Research Paper – U.S. Healthcare Outcomes

Assessing the performance of healthcare system is a difficult task. The most definitive measures of success are the health outcomes--the incidence of illness and injury, success the system has in treating those cases, and the quality and length of lives as a result. But the incidence of illness and injury is largely determined outside the realm of healthcare—genetics, population demographics, culture, education, and environment all weigh in through a multitude of ways. Together these factors create the situation to which a healthcare system must react. No one can fully discern the results of healthcare from the initial landscape of patient need.

Nonetheless, we try. Gauging our performance, relative to both other countries and our own past performance, is a precondition to forming effective public policy around healthcare. For such large-scale comparison, objective measures are a necessity. Among these, **mortality** is the ultimate metric--it expresses the outcome that all medicine seeks to delay. It is the target of all public health initiatives. Beyond mortality, metrics become difficult to value, and the overall project of assessing systemic performance becomes significantly political.

Mortality

Life expectancy is a slightly misleading term because it is wholly derived from the death rate—it is an average of age at time of death, often adjusted for imbalances in age demographics (age-adjusted life expectancy). Life expectancy is only true to its name if mortality rates remain the same. It is commonly thrown around as the broadest indicator of populations overall health or human welfare situation.

In the United States, the 2008 life expectancy was 78.06 years. There are significant variations when this is broken down by age, sex and other demographics. White women, for instance, have a life expectancy of 80.6, and black men 69.2, in 2006.[1]

In comparison with other countries, this result is disappointing. Though we spend more per capita than any other nation, we're still ranked 30th among United Nations members. We are the second lowest among the Group of Eight (G8) nations, only above Russia. We are lower than the EU average and over 4 years under Japan, which is the leader among nations with more than 100 million citizens. But this statistic is on the rise—the US participates in a global trend towards higher longevity, and we are even climbing in the rankings.

In considering this statistic, it is important to recognize so factors that have more to do with general public welfare than "health" specifically, namely homicide and suicide.

In the United States, suicide should not be considered as a key contributor to our low life expectancy. In 2006, suicide ranked 11th among ICD causes of death; heart disease, the leading cause of death, killed almost 20 times more people. Our suicide rate was 17.7 per 100,000 people and accounted for just over 1.3% of deaths. Suicide does tend to kill younger individuals than other causes of death, and thus affect the life expectancy more—if measured in Years per Potential Life Lost (calculations of this statistic has yet

[1] http://www.cdc.gov/nchs/data/nvsr/nvsr57/nvsr57_14.pdf

to be standardized, so specific rates are controversial) suicide is shown to have a much greater effect on life expectancy. Nonetheless, our rate is lower than most of the OECD nations (we are 20th out of 29), many of which still have higher life expectancies. Our ranking here varies by data compilation but usually lands us in the 40's. Japan, by contrast, which has very high life expectancy and median age, is ranked 9th.

Homicide is even less of considerable factor; it is the 15th most common cause of death, only accounting for less than 1% of deaths. Although our rate is 2nd highest among OECD countries, it is still a miniscule percentage of overall mortality. Our homicide rate is usually around half of our suicide rate, and variations between OECD countries is small.

The more important factors are illustrated by the leading causes of death. The top two causes—heart disease and cancer—account for almost half of all deaths. The top five account for over 60% of deaths. The death rates for all of these are in decline, both globally and in the U.S.[2] In comparison with the industrialized counterparts in the EU and the OECD, our numbers are not very exceptional, although we do have slightly higher-than-average heart disease mortality (and probably much greater incidence, although there is not reliable data on this).

The Top 15 Causes of Death (2006 data) – overall was 810.4:

1. Heart Disease (211 per 100,000)
2. Cancer (185)
3. Stroke (45)
4. Chronic Lower Respiratory Diseases (41)
5. Accident (40)
6. Diabetes (24)
7. Alzheimer's (24)
8. Influenza and Pneumonia (18)
9. Kidney Disease (15)
10. Septicemia (11)
11. Suicide (11)
12. Chronic Liver Disease/Cirrhosis (9)
13. Hypertension/Renal Disease (8)
14. Parkinson's (6)
15. Murder (6)

In comparing these statistics to international WHO data, it is surprising that many economically comparable countries have similar distributions in disease-specific mortality, yet higher life expectancy. It is possible that—due to unhealthy lifestyle or other cultural/environmental factors—the U.S. tends to get the same chronic diseases but at an earlier or age. Our survivability rates for cancer and our mortality through acute myocardial infarction (heart attack) suggest that treatment is good, but public health is bad in terms of these chronic illnesses.

