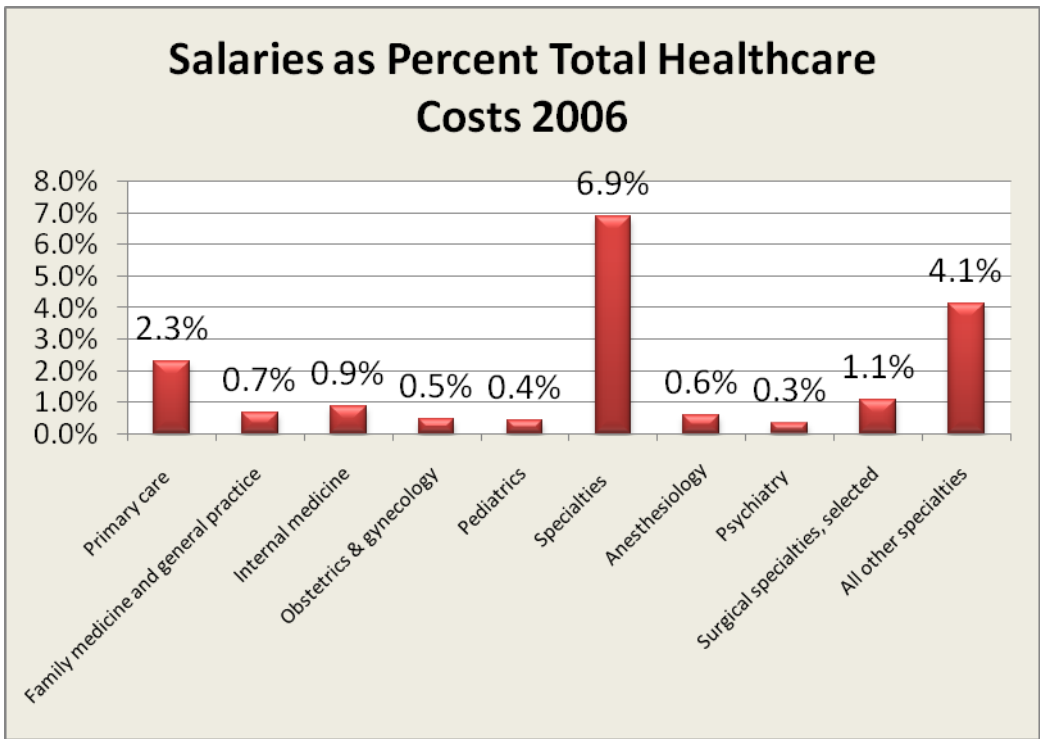
Table 9. DISTRIBUTION OF PHYSICIAN AND SALARY BY PRACTICE AREA

	Percent	*Total*	*Salary After Year in Practice*	*Salary Average*	*Total Salaries (000,000)*
Total	100.0%	633,000			
Primary care	40.4%	255,732	$160,000	$216,000	$55,238
Family medicine and general practice	12.3%	77,859	$156,010	$210,614	$16,398
Internal medicine	15.0%	94,950	$166,420	$224,667	$21,332
Obstetrics & gynecology	5.5%	34,815	$247,348	$333,920	$11,625
Pediatrics	7.5%	47,475	$161,331	$217,797	$10,340
Specialties	59.6%	377,268	$325,000	$438,750	$165,526
Anesthesiology	5.2%	32,916	$321,686	$434,276	$14,295
Psychiatry	5.1%	32,283	$180,000	$243,000	$7,845
Surgical specialties, selected	10.8%	68,364	$282,504	$381,380	$26,073
All other specialties	38.5%	243,705	$300,000	$405,000	$98,701
Total					$427,373

The following depicts the Physician salaries as an element of the supply side.



We now show the salaries as a percent of healthcare costs in each of the major areas of service delivery in the following Figure.



It is interesting to note from the above Figure the following:

1. Specialties have the highest contribution coming from physician salaries. The ObGyn is one of the smallest accounted for by the high costs associated with the hospital. Most people do not recognize that the dominant costs in the current delivery of children are the hospital cost and the cost of malpractice. In view of the dramatic growth in population especially from the growing Hispanic population which for the most part uninsured this implies dramatic costs for this cost element.

2. Primary care also is dominated by administrative overhead and medications. The typical Family Physician charges $75 for a 10 minute visit but the physician has a dramatic overhead in records, billing, nurse care and the like. The fully loaded $750 per hour has allocated costs of in excess of $450 per hour just for direct overhead. One should remember that a new Harvard Law Graduate on Wall Street was getting a $200,000 plus salary in 2008!

The last point is a key point for change in Healthcare. As we have pointed out previously:

One can start be looking at some recent data. In a paper in The New England Journal of Medicine[7], the authors present data on college and professional education, focusing on medical training, but that is just the specific example. However, the cost of medical training is an excellent example of the problem. It is a field which has now more than 50% of the entrants being women and with 25% of the recent graduates being over $200,000 in debt, the day the complete their degree. It could just get worse from there. This economic fact will have dramatic impacts on the field or medicine in the next fifty years, and the effects are starting now.

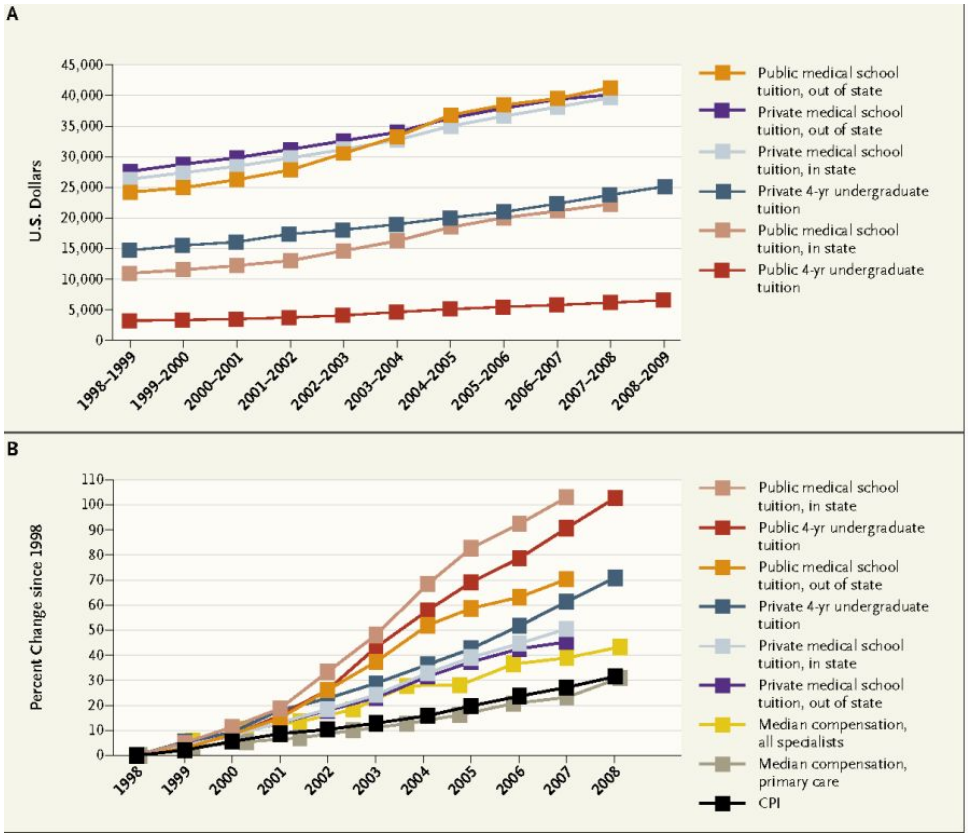
The following graph is from the Steinbrook article (this is copyrighted by NEJM 2008). Several key observations are noted:

(1) The average compensation for a primary care physician has risen with the CPI, about 30% in ten years (1998-2008).

(2) Private school tuition for college has risen at 70% for the same period (Now $25,000 per annum, growing at 6-8% per annum going forward).

(3) Private and public Medical School tuition is now in excess of $40,000 per annum and growing between 40% and 110% over the ten year period.

[7] See Medical Student Debt — Is There a Limit? Robert Steinbrook, M.D., NEJM Volume 359:2629-2632 December 18, 2008 Number 25 http://content.nejm.org/cgi/content/short/359/25/2629



The implications of these bubbles like change are most likely to be:

(1) Potential default on tuition payments. This continued explosion of tuition and reasonable growth of salaries will soon collide. It will result in defaults.

The following Table depicts the Medical School Enrollment[8].

[8] From NEJM The Case for More U.S. Medical Students, Volume 343:213-217July 20, 2000 Number 3, Copyright NEJM.

TABLE 1. APPLICANTS TO ALLOPATHIC MEDICAL SCHOOLS AND ENROLLMENT.*

YEAR	NO. OF APPLICANTS	NO. ACCEPTED	APPLIED: ACCEPTED RATIO	NO. ENROLLED	MEAN GPA OF APPLICANTS†
1980	36,100	17,146	2.1	16,590	3.32
1992	37,410	17,464	2.1	16,289	3.24
1993	42,808	17,362	2.5	16,307	3.26
1994	45,365	17,317	2.6	16,287	3.27
1995	46,591	17,357	2.7	16,253	3.31
1996	46,968	17,385	2.7	16,200	3.34
1997	43,020	17,313	2.5	16,165	3.38
1998	41,004	17,379	2.4	16,170	3.40
1999	38,529	17,445	2.2	16,221	3.43

*Data are from the American Association of Medical Schools.

†GPA denotes grade-point average.

Thus the costs to finance all medical school students at $40,000 per year are about $2.5 billion. This is a de minimis amount compared to all other costs and would clearly be a low cost alternative to the results that would come from the exploding costs and shift away from medicine of some of the better students no looking at alternative careers. We will see what is happening to engineering despite that area actually being financed.

(2) Funneling of physicians into "institutional" like practices and the ultimate demise of the single or small group practice. No physician with such existing debt could take on additional debt of buying out or starting a new practice.

(3) The view of the profession as a job.

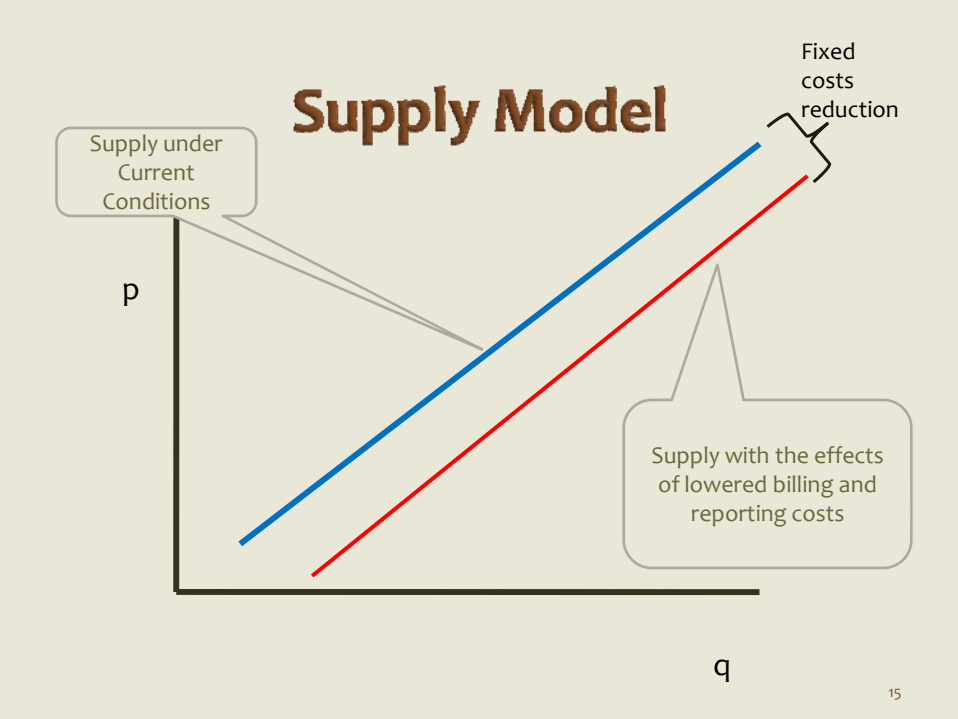
(4) The loss of the best in class to professions paying better compensation with low cost of entry such as corporate positions, start-up companies, investment banking and venture capital.

(5) The "dumbing down" of the family practice since the better students will be driven to alternative career options.

