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A Society in Need of Change: International Health Status Comparisons – A Dismal Showing by the United States

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Abstract

This research compares U. S. health status internationally utilizing indicators infant mortality, life expectancy at birth, and maternal mortality data as comparison. This research compares U.S. health status data with OECD country data to ascertain the U.S. international rankings. This research found the U.S. ranked in the lowest quartile in each of the health status variables examined internationally. This research offers the argument that the inequalities in delivery of health care in the U.S. is foundational in explaining the reduced health status discovered.

This research utilizes critical theory as the foundation of investigation. It allows this research to examine the differences in health status internationally for structural answers to the perceived problem utilizing Organization for Economic Cooperation and Development (OECD). This research offers a critical theory interpretation for the expected inequalities by examining the structural inadequacies inherent in a heterogeneous society like the United States – a society that conceptualizes universal access to health care resources as a high-priced privilege not an affordable right in comparison to the leading World Health Organization (WHO) nation states with respect to health status distribution. The literature is littered with international comparisons between the United States health status indicators - life expectancy, infant mortality, and maternal mortality rates and the rest of the OECD countries (Weitz, 2012, U.S. Census, 2013, WHO, 2014). As to say, the U.S. ranks 31st out of 34 nations in 2012 in infant mortality or a 26th in life expectancy and 28th in maternal mortality (OECD, 2014). On the surface these rankings seem to validate this research assumption that the United States health care delivery system does not produce top health status in international comparisons.

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However, these health status comparison rankings do little more than position the United States internationally based on these indicators.

A 31st ranking may not be problematic because it is not statistically significant. If there is very little difference between the U.S. infant mortality raw rate and the first ranked country then the ranking is not a valid measure of the misconception promoted by this research - that the United States health care delivery system is world class or best in the world by generating high health status.

This research strives to add to the literature and further the discussion of the perceived inadequacies of the health care delivery system in the United States. This research attempts to further the community understanding by examining these data to determine whether statistical significance exists. The literature review does not produce any study that specifically examines these health status indicators in comparisons within the OECD to determine statistical significance. The OECD nations are expected to utilize definitions consistent with the WHO's definitions when gathering and reporting their data (OECD, 2014). One of the concerns when examining international health statistics is reporting inconsistencies. This research accepts that the possibility of data reporting errors, however data such as the OECD sets are considered to be acceptable based on the fact that health policy and budget decisions utilize these data regularly (OECD, 2014).

Methods

International data are presented on the United States' overall ranking based on comparisons with 33 other countries of the Organization for Economic Co-Operation and Development (OECD), utilizing three health status indicators: infant mortality, maternal mortality, and life expectancy at birth. The utilization of health status indicators has long been promoted as a valid representation of a populations' overall health (WHO, 2006; CDC, 2006). The data sets utilized are the most recent complete sets for the measures examined at the time of this research.

Infant mortality rates are measured as the number of deaths within the first year of life per 1000 live births. Historically, high levels of infant mortality have been presented as a result of unhealthiness of the mother, lack of adequate pre-natal care, reduced public health programs, and poor socioeconomic conditions (CDC, 2006). According to health officials, it is reasonable to assume that the higher the infant mortality rate, the lower the overall health status of the population (WHO, 2006; CDC, 2006).

Maternal mortality rates are measured as the number of deaths from causes directly related to pregnancy or childbirth of birthing mothers per 100,000 from the start of pregnancy through 42 days after pregnancy termination (WHO, 2006; CDC, 2006). Historically, high levels of maternal mortality have been presented as a result of unhealthiness of the mother, lack of basic health care, reduced public health programs, and poor socioeconomic conditions (CDC, 2006). Life expectancy at birth is the average number of years a person can be expected to live from birth (WHO, 2006; CDC, 2006). It is also "a measure often used to gauge the overall health of a society (CDC, 2006:78)." This research utilizes the 2014 OECD Health Report to critically examine U.S. health status indicators in comparison to other member nations. This is accomplished by presenting a rank order assessment of these indicators within the 34 OECD nation states. The OECD health data set is considered by health researchers to be a valid source of assessment and comparison (CDC 2009; OECD, 2007; and WHO, 2009). These data are collected and reported by each OECD member nation to the OECD based on criteria expect by the OECD set in their Principles and Guidelines guide. OECD recommendations set out collective and precise standards or objectives which the member countries are expected to implement (OECD, 2006). The OECD analysis examines the different components of health care systems for the nations with the highest overall rankings on health status indicators. These overall rankings are constructed by adding the nations' rankings on each health status indicator and utilizing the overall scores of the highest performers with respect to life expectancy at birth, maternal mortality, and infant mortality. The fact that infant mortality and maternal mortality rates are inversely related to health while life expectancy at birth is directly related is taken into consideration.

The OECD data are first presented in table form for each of the following three years: 1995, 2000, and 2012 by 2012 descending ranking order. The utilization of data over a period of time allows this research to control for acute sources outside of the normal system of health delivery – such as pandemics, natural disasters, recession, etc. The utilization of 1995 and 2000are consistent with prior OECD research by the author – at the time Chile, Israel, Estonia, and Slovenia were not part of the OECD), however, 2012 is utilized as the last full data set presented by the OECD and included the additional four nations. Table #1 consists of life expectancy at birth data for each OECD nation state and the overall ranking for that country in the corresponding column – 1995, 2000, and 2012.

Table #2 employs the same procedure with respect to infant mortality data. Table #3 employs the same procedure with respect to maternal mortality data. Table #4 presents the overall rankings of all health status indicators by adding each nation's ranking for life expectancy at birth, infant mortality, and maternal mortality data. The lowest overall score is the top ranking and the overall highest score is the lowest ranking. Lastly, the scores generated by the United States are compared with the other OECD nation's scores to examine any significant inequalities associated utilizing the t test statistic.

