Potential Impact of Pandemic Influenza On the U.S. Health Insurance Industry

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TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 Background & Purpose 1

1.2 Scope 2

1.3 Limitations 3

2. EXECUTIVE SUMMARY 6

2.1 Methodology 6

2.2 Assumptions 8

2.3 Results 12

2.4 Scalability 13

2.5 Impact on Industry Surplus Levels 16

2.6 H1N1 18

3. POTENTIAL IMPACT ON TRADITIONAL HEALTH INSURERS 19

3.1 Methodology 19

3.2 Gross Cost Assumptions 20

3.3 Gross to Net Assumptions 21

3.4 Medicare Advantage and Medigap 23

3.5 Reinsurance 23

4. POTENTIAL IMPACT ON SELF-INSURED PLANS 24

4.1 Methodology & Assumptions 24

4.2 Reinsurance 24

4.3 Enterprise Risk Management 25

5. POTENTIAL IMPACT ON HEALTH CARE PROVIDERS 26

5.1 Hospital Scenario Assumptions 26

5.2 Alternate Care Facilities 33

5.3 Deferred Elective Care 38

5.4 Outpatient Scenario Assumptions 38

6. PANDEMIC SCENARIO ASSUMPTIONS 41

6.1 Mortality 41

6.2 Morbidity 43

6.3 Case Distribution by Provider 46

6.4 High Risk Populations 48

6.5 Case Distribution by Risk Class 53

7. OTHER ISSUES 55

7.1 Geography 55

7.2 Mitigation and Intervention 56

7.3 Supply Chain Disruption 56

7.4 Provider Regulatory Issues 57

7.5 Health Insurance Regulatory Issues 58

7.6 Expenses 59

7.7 Other Financial Risks 60

7.8 Business Continuity 61

7.9 Communication 62

8. CONCLUSIONS 63

BIBLIOGRAPHY 65

EXHIBITS 69

EXHIBITS

Exhibit 1—Estimated Costs

Page 1—Traditional Health Insurers Estimated Net Payer Costs as of 2010

Page 2—Traditional Health Insurers Costs by Provider and Risk Class

Page 3—Traditional Health Insurers Case Distribution by Provider and Risk Class

Page 4—Self-insured Estimated Net Payer Cost as of 2010

Page 5—Self-insured Costs by Provider and Risk Class

Page 6—Self-insured Case Distribution by Provider and Risk Class

Page 7—Total System Estimated Gross Costs as of 2010

Page 8—Total Costs by Provider and Risk Group

Exhibit 2—Provider Scenario Assumptions

Page 1—Capacity and Staffing by Provider

Page 2—Provider Charges By Scenario, Provider, and Risk Group

Pages 3 & 4—Provider Utilization by Week

Page 5—Provider Case Distribution

Page 6—Provider Case Distribution Graph

Page 7—Alternate Care Facility Costs

Page 8—Estimated Value of Deferred Elective Care

Exhibit 3—Pandemic Scenario Assumptions

Page 1—Mortality Distribution

Page 2—Morbidity Distribution

Page 3—Case Distribution by Provider Type

Page 4—Case Distribution by Risk Class

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Potential Impact of Pandemic Influenza On the U.S. Health Insurance Industry

1. INTRODUCTION

Actuaries quantify the economic consequences of risk and explore opportunities for risk mitigation, diversification and/or retention. The Society of Actuaries (SOA) is an education, research and professional organization dedicated to serving the public and its members. The SOA published a report, "Potential Impact of Pandemic Influenza on the U.S. Life Insurance Industry," in May 2007.[1] In the interim, the specific threat of H5N1 bird flu appears to have receded, and other crises and fears have absorbed the public consciousness, foremost among them a novel strain of infectious H1N1 swine flu.

1.1 Background & Purpose

The purpose of this project is to create reference material to educate actuaries and other risk management professionals as to the potential impact of pandemic influenza on the U.S. health insurance industry, primarily traditional health insurers and self-insured companies. The goal is not to try to predict the impact of a particular pandemic, but to learn from the past and, to the extent possible, apply that information to today in order to better understand the constraints of the current system. The information developed is intended to serve as a resource for exploring the financial consequences to the U.S. health insurance industry when sustained human-to-human transmission of pandemic influenza or other infectious disease occurs.

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[1] Toole, Jim. "Potential Impact of Pandemic Influenza on the U.S. Life Insurance Industry," http://www.soa.org/research/life/research-impact-pan-influ-life-ins.aspx, May 2007.

1.2 Scope

The U.S. health sector encompasses multiple payers and many different lines of business. Payers include traditional health insurers, self-insured companies, public sector (Medicare and Medicaid), hospitals (in the form of unreimbursed care), insured individuals (in the form of cost sharing) and the uninsured.