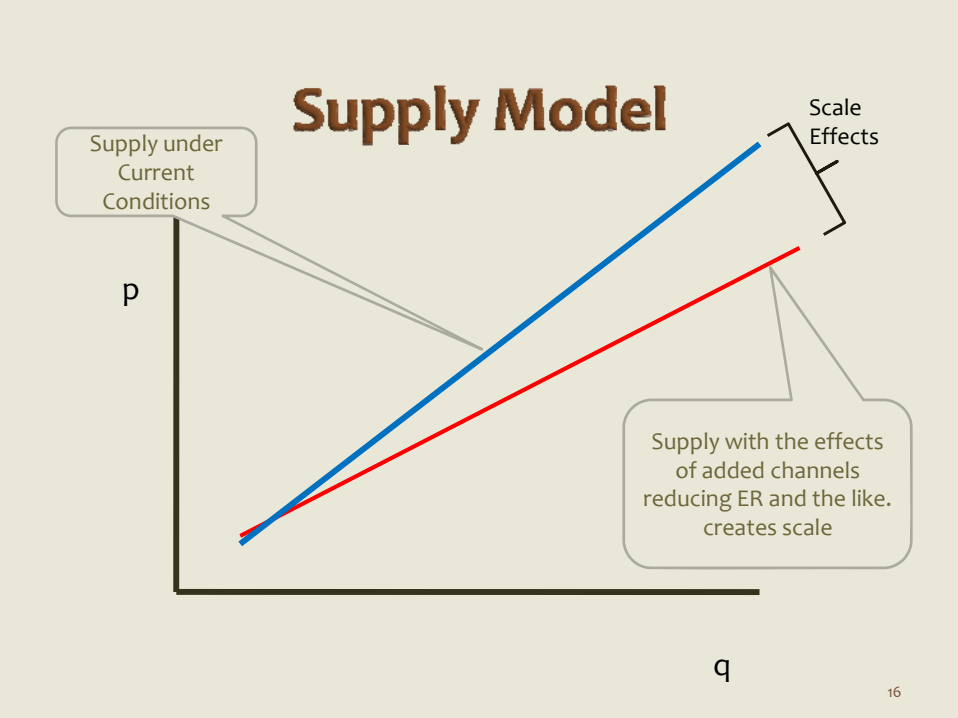
4.4 IMPLICATIONS OF THE SUPPLY MODEL

Based upon the preceding we can stipulate a Supply model. Namely we have one as follows:

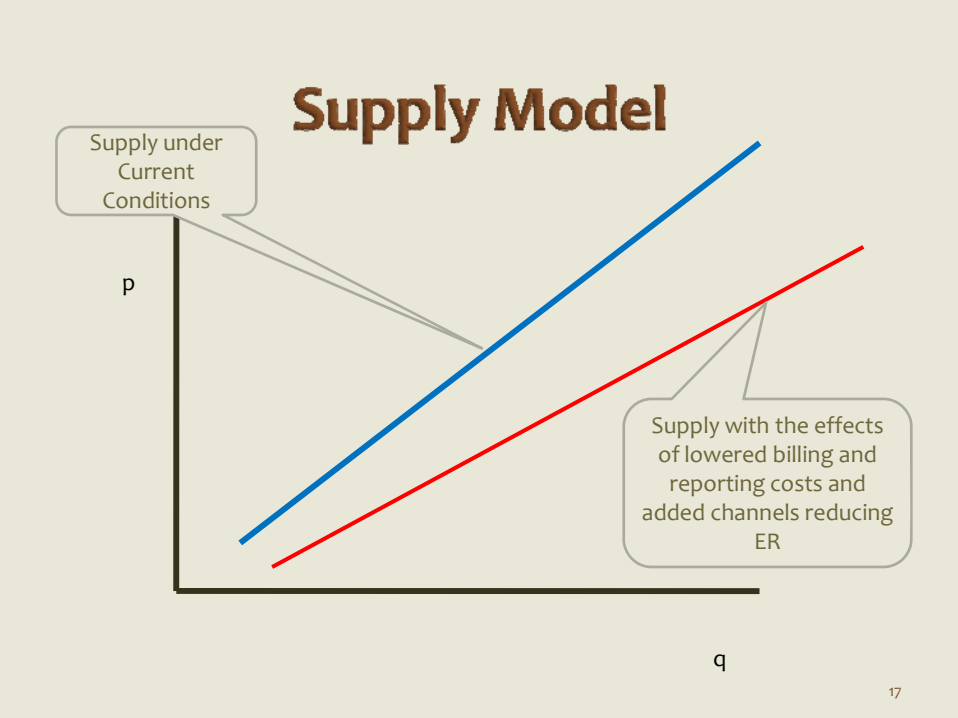
Now the first step in the supply curve will be to drive out costs which are overhead costs. Thus is we reduce the cost of billing and that of report management on a per patient basis this would represent a shift in the supply curve downward as shown in the following. This is the first step in cost reduction.



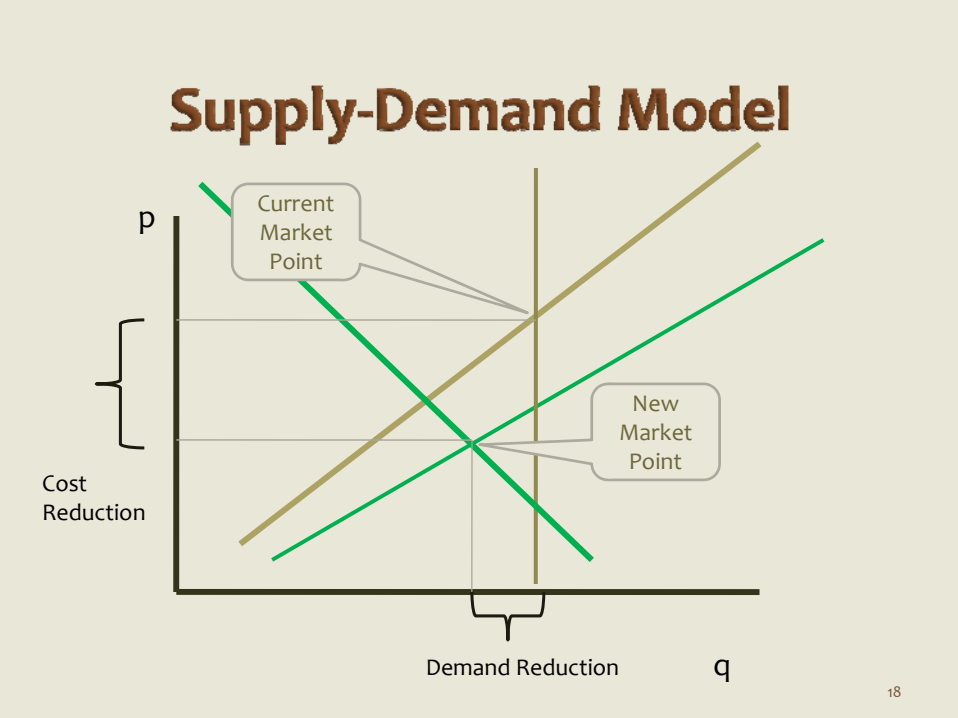
The alternative would be to create scale economies in the delivery, namely making it less costly the more service that are delivered. We argue herein that using a Public Health delivery system would do so by alleviating other more costly means such as the ER. There are many more examples of such an approach. The following Figure depicts what would happen in this event. Namely we see a decline of the supply curve the larger the demand becomes, clear scale effects.



We can then combine the two effects of reducing overhead and achieving scale to create a compound new supply curve as shown in the following Figure



Finally we can combine the Demand and the Supply curves to show what the total effect would be. This is done in the following Figure.



We note that we reduce the costs significantly while have a small but measurable decrease in the supply by means or reallocation while keeping the overall quality high. This above graphic is in essence what we propose in the plan.

Note that we now have a lower price and slightly lower demand. This approach deals with the healthcare problem on two levels. It dramatically creates a sensitive endogenous demand and allows for both a shift and scale in supply. The reduction in cost is significant and the supply provided is shifted by channels of supply not quality.

5 TECHNOLOGY

Technology is not a panacea for all the problems of cost containment. Technology in many cases adds to the costs but in many ways improves the quality of life for the patient. The introduction of the MRI and CAT systems dramatically changed the way we see internal problems. These are but two of many examples of technological improvements, costly but of great advantage to the delivery of healthcare.

Technology can address three major areas in the delivery of healthcare. Specifically:

1. Cost Reduction: The impact of technology on cost reduction can be massive. The practice of medicine has exploded with overhead in the past thirty years. Record keeping is a time consuming and expensive process, and one that in many important cases fails to properly present patient data. On the other hand it is historically a holographic record used in any litigation. Electronic Medical Records, an idea whose time may be coming, can dramatically effect improvement if and only if implemented wisely. Another area is billing and payment. This is an almost unworkable area. Medicare has established a system which somewhat functions but each insurer creates a new and separate system. Delays and denials in payments create great cash flow and overhead costs for the physician and hospitals. Technology has been applied to this area for twenty five years with glacial progress. The institutional and structural issues still dominate.

2. Quality of Care: Technology improves quality of care but is costly if used in areas where the utilization is low. A CAT or MRI can be costly if used infrequently.

3. Risk Reduction: The area of risk reduction is a significant one. The simplest example is the washing of hands to reduce MRSA infections in hospitals. Nosocomial infections are a major cause of hospital morbidity and mortality. This simple issue can be addressed by technology which forces healthcare professionals to comply. The proper administration of medications is another area. All too often patients in hospitals are administered the wrong drug, dosage, or not obtaining the medications required. This can be handled technically as well. Measuring, monitoring and repairing processes which cause increased morbidity and mortality are essential, and thus these can be best effected by technology. Certain institutions, and even providers, have poor records of delivery.

5.1 A PROPOSED TECHNOLOGY STRATEGY

The three operative terms in the delivery of Healthcare are universality, quality and cost. They are all based upon a six point strategy, as described below.

(i) **Productivity Improvements:** Develop a system of healthcare delivery that fits paradigms of comparable service businesses that measure and manage the delivery of service efficiencies and organize to maximize this effectiveness. In essence, measure, organize, and remeasure to gain productivity.

(ii) **Cost Awareness:** All health care professionals and the customers, the patients, should be aware of the costs or prices. Namely, the patient and the physician should be made aware to the cost of the sets of possible procedures and the risks. The patient and the physician as a team must make a cost effective decision. Angiography as a means for diagnosing coronary disease is an expensive and risky procedure. Alternative therapies that address both the symptoms and the underlying disorder may be equally efficacious if the patient and the physician are made aware of the costs. The physician must have that awareness across procedures as well as providers. Thus lab tests must also be priced by test as well as by vendor.

(iii)**Alternative Awareness: T**he alternative procedures must be made aware to the patient. These procedures are not only costs based but risk and efficacy based. MRIs are a very effective tool in diagnosing disorders and have a low risk profile. Angiographies are invasive and have higher risks. The patient must become part of the choice process along with the physician. The patient must become an economic choice selector in the process.

(iv) **Centers of Excellence:** Not every hospital can perform heart transplants, kidney transplants, and neurosurgery. The Center of Excellence strategy recognizes that large geographical areas need to join together to select what institution has which facilities. This is for both interventional as well as diagnostic facilities. The New Hampshire plan is one that takes a total state view of such care, having a single tertiary teaching hospital act as the primary center and refocus from that for other select centers. This clearly puts the burden on the Hospital system and not just on the individual hospital.

(v) **Electronic Transaction Intensive:** Paperwork is the bane of healthcare. No other industry, other than the regulated monopolistic telephone companies, can sustain the burden of the paperwork that exists in healthcare. From the physician's office through the clinical and administrative realms of the hospital; there is an excessive amount of paperwork. It is essential that electronic transaction systems be put in place that are integrated and meet standards of interfaces. This will result in increased productivity, enable the efficient use of centers of excellence, reduce the cost of creating and handling the paper, and allow an enabling capability to measure, monitor and manage the expenditures, the productivity, and the quality of patient care. Transaction systems, using both text and multimedia formats, are at the heart of the structural reform.