Critical evaluations of OECD health status data offer a number of inequalities that may produce significant variations. First, there was a broad range in infant mortality rates. Second, life expectancy at birth rates was unequally distributed between the 34 nations. Third, the inequalities in maternal mortality rates between the countries were widely varied. Fourth, health status rates for each nation were offered in comparison to their OECD cohort or other group members and ranked accordingly. Finally, this research evaluates the statistical significance of the United States health status rates in comparison to the mean rates the four quartiles of OECD countries utilizing the one sample t test. This research assumes a level of significance at .05.

Findings

Infant Mortality

There was a broad range of infant mortality rates within the 34 OECD countries. Table 1 presents infant mortality rates for reporting years 1995, 2000, and 2012 (last complete year of OECD data). The 2005 infant mortality rate by country ranking are included in Table 1.

Table 1. Infant Mortality

OECD Country	1995	2000	2012	2012 Rank
Iceland	6.0	3.0	1.1	1
Slovenia			1.6	2
Japan	4.3	3.2	2.2	3
Finland	3.9	3.8	2.4	4
Luxembourg	5.5	5.1	2.5	5
Norway	4.0	3.8	2.5	5
Czech Republic	7.7	4.1	2.6	7
Spain	5.5	4.4	2.6	7
Sweden	4.1	3.4	2.6	7
Greece	8.1	5.4	2.9	10
Italy	6.2	4.5	2.9	10
Korea	7.7	6.2	2.9	10
Austria	5.7	5.2	3.2	13
Australia	5.7	5.2	3.3	14
Germany	5.3	4.4	3.3	14
Denmark	5.1	5.3	3.4	16
Portugal	7.5	5.5	3.4	16
France	5.0	4.5	3.5	18
Ireland	6.4	6.2	3.5	18
Estonia			3.6	20
Israel			3.6	20
Switzerland	5.0	4.9	3.6	22
Netherlands	5.5	5.1	3.7	23
Belgium	5.9	4.8	3.8	24
United Kingdom	6.2	5.6	4.1	25
Poland	13.6	8.1	4.6	26
Canada	6.1	5.3	4.8	27
Hungary	10.7	9.2	4.9	28
New Zealand	6.7	6.3	5.2	29
Slovak Republic	11.0	8.6	5.8	30
United States	7.6	6.9	6.1	31
Turkey	43.0	28.9	7.4	32
Chile			7.7	33
Mexico	27.7	19.4	13.3	34

Infant mortality rates were generated from the Organization for Economic Co-Operation and Development Health Data Report 2014.

In 2012, infant mortality rates range from Iceland's best 1.1 deaths per 1000 live birth within the first year to Mexico's worse rate of 33.3. The rate for the median was 3.4 or three times more than that of Iceland. The United States rate of 6.1 was approximately six times higher than the Iceland rate. The United States 2012 infant mortality rate OECD ranking was 31st out of 34 countries, which secured the U.S. in the bottom quartile.

Comparison of the 1995 and 2000 rates with the 2012 rate allow this research to control for external confounding sources of variations that can acutely affect infant mortality such as famine, epidemics, wars, and natural disasters. All nation states reduced their infant mortality rates from 1995 to 2005. The data suggests no external variations acutely affected the rates and the positive changes in OECD countries infant mortality rates were considered a normal progression free of artificial stimuli.

An evaluation of the preceding years of 1995 and 2000 also offer a number of discrepancies. In 1995, Finland topped the list at 3.9 infant mortality rates. In 2000, Iceland unseated Finland with a 3.0 rate compared to Finland's 3.8 rate. Turkey has remained the lowest ranked country with rates of 43.0 in 1995 and 28.9 in 2000. The 15th ranked country in 1995 was Iceland with a 6.0 rate. In 2000, Luxembourg and Netherlands tied for the 14th spot with a 5.1 infant mortality rate. The United States' rate of 7.6 in 1995 ranked 23rd out of 30 OECD countries. The U.S. rate decreased positively to 6.9 in 2000; however the U.S. overall infant mortality OECD ranking dropped to 27th in 2000, securing the U.S. position in the bottom quartile in both 1995 and 2000.

Life Expectancy at Birth

There was a broad range of life expectancy at birth rates within the 34 OECD countries. Table #2 presents life expectancy at birth rates for reporting years 1995, 2000, and 2012. The 2012 life expectancy at birth rates country rankings are included in Table 2. In 2012, life expectancy at birth rates range from Japan's best 83.2 to Mexico's worse rates of 74.4, a difference of 8.8years of life. The median was 81.0 years of life. The United States rate of 78.8 was 4.4 years less than Japan's rate or a slight increase from the 3.9 years of difference in 2005. The United States 2012 life expectancy at birth rates OECD ranking was 27th out of 34 countries, which again secures the U.S. in the bottom quartile.

All nation states increased their life expectancy rates from 1995 to 2005. No OECD countries decreased their life expectancy rates from 2000 to 2012. Thus, the data suggests no external variations acutely affected the life expectancy rates and the positive changes in OECD countries rates were considered a normal progression free of artificial stimuli. However, there were a number of changes from 1995 to 2012 that allow examination.