The primary focus of this analysis is major medical costs for traditional health insurers (fully insured large group, small group and individual plans) and self-insured companies. An estimate of the total major medical costs resulting from a pandemic across all payers for the entire population has also been performed. Although all major medical costs are presumed captured by this methodology, the analysis does not separately allocate the net additional charges by payer (public sector, hospital, individual).

Other health insurance coverages are excluded from this analysis. Long-tail coverages such as disability income and long-term care are not included in this estimate. Short-term increases in mental health costs have not been explicitly modeled; health insurance premiums can be re-priced for increases in demand for mental health services beyond one year. Voluntary benefits are typically paid by individuals and include a variety of niche coverages including accidental death, critical illness, dental, hospital income and vision. Other than hospital income, these coverages typically do not have an exposure directly associated to pandemics. Writers of hospital income can use the information and individual company spreadsheet tool provided in this research to quantify their own exposure to pandemic influenza.

Some important factors affecting the full economic impact of a pandemic on the insurance industry are not within the scope of this research. Some of these considerations include, but are not limited to, the impact of a pandemic on interest rates, asset values, potential liquidity and disintermediation risks, and the

ability to re-price short-term health contracts. While reinsurance is not a significant factor in the health insurance industry overall, some traditional health insurers and self-insurers place a greater reliance on reinsurance than others. Users should take steps to ensure that the strength of counterparty relationships have been properly considered in using the results of this model.

Pandemic preparation also assists in "all hazard" business continuity preparations for other extreme events. The level of business continuity planning will affect a company's ability to weather a pandemic, perhaps materially. A discussion of business continuity and disaster recovery planning at the individual company level is beyond the scope of this paper.

1.3 Limitations

Use of this report is limited to the purpose described herein and subject to the following limitations. This research has been prepared to assist the user in understanding the potential implications of a pandemic on the U.S. health insurance industry. The SOA does not endorse the use of this work to predict the impact of a pandemic on a particular company or group. Parties who are interested in applying this research to individual companies may use the spreadsheet tools on the SOA website.[2] The research does not reflect any changes due to health care reform. Users should closely examine the characteristics of their unique situation and use judgment in developing and applying assumptions regarding pandemic scenarios and company-specific assumptions.

Assumptions that drive the model results have been developed from published literature, industry data and informed judgment. These assumptions include and are not limited to:

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[2] http://www.soa.org/research/research-projects/health/default.aspx.

Health Insurance Industry Assumptions

- Total exposure and distribution by age
- Subscriber out–of-pocket costs
- Impact of taxes

Provider Assumptions

- Hospital capacity and utilization by level of care
- Adjustments to baseline capacity and utilization based on pandemic scenario
- Alternate care facilities (ACFs) and charges
- Potential savings from deferring elective care
- Charge assumptions by provider, age and risk class

Pandemic Scenario Assumptions

- Morbidity and mortality rates and their distribution by age
- Mortality ratio of insured versus general population
- Adjustments of insured versus general population for utilization and risk class
- Distribution of cases by risk class and care provider
- Wave duration

Since the potential virulence of pandemic influenza historically varies widely, it is important to consider a range of outcomes rather than assume a single point estimate. Two deterministic pandemic scenarios reflecting different degrees of virulence were selected: a moderate scenario (comparable to 1957) and a severe scenario (comparable to 1918). They are intended to serve as reference points to bracket a broad range of, but not necessarily all, potential outcomes. A scenario calculating the annual impact of seasonal influenza was also prepared for model validation purposes.

The moderate and severe naming convention provides consistency with Centers for Disease Control and Prevention (CDC) pronouncements but does not do

justice to the potential impact of pandemics of this magnitude. In an average year, seasonal influenza claims roughly 36,000 lives in the United States. The moderate scenario assumes 209,000 deaths, and the severe influenza pandemic scenario anticipates 1.9 million lives will be lost. Later in the paper other characteristics of these scenarios will be developed.

Similar to deterministic scenarios used in cash flow testing for life insurers, probabilities have not been ascribed to the selected scenarios. There is no way of determining the virulence of a pandemic or its distribution patterns by age until it occurs. It is assumed in the model that all areas of the United States are effectively hit at the same time. No allowance has been made in the model to account for potential variance in timing or virulence of strain by region.

This analysis relies heavily on published and unpublished sources of aggregate industry data. The economic impact estimates derived herein may vary under different data sources or assumptions. Using different assumptions will produce different results. Individual companies that replace aggregate industry data with company-specific data may avoid some of the shortcomings inherent in using aggregate industry estimates. Companies that use this research and accompanying spreadsheet tool to perform their own risk analysis are encouraged to carefully review the assumptions and methodology contained herein with the assistance of a qualified actuary to ensure appropriate implementation.