(vi) **Quality Care Management:** Having the transaction capabilities allows for the monitoring of all patient care on a real time basis. It is the ability to monitor the rate of diseases development, the relative and absolute performance of physicians and hospitals, and the interactive informing of physicians of better alternatives and options. It is interventional as well as monitoring. Measurements assure the consistent delivery of quality care. Variance in physician or geographical mortality and morbidity can be determined at the micro level. These can then be addressed and resolved. Standards for quality can be communicated, updated and improved. Quality care can then follow more closely the most effective and efficacious approaches - available.

The six point strategy articulated above can be met through the use of five key technology areas:

(i) **Multimedia Communications**: Multimedia communications is more than just the technology for combining video, voice and data. It is a paradigm shift in interpersonal communications. It is an enabling technology for the use of multimedia data elements, such as real time voice, text that is stored, images and real time video, in a fully conversational mode by a group of participants. Multimedia communications is a confluence of technologies that is end user driven, focuses on the seasoning of users together. This in many ways transcends what we have today in the Internet since in the provision of medical services the media used are extensive, complex, interrelated and are critical to the overall care of the patient.

(ii)**Multimedia Databases:** Disparate date elements in multimedia databases must be associated with one another in a temporal, spatial and logical context. Multimedia database technology allows this to happen. It permits the binding together of voice segments, annotating with a mouse a full motion video element. The multimedia database is also much more complex than what we see today in any Internet use. One must be able to search images and videos as well as we can search text and data elements.

(iii)**Networking**: The current watchword here is broadband. Access to broadband has increased and has become cost effective in many ways. However it still suffers from several shortcomings such as universal availability and security.

(v) **Transaction Networking:** Transactions must be at the heart of the technology. Each interaction must be monitored, measured, logged, billed, and evaluated. This means that behind the technology of interaction is a technology of transaction. The transaction network enables the price tag mechanism that is so critical for the natural forces of economics to play themselves out.

5.2 THE EXAMPLE OF OFFICE BILLING

Medical Practice is both the provision of the healing arts and the management of a business. The business aspect of a practice is one which has take a significantly lesser role in the minds of many practitioners and thus may have resulted in the incorporation of many inefficiencies. In this paper we discuss the practice as business concept and demonstrate how significant improvements in practice management can be achieved. As a result of these structural efficiency improvements, it is argued that overall patient quality of care can also be improved. The results in this paper are based upon data accumulated over the past two years of addressing specific practice management issues.

The physician's office management is based upon a careful balance of quality patient care and intermittent business management. The primary function of the physician is the care and management of their patients. However, the management of the practice requires both an understanding of the practice as business as well as the tools necessary to effect that management process. In this paper we describe several case studies of office management practice and discuss the key areas of practice management optimization. It has been shown that improvements of 10% to 25% in combine revenue control and cost containment can be achieved.

At the heart of the effective management of a practice as business is the implementation, use and optimization of a computer based system that allows for the management, processing and tracking of all key office financial factors. Practice management requires that three major factors be focused upon:

(1) *Effective collection of receivables:* Specifically, the billing process must be viewed as the revenue generation porches and leakage from that process must be kept to a minimum. All bills must be entered, processed, tracked and collected. Lost revenue must not be left on the floor either out of lack of knowledge or through frustration with the process.

(2) *Maximum productivity for reduced expenses:* Inefficiency in the various elements of the practice management can increase costs and significantly reduce the flow to the bottom line. Redundant manual processes are not only prone to errors but all too frequently increase costs due to these inefficiencies.

(3) *Timely management of cash:* Cash flow is the heart of any business and in turn that of any practice. The focus should not only be on revenue collection but on the flow of cash in the - practice. This means that the systems in place address the issues of receivables, payables, and changes in working capital. Thus, any system put into operation must deal with the whole flow of cash through the practice and optimization should occur in that area.

In this paper we address the issues of managing a practice, recognizing that it is a combination of both process and tools. The process aspect is one that starts with a recognition of the practice as business and allows for a deconstruction of the various business elements of the practice and places measure of performance on each of them. The tools part of the effort will show that to effectively implement the process portions, tools other than just good thinking are necessary. With the advent of the personal computer, networked systems and the interfacing with large scale computer systems, the tools are now becoming available at a cost effective level. This paper will focus on the confluence of process and tools.

Current Office management can be viewed as a process that begins with the patient entering the office and ends with the collection of the fee for the services rendered. The management of the office is divided into two major economic dimensions; revenue and expenses. Revenue is generally based upon an accrual system that recognizes the revenue at the time of service. Expense, similarly is based on an accrual system. We first will deal with the revenue issues and then with the expense factors.

The revenue process is shown in Figure 1. The flow is first shown as patient processing and then the submission of the of the bill for processing. The options for billing are as follows:

(1) *Cash/ Fee for Service:* This fraction of the practice provides for instant cash into the receivable flow and thus does not represent a major factor in cash flow management. However, many practices have a decreasing number of their patients in this pool.

(2) *Managed Care:* The introduction of managed care systems has had a significant impact in the West and is moving East as they are improved and demonstrate their effectiveness in containing costs for major corporations. The contract stipulates the fee accepted, the payment time and the mechanism for submitting claims. Typically significant delays occur in a Managed Care

system as well as an increase in the non-collectibles. Thus the physician participating in a managed care program is faced with lower revenues per service, longer time to collect, increased non-collectibles due to a variety of causes, and finally an increase in the total billing costs. However, many of the managed care programs now have electronic interfaces and thus will allow for better control of several of these variables leading to lower losses.

(3) *HMO/PPO:* The HMO/PPO contract with a third party physician typically is also a contractual agreement that specifies the fee for service and thus is similar in many ways to the Managed Care program. The difference is that a HMO/PPO system may cover many companies and thus is not company specific. The same problems occur with this system.

(4) *Medicare:* Medicare may be a dominant factor in many practices. Specifically for the Internist, the Ophthalmologist, the Cardiologist etc. a growing number of the patients are Medicare covered. Medicare currently support electronic billing and currently requires the physician to prepare the patients billing information. Medicare must also be billed first and the fee structure is highly regulated. Assignment of Medicare is becoming more frequent and the Physician may face a growing demand from both patients

(5) *Third Party FFS Assignment:* The classic method of payment for many years has been Fee for Service (FFS) with a third party insurer. This is the now almost fifty year old paradigm in HealthCare insurance. In most practices, however, this form of payment is infrequently put in the assignment pool. In contrast, the patient pays either at the time of service or after billed and then is personally responsible for the processing with the insurer. Thus, this form of reimbursement is of limited impact on practice financials.

(6) *Medicaid:* State reimbursement plans are notoriously low and excessively delayed in reimbursement. Little if any work has been done in automating this area and the differences from state to state are staggering. The concentration on this area leaves one with the impression that there is still a great deal to be accomplished before Medicaid can be integrated effectively into the practice payment system.

Current office management practices fall into one of three extremes; manual in-office systems, service bureaus, and computerized in-office systems. They can be characterized as follows:

(1) **Manual In-Office Systems (MIOS):** In this case the patient and billing information are collected manually and stored in the patient record and billing files, In extremis, the patient billing file may be nothing more than a 3" by 5" index card system with a rolling summary of bills and receipts. The two sets of filing systems are separate and independent. The advantages of such a system are that it requires no technology, is manually under the control of the physician, and costs nothing in terms of capital or training. The disadvantages are that such a system results in very labor intensive bill preparation, tracking, auditing and is subject to the vagaries of the office manager. The most serious drawback is not the labor intensiveness of the approach it really is its lack of frequent auditability. Such systems become prone to revenue "shrinkage".

(2) **Service Bureaus:** The service bureau approach starts at the same point of the MIOS approach of manual collection of information. It then results in placing all of the manual information in the hands of a third party to perform all of the processing and collections efforts. The advantages of such an approach are that they are predictable in cost and eliminate the concerns

of managing the process internally. The disadvantages are significant. Quality of service bureaus may vary greatly, most are themselves manual and do not provide adequate audit information, and some even have ethical or legal problems.

(3) **Computerized In-Office Systems (CIOS):** The CIOS approach uses a computerized system on premise that enters all patient information, all billing information, prepares the bills and electronically transmits the bills, if appropriate, the proper agencies. The advantages of such a system are obvious. First they provide auditability and control back to the practice. All the information is available and trackable at any time. Second, the systems are focused on delivering a cash flow management process to the practice which is what desired. Third is, the records are kept in an orderly and retrievable fashion. The disadvantages are those of computer systems. First is the issue of computer phobias. These however are lessening with the advent of user friendly interfaces, window environments, artificial intelligence front ends and all of the other tools that help the end user. The second disadvantage is the issue of user acceptance. namely, a computer changes the routine, it disturbs the current work flow, and it can cause emotional dissonance in the office staff. Quite frankly, so did the X-ray machine, and even the stethoscope. This must be dealt with as a human issue of office management through training and education and through leadership and direction

We will now focus on the use of computers in this environment and delineate the efficiencies and bottom line impacts to a practice.

The revenue collections flow has been shown in Figure 2. Here we have shown the bill preparation and the submission to one of several channels. The channel prepares, transmits and processes the bill. The net result is acceptance and payment, rejection, loss due to some endogenous or exogenous factor. In this Figure we show that typically bills in these channel may pass without error 70% of the time, are rejected and re submitted 20% of the time and are lost or are non-collectable 10% of the time. We shall discuss the reasons for loss.

As we have discussed above, there are several mechanism that result in loss of cash from the practice. They naturally fall into two categories, the revenue loss and the expense burden. The details on each are:

(1) **Revenue Loss:** Revenue loss may occur from several courses.

i. Improper Billing: The submission of a bill that has been improperly prepared.

ii. Unfilled Bills: Bills that should have been filed but that have been neglected.

iii. Rejected Bills: Bills that have been filed, properly prepared, but rejected for other than procedural reasons.

iv. Lost Bills: Infrequent as it may be, some of the bills are lost after processed. Unless properly tracked, these bills are not followed up on.

(2) **Expense Flow:** This area of collections flow relates to the specific elements that are in the practice for managing the flow of revenue. Namely, the elements necessary to manage this flow,

in terms of direct and indirect costs must be available. This will be discussed in detail in the next section.

The issue of infrastructure management is the one that combines the revenue management with the expense management, resulting in the management of working capital. Figure 3 shows the flow of funds from the point of practice collection to the net operating income number. The infrastructure of the practice is composed of four elements as regards to the billing process. These are shown in the Figure, specifically:

(1) **Billing Costs:** In a practice there are costs per bill in the preparation and mailing of the bills that need to be processed. For example, with patients who would pay in cash may in 30% of the cases require the bill to be sent rather than pay at time of service. Thus 30% of the cash patients say 25% of the practice, or 7.5% of the patients per month get bill sent who should have paid in cash. Medicare patients on assignment also fall in this category, as do assignments on all other bills. Finally, all HMO/PPO or Managed Care programs require bill submission. It is not unreasonable for 50% of the practice to be billed in some - form. The cost per bill may frequently be a percent of the bill, for example 8% of the bill amount. Thus for this simple case, 8% of 50% is 4% of the gross revenue being the billing costs. In a $500,000 gross revenue practice, this amounts to $20,000 per year.

(2) **Administrative Staff Costs:** There are costs of administering the preparation of forms, filing and retrieving billing data, preparing and managing the billing operators. The typical practice will have a half time person at a loaded cost of $20,000 per year.

(3) **Accounting Costs:** The preparation of the practices annual tax returns typically is based on an hourly charge. The charge is clearly dependent to the amount of prepared information on revenues and expenses that are available. Typically an electronic based system will reduce the accounting fees by a factor of two or more.

(4) **Imputed Interests:** Working Capital is the difference between Accounts Receivable and Accounts Payable. In essence it is what is owed the practice but not collected less what the practice owes but has not been paid. If the practice has a large working capital number it means that the physician is financing their patients, and that the money used to finance patients could to get a return even in a simple interest bearing account. Simply stated, for a $500,000 per year gross practice, having 90 days, or 25% of the years revenue in receivables, and having this in 40% of the cases says that $50,000 is the working capital value. At 8% interest, this is a loss of $4,000 from the practice.

This simple study states that for a $500,000 practice, $50,000 may be lost in these four channels. Practice management focuses on reducing these internal inefficiencies. Combine this with a10% non collectible rate; this total is a $100,000 loss from the practice or 20%!

Office Practice Management systems are based upon standard practices that have been manually introduced into office practices. Recently computer based systems have been introduced into practices to address many of the issues that have been discussed in this paper. These systems have been introduced in several forms. Some have evolved from the older minicomputer systems that were originally developed for Hospital systems. Recent versions use PCs as the base platform and work as standalone systems.