Another important factor to consider in U.S. mortality is the difficult-to-quantify effect of narcotic abuse. The World Drug Report indicates that the U.S. has a greater percentage of cocaine, amphetamine and opiate users than most industrialized nations,

[2] http://www.cbsnews.com/stories/2008/06/11/national/main4173583.shtml?source=related_story

particularly west, central and southern Europe. Eastern Europe and Russia, which currently face a massive heroine epidemic, generally have life expectancies lower than the U.S.

It is difficult to estimate the effect of drug addiction on life expectancy because heavy narcotic use can cause such a variety of different health problems. There were around 38,000 drug-induced (overdose) deaths in 2006—this is categorized as unintentional accident, but the rate is 12 per 100,000 on its own (which would place it as #10 on the Cause of Death list). Few heroine and cocaine addicts, however, actually succumb to overdose—more frequently they survive into their 40's or 50's, and die of stroke, heart disease, various types of cancer, or liver/kidney failure. This is true of meth to a lesser extent. There is a clear need for more research on this effect. [3]

Infant mortality

Another frequently mentioned outcome statistic is infant mortality. The U.S. has a comparatively high infant mortality rate, and this is often seen as a major short-coming of our costly system. Our IM rate is higher than all the G8 countries except Russia, and well above the OECD average.

It is important to note that infant mortalities are kept separate from mortalities in general, so infant mortality rates do not factor into our overall life expectancy. Infant mortality is defined as any death of a child under one year of age who dies after showing some signs of post-natal life (usually breath or heartbeat). The rate is described as the number of deaths per 1,000 live births. The U.S. was measured at 6.3 in 2008.[4]

There are several reasons often used to explain higher IM rates in the U.S. than in other countries—some vindicate the healthcare system, and others do not, and the issue has become quite politicized.

The US has spearheaded development of **fertility drugs and procedures**, which are more prone to complications, sometimes correlated with the age of the mother (a significant risk factor) or with multiple births (e.g. twins, triplets—the US has more frequent instance of this than other nations—the birth rate for twins has increased over 30% since 1995).[5] The IMR for in-vitro fertilization is generally around 20 times that of non-IVF births.[6] This trend, however, has only occurred in the last 20 years, whereas the U.S. has historically lagged in infant mortality among developed countries.

Indeed, the US leads the world in medical research in general, and many attribute our high IM to **more aggressive practices in saving problematic pregnancies**. These efforts can often result in premature or induced delivery, which may still end in death. In this case, the event would be classified as an infant death, whereas less aggressive medical practice might have ended in a stillbirth. 2006 data from the WHO suggests that this effect is at play—there is a higher ratio of infant deaths to stillbirths than in comparable countries. Still, the rate of combined stillbirths and infant deaths is high, so the effect cannot be said to account for everything.[7] Italy offers a useful contrast here—according to OECD data from 2005, they perform greater than 35% more Caesarean

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[3] http://www.unodc.org/pdf/research/wdr07/WDR_2007_1.5_ats.pdf

[4] *National Vital Statistics Reports, Vol 57. No. 7, January 7, 2009*

[5] http://www.asrm.org/Patients/FactSheets/fertilitydrugs_multiplebirths.pdf

[6] http://econlog.econlib.org/archives/2007/09/another_reason_2.html)

[7] http://creativedestruction.wordpress.com/2006/05/22/regarding-the-uss-high-infant-mortality-rate/

sections per live birth, but still have lower numbers in all pre- and post-natal mortality, and a lower ratio of infant death to stillbirth.[8]

Fertility drugs, multiple births and obstetric intervention are all associated with the **general rate of premature births**, which is closely related to infant mortality. Around two-thirds of all infant deaths occur in the 8.2% of infants born at low birth weight. Even controlling for obstetric intervention, the US has a higher rate of premature birth than other industrialized nations. This can be somewhat attributed to fertility drugs and more frequent multiple birthing, but that is still a small segment of overall births (less than 1%). Other suspected causes extend into the extremely complex realm of reproductive physiology, and there has yet to be any definitive conclusions. This is an important area of study, however, because even as rates of pre-natal and infant mortality fall, rates of premature birth are rising steadily.[9]

The U.S. infant mortality rate shows large racial discrepancies, which seem to partially nullify the obstetric intervention/fertility drug explanations because no studies have shown that black women use more fertility drugs or obstetric intervention. Black women are, however, twice as likely to have a prematurely born child and black IMR is twice that of white IMR. A more viable explanation is that a certain portion of U.S. society is wanting in terms of **reproductive education** and **prenatal care.**[10] This dearth of prenatal care among certain societal groups is indicative of an overall issue within the system—Medicare and Medicaid support is available for emergency room visits but does little to promote ambulatory and preventative care. This makes the overall care less effective and less efficient (because prevention is usually less costly than treatment).[11]

There has yet to be a definitive study or medical consensus on the high IMR in the U.S. It is likely that this is indeed one of our weak points, although mostly in terms of equity. Even if the majority of mothers have access to excellent pre-, peri- and neo-natal care, a small portion of the population who are poorly educated about nutrition and pregnancy health, and who receive much less prenatal care, can greatly affect IMR.