2. EXECUTIVE SUMMARY

The purpose of this project is to create reference material to educate actuaries and other risk management professionals as to the potential impact of pandemic influenza on the U.S. health insurance industry, primarily traditional health insurers and self-insured companies. The goal is not to try to predict the impact of a particular pandemic, but to learn from the past and, to the extent possible, apply that information to today in order to better understand the constraints of the current system. The information developed is intended to serve as a resource for exploring the financial consequences to the U.S. health insurance industry when sustained human-to-human transmission of pandemic influenza occurs. By better understanding the risks, better decisions can be made during a turbulent period when response time costs lives.

2.1 Methodology

This research is primarily interested in the impact of a pandemic on a particular class of payers, but the actions, reactions and responses of consumers, providers and even other payer classes under the extraordinary challenges and stresses presented by a pandemic will impact each of the other stakeholders in the system. While no single stakeholder or payer class operates in isolation, this research is attempting to quantify the cost of a pandemic to the private health insurance industry (traditional health insurers and self-insured companies) and, by inference, the insured population.

There are two ways of attacking a problem of this sort: “top-down” and “bottom-up.” Using comparable scenario assumptions and access to adequate information, both methods should yield comparable results, offering some degree of validation.

2.1.1 Top-Down

A top-down approach would first estimate the total direct health care costs of a pandemic and then allocate those costs to different payers. If one assumes that health care resources are distributed to consumers in the same manner during a pandemic as they were prior, allocations of costs to different payer classes would be based on their percentage share of current health care expenditures. According to 2008 statistics from the Centers for Medicare and Medicaid Services (CMS) Office of the Actuary,[3] about 52 percent of U.S. health care costs are paid for by the private sector. The remaining 48 percent of health care costs are funded by the government, primarily in the form of Medicare and Medicaid.

Approximately 18 percent of U.S. health care expenditures are funded through traditional health insurance; some 15 percent are paid for by businesses that self-insure. Twelve percent are paid by individuals, including out–of-pocket costs from the insured and payments by the uninsured. The remaining 7 percent of private sector expenditures are funded by philanthropy and other sources. All things being equal, this would imply the health insurance industry would bear approximately 33 percent of the burden of the total population's direct health care costs during a pandemic.

2.1.2 Bottom-Up

The approach for this report will be to construct a bottom-up cost estimate consisting of granular assumptions aggregated to produce a potential cost for U.S. health insurers for a specific set of assumptions. A "bottom-up" approach attempts to estimate costs based on the exposure of the insurance industry (i.e., insureds by age), health care utilization by provider and cost of services for different provider classes. The software used is a deterministic spreadsheet approach. This approach enables us to perform "what if" analysis, and the resulting model can be used by others to explore their own questions.

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[3] http://www.cms.hhs.gov/NationalHealthExpendData/downloads/PieChartSourcesExpenditures2008.pdf.

Several models for estimating the economic impact of pandemic influenza are described in the literature. Perhaps most influential is a paper used to evaluate the effectiveness of vaccination intervention strategies written by a team led by Dr. Martin Meltzer of the CDC.[4] Although his approach to evaluating the economic aspects of vaccination strategies was an established one, applying it to the problem of pandemic influenza was novel. As H5N1 began to emerge, Dr. Meltzer's seminal work went on to influence nearly all others who subsequently worked on the problem.

In April 2007, Dr. Noelle-Angelique Molinari and another team of researchers at the CDC published a paper quantifying the cost of seasonal influenza in the United States.[5] In the process, the researchers updated many of Dr. Meltzer's assumptions and expanded the methodology to include other assumptions needed for the updated objective. Dr. Molinari's work was reviewed by Dr. Meltzer, and her paper formed the basis for validating this model with seasonal influenza costs.

2.2 Assumptions

The assumption set attempts to estimate the short-term interaction of stakeholder behaviors and system constraints during a specific pandemic scenario. Traditional health insurers and self-insured companies are often aggregated for statistical purposes in the United States. They have been modeled separately in this research to highlight the different risks and exposures they face under the

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[4] Meltzer, Martin et al. "Economic Impact of Pandemic Influenza in the United States: Priorities for Intervention." *Emerging Infectious Diseases*. September–October 1999;5(5):659–671. This paper did not include all the assumptions used to create the model; a background paper was produced on April 30, 1999 with supporting detail which can be found at: www.cdc.gov/ncidod/EID/vol5no5/meltzerback.htm.

[5] Molinari, Noelle-Angelique M. et al. "The Annual Impact of Seasonal Influenza in the U.S.: Measuring Disease Burden and Costs." *Vaccine*. 2007;25(2007):5086–5096.

stress of extreme events. Hopefully, the results provide insight into potential responses and solutions.