In this section we present several examples of systems and describe their functions and Architectures. We also discuss how these systems may be used to address the reduction and possible elimination of the losses discussed is the past section.

An office management system that is computer based performs the following set of functions (See Hudson):

(1) **Registration:** This must take all pertinent patient information that is necessary both for the practice as well as for the billing process. This system must be intelligent enough to correct all mistakes that could latter cause billing errors. For example, simple issue such as zip codes, dates of birth etc. must be properly filled in and Medicare information fields must be complete. Any system must assure the integrity of the registration fields.

(2) Accounting: This module of the system must track all receivables, must do aging and must be integratable into a full accounting package to enter payables as well and have a full chart of accounts. Since the patient system is revenue focused it looks primarily at receivables or cash into the practice. It does not have to be a full accounting system.

(3) **Electronic Billing:** The system module must interface into all Medicare systems as required, and into such third party systems as NEIC, GTE and others. It must also be flexible enough to deal with HMO/PPO and Managed Care electronic systems.

(4) **Reports:** All types of reports must be available. In addition the system should allow for flexible report preparation.

(5) **Correspondence:** Patient and other physician communications and correspondence should be available. This may include standard follow up letters and custom responses.

(6) **Reminders:** Patient reminders are critical. Mammogram, colonoscopy, indirect opthalmoscopy etc. procedures must be tracked over fixed periods. Office staff may change but the system must remember these. Thus any computer system must have a fail safe reminders capability.

(7) **Scheduling:** Patient scheduling may be computerized or may best be left in "the Book". The choice here is up to the practice but the need is still there to register the patient.

(8) **Forms:** The system must prepare forms of all types. These are the HCFA, Workmen's Comp, Camp/School Physicals and many other forms. These may be practice specific, but with the use of laser printers, flexible form creation is readily available.

(9) **Rules Updates:** Any effective system must have a rules engine and a rules update process. This is especially true in the time of changing Medicare rules and other reimbursement rules. The vendors must demonstrate how effectively they can keep the system up to date with these changing rules. If they are not kept current, all of the efficiencies discussed will disappear.

These functions are then providing a computer database with all of the information that may them be cross referenced, retrieved, processed, transmitted, or displayed to perform all of the tasks in the office management process.

The features that are necessary in any such CIOS are those that make it both functionally easy to use but also upgradeable in the context of a growing practice or changing reimbursement environment. These features are;

*(1) **Ease of Access:** The end user interface of any system must be easy to understand, access, and recover from. There should be a flexible window type design, avoiding the menu approach of dated systems. Menus reflect minicomputer/ mainframe computer styles of the 1970's, whereas the windowing environment is the paradigm of the 2000's.*

*(2) **Flexibility of Data Base:** The data base must be flexible and handle all types of fields that can be entered. In addition the database must allow for the use by many users in a transaction mode with minimum delay in processing.*

*(3) **Modularity of Design:** The design must be modular, allowing the practice to get what is needed, to build by adding new modules, and to allow the modules to be updated, each as needed. Some systems are all one lump of computer code. This makes for an inflexible design and system.*

*(4) **Extensibility of the System:** An extensible system is one that easily allows growth; both in terms of new users and new uses. Atypical system may start out as a single workstation and then may expand into a network. The network may be on premises or between premises. The system must be able to grow in any direction.*

*(5) **Communications Enhanced:** The system must be able to communicate in many modes. Simply, it must have a modem to deal with electronic claims. But it must also allow for other communications in such areas as on-line in-office hospital admissions, the entering and receiving of pathology, x-ray and lab tests, and the access of medical information. This means that higher data speeds must be supportable and the system may also have to deal with images.*

All of these features should be considered in choosing a system for a practice. The lack of any one feature could result in a situation that would require a replacement and the change over costs could be quite significant.

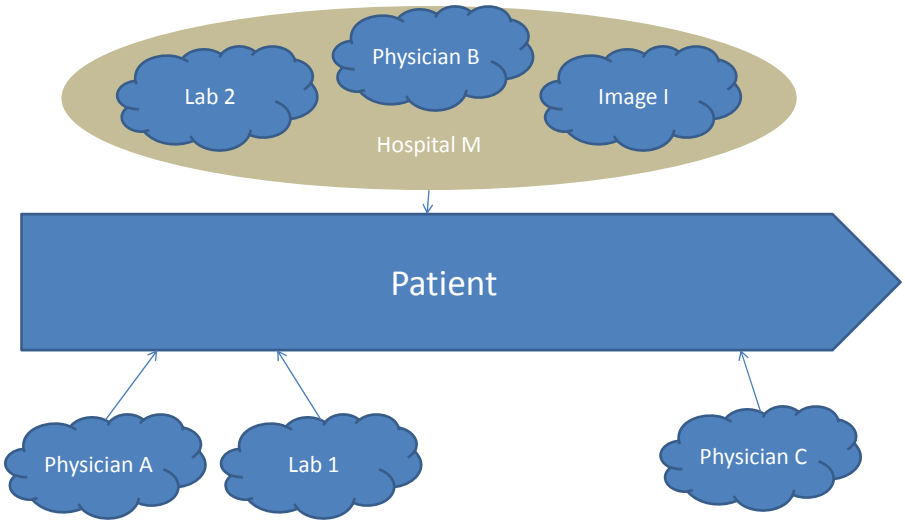
In order to fully understand the impact of electronic office practice systems we have taken two examples of practices that have used the system and the impact on the practice with the introduction of an electronic billing system.

The practices analyzed have fallen into two categories; a high volume low fee per visit practice and a low volume high fee per visit practice. The former may be that of an Internist or - Pediatrician and the latter that of a Gastroenterologist.

5.3 ELECTRONIC MEDICAL RECORD (EMR)

Before continuing it is necessary to give some structure to the EMR. This presentation is but a single view of what it can be in a clinical setting. There are many and it is certain that there will be thousands of other embodiments but they all will have some reflection of the issues contained in this one. Specifically we can characterize an EMR as follows:

1. The Electronic Medical Record is an abstraction with many current realities
2.
3. The principle is that the "Record" follows the patient, in hyper-space, namely an Internet based scheme available at any point of medical service.
4.
5. However the EMR must be a highly adaptive system providing multimedia capabilities in the extreme; images, text, data, voice, and the ability to look at the patient "over time"
6.
7. The EMR must not turn the patient into the iPatient, some abstraction in hyper space.
8.

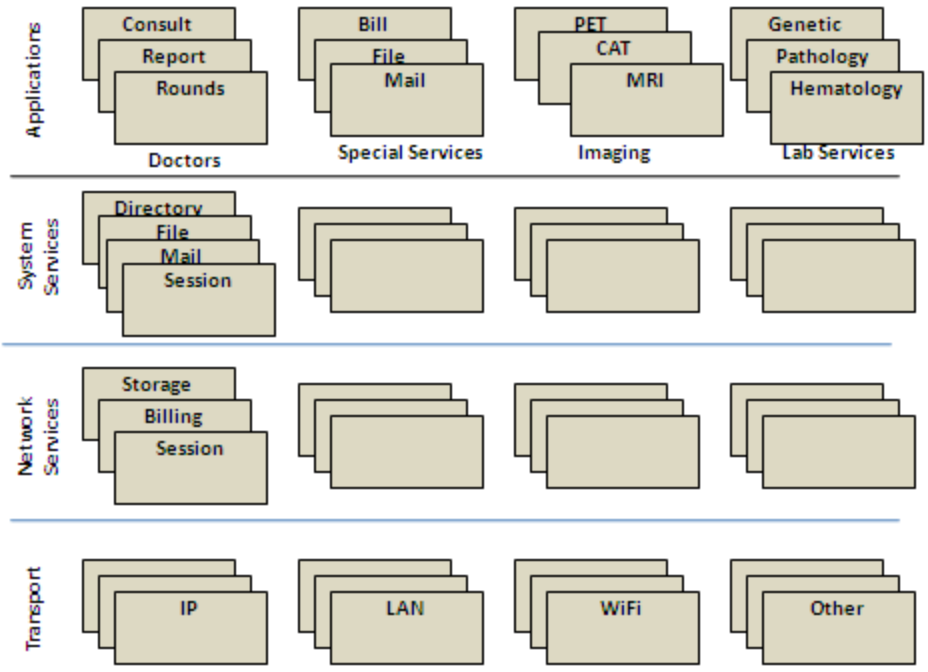


The above is a concept. But it has been implemented in bits and pieces for the past thirty to forty years, with slow but growing success. In 1988 I developed the first broadband based integrated health information system jointly with Harvard Medical School, Mass General, Brigham and Women's and Children's Hospital, as well as Tufts Medical Center[9]. The principals at the Harvard Hospital included Dr. David Margulies and Dr. Ted Treves[10]. The system was designed, implemented and deployed, using a 45 Mbps network to interconnect facilities as well as physician offices. A common record format was developed, email capabilities, storage capabilities and data retrieval was also integrated. The architecture as developed in 1988 is shown below. This is what was implemented. This is twenty years ago, using Sun and DEC work stations rather than PCs and using earlier versions of screen access and control before html and the like.

This was a four layer system; transport, network, systems and applications. It was a fully integrated architecture with an open design. It migrated to a fully IP based platform as well. It recognized that medicine is a multimedia world, having text, images, path slides, blood work results, and the like.

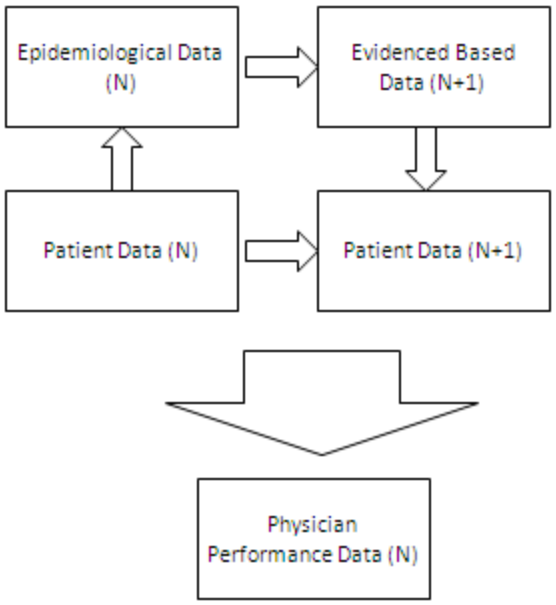
[9] See on www,telmarc.com the following publications: Image Processing in Full Multimedia Communications, Advanced Imaging, pp 28-33, November, 1990. Applications of Multimedia Communications Systems for Health Care Transaction Management, HIMMS Conference, San Francisco, CA, January, 1991. Multimedia Communications Technology in Diagnostic Imaging, *Investigative Radiology*, Vol. 26, No 4, pp 377-381, April, 1991. Multimedia Communications: Architectural Alternatives, SPIE Conference, Boston, MA, September, 1991. Multimedia Session Management, IEEE Proceedings on Communications, 1990. Wireless Communications Economics, Advanced Telecommunications Institute Policy Paper, Carnegie Mellon University, February, 1992. Multimedia Communications in Medicine, IEEE JSAC, November, 1992. Health Care Policy Alternatives, An Analysis of Costs from the Perspective of Outcomes, published, 1993.

[10] David Margulies, MD, was at the time the CIO of Children's Hospital as well as an attending physician in Internal Medicine. Ted Treves MD was and remains a Professor at Harvard Medical and head of Nuclear Medicine at Children's Hospital Margulies left and became the CTO of Cerner one of the largest electronic medical record companies in the world for managing lab results.



The system was implemented but it ran across many problems. The greatest was institutional blockage. There classic turf wars in any institution where one group is perceived as telling another what is best and other groups feeling that they are losing control. It ran across the problem of insurance and payment. The systems attempted to effect pre-approval of procedures and thus cut down on insurance costs. The insurance companies just balked, they wanted to apply their classic "passive aggressive" approach to health care cost containment. Then there were the legal issues; that is malpractice suits could explode if one made these records readily available. Or perhaps as some lawyers said the patient record could become fungible and changeable being in a digital form rather than in the hand of physician.