More Detailed Studies and Metrics

Beyond the oft-cited infant mortality and life expectancy statistics, there are a variety of other indicators that NGO's, governments and intergovernmental organizations use to assess the overall performance of healthcare systems in meeting health challenges. These statistics are compiled into periodical reports on the state of healthcare indicators. The UN-based **World Health Organization's annual report** is a broad assessment of national health systems and global health trends in general. They collect data systematically but the reports themselves vary from year to year. A landmark report was published in 2000, when the WHO conducted its first-ever comparative analysis of national health-care system. It ranked the U.S. in the 37th place overall, which captured the attention of anyone interested in public health policy. Serendipitously it was an election year in the U.S., so candidates could use the ranking as a springboard for discussing reform, and no administration stood to lose much from the bold critique.

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[8] http://www.who.int/making_pregnancy_safer/publications/neonatal.pdf
[9] http://www.time.com/time/health/article/0,8599,1736042,00.html
[10] http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2608536
[11] http://www.cdc.gov/nchs/data/databriefs/db09.htm

To this day the ranking is often cited in the health care reform debate by bloggers and media. The details of the comparative system are rarely mentioned however, and the dismal ranking (given our economic stature) is misunderstood. Consider this excerpt from a random blog discussion on healthcare (2009):

> *again for being the US [our] ranking is pretty crappy, ranked 37th* [link to WHO stats] *but more interesting, on the Total Expenditure on Health , we are ranked 1st* [link to NHE stats] *So why....we do we have to pay the 2nd most expensive healthcare in the world, but we get 37th service? We are getting screwed over…*

This is a logical enough reaction, but the blogger is probably not considering the WHO's unique methodology here, which is not actually intended to provide a standardized method for comparing all the national systems:

> *In designing the framework for health system performance, WHO broke new methodological ground, employing a technique not previously used for health systems. It compares each country's system to what the experts estimate to be the upper limit of what can be done with the level of resources available in that country. It also measures what each country's system has accomplished in comparison with those of other countries* .

So this assessment is like a test where grades are provided in relation to each students maximum potential aptitude. This explains for glaring underdogs in the upper-ranks. Oman, for example, ranked in eighth place despite its infant mortality rate, which was over twice that of the U.S. at the time, and its life expectancy, which was over 4 years lower than that of the U.S. population. The idea, in the WHO's system, is that Oman was utilizing their economic resources with the great efficiency.

The WHO assessment is broken down into five key categories:

- *overall level of population health*
- *health inequalities (or disparities) within the population*
- *overall level of health system responsiveness (a combination of patient satisfaction and how well the system acts)*
- *distribution of responsiveness within the population (how well people of varying economic status find that they are served by the health system);*
- *the distribution of the health system's financial burden within the population (who pays the costs).*

Three out of the five categories are focused on "disparities" or "distribution". It is telling that in "responsiveness," which measures patient's satisfaction with the care they receive and the manner in which they receive it, the U.S. was ranked #1. It scored low because—given its spending—the WHO assessed it should have better results, and because there are clear inequalities in how care and expenditures are distributed.

Overall, the WHO study emphasized the organization's values, which center around health equality, and the explicit institutional credo that there should be equal access to health of equal quality. This is perhaps just not in line with U.S. political culture. Our spending is, indeed, largely out-of-pocket compared to other countries. Nations with similarly high out-of-pocket spending at the time—namely Brazil, New Zealand, Canada—also ranked low. The WHO should also consider that our society has

developed disposal income for healthcare that is arguably not of the same category as "vital care" which is all that most people can afford. Many "healthcare" goods and services—in the U.S.—should be looked at as consumer goods with significantly more elastic demand and little relation to serious need for medical attention. These include plastic surgery, extensive dental care, many prescription drugs (such as "lifestyle drugs" and acne medication), and even home care, which can include physical therapy or massage.

Domestic Reports—the Commonwealth Fund and National Healthcare Quality Report

Within the U.S., the **Commonwealth Fund** publishes a detailed "scorecard" on the performance of American healthcare. It draws on CDC/NVSS data to monitor progress towards "benchmarks". It also incorporates important studies from academia to note important trends. For comparative measurements, it mostly draws on comprehensive OECD data and the aforementioned WHO report. There are frequently other studies similar to this compiled by think-tanks, NGOs and periodicals, but the Commonwealth Fund report has been the focus of the most attention in the recent health debate.[12]

While the commonwealth fund's study is draws on some vetted and reliable sources of data, its selection is subjective and probably geared towards the express mission of the Fund—"working toward a high performance health system". Unfortunately, some of the most useful indicators of healthcare in the U.S. are also left useless by the absence of other national data by which to compare them. Hence the necessity of "benchmarks," which can tell us little about how our exorbitant spending is providing positive returns.