The evaluation of the preceding years of 1995 and 2000 offer a number of discrepancies. In 1995, Japan topped the list with a 79.6 life expectancy at birth rate. Japan lead again in 2000 with a rate of 81.2 years. Turkey has remained the lowest ranked country with a rate of 67.9 in 1995 and 70.5 in 2000. The 15th ranked country in 1995 was a tie between Luxembourg and New Zealand with a 76.8 rate. In 2000, Greece, Luxembourg and Netherlands tied for the 14th spot with a 78.0 life expectancy at birth rate. The United States' rate of 75.7 in 1995 ranked 20th out of 30 OECD countries. The U.S. rate of 76.8 in 2000 secured a 21st position within the OECD countries comparisons. The United States has continued to drop from a 20th position in 1995 to a 21st in 2000, to a 27th position in 2012. The United States has dropped from the 3rd quartile in 1995 to the bottom quartile in 2012.

Table 2. Life Expectancy at Birth

OECD Country	1995	2000	2012	2012 Rank
Japan	79.6	81.2	83.2	1
Iceland	78.0	79.9	83.0	2
Switzerland	78.7	79.9	82.8	3
Spain	78.1	79.4	82.5	4
Italy	78.4	80.0	82.3	5
Australia	77.9	79.3	82.1	6
France	77.9	79.1	82.1	6
Canada	78.1	79.3	81.8	8
Israel			81.8	8
Sweden	78.8	79.7	81.8	8
Luxemborg	76.8	78.0	81.5	11
New Zealand	76.8	78.4	81.5	11
Norway	77.9	78.8	81.5	11
Korea	73.5	76.0	81.3	14
Netherlands	77.5	78.0	81.2	15
Austria	76.6	78.1	81.0	16
Germany	76.6	78.2	81.0	16
Ireland	75.6	76.6	81.0	16
United Kingdom	76.7	77.9	81.0	16
Finland	77.9	79.1	80.7	20
Greece	77.7	78.0	80.7	20
Belgium	77.0	78.1	80.5	22
Portugal	75.4	76.7	80.5	22
Slovenia			80.2	24
Denmark	75.3	76.9	80.1	25
Chile			78.9	26
United States	75.7	76.8	78.8	27
Czech Republic	73.3	75.1	78.2	28
Poland	72.0	73.9	76.9	29
Estonia			76.5	30
Slovak Republic	72.4	73.3	76.2	31
Hungary	69.9	71.7	75.2	32
Turkey	67.9	70.5	74.6	33
Mexico	72.5	73.9	74.4	34

Life expectancy at birth rates were generated from the Organization for Economic Co-Operation and Development Health Data Report 2014.

Maternal Mortality

There were a broad range of maternal mortality rates within the 34 OECD countries. Table 3 presents maternal mortality rates for reporting years 1995, 2000, and 2010. The 2010 maternal mortality rates country rankings are included in Table 3 and are the last complete data supplied by OECD.

Table 3. Maternal Mortality

OECD Country	1995	2000	2010	2010 Rank
Iceland	0.0	0.0	0.0	1
Austria	1.0	2.6	1.3	2
Ireland	0.0	1.8	1.3	2
Netherlands	7.3	8.7	2.2	4
Poland	9.9	7.9	2.2	4
Sweden	3.9	6.4	2.6	6
Italy	3.2	3.0	2.9	7
Denmark	17.7	13.6	3.2	8
Australia	9.4	6.0	3.5	9
Switzerland	8.5	6.4	3.7	10
Spain	3.0	3.5	4.1	11
Israel			4.2	12
Japan	7.2	6.6	4.6	13
Slovenia			4.6	13
Finland	1.6	5.3	4.9	15
Norway	6.6	3.4	4.9	15
United Kingdom	7.0	6.8	5.0	17
Germany	5.4	5.6	5.2	18
Greece	1.9	6.0	5.2	18
Belgium	9.5	8.1	5.4	20
Estonia			6.3	21
Canada	4.5	3.4	6.4	22
Czech Republic	6.0	10.0	7.7	23
New Zealand	3.5	8.8	7.7	23
Portugal	8.4	2.5	7.9	25
France	9.5	6.5	8.9	26
Slovak Republic	8.1	1.8	11.4	27
United States	7.1	9.8	11.4	27
Hungary	15.2	10.2	15.5	29
Korea	20.0	15.0	15.7	30
Turkey	49.2	49.2	16.4	31
Luxembourg	18.5	17.5	17.0	32
Chile			18.3	33
Mexico	83.2	72.6	44.1	34

Maternal Mortality rates were generated from the Organization for Economic Co-Operation and Development Health Data Report 2014.

In 2010, maternal mortality rates range from Iceland's best 0.0 to Mexico's worse rate of 44.1. The median, France was 5.0 or nine times less than Mexico. The United States rate of 11.4 was approximately 11 deaths per 100,000 live births more than that of Iceland. The United States 2010 maternal mortality OECD ranking was 27th out of 34 countries, which secured the U.S. in the bottom quartile.

An evaluation of the preceding years of 1995 and 2000 with 2010 offer a number of discrepancies. In 1995, Iceland and Ireland topped the list with a 0.0 maternal mortality rates. Iceland leads again in 2000 with a rate of 0.0. Mexico has remained the lowest ranked country with rates of 83.2 in 1995 and 72.6 in 2000. The 15th ranked country in 1995 was the United States with a 7.1 rate. In 2000 Switzerland was in the15th spot with a 6.4 maternal mortality rate. The U.S. rate of 9.8 in 2000 secured a 23rd position within the OECD countries, a drop of 8 spots from 1995. The U.S. maternal mortality rate has risen substantially from 1995 to 2010, 7.1 to 11.4, an increase of 4.3 additional maternal deaths per 100,000 live births or 61%. The United States has continued to drop from a 15th position in 1995 to a 23rd in 2000, to a 27th position in 2010. The United States has dropped from the top ranked country in the 3rd quartile in 1995 to the bottom quartile in 2012.