In addition there was a change in the provision of health care which this system could adapt to but

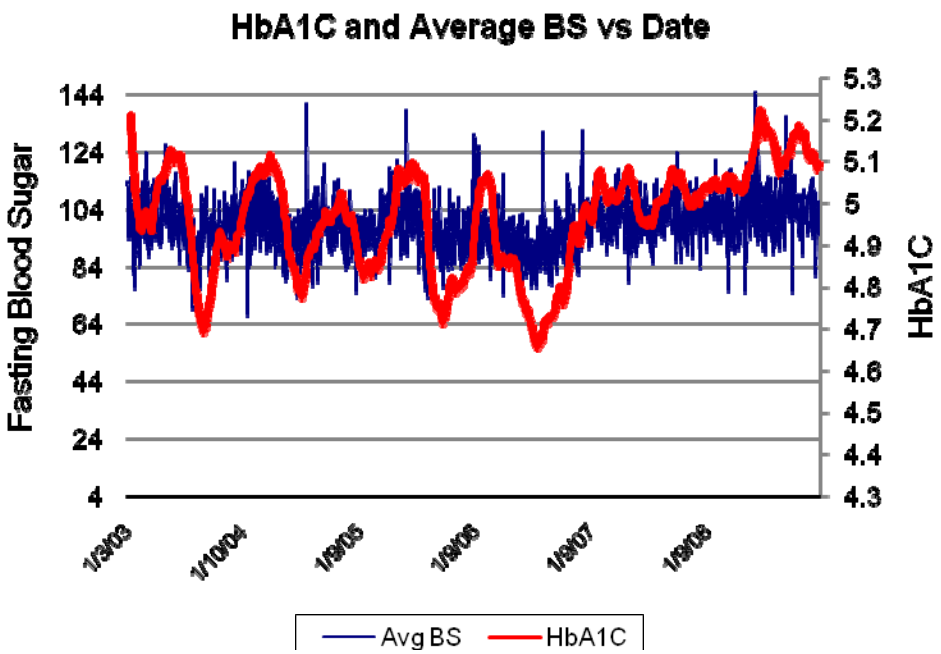


5.3.1 Examples

We provide here three simple examples of the potential complexity and usefulness of an EMR.

5.3.1.1 Example 1:

Several physicians have been following this patient for five years. They have had access to the patient's daily blood sugar tests, which have been electronically shared in a common EMR, and specialist to seek a consult on whether he should consider medication. His fasting blood sugar has been consistently peaking above 100 but his HbA1c is 5.2%. The concern is a pattern of increase in FBS.



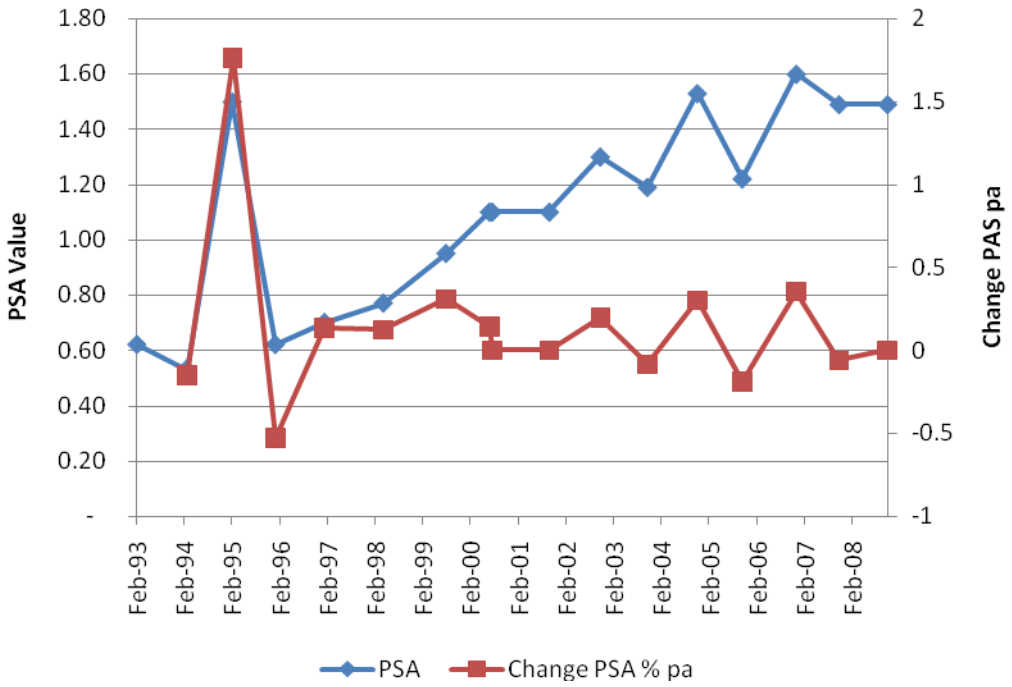
The problem presented above is that the patient must take blood sample twice a day, every day, and the results must be recorded in the patient record and reviewable by the physician. It also must become an input into what we see as the bases for Evidence Based Medicine. The patient has treated his Diabetes by diet and exercise and has for a period of six years kept the HbA1c well below 7. However there appears to be an increasing trend and should the primary physician look more closely to see if this is addressable by stronger diet and exercise controls or is this evidence of the recurrence of T2 Diabetes returning, which is assumed to be a matter of course in the long term.

This patient presents a case where real time data collection can assist. T2 Diabetes can be "cured" in over 90% of the cases by diet and exercise alone. In fact the use of drugs like metformin and insulin may exacerbate other conditions. The positive feedback of daily results may provide a behavior modification which effects better compliance without drug use. The result is dramatically lower costs by not using drugs and not resulting in any secondary effects such a kidney failure or heart disease.

5.3.1.2 Example 2:

A patient whose father died of a very aggressive form of prostate cancer at 79 has been followed by several physicians for fifteen years. The PSA has gone from 0.6 to 1.45 over that period and there have been several years with percent jumps which have well exceeded the 25% per annum change which would normally warrant a biopsy. Should this patient proceed to an ultrasound and subsequent biopsy, which percent guideline recommends or should the patient have watchful waiting[11].

[11] See http://content.nejm.org/cgi/content/full/359/24/2605 for an interesting study of three treatment options.

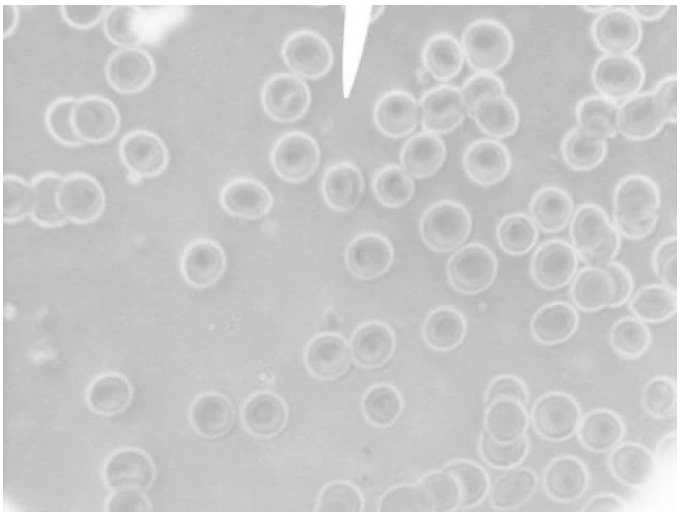


This example demonstrates the usefulness of having long terms data available on a patient and having the changes also available. Prostate cancer is most often noticed in changes in PSA, namely change per annum in percent. A 25-30% change is what most of concern is. In this patient there is a large change in the mid 90s but that may have been the result of a change in test methodology. Since the patient was young and since the PSA value was low, this was neglected. It showed a reduction the following year. However it has been increasing somewhat on a trend since 1996 going from a 0.6 to the current 1.4. However it has been relatively stable for four years.

5.3.1.3 Example 3:

A fifty year old female patient arrives at the Emergency Room with lower right quadrant pain, afebrile, and is in no other distress. She has been a patient at this Hospital before so that when she arrives the attending physical calls up a recent CAT scan as shown below along with the report of the radiologist taken at that time.

The patient has blood drawn and the attending wants to look more closely at the morphology of the red cells, he is concerned that there may be blood loss and some anemia. The cells are shown in contrast below. The attending can manipulate this image to obtain better resolution with the facilities on the terminal in the ER. He then looks at the data on the patient count as well. He records his findings.



This is an example of a multimedia diagnosis using past and current data. It will assist the physician in targeting a closer examination of the lower abdomen of the patient.

The above three examples show several important things about the EMR. First none of them contain a physician's comments. They are all images. The first example shows how an EMR can result from patient generated data and can then be used to feedback to the patient for patient adjustment to meet the goals of the management of the disease. The second example shows the criticality of presenting long term data. All too often the physician files reflect at best the last data point. As with the first example, fasting blood sugar is useless as a single measurement, unless severely off from the norm. It is like taking the blood pressure of a patient awaiting a potential diagnosis of cancer; it will be high! The third example is a case where having images

taken at a prior time and a different location is critical. Also it shows the correlation in modalities as an integral part of the EMR. Again, there is not a single word written.

5.3.2 The Disadvantages of EMR

There are many disadvantages with the EMR. We recount a few here. They are not at all insurmountable, and it is just a matter of time and working with evolving versions of them that will effect positive change. However one would be wrong to assume that we are at a point that just throwing money at the EMR issue will result in its solution. I am certain that there are many companies who would sell their wares claiming solutions but as we all know these solutions are as culturally based as they are technically. Frankly there are very few if any technical problems. There are however almost insurmountable cultural one at this time. Let us examine a few.

5.3.2.1 Patient Histories are Complicated

The first thing a Medical Student learns after the course work is taking a patient's history. This is a ritual of passing, from learning to listening, not just asking questions and getting rote answers, but seeking out from the patient what the real problem is. The patient typically arrives with a sense of dread, no matter what the problem is, they have most likely aggrandized the problem into the potential of a serious one, and the physician is seeking to look through this detail and obtain a better understanding of what the true problem is. Thus the eliciting of information in this manner is not always readily amenable to a computerized system.

5.3.2.2 Electronic File Cabinet versus A Searchable Data Base

One approach to the EMR is just taking the patient record and storing it in an electronic file cabinet. That is possibly a pdf file and then keeping it so that at some future time it may be extracted and reviewed. The second approach is if the searchable file database is available. In this case one asks the patient questions and enters a pre selected set of answers. In fact the patient may very well not need a physician to even go this far. At one extreme we keep what has been done all along and just digitize the result and at the other extreme we enter the data in a digital form ab initio.

5.3.2.3 Data Versus Patient Information

Having access to the patient, looking at, talking to, listening to, performing certain maneuvers on the patient to test for certain response is critical. Using the EMR terminal by itself after ordering tests and making all decisions at the point of the terminal, most likely because of its apparent efficiency, can result in diminished patient care caused by not seeing certain artifacts of the patient and the disease evident only through observation. Neurological disorders are typical. The neurologist looks at a patient differently than an internist. The Internist looks at a patient using the eyes of a differential diagnosis; what are the possible disorders given the presenting symptoms and then eliminate those that do not fit. It is a process of elimination. The neurologist looks at the patient to ascertain where the neurological fault is, the spine, the limbs, the mid brain, the hypothalamus, the cerebellum, the frontal lobe. Then and only then does the neurologist tries to find out what may be causing the defect. Information on the patient is not all found in the data record.

5.3.2.4 Multimedia Issues

There are in medicine many multimedia studies which are complex but critical to the patients diagnosis and care. Many of these are imaging such as CAT, PET, MRI and all variants thereof. We have shown the multimedia elements in some of our previous examples. Imaging and hematological results can be accessed directly but they must also be processed, enhanced, compared, correlated, and commented upon, and then they in this form must be actionable in terms of patient care. Finally the multimedia world will result in massive volumes of storage. Consider the following examples:

Modality	Technical Driver
Multi-Slice CT or Volume MR	>1000 images, 1024*1024*2Bytes,>2 gigabytes/ Study
User-Friendly Ultrasound - Volume	Laptop/Handheld/PDA, 3D, 128 x128 x 32, But…>20images/sec
PET/CT, SPECT/CT	More agents (C11, O15, NH3 -> function, staging, guide Rx
Multimodality Image Fusion	
Optical Imaging	
CAD	Extend techniques from Mammo ,Lung, Vascular, Neuro

There are trends seen in these systems[12]:

- Workstations will become intuitive customizable multimodality platforms
- Individual imaging specialists will be “served” with more information automatically based on the individual examination
  - Clinic or ER information
  - Results of relevant lab tests

[12] From Dr Ted Treves, Children's Hospital, Boston, and Harvard Medical School. Personal Communications January 2008.