In order to arrive at these conclusions, assumptions were first developed with regard to specific pandemic scenarios. Demand for medical services was then estimated arising from these scenarios. The capacity of U.S. health care providers to deliver care under the conditions specified was evaluated, and the estimated cost for services provided quantified. These results were then analyzed in conjunction with information about the exposures of health insurers.

2.2.1 Pandemic Scenario

The scenarios chosen are intended to highlight the stresses faced by the U.S. health care system while attempting to predict the behaviors of different stakeholders during an event that is without precedent in modern times. Pandemic scenario assumptions include overall population morbidity and mortality rates and their distribution by age. Additional assumptions regarding the distribution of cases by care provider (outpatient, hospital or ACF) and risk class (high or low) were developed. The assumed duration of the pandemic is also an important element in estimating case distribution and the constraints of provider capacity.

Two scenarios were developed by the U.S. Department of Health and Human Services (HHS): a moderate scenario based on 209,000 deaths and a severe scenario based on 1.9 million deaths. These are comparable to the death rates experienced in the 1957 and 1918 pandemics respectively, grossed up to recent population estimates.[6] These estimates do not include the potential impact of current interventions (medical or otherwise) that were unavailable during

[6] U.S. Department of Health and Human Services. "HHS Pandemic Influenza Plan." November 2005, p. 18. www.hhs.gov/pandemicflu/plan/pdf/HHSPandemicInfluenzaPlan.pdf.

previous pandemics.[7] This is an assumption that individuals and firms will want to carefully consider, as opinions vary widely regarding the effectiveness of medical interventions, the stability of just-in-time supply chains and overall responsiveness of an already stretched health care system.

The distribution of deaths by age is another important driver of total charges, as well as the allocation of costs by payer. Two distribution patterns were developed based on historical data and judgment: a "U" curve (deaths primarily at very young ages and at ages 65-plus) and a "V\" curve (deaths at the very young ages and a spike at ages 20–40). The "U" distribution was applied to the moderate scenario, while the "V\" distribution was applied to the severe scenario. A third "VV" scenario was developed based on the "U" and V\" curves, and serves as a placeholder for users who wish to model their own distributions.

The morbidity distribution of influenza by age is not as well documented as the mortality distribution by age. The distributions of cases by care provider and risk class are important drivers impacting both cost and capacity; these assumptions vary by age and virulence. Accordingly, demand for provider services varies by scenario. Morbidity for the moderate and severe scenarios was based on HHS assumptions. Severe scenario morbidity was adjusted for the ratio of assumed severe to moderate scenario mortality. Morbidity distribution patterns by age were developed in a similar manner.

Scenario duration is the length of time assumed for the number of cases estimated in the scenario to occur. The shorter the duration, the more cases present at the same time. This approach toward duration assumes the "short,

[7] Almost all "then versus now" comparisons are encouraging, in theory. The weight of evidence suggests that if a novel virus as pathogenic as the 1918 strain were to reappear today, a substantial proportion of the potential 1.9 million fatalities could be prevented with aggressive public health, technologic and medical interventions. See Morens, David and Anthony Fauci. "The 1918 Influenza Pandemic: Insights for the 21st Century." *The Journal of Infectious Diseases*. April 2007, p. 1025.

sharp shock" of a single wave pandemic or the main blow from a severe first wave. This makes sense from the standpoint of solvency testing, and sidesteps the many unknowns surrounding the manufacture and large scale distribution of vaccines and antivirals. While the cost of drugs has been implicitly considered in provider charges, the possibility of drug and vaccine makers being able to respond with novel cures within the assumed duration of the first wave of the pandemic has not been explicitly considered.

2.2.2 Provider Assumptions

Provider assumptions can be broken broadly into capacity and charges. Health service providers have been separated into three broad classes: outpatient, hospital and ACF. The capacity of medical providers to see patients, given the effect of a pandemic on staffing, has been explored. The bed capacity of hospitals as well as their ability to both expand capacity and defer noncritical care to respond to increased demand has been factored into the analysis. That said, hospital beds are finite in number, as are staff.

At some level of demand, hospitals will not have adequate capacity. Intensive care unit (ICU) demand in excess of available ICU beds is assumed to "step down" to non-ICU beds and receive non-ICU charges. Based on discussions with experts, simulation exercises, and a review of extant research, hospital demand in excess of bed capacity has been presumed to be available in the form of ACFs.

Different providers and levels of care incur different charges. Charges appropriate to the care delivery setting have been estimated and are assumed paid to the provider. Charge assumptions for different provider settings were developed based on published research and industry data. This research makes the assumption that some type of alternate care facility will be developed in

communities, and a mechanism will be found for charging for the level of care provided in that setting.

The effect of consumer behavior on health care demand during a pandemic must also be considered. At some point, elective care will be deferred as individuals avoid seeking treatment as