Overall Rankings of Health Status

The overall health status rankings are included in Table 4. The overall health status rankings are calculated by this researcher to ascertain a comprehensive ranking for each nation. This allows for the research to examine each health status indicator by comparison, but to also examine the overall health status of each country for comparison purposes. The overall rankings are calculated by adding the last available rates for each country's infant mortality ranking, life expectancy at birth ranking, and maternal mortality ranking together and comparing that ranking score to the other 33 OECD country ranking scores with the lowest score being the best overall ranking. For example, in 2010, the United States ranked 31st in infant mortality, 27th in life expectancy at birth, and 27th in maternal mortality for a total score of 85 which is then compared to the other 33 nation overall 2010 health status score to determine the U.S. ranking [the lowest score is ranked 1st because the lower the total score the higher the health status overall].

This research only utilized the 2010 health status data to develop overall rankings because examination of the 1995 and 2000 data produced no external confounding sources of variation.

So, the use of the most recent complete year of health status data in this set is justified. Lastly, the research grouped the rankings by quartiles. This is accomplished by grouping the first eight ranked countries and ties into the first quartile, the second nine plus ties, and so on until all 34 countries were in a quartile. According to Statistics Canada (2011), quartile range is hardly affected by higher values, so its use is a good model for potentially skewed distributions. This modeling mechanism allowed the research to examine the overall health status rankings cleanly without suspicion of outliers affecting the statistic.

Table 4.Overall Health Status Ranking

OECD Country	Infant mortality ranking	Life expectancy at birth ranking	Maternal mortality ranking	Overall health status country ranking score	Overall health status country ranking
Iceland	1	2	1	4	1
Japan	3	1	13	17	2
Sweden	7	8	6	21	3
Italy	10	5	7	22	4
Spain	7	4	11	22	4
Australia	14	6	9	29	6
Austria	13	16	2	31	7
Norway	5	11	15	31	7
Switzerland	22	3	10	35	9
Ireland	18	16	2	36	10
Finland	4	20	15	39	11
Slovenia	2	24	13	39	11
Israel	20	8	12	40	13
Netherlands	23	15	4	42	14
Germany	14	16	18	48	15
Greece	10	20	18	48	15
Luxembourg	5	11	32	48	15
Denmark	16	25	8	49	18
France	18	6	26	50	19
Korea	10	14	30	54	20
Canada	27	8	22	57	21
Czech Republic	7	28	23	58	22
United Kingdom	25	16	17	58	22
Poland	26	29	4	59	24
New Zealand	29	11	23	63	25
Portugal	16	22	25	63	25
Belgium	24	22	20	66	27
Estonia	20	30	21	71	28
United States	31	27	27	85	29
Slovak Republic	30	31	27	88	30
Chile	33	26	33	89	31
Hungary	28	32	29	89	31
Turkey	32	33	31	96	33
Mexico	34	34	34	102	34

Overall health status ranking was generated from the Organization for Economic Co-Operation and Development Health Data Report 2014

Table 4 presents 2010 overall country rankings on all health indicators being scored. Iceland leads the OECD health status ranking chart by scoring first on infant and maternal mortality rates and second overall on life expectancy. Mexico is 34th on the chart by scoring last on all health status variables. The United States charts at a dismal 29th overall by scoring 27th on infant and maternal mortality and a 31stson life expectancy – showing a consistent lowest quartile ranking score on all health status indicators in comparison to the 33 other OECD nation states. The United States 2010 overall ranking in the bottom quartile on all three health status indicators was examined to determine statistical significance.

T Tests

In each of the t test statistical analyses, the test value is the mean score for the United States. This research examines the mean score for the United States in comparison to each OECD health status indicator ranking to determine if the U.S. mean value is statistically significantly different than each of the quartile's means. The examination of the statistical differences in the quartile means in comparison to the U.S. mean is needed to determine if the U.S. health status mean is significantly higher or lower than each the quartile's means, to demonstrate whether the U.S. performed statistically better or worse than the average in the quartile.

The first health status indicator examined was infant mortality. The U.S. 2012 infant mortality rate was 6.1 deaths in the first year per 1000 live births. The mean rate for the top quartile was 2.29; countries included in the top quartile were Iceland, Sweden, Luxembourg, Japan, Finland, Norway, Spain, Slovenia, and the Czech Republic. The second quartile mean rate was 3.16; countries included in the second quartile were Portugal, Korea, Austria, Australia, Italy, Denmark, Greece, and Germany. The third quartile mean rate was 3.78; countries included in the third quartile were Ireland, Estonia, Switzerland, France,Israel, Netherlands, Belgium,United Kingdom, and Poland. The fourth quartile mean rate (excluding the U.S.) was 7.01; countries included in the fourth quartile were New Zealand, Canada, Hungary, Slovak Republic, Chile, Mexico, and Turkey. One-Sample T test statistics were conducted on the statistical significance of the United States 2012 infant mortality rates and each of the quartile mean rates. The results are included in Figure 1.

Infant mortality - One-Sample Test

		Test Value = 6.1					
		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
	Mean					Lower	Upper
1st quartile	2.29	-19.159	8	.000	-3.81111	-4.2698	-3.3524
2nd quartile	3.16	-36.701	7	.000	-2.93750	-3.1268	-2.7482
3rd quartile	3.78	-19.363	8	.000	-2.32222	-2.5988	-2.0457
4th quartile	7.01	.804	6	.452	.91429	-1.8671	3.6957

T test generated data attained from the Organization for Economic Co-Operation and Development Health Data Report 2014

Figure 1. Infant Mortality One Sample T Test

Examination of Figure 1 indicates the top quartile infant mortality mean rate of 2.80 was statistically significant when compared to the U.S. rate of 6.1 ($p = .000$). Statistical significance was also present when comparing the 6.1 U. S rate with the second quartile mean rate of 3.16 ($p = .000$). Furthermore, a $p=.000$ suggests statistical significance when compared with the third quartile mean rate of 3.78 with the U.S. rate of 6.1. Finally, the fourth quartile mean rate of 7.01was not statistically significant ($p = .452$) when compared with the 6.1 U.S. infant mortality rates.