  - Current and Prior relevant images presented according to preferred display protocols
  - Images already fused

- Images and reports will become a routine and integral part of the electronic medical record
- On-line decision support will be easily available to the imaging specialist
- Reporting will become richer

  - Voice
  - Text
  - Text overlays
  - Pointers

Applications include

- Reporting
- Consultation
  - Rounds Image annotations including voice objects
  - Interactive consultation (i.e.: sharing a pointer and voice with another physician on-line (or off-line by means of multimedia objects: image voice and text)
  - Joint reporting by more than one imaging specialist

However meeting the challenges of these trends is quite difficult. Many entities are working on the complexity of the multimedia challenge and have been doing so for two decades. I taught the first course on Multimedia Communications in 1989 at MIT. It was a first step and the main concern was the philosophy of what we were doing more than the technology. I started out assuming it was a simple technical problem but after some thought it was clear that the old Marshall McLuhan phrase that "The Medium is the Message" would clearly play its part. One must be careful than what the message becomes in an EMR system.

5.3.3 The Use of the "Commons" for EMR

Eric Schmidt, the CEO of Google, and a major Obama backer, has started a Google offering of Google Health which is Goggle's view of what a physician should do. One may admit that Google is a good search engine and dominates that space but one must question whether they are the true answer for this problem. The Google Health concept is one of the many which employ what is called the Commons, using the capabilities already in hyperspace to follow the patient.

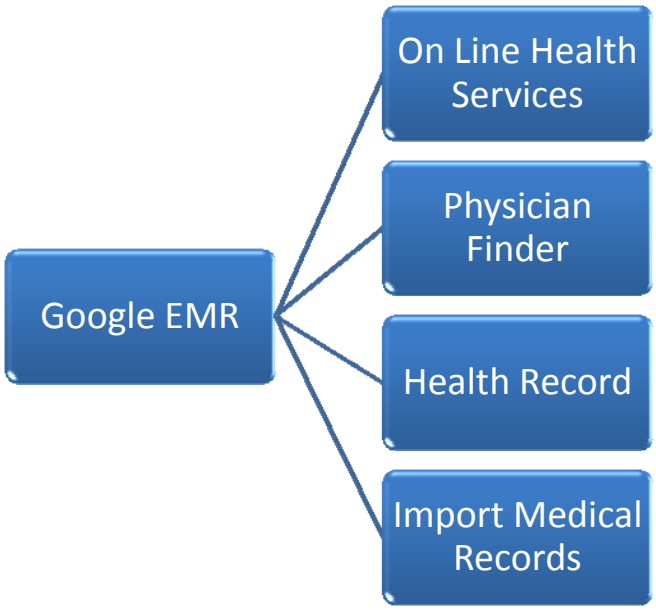
It comes as no surprise then that Google, its executives being major Obama supporters, have positioned Google Health as a major player in this new Market.

The first Figure below depicts the current structure of Google Health. It has the patients Health Record, allows for Importing medical data, connects to online health information and then allows for finding physicians.

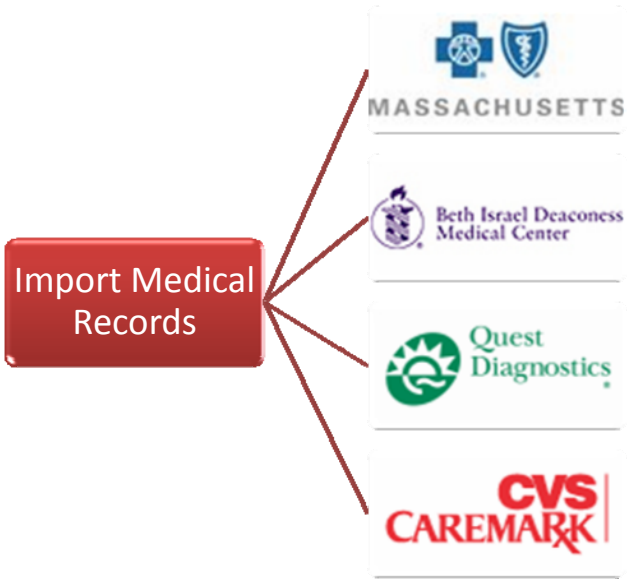
Many have tried out the Health Record and frankly any first year Medical Student would probably fail their course on history taking with what is available any physician worth their salt would most likely go elsewhere. But this is a start. It is cumbersome with all the manual entries.

This it is even more complicated for the physician.

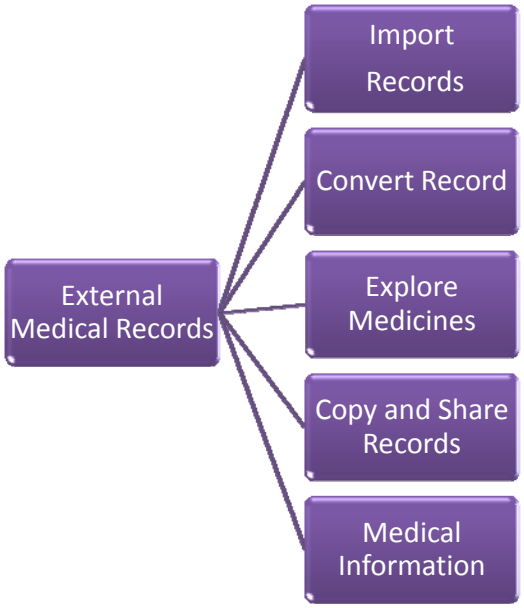
The Record contains the demographic data, conditions and history, procedures performed, test results, immunizations. It does not permit ready comparison of HbA1C for example to monitor Type 2 Diabetes or ESR or CA 125 or a wide variety of tests which a physician wants to see change readily. It also lacks any multimedia ability to incorporate CAT, MRI, pathology slides, and ultrasounds.



One attraction may be, however, that as a Commons, the Google approach may allow other entities to connect through it. The next Figure depicts some of the current connections available. It is patient directed and the patient or physician may access lab results, hospital tests and the like. This is attractive yet as we have stated they lack the multimedia and temporal analyses capabilities which are critical. They also lack the ability to be readily used for studies.



The External Medical Records function is displayed below. It can get distant records and import them into a common form and it can convert records, although in a limited manner, and it can share them. This in many ways is a limited version of what we designed twenty years ago.



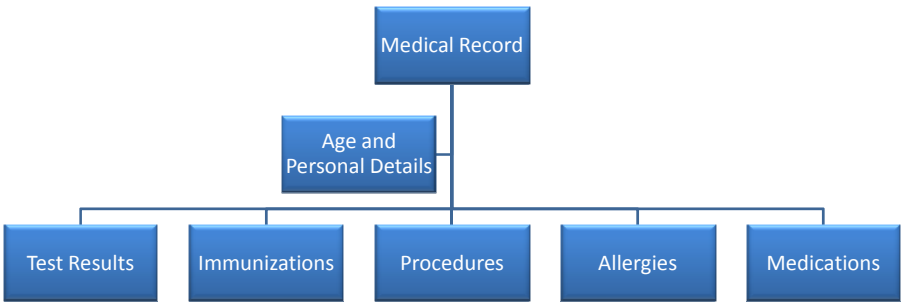
The structure of the final EMR is shown in the following Figure. The import of medical records is attractive since it allows the patient to import lab tests say from Quest or records from your hospital or from other sources. It is a patient oriented system and functions well for a

cumbersome initial attempt.

The medical records can be imported, copies, shared, converted and thus have a potential for wide accessibility. The problem again is that they are so rudimentary that they are virtually useless in any real medical environment. They also lack any Evidence Based Medicine inputs which we believe will be critical. They also seem at this stage to lack pharmaceutical interaction and of course there is no pricing or costs information, thus billing and awareness of costs is totally lacking.

The final chart below shows the details of the medical record we have discussed above.

Finally, one wonders of this is a Trojan Horse for the EMR push that is in the new Budget. Clearly Google has the technology and political connections. It seems to lack the "business side" of the equation however. It lacks what Vint Cerf and Bob Kahn assembled in the days of the Internet's beginning, an IETF type organization, an entity of involved practitioners. That, in our opinion, is an essential and critical element in getting this effort moving and accepted. It must have that ground up effort.



5.3.4 Integration of Data Elements

Integrating text, time data, images, lab results, and pathology results, electro testing (cardiology, neurology and the like) into a single searchable and presentable record is no mean task. The EMR is not just an electronic file cabinets. If that is the paradigm then the result is useless.

5.3.4.1 Retrieval and Correlations

How the data is stored, retrieved and correlated is a non trivial problem. First is the amount of storage and it accessibility. The second and truly most critical issue is the searchability of these records[13]. How does the EMR deal with searching across complex multimedia objects? Take a CAT scan; it may consist of 75-90 slices, each containing some information. The disease process may be best articulated on slice 57, for example. That may be on the radiologists report. That is most likely searchable, but it must readily tie into the CAT scan images and the remaining images must also be searchable.

5.3.4.2 Networking and Sharing

Sharing the data is a very complex networking problem. There is the intra-institutional and the inter-institutional issues. Within a teaching hospital, for example, there is the attending and consults, the labs, the path, the imaging, and added to this is the admin and the billing, not to mention all the residents wandering through the process. Thus there are many forms of multi-media data; image, slides, new and old, voice and text, scanned paper, EKG, and ultrasounds, and the list goes on. Physicians want to see the CAT as well as read the report. They want to see the CAT and ultrasound and have the lab work and not just rely on the repots.

5.3.4.3 Histories and Profiles

Physicians also want to see the history. Disease is a process of change from a norm. The first part understands the norm and the second part is managing the change. Spots on the lung may not mean anything is they have been there for twenty years. PSA of 4.5 may also not be a serious concern if it has been that for twenty years, assuming the same test procedures are used. Thus networking and sharing in a spatio-temporal context will be a key element. This means inter-institutional and stored for indeterminate periods of time.

5.3.4.4 Security and Privacy

The HIPPA laws place great restrictions on patient data. For example it requires faxing and prohibits email[14]. Now that may have been fine in 19965 but it is absurd in 2009. There is the strain between patient medical records privacy and the need to share information between medical professionals and even back to the patient them. Finally, the HIPPA rules have become a straitjacket on the development of medical information systems, because all such systems must be HIPPA compliant. Patient information privacy is a true essential if there is to be any trust in the medical system. Yet access to information by those studying the efficacy of drugs, the performance of medical institutions and professionals, the expansion of an evidence based medicine, all rely on having a broad based access to records, devoid of patient information. Yet there is the conflict that a patient's medical file, exclusive of the patients direct personal information, may in and of itself be enough information to identify patients, it may be akin to a

[13] Of course one could try the Data Warehousing approach which is just dumping all the data in one heap and then sorting thru it after the fact as suggested by Teradata, see http://www.nytimes.com/2008/12/29/technology/29hewlett.html?_r=1&adxnnl=1&ref=business&pagewanted=print&adxnnlx=1230558491-g2vD5ie88HtwfdwEakudxQ Yet if one has the opportunity to start afresh then one should at least try to get it right from the beginning.

[14] See http://www.hhs.gov/ocr/hipaa/

fingerprint in its uniqueness. There will always be a conflict between privacy and the need for more open access to non-patient identified information.

5.3.4.5 Litigation

There is still the problem if litigation. The physician has now a massive amount of information before them and in addition the physician may also have, or should have, then EBM information as well. Has the physician taken the correct next steps, and if not and if harm ensues to the patient, there now exists a detailed trail in electronic documents and actions that may or may not reflect the actual process. It opens many new doors for mal practice litigation, based upon what the physician should have done, given the time available.

5.3.4.6 Time Constraints

Data must be both current and immediate. Lab results when requested must be made available in a timely manner. Imaging studies must also fit that example. Pathology results likewise must fit.

5.3.5 Evidenced Based Medicine and The EMR

Evidenced Based Medicine, EBM, is a recently new approach wherein each procedure used in diagnosis and treatment is now given an assessment based upon the degree to which it has been shown in standardized medical trial to be efficacious or not[15]. Thus based upon various clinical trials the techniques used for example to determine if a patient has appendicitis are examined and then are classified as to how effective they may be in determining whether it is truly appendicitis. Considerations such as the specificity and accuracy of certain procedures and then the effectiveness of certain treatments and even the effectiveness of certain preventive measure are considered.