The Commonwealth's most recent report was negative:

> *Across 37 core indicators of performance, the U.S. achieves an overall score of 65 out of a possible 100 when comparing national averages with U.S. and international performance benchmarks. Overall, performance did not improve from 2006 to 2008. Access to health care significantly declined, while health system efficiency remained low. Quality metrics that have been the focus of national campaigns or public reporting efforts did show gains.*

The reports mission is a difficult one, and in many ways it is an unreliable way of judging the U.S. healthcare outcome.

Firstly, the report uses some highly subjective metrics. Particularly they seem to rely on medical distinctions that are still in debate. For example:

> *In 2004, nearly one of five elderly Americans (17%) was prescribed one of the 33 drugs that experts consider potentially inappropriate for the elderly because of limited effectiveness or risk of harm. There was little change in the national rate since 2002.*

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[12] http://www.commonwealthfund.org/~/media/Files/Publications/Fund%20Report/2008/Jul/Why%20Not%20the%20Best%20%20Results%20from%20the%20National%20Scorecard%20on%20U%20S%20%20Health%20System%20Performance%20%202008/Why_Not_the_Best_national_scorecard_2008%20pdf.pdf

Obviously "potentially inappropriate" is semantically weak and does not indicate a clear knowledge-base. The report goes on to use many other metrics based on "potential" outcomes. In this case there is also an assumption that "experts" know better than on-the-ground physicians and caregivers. Other data is drawn from surveys which are dangerous to compare over time, or from different surveys used to measure the same metric at different times.[13] For instance, two different surveys were used at different times to measure whether "staff always responded when needed help to get to the bathroom or pressed call button."

Other data is more than subjective—it is simply flawed. Benchmarks and comparison among "percent of children who received recommended vaccinations," for instance, ignores significant differences in the necessity of such vaccinations based on the child's place of residence. This certainly applies from country to country, where diseases like TB and Measles can range from pandemic status to nearly eradicated. There are also differences within regions of the United States.

Despite these considerable flaws, the main goal of the Commonwealth Fund's reports is to aim high and push for progress in healthcare, which is logical and admirable. As a comparative tool, it seems to be fairly useless, although it's easy to find it being interpreted as an indicator of our international status.

The report uses a variety of data from the WHO and from independent surveys and studies, along with some of its own research. It also relies heavily on data from the **National Healthcare Quality Report**[14]—a different, perhaps more empirical publishing that is produced by the Agency for Healthcare Research and Quality. The AHQ draws data from a variety of medical databases and programs, including the CDC and National Vital Statistics program. It is a more objective way of gauging changes in U.S. healthcare quality, but like the C.F. report, it is ill-suited to gauge our health system in comparison with others.

General Conclusions

The outcome indicators generally emphasize one issue with American healthcare—this is equity. Large race-gaps in mortality and infant mortality, along with the more subjective assessments of our healthcare financing, illustrate imbalances in the distribution of healthcare. Even metrics which do not seek to specifically measure equity are greatly affected by these imbalances. For example, the surveys like those used by the Commonwealth Fund and the AHRQ tend to rely on binomial data, e.g. "Percent of pregnant women receiving prenatal care in first trimester." In this case the figure is "83.9%," which is not entirely informative beyond the issue of equity. It sets a bar, but it won't express the quality of care that the 83.9% of women received, which may be the best, or worst, in the world.

So the point is driven home; the U.S. should recognize and address the major shortcoming of its system (and perhaps its society in general), which is the failure of healthcare to adequately include a certain segment of our population into our high-performing healthcare system.

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[13] Observe the cited studies-- "2005 data provided by Dale Shaller and AHRQ CAHPS benchmarking database team; 2007 data retrieved from CMS Hospital Compare database at www.hospitalcompare.hhs.gov".

[14] http://www.ahrq.gov/qual/nhqr08/nhqr08.pdf

Second to inequity, the salient feature of US healthcare seems to be an under-use of preventative measures. The prevalence of obesity and drug addiction show that U.S. healthcare is more reactive then proactive. Significant gains in efficiency can be achieved by promoting better public health and preventative or ambulatory care.

Despite these major drawbacks to our system, and some weak points or singularities (such as the yet-to-be-explained increase of premature births), the U.S. system is among the very best in the world. Even considering our mediocre life expectancy, our relatively high IMR, and misconstrued reports by the WHO and other institutions, our system should be highly regarded. For well-insured or wealthy individuals, and even for Medicaid and Medicare patients, very few countries offer as many resources and as high-quality care as the U.S. does.