The second health status indicator examined was life expectancy. The U.S. 2012 life expectancy rate was 78.8 years. The mean rate for the top quartile was 83.92; countries included in the top quartile were Japan, Switzerland, Iceland, Italy, Australia, France, and Spain. The second quartile mean rate was 83.72; countries included in the second quartile were Canada, Israel, Sweden,New Zealand, Norway, Korea, Netherlands, and Luxembourg.

The third quartile mean rate was 83.17; countries included in the third quartile were Germany, Ireland, Greece, Belgium, Finland, United Kingdom, Portugal, Denmark, Slovenia, and Austria. The fourth quartile mean rate (excluding the U.S.) was 79.62; countries included in the fourth quartile were Estonia, Chile, Czech Republic, Poland, Mexico, Slovak Republic, Hungary, and Turkey. One-Sample T test statistics were conducted to determine statistical significance with comparison of the United States 2012 life expectancy rate and each of the quartile mean rates. The results are included in Figure 2.

Life expectancy at Birth - One-Sample Test

	Test Value = 78.8					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Mean 83.92 1st quartile	10.568	8	.000	5.1222	4.004	6.240
Mean 83.71 2nd quartile	16.108	7	.000	4.9125	4.191	5.634
Mean 83.18 3rd quartile	9.467	8	.000	4.3778	3.311	5.444
Mean 79.62 4th quartile	.843	5	.438	.8167	-1.673	3.307

T test generated data attained from the Organization for Economic Co-Operation and Development Health Data Report 2014

Figure 2. Life Expectancy One Sample T Test

A critical examination of Figure 2 suggests the United States 78.8 life expectancy rate was statistically significant when compared with the quartile mean rate of the other 2012 OECD countries ($p = .000$). The United States rate of 78.8 was lower than the mean rate of the first three quartiles – 83.92, 83.71, and 83.17 respectively – all displaying statistical significance at $p = .000$.

However, the U.S. rate of 78.8 was lower than the fourth quartile mean rate of 79.62, however, did not raise to the level of statistical significance (p = .438).

The third health status indicator examined was maternal mortality. The U.S. 2010 maternal mortality rate was 11.4 maternal deaths per 100,000 live births. The mean rate for the top quartile was 4.36; countries included in the top quartile were Ireland, Iceland, Austria, Netherlands, Poland, Sweden, Italy, and Denmark. The second quartile mean rate was 5.60; countries included in the second quartile wereAustralia, Spain, Switzerland, Israel, Japan, Slovenia, Finland, Norway, and United Kingdom. The third quartile mean rate was 6.50; countries included in the third quartile were Germany, Greece, Estonia, Belgium, Canada, Czech Republic, Portugal, France, and New Zealand. The fourth quartile mean rate (excluding the U.S.) was 18.07; countries included in the fourth quartile were Slovak Republic, Hungary, Korea, Chile, Luxembourg, Turkey, and Mexico. One-Sample T test statistics were conducted on the statistical significance of the United States 2010 maternal mortality rate and each of the quartile mean rates. The results are included in Figure 3.

Maternal Mortality - One-Sample Test

	Test Value = 11.4					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Mean 4.36 1st quartile	-8.908	8	.000	-7.0444	-8.868	-5.221
Mean 5.60 2nd quartile	-3.617	7	.009	-5.8000	-9.592	-2.008
Mean 6.50 3rd quartile	-2.647	6	.038	-4.8571	-9.346	-.368
Mean 18.07 4th quartile	1.197	5	.285	6.6667	-7.651	20.985

T test generated data attained from the Organization for Economic Co-Operation and Development Health Data Report 2014

Figure 3. Maternal Mortality One Sample T Test

Figure 3 suggests the first three quartile's mean rates were statistically significant to the U.S. overall rate. The top quartile mean rate was 4.36 and a level of significance ($p = .000$). The U.S. maternal mortality rate of 11.4 was significantly higher than both the second and third quartiles' mean rates. The second quartile mean rate of 5.60 compared with the U.S. rate resulted in a significance level of $p = .009$. Likewise, the third quartile 6.50 rate was statistically significant ($p = .038$) to the U.S. rate of 11.4. A final observation of the data in Figure 3 suggests the 11.4 U.S. maternal rate does not rise to a level of statistical significance, $p = .285$ with the fourth quartile mean rate.

Discussion

The focus of this research is to examine the contention by past President's Clinton and Bush that the U.S. health care system is "world-class" and "best in the world" by critically scrutinizing U.S. health status indicators internationally. This research assumes the WHO position that a good and fair societal health care system should produce good rates of health status (infant mortality, maternal mortality, and life expectancy) in comparison with other global societies and within and between different groups domestically. Research findings suggest that the U.S. health status indicators compared with other OECD countries do not rank high and also suggest that health status in unequally distributed within and between groups domestically.