Younger physicians are now more frequently trained in the EBM approach and they all too often may question an experienced physician as to what basis they have used to make the diagnosis or assert a treatment. EBM is in a sense a more scientific method of practicing medicine and in certain ways it is a way to practice which may help to avoid litigation. However it can become a straight jacket if applied excessively for many problems have yet to be studied using this approach.

However the use of the EMR can potentially create a massive data base which in turn adds to the underlying elements of EBM. The EMR if statistically valid and if applied appropriately can become the main drive in an EBM paradigm.

5.3.6 The iPatient Syndrome

However, with the combination of a workable EBM using EMR on a national basis and adding to this the demand to interact with the data, qua data, and actually qua disease, the physician may lose contact with the patient. A hundred years ago, when physicians visited patients and when

[15] See Simel, D.L., D. Rennie, The Rational Clinical Exam, McGraw Hill & JAMA 2009.

physicians walked the wards of hospitals, such things as looking at the patient, listening to the patient, even smelling the patients urine were common place. The old adage was "If all else fails listen to the patient…." for sooner or later the patient will let you know what is wrong. However the EMR and EBM approach sets the patient to the background, tests are processed, results are entered, and the summary and even detail are made available on the monitors. These monitors reside in the physicians room on the floor and in many ways the new young physicians sit and look at the data, look up references in the medieval literature, scan for the use of other tests and data and in many ways reduce the patient to a far off element of this process, like a router in a large IP network supporting the Internet, distant, possibly malfunction, but it can be pinged with various tests to see what is wrong with it. The patient has been turned into an iPatient.

Dr. Verghese, from Stamford, has recently written a superb piece in the New England Journal of Medicine, NEJM, on the use of EMR at the Stanford Hospitals. In many ways it is most likely the same at other Tier 1 Medical Centers, albeit with some changes. From the NEJM Verghese states the following[16]:

"On my first day as an attending physician in a new hospital, I found my house staff and students in the team room, a snug bunker filled with glowing monitors. Instead of sitting down to hear about the patients, I suggested we head out to see them. My team came willingly, though they probably felt that everything I would need to get up to speed on our patients — the necessary images, the laboratory results — was right there in the team room. From my perspective, the most crucial element wasn't…..

Still, the demands of charting in the electronic medical record (EMR), moving patients through the system, and respecting work-hour limits led residents to spend an astonishing amount of time in front of the monitor; the EMR was their portal to consultative teams, the pharmacy, the laboratory, and radiology. It was meant to serve them, but at times the opposite seemed true…..

The other way — call it the expedient way — is not formally taught, and yet residents seem to have learned it no matter where in the United States they trained. The patient is still at the center, but more as an icon for another entity clothed in binary garments: the "iPatient." Often, emergency room personnel have already scanned, tested, and diagnosed, so that interns meet a fully formed iPatient long before seeing the real patient. The iPatient's blood counts and emanations are tracked and trended like a Dow Jones Index, and pop-up flags remind caregivers to feed or bleed. iPatients are handily discussed (or "card-flipped") in the bunker, while the real patients keep the beds warm and ensure that the folders bearing their names stay alive on the computer.

The problem with this chart as- surrogate-for-the-patient approach is — to quote Alfred Korzybski, the father of general semantics — that the map is not the territory. If one eschews the skilled and repeated examination of the real patient, then simple diagnoses and new developments are overlooked, while tests, consultations, and procedures that might not be needed are ordered. "

[16] NEJM N Engl J Med 359;26 www.nejm.org December 25, 2008 **Culture Shock — Patient as Icon, Icon as Patient,** Abraham, Verghese, M.D.

He uses the term iPatient, because the use of the technology moves the physician more and more in front of the screen, making the patient at best a small part in the process of providing medicine.

6 POLICY ALTERNATIVES

As we presented in the Executive Summary, the key elements of any Healthcare Policy should include the following:

1. Catastrophic Coverage: There should be coverage of catastrophic incidents such as cancers, stroke, and long term disabling diseases such as MS, ALS, Parkinson's and Alzheimer's

2. Every One In: Like the Massachusetts Plan, it must require all to participate.

3. Choice: The Plan(s) must allow choice so that a patient may choose their health care provider and hospital.

4. Reward Good Health: There must be a system which incentivizes good health practices and dis-incentivizes bad ones.

5. Establish Public Health Facilities: Utilize Public Health Clinics in place of the ER as a means of dealing with those in need of non-urgent care. Facilitate this by staffing with Medical School Graduates with tuition repayment.

6. Evolve Enabling Technology: Mandating technology solutions means the Government is choosing winners and losers and this always leads to increased costs and reduced quality of care.

We now review several of the Plans and make our recommendations.

6.1 THE OBAMA PLAN

The Obama Plan has been out there for the past election and it seems to have remained intact. It is detailed below. The problem is that it contain broad generalities and there is not analysis as to how it will reduce costs while ensuring quality. We will avoid those details herein since any discussion would be pure speculation.

Table 10. OBAMA PLAN

Area	*Impact*
(1) INVEST IN ELECTRONIC HEALTH INFORMATION TECHNOLOGY SYSTEMS	Invest $10 billion a year over the next five years to move the U.S. health care system to broad adoption of standards-based electronic health information systems, including electronic health records. $77 billion of savings would be realized each year
(2) IMPROVE ACCESS TO PREVENTION AND PROVEN DISEASE MANAGEMENT PROGRAMS.	

Area	*Impact*
Support disease management programs.	Over seventy-five percent of total health care dollars are spent on patients with one or more chronic conditions, such as diabetes, heart disease, and high blood pressure. Many patients with chronic diseases benefit greatly from ***disease management programs***.
Coordinate and integrate care.	Rates of chronic diseases have skyrocketed in the last 2 decades. Over 133 million Americans have at least one chronic disease and these chronic conditions cost a staggering $1.7 trillion yearly. Support providers to put in place care management programs and encourage team care through implementation of medical home type models
Require full transparency regarding quality and costs.	Require hospitals and providers to collect and publicly report measures of health care costs and quality,
Promote patient safety.	will require providers to report preventable medical errors, and support hospital and physician practice improvement to prevent future errors.
Align incentives for excellence.	Providers will be rewarded for achieving performance thresholds on physician-validated outcome measures.
Comparative effectiveness reviews and research.	Comparative effectiveness reviews and research. This information is developed by reviewing existing literature, analyzing electronic health care data, and conducting simple, real world studies of new technologies and will establish an independent institute
Tackle disparities in health care.	Implementing and funding **evidence-based interventions**,
Reform medical malpractice while preserving patient rights.	Strengthen antitrust laws to prevent insurers from overcharging physicians for their malpractice insurance.
(3) LOWER COSTS BY TAKING ON ANTICOMPETITIVE ACTIONS IN THE DRUG AND INSURANCE COMPANIES.	
Increasing competition in the insurance industry.	
Prevent private insurance waste and abuse in Medicare.	Eliminate the excessive subsidies to Medicare Advantage plans and pay them the same amount it would cost to treat the same patients under regular Medicare. drug companies from keeping generics out of markets
Allow consumers to import safe drugs from other countries.	Allow Americans to buy their medicines from other developed countries if the drugs are safe and prices are lower outside the U.S. and increase use of generic
Prevent drug companies from blocking generic drugs from consumers.	The plan will work to ensure that market power does not lead to higher prices for consumers.
Allow Medicare to negotiate for cheaper drug prices	Repeal the ban on direct negotiation with drug companies
(4) REDUCE COSTS OF CATASTROPHIC ILLNESSES FOR EMPLOYERS AND THEIR EMPLOYEES.	Catastrophic health expenditures account for 49 percent of the overall health care dollar. Offsetting some of the catastrophic costs would make health care more affordable for employers, workers and their families.
(1) GUARANTEED ELIGIBILITY.	Require insurance companies to cover pre-existing conditions so all Americans, regardless of their health status or history, can get comprehensive benefits at fair and stable premiums.

Area	*Impact*
(2) NEW AFFORDABLE, ACCESSIBLE HEALTH INSURANCE OPTIONS.	Create a National Health Insurance Exchange to help individuals purchase new affordable health care options if they are uninsured or want new health insurance. The Exchange will require that all the plans offered are at least as generous as the new public plan and meet the same standards for quality and efficiency.
Comprehensive benefits.	The benefit package will be similar to that offered through the Federal Employees Health Benefits Program (FEHBP)
Affordable premiums, co-pays and deductibles.	Participants will be charged fair premiums and minimal co-pays for deductibles for preventive services.
Simplified paperwork.	The plan will simplify paperwork for providers and will increase savings to the system overall.
Easy enrollment.	All Exchange health insurance plans will be simple to enroll in and provide ready access to coverage.
Portability and choice.	Participants will be able to move from job to job without changing or jeopardizing their health care coverage.
Quality and efficiency.	Participating hospitals and providers that participate in the new public plan will be required to collect and report data to ensure that standards for health care quality, health information technology and administration are being met.
(3) TAX CREDITS FOR FAMILIES AND SMALL BUSINESSES.	The health care plan will provide tax credits to all individuals who need it for their premiums. They will also create a new Small Business Health Tax Credit to provide small businesses with a refundable tax credit of up to 50 percent on premiums paid by small businesses on behalf of their employees.
(4) EMPLOYER CONTRIBUTION.	Large employers that do not offer meaningful coverage or make a meaningful contribution to the cost of quality health coverage for their employees will be required to contribute a percentage of payroll toward the costs of the national plan.
(5) REQUIRE COVERAGE OF CHILDREN.	Require that all children have health care coverage. will expand the number of options for young adults to get coverage by allowing young people up to age 25 to continue coverage through their parents' plans.
(6) EXPANSION OF MEDICAID AND SCHIP	will expand eligibility for the Medicaid and SCHIP programs and ensure that these programs continue to serve their critical safety net function.
(7) FLEXIBILITY FOR STATE PLANS.	Due to federal inaction, some states have taken the lead in health care reform. Under the plan, states can continue to experiment, provided they meet the minimum standards of the national plan.

6.2 THE OLD HILLARY PLAN

It is worth looking at the 1993 Hillary Healthcare Plan to see the dramatic difference. The Hillary Plan was clearly a socialization of Healthcare. Whereas the AMA is today a supporter of the Obama Plan, frankly who could not since it is full of the right platitudes, the Hillary Plan evoked massive outcries. Its review is educational, for she presented details.

Table 11. HILLARY HEALTHCARE PLAN 1993

Element	*Clinton Plan*
Coverage	Universal coverage of all persons in the United States. Mandated participation no matter what religious beliefs a person may have.
Responsibility	The employer of the individual is responsible for payment. The individual has no personal responsibility for any participation, payment, selection, or offerings.
Children	Plans cover individuals or families as appropriate.
Over 65	Become members of state alliances.
Payment	Each participant is responsible for 20% of the plans payment.
Pricing	All prices shall be set by agents of the National Health Board.
Choice	There is choice of alliance approved managed care plans. Within a managed care plan no U.S. citizen, other than the President and Congress, shall have any choice in any health care delivery. Any U.S. citizen, other than the President and Congress, shall be held in violation of Federal law in seeking out any services not mandated by the managed care plan. Any physician participating or delivering such unauthorized and mandated services shall also be in violation of Federal law.
Catastrophic Coverage	No specific control for catastrophic coverage. It is combined with the total plan.
Quality Control	Quality control shall be mandated by the National Health Board. The Federal government shall mandate quality measures and physician service delivery standards for every possible health process. Violation of such a standard by a physician may be viewed as a violation of the law. The state and the state alliances also will have a role in the policing of these federally mandated standards.
Management Control	There will be a national database system that will use the HCFA 1500 form or equivalent. All information will be analyzed and preceded by the Health Board or its agents and the state alliances.
Price Control	All provider prices shall be fixed and controlled at a maximum level. Violation of these will be viewed as a Federal crime.
Demand Control	Demand control is managed by the primary care physician disallowing patient requests via a managed care plan. There will be no patient recourse. Each alliance shall have a budget which shall not be exceeded. Each alliance shall increase its budget in a fashion consistent with inflation. The alliance budget shall in no way reflect changes in health patterns or population demographics.
Supply Control	Price controls and caps will be placed upon the provision of services. Criminal penalties will be placed on the provision of services in deviation from the federal plan.

Element	*Clinton Plan*
Workforce Management	The current union based workforce will be maintained and expended where possible. Healthcare is viewed as a segment for employment growth and growth in a segment with increased union involvement.
Oversight	Oversight is by a complex structure of federal, state, insurer, provider groups. The structure allows for multiple levels of appeals.
Payment	All employers will be responsible for paying for the plan and for collecting the employee's contribution.
Coverage Management	All citizens of the United States are covered. Each individual is mandated to join a local state health alliance is forbidden by law from using services outside of that alliance. Criminal penalties shall apply to any patient seeking to obtain services from providers not in their assigned alliance.
Medical Education	Federally mandated selection on specializations. Federally mandated selection of quotas for appropriate representation of racial, ethnic, sex, and lifestyle participants in order for the physician mix to reflect the mix in the population as a whole. Federally mandated control of curricula to focus on primary health care delivery and dramatic reduction on any form of specialization.
Medical Research	Federally mandated selection of specialization will result in a diminution of capable researchers. Research will focus on Prevention and Health Service respectively. There is s diminution of basic research. Prevention will focus on the establishment of new federal programs to education disenfranchised groups and those needing special education in health matters. Health services will focus on new and innovative ways to monitor physician health care delivery.
Physician Peer Review	Physician and other provider review shall be the responsibility of the Federal Government. The National Health Board shall set either directly or otherwise standards of performance. The proposed federal information gathering system shall monitor the practice patterns of physicians and shall take the appropriate measures to mandate compliance with federally set mandates and performance levels.
Patient Responsibility and Patient Training	The patient or individual has no personal responsibility or choice. The plan dictates from the federal level any and all procedures, access to specialized care required, or other accesses to health care. There is no intent to inform the individual of risk factors other than through the process of taxation of at risk consumable. At risk behavior is still considered the individual choice and the individual will not be held responsible.

6.3 ALTERNATIVES

This section presents an overview of some of two of the more current plans.

6.3.1 AMA Plan

The AMA proposal would expand health insurance coverage and improve fairness by shifting government spending toward those most likely to be uninsured— people with lower incomes. It would also reduce the hidden bias favoring employment-based coverage, which provides special employee income tax breaks for insurance obtained through an employer. Reducing this bias has important advantages, as well as potential drawbacks, that must be addressed. Those without the option of insurance through a job don't get this tax break, and would finally get assistance under the AMA proposal. Employees who are dissatisfied with their employers' health plan offerings could choose to buy insurance elsewhere and still be eligible for assistance.

Reducing the bias, however, could accelerate the decline in employment-based insurance, causing further disruption. Especially in this context, strong safeguards are needed to ensure that people with predictably high medical costs can afford coverage. Health insurance market regulations should be reformed to establish fair rules that protect vulnerable populations without unduly driving up premiums for the rest of the population. Regulations should also allow market experimentation to find the most attractive combinations of plan benefits, patient cost-sharing and premiums. In short, the AMA advocates a clear role for government in financing and regulating health insurance coverage, with health plans and health care services being provided through private markets, as they are currently. The AMA proposal gives patients more control over our nation's health Series on

The AMA proposal to expand health insurance coverage is based on three pillars:

Helping people buy health insurance through tax credits or vouchers. These tax credits or vouchers should be more generous at lower income levels, and should be earmarked for health insurance coverage. It is important to note that the government *already* gives people financial assistance to buy private health insurance—well over $125 billion each year. The form of this support—an employee income tax break on job based insurance—is hidden from public view. This tax break gives more assistance to those in higher tax brackets, and gives no assistance to those without employee health benefits. Shifting some of this assistance to tax credits or vouchers for lower-income people would reduce the number of uninsured and improve fairness in the health care system. One way this can be achieved, for example, is by putting limits on the existing tax break so that employees do not get a bigger income tax break for simply enrolling in more expensive health plans. Under this scenario, premiums for employee health insurance below a specified limit could still be tax-free, with additional spending becoming subject to income tax. Limiting the $125 billion tax break for job-based insurance would yield additional revenue for the government, which could be used to fund tax credits and vouchers for those who currently get little or no assistance. The limit would also encourage insurers, employers and employees to avoid excessively generous health plans, curbing the rising cost of health care and insurance premiums.

Choice for individuals and families in what health plan to join. Today, people are effectively locked into the health plans their employers offer, often just one or two, which are subject to change from year to year. A change in employment typically means a change in insurance coverage. In contrast, under the AMA plan, people could use tax credits or vouchers to help pay for premiums of any available insurance, whether offered through a job, another arrangement

or the open market. As with job-based insurance today, health plans would still have to meet federal guidelines in covered benefits, but people would have greater say in what types of benefits and plan features they value. Coupled with individual choice, tax credits benefit recipients directly, and everyone indirectly, by stimulating the market for health insurance. If enough people have enough purchasing power—and enough say over how that purchasing power is used—insurers will be compelled to step up to the plate with better, more affordable coverage options that are within reach of more people.

Fair rules of the game: Regulating markets and protecting high-risk patients. For markets to function properly, it is important to establish fair ground rules. A proliferation of state and federal health insurance market regulations has made it more difficult and expensive for insurers to do business in many markets. The AMA proposes streamlined, more uniform health insurance market regulations. Regulations should permit market experimentation to find the most attractive combinations of plan benefits, patient cost-sharing and premiums. It is also important that market regulations reward, not penalize, insurers for taking all types of patients. Market regulations intended to protect people with high health risks have typically backfired, sometimes disastrously, by driving up premiums for younger, healthier people and leading them to drop coverage.

6.3.2 Massachusetts Plan

1. Massachusetts' health spending increased by 34.7 percent between 2000 and 2004, or 7.7 percent per year.
2. On a per capita basis, health spending is more than 26 percent higher in Massachusetts than in the United States as a whole and grew somewhat faster between 1991 and 2004. Spending in Massachusetts increased from $3,249 per capita in 1991 to $6,683 per capita in 2004. The comparable numbers for the United States as a whole were $2,654 in 1991 and $5,283 in 2004
3. While health care spending increased by 33 percent between 2000 and 2004 in Massachusetts, health insurance premiums increased by 53 percent for individual policies and 44 percent for family policies.
4. Health insurance premiums increased by 8.9 percent per year in Massachusetts between 2001 and 2007, faster than the U.S. average growth in premiums of 7.7 percent.

6.4 PROPOSED PLAN

The following is the detail we see in a modern Healthcare Policy Plan. We have called this the "Preferred" Plan. It has changed little from our proposal in 1993. It now includes, however, details that are consistent with the overall principles we have presented at the beginning if this report.

Table 12. SUGGESTED HEALTHCARE PLAN ELEMENTS

Element	"Preferred" Plan
Coverage	Universal coverage, if not objected to on religious or other grounds, of all citizens of the United States. Maintains ability of those practicing their rights under the First Amendment of the Constitution to refrain from mandated health coverage.
Responsibility	The Individual is responsible directly. There will be no Group Plans and there will be no groups or collusive buying groups. Each individual will be responsible for procurement of an individual policy.
Children	All dependent children will be covered individually by a plan paid for by their parent, legal guardian, or by the state, if there is no such guardian.
Over 65	All current Medicare eligible individuals will purchase a plan from a registered provider, and the Government will pay for the base price of the base plan, directly.
Payment	Each individual will be responsible for selecting and paying for an insurance plan. Each family will be responsible for their children and payment for a children's plan. If there individual or family is not able to purchase the plan because of financial reasons, lack of employment or other accepted reason, the Government shall provide that individual with a subsidy per person equal to that of the fee for the minimal service provided by the lowest cost provider. The subsidy shall be paid directly to that provider on behalf of the subscriber. In the event that the patient does not purchase a plan and seeks services, and is not covered by a self selected waiver, then the patient will be personally responsible for payment of all fees, will have subsequent fees paid out of their taxes, and shall be fined for the failure. It will be the IRS responsibility to collect said fees.
Pricing	There shall be a set of standard offerings, with the minimal offering of a basic medical plan. No provider shall offer other plans unless they offer the standard minimal common plans. There shall be no difference in such plans. All providers shall list publicly the price per person per plan. There shall be no difference between any person based upon age, sex, health history, or for any other reason. Each person shall pay the same insurer the same price for the same plan. Insurers may offer the basis plan in combination with other plans, but the subscriber must be able to buy the basis plan alone.
Choice	There is total and complete freedom of choice. The patient may choose any physician at any time for any purpose. The physician may charge any fee for any service as long as the physician's fees are posted with common knowledge of what those fees are to any interested party.
Catastrophic Coverage	There will be a list of catastrophic diseases. Any and all expenses of services directly related to meeting the needs of such a disease shall be paid for from a Federal fund. No individual shall be charged a deductible for any disease that is deemed catastrophic.

Element	"Preferred" Plan
Quality Control	There shall be a state, federal, and/or other regulatory oversight control on physician, hospital, or other providers of services monitoring the quality of health care provided. The patients shall have immediate and direct access to this. There shall be a minimal level or standard established and there shall be monitoring of such providers to assure that they meet the standard. In the event that said standard if not met, the provider will be immediately denied the right to continue to provide service.
Management Control	All patient records will be computerized. There will be a standard patient billing record and said record will be generated at the provider's premises at the time the services are rendered. There will be a copy of that record available to the insurer and the patient and a summary available to the appropriate governing bodies and state and federal agencies.
Price Control	Each provider of services shall have available to them at the time of referral, the list of prices on all drugs, diagnostic services, referral services, or other services not directly provided by them. They must provide those prices to the patient at the time of referral. These prices must be provided in writing and must be honored at the time at which they are provided to the patient.
Demand Control	Each individual will have a deductible of 5% of their gross income or equivalent, and families will have to pay a deductible of 2% of their gross family income for each child. All deductibles are on an annual basis and the deductible will be renewed each calendar year.
Supply Control	The desire is to have a health care system that "clears the market" from an economic perspective. To achieve this, there will be no subsidies of any type to providers of any type for the provision of service other than the fees provided by purchasers of said services. There shall be no government subsidies and there shall be no control on prices.
Workforce Management	Productivity is to be the measure of performance with quality being maintained by mandate. By means of the supply demand relationship and by means of the market clearing activities of no supports, inefficient providers shall be driven from the market. Providers shall be responsible for the manner in which they provide the most efficient service at the desired level of quality.
Oversight	Oversight is by a mutually acceptable professional, state, and/or federal oversight Board. There shall be no compensation for participation on this Board.

Element	"Preferred" Plan
Payment	Each Provider of Health Care must offer a set of minimal benefit packages, such packages being identical from one provider to another. Each Provider must offer the package at the same price per person and such a price must be a matter of public record. Each provider of service will have real time access to the amount paid by the individual at the time of service. If the amount is still within the deductible level, the provider is responsible for collecting the amount at the time of service. If the amount is now above the deductible, in total, the provider shall be reimbursed by the insurer of record within forty eight hours of the provision of service. There shall be no denial of payment. Post service audits may be performed, and in the event that fraud has been perpetrated, it shall be a federal crime.
Coverage Management	All citizens of the United States must be covered. The responsibility is that of the individual to seek out an obtain insurance. Those individuals not desiring insurance because of their own ability to pay, because of religious reasons or because of other personal beliefs, may not be compelled to purchase insurance. However, in the event that such individuals seek medical care, they will be charged a full and complete fee and will be held personally liable for all charges render. These individuals will be informed as such at the time of service provision.
Medical Education	There shall be no controls of any type on the nature of, the operations of, the choice of, the content of, of any other element of medical training. The market forces of the supply and demand elements of the health care business shall be the only controls. The selection of individuals shall be based on academic performance and clinical performance only. The goal in physician selection is on capabilities and performance, and no other factors shall be considered.
Medical Research	There shall be no control or influence over the nature of research. Current research policies shall be continued and improved upon. The goal is to continue to foster and improve medical delivery through innovation and productivity, while maintaining the highest quality.
Physician Peer Review	Quality of delivery is the ultimate goal, in a free market competitive environment. Patient complaints, provider's malpractice, and other deviations from quality shall be dealt with immediately and severely to resolve them in a timely fashion. There shall be a Peer review process set in place with patient representatives having at least on third the deciding positions.
Patient Responsibility and Patient Training	The individual is held ultimately responsible for their own individual health and well being. The individual will not in any way be disenfranchised or otherwise discriminated against for any and all genetically related disorders. However the individual will be responsible for their behavior that places them at risk. As such, there will be health information made readily available describing risky behavior and indicating that such behavior has penalties. Where possible, the government shall take the elements of such behavior such as with tobacco or alcohol.

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