This research suggests the U.S. is not adequate in producing high health status for its population in comparison to other countries. The U.S. consistent ranking in the bottom quartile on all three and then the overall examined health status indicators, and the statistical significance of the differences in infant mortality, maternal mortality, and life expectancy, all demonstrate that the U.S. produces less than adequate health status for its population. At first glance this may be the case- it is the case at second glance and third; however with further examination an even more disturbing pattern is discerned. The overall U.S. health status rates are lower internationally than most of the OECD nation states examined, and , when health status rates between groups within the U.S. are examined it appears that the low rankings may be a result of some groups skewing the overall results such that poor health measures are so pronounced for some groups [while good health indicators obtain in other groups] that the U.S. overall health rates are drawn profoundly downward, leaving the U.S. low in international comparisons.

Although in modern times most health care delivery systems are a mix of the Beveridge and Bismarck models, categorization exists based on the ownership foundation of the system and universality. If the society is universal and has public ownership of most of the means of health care delivery, then it said to have a Beveridge foundation. If the health care delivery system is universal and has mostly private ownership, then it is said to model the Bismarck system. Both systems are foundationally single-payer. As mentioned previously, the United States health care delivery system does not have a foundation of either the Beveridge or Bismarck models. The health care delivery system is mostly privately owned, mostly multi-payer, and does not offer health services to its citizenship universally. The term citizen is utilized in this research to describe a person as a resident, not as a legal definition.

The top nine OECD countries ranked in overall health status based on research findings are all universal in offering citizens access to basic health care services. However, how those services are offered and financed vary from country to country somewhat. The majority of the top nine countries employ the Beveridge model to deliver their health care resources. Since the Beveridge model is utilized by most of the top ranking OECD countries, comprehensive evaluation of three should yield a realistic representation for comparison. Scrutiny three of the top ten overall ranked countries (two from quartile on and one from quartile two) health care delivery systems and lifestyle factors is needed to evaluate if the U.S. reduced health status ranking in comparison is a result of problems associated with delivery of health care resources or some other cause like individual health behaviors. A comprehensive examination of these three OECD ranked countries individual health behaviors and their health care delivery systems in comparison to the U.S. may produce a better understanding of the reasons for the inadequacies of the U.S. health status internationally.

The findings contend the country that produced the overall top health status ranking was Iceland. Iceland would be considered a Beveridge health care delivery system country. Iceland's Health Care Act entitles all its citizens comprehensive medical coverage universally and the health care delivery entities are mostly publically owned and regulated. According to the World Health Organization, Iceland's health care system is financed by 85% taxation and approximately 15% fees at time of service suggesting a patient is required to pay an out of pocket fee at time of service for certain health care resources [over 50% of the out of pocket fees are for pharmaceuticals and dental work] (WHO, 2003) .

However, the fee is based on ability to pay according to government pay for service scale and all means of health care resource delivery, including out of pocket fee for service scales are strictly regulated by the State Social Security Agency (WHO, 2003).

Based on research findings, Iceland produces high health status for its GDP investment. An examination of OECD health care expenditures as a share of GDP in 2007 suggests Iceland spends approximately 9.3% of its GDP on health care resources to provide for all of its citizens (OECD, 2009). The 2007 average for all OECD countries is 8.9%, which ranks Iceland slightly higher than average. In comparison, the United States spends 16.0% of its GDP to provide health care to approximately 85% of its citizens – almost twice as much as the 2007 OECD average (OECD, 2009).

The Iceland citizen can expect access to comprehensive medical services for their investment. Health education and promotion, disease prevention, and public health interventions are all a significant part of Icelandic health care system illustrated by Iceland having a very high vaccination rate. According to Iceland's Health Services Act, primary health care refers to preventive health care measures, medical care performed for the benefit of the healthy, and services for the sick that are not in hospitals. Health care centers are established in order to provide primary care. When possible, a health care center functions in association with a hospital. A health care center is provided for each designated area of the country, and all inhabitants are entitled to seek medical assistance at the health care center or clinic most easily accessible to them at any given time. If possible, The Health Services Act requires that following services be provided at each health care center or in association with it (WHO, 2003):

- general medical services, nursing services, physiotherapy, occupational therapy, on-call services, home visits and ambulance services;
- laboratory and X-ray services;
- specialized medical services, dental care and medical rehabilitation;
- home nursing;
- preventive health care, including prevention of tuberculosis, accidents, venereal diseases and diseases of the eyes and ears;
- health education;
- maternal care, infant and child care and immunizations;
- mass screening and systematic case finding;
- social work and environmental and occupational health.

The glaring difference between Iceland's delivery of primary care resources and the United States system is summarized with the phrase "all inhabitants are entitled to seek medical assistance at the health center or clinic most easily accessible to them at any given time." The U.S. system does not offer mandatory access for all of its citizens to the most accessible health care facility, period. The United States system is not offered or regulated as a right, it is thought of as a privilege.

Opponents of such a system in the United States argue the problem is not the delivery system but the unhealthy behaviors of U.S. citizens in comparison to other countries. Icelandic citizen tend to present unhealthy behaviors, what social epidemiologists consider lifestyle factors (CDC, 2009), similar to that of a U.S. citizen. The CDC recommends for overall health and longevity a population should increase consumption of fruits and vegetables while reducing the consumption of fat, reduce sugar intake, increase exercise, reduce tobacco use, and lose weight.

According to a 2002 study conducted by the Icelandic Nutrition Council, Icelandic people are attempting to consume less fat and eat more fruits and vegetables (WHO, 2003) – not unlike a 2004 USDA report acknowledging the same in the United States. Similarly, both studies reported the healthier consumption habits were disproportionally seen in the higher SES of the population. The same Icelandic report presented data suggesting their average citizen consumes more sugar than any other countries citizen. The average U.S. citizen consumes approximately 31 kilograms of sugar annually in comparison to Iceland's average citizen's consumption of approximately 38 kilograms of added sugar (WHO, 2006). Most health professionals consider added sugar consumption and sedentary lifestyles as the main causes of obesity. The WHO defines individuals with a Body Mass Index (BMI) equal to or greater than 25 as "overweight". Additionally, individuals classified as "overweight" can be further divided into "pre-obese" (with a BMI value of 25-30) and "obese" (with a BMI equal to or greater than 30). The WHO contends a sedentary lifestyle is partly responsible for obesity. The WHO defines sedentary as a lack of moderate physical activity daily for 30 minutes or more (WHO, 2006). Both countries contend over 20% of their citizenship as living a sedentary lifestyle – most alarming is the growing sedentary lifestyle of children (WHO, 2005). This does not bode well for either country's future battle with obesity or the health problems they cause. The Icelandic Nutrition Council reports 60% of women and 70% of men ages 45 – 64 are obese.

The United States reports approximately 45% of women and 55% of men 45 - 64 are obese (CDC, 2010). Both countries report over 20% of their citizenship as living a sedentary lifestyle. Finally, the 2005 tobacco use by population percentage in Iceland was approximately 26% compared to the U.S. rate of 21% (WHO, 2005).

The examination of lifestyle factors between the U.S. and Iceland produced conflicting results if one is to believe it is an individual's unhealthy behaviors that promote reduced health status by comparison. The U.S. citizen tends not to display unhealthy behaviors at a higher rate than the top ranked health status country. The lifestyle factor examination suggests that there may be more to the U.S. citizens reduced health status than just individual unhealthy behaviors. This research does not suggest that these behaviors are not producing lower health status universally; however the examination does not support unhealthy lifestyle factors as the main cause of the U.S. low health status ranking in comparison to Iceland. This research does not examine the economic differences within each population to assess a potential for these discrepancies. Additional research is needed to adequately assess the correlation between lifestyle and economic resources between these countries.

Is Iceland an outlier when it comes to producing high rankings of infant mortality, maternal mortality, and life expectancy, while presenting individual health behaviors similar to the United States? This research continues to try to discredit this assumption by comprehensively examining the second overall ranked OECD country based on health status, Italy. Based on this research findings, Italy ranked second in overall health status and performed in the top quartile with respect to life expectancy/ maternal mortality and in the second quartile on infant mortality.

Not unlike the Icelandic health care delivery system, Italy most closely resembles the Beveridge model. The Italians enjoy guaranteed access to comprehensive health care resources. Italy's National Health Service, or ServizioSanitarioNazioanale, entitles all its citizens comprehensive medical coverage universally and the health care delivery entities are mostly publically owned and regulated. According to the World Health Organization, Italy's health care system is financed by 76% taxation and approximately 24% fees at time of service suggesting a patient is required to pay an out of pocket fee. The fee is based on ability to pay according to government pay for service scale and all means of health care resource delivery, including out of pocket fee for service scales are strictly regulated by the National Health Service (WHO, 2006).

Based on research findings, Italy produces high health status for its GDP investment. An examination of OECD health care expenditures as a share of GDP in 2009 suggests Italy spends approximately 9.0% of its GDP on health care resources to provide for all of its citizens (OECD, 2009). In comparison, the United States spends 16.0% of its GDP to provide health care to approximately 85% of its citizens – almost 80% more than Ital.

The Italian citizen can expect access to basic medical services for their employer's investment. Each employer is required by law to provide basic health care insurance for their workers, if not employed, it is provided by a social security system. Furthermore, many Italians purchased private health insurance policies to allow them access to up-scale hospitals and shorter waiting periods. Health education and promotion, disease prevention, and public health interventions are all a significant part of their health care system illustrated by Italy's having a high health status OECD rank. Italy ranked 3rd in maternal mortality, 4th in life expectancy, and 10th in infant mortality.

Opponents of a universal health care delivery system in the United States argue the problem is not the delivery system but the unhealthy behaviors of U.S. citizens in comparison to other countries. Not unlike Icelandic's, Italians tend to present unhealthy behaviors similar to that of a U.S. citizen. The 2005 restrictive tobacco policies in Italy has not stopped the use by its population, percentage in Italy was approximately 20% compared to the U.S. rate of 21% (WHO, 2005). According to a 2000 study conducted by the Economic and Social Development Department, 18% of Italians daily diet includes basic levels of fruits and vegetables – 15% of Americans daily diet includes basic levels of fruits and vegetables (CDC, 2005). Similarly, both studies reported the healthier consumption habits were disproportionally seen in the higher SES of the population. Italy has a sugar consumption level comparative to the United States. The 2005 per capita of sugar consumption in the U.S was 31kilograms in comparison to Italy's 26 kilograms WHO, 2006). There is a measurable difference in obesity statistics provided by the OECD. In a 2005 report, the study suggests 30.6% of U.S. citizens are obese in comparison to 8.5% of Italians. It needs to be noted that the definition of obese may be cultural and thus skew some findings in comparison. Additional research is warranted to examine if the Italian obesity rate is significantly lower than the U.S. or if the statistics are skewed due to defining obesity differently than the WHO.

The examination of lifestyle factors between the U.S. and Italy produced conflicting results if one is to believe it is an individual's unhealthy behaviors that promote reduced health status by comparison. However, there is one lifestyle factor that needs to be discussed – obesity. The U.S. citizen tends not to display unhealthy behaviors at a higher rate than the second ranked health status country except obesity. Obesity may be a lifestyle factor negative when comparing the United States life expectancy rates with that of Italy. However, it is out of the scope of this research to suggest that the obesity difference between the U.S. and Italy is the main difference in all their health status rankings.

The third overall ranked country by health status based on research findings is Norway.Norway's highly ranked health care delivery system has a foundation in the Beveridge model. According to the Healthcare Economist (2008), Norwegians receive comprehensive medical services through the National Insurance Scheme. It is 100% funded by general taxation [there is no separate fund for health care]. This single-payer, fully tax-funded, universal health delivery system offers citizens an opt-out option. The opt-out option is when a citizen chooses to privately fund his/her health care costs. Some utilize this option to travel outside Norway to seek health care services when the wait for a non-emergency procedure is longer than desired. However, this option is only for the citizen that can pay out-of-pocket for the procedure.

Based on these research findings, Norway produces high health status for its GDP investment. An examination of WHO health care expenditures as a share of GDP in 2008 suggests Norway spends approximately 9% of its GDP on health care resources to provide for all of its citizens (WHO, 2008). In comparison, the United States spends 16.0% of its GDP to provide health care to approximately 85% of its citizens – almost 80% more than Norway. Since the taxation for health care in Norway comes from a 45% general taxation fund, it is impossible to know exactly what an individual pays for access to her/his system. The WHO (2008) suggests Norwegians pay between 8-11% of their incomes for health care insurance.

A Norwegian can expect comprehensive medical services for his/her taxation. They do not pay a co-payment for hospitalization or pharmaceuticals [small co-pay is required for basic out-patient services].

Patients choose their own general practitioner. Overall benefits are very generous including complete dental services free of co-pay for all children 16 years and under and sick pay for adults that are unable to work due to a medical condition (Healthcare Economist, 2008).

According to this research, Norway's system of delivering health care to their citizenship produces high rankings of health status, however as noted previously, is it the system or individual health behaviors that produce high rankings of health status?

Examination of lifestyle behaviors in Norway will allow for this research to critically evaluate the last of the top three OECD health status ranked countries in comparison to the United States to further examine the system vs. behavior debate. The CDC reported in 2007, that the Norway has, not unlike most developed countries; provided nutrition guidelines for its citizens. Norway does not produce data suggesting the daily intake of servings of fruits and vegetables, however it is reported that consumption of fruits and vegetables in Norway is higher among children than adults (Elling and Knut-Inge, 2005). Elling and Knut-Inge (2005) report their findings suggest that increased consumption of fruits and vegetables in Norway is related to higher SES and greater accessibility. The 2005 per capita of sugar consumption in the U.S was 31kilograms in comparison to Norway's 39 kilograms (WHO, 2006). According to the Norwegian Institute of Public Health (2005), over 50% of men and just fewer than 50% of women are considered overweight. Furthermore, the Institute suggested 18-22% of the population was considered obese; in comparison to the 30% of U.S. citizens reported to be obese. Not unlike suggested in the U.S., the Norwegian population obesity epidemic has increased in the last twenty years. The Institute reports that over one in five Norwegians utilized tobacco in their daily lives; which is practically identical to the U.S. statistics. Lastly, the WHO reports approximately one in five citizens of both countries lead what would be considered a sedentary lifestyle free of a routine exercise regime.

These three top performing OECD countries with respect to overall health status all have a structural foundation in the Beveridge health care delivery model. All three offer universal access to health care services to all groups within their populations. All three offer at least basic dental services as a component of their overall health care system. All three utilize a single-payer system to control costs within their systems. All three finance their systems by taxing their citizens and employers for health care. All three have differing forms of co-pays and deductibles.

All three basically have societal ownership of the means of health care production from public hospitals/clinics to salaried health care professionals.

This research finds the United States OECD health status overall ranking, when compared to these three overall high performing OECD countries, as having a statistically significant lower difference. The U.S. does not afford its overall population high health status in comparison to most OECD countries [overall 2010 health status ranking of 28th out of 34countries]. Proponents of a universal national health care system in the United States argue the reduced health status in OECD comparison is due to a discriminatory delivery system that distributes health status unequally. Likewise, opponents of a universal national health care system to replace the world's only foundational entrepreneurial system argues the inequalities lie within the individual's health behaviors. Examination of health behaviors between the top three health status performing delivery systems and the United States produced only a couple of differences in obese statistics that may suggest potential in explaining some of the reduction in health status in the United States in comparison. However, glaring differences in accessibility to health care services also suggest a potential in explaining some of the differences in health status.

Conclusion

This research suggests a viable process to ensure increased health status universally in the United States and increase our health status ranking in the OECD is to reduce the structural discrimination suffered by minority group members. This research is not naïve in believing that all forms of structural discrimination can, or will be eliminated through conscious effort. There are much discrimination that are not being adequately addressed such as access to viable education, environmental racism, overcrowding, inequalities in economic distribution, and health care to name a few that promote less health status. This research contends the most productive starting point in reducing the inequalities in health status is by offering every U.S. citizen the right to a single-payer, comprehensive, and affordable national health care system without regards to economic means based on the top three health status producing OECD nation's tax-based Beveridge delivery systems.

The United States has an existing health delivery system that is the most efficient in the world at meeting the health care needs of its population at the lowest overhead cost at 4% (CDC, 2006) of any delivery system – Medicare.

Medicare is a system that insures the health needs universally in the population group 65 years old and older along with the population Medicare deems to be disabled. Statistics suggest an average U.S. citizen utilizes 85% of her/his total lifetime health care dollars spent in the last 10 years of life (CDC, 2006; Weitz, 2012).

The expansion of Medicare universally throughout the U.S. population would seem to be the most prudent way to attempt to equalize affordable access to health care services. It is a system that is workable within a population group that requires more health care services than any other group in the United States. However, in January 2014, the United States started instituting a hybrid form of potentially universal health care called the Affordable Care Act and future research is needed to ascertain if this hodgepodge health insurance system benefits health status in the United States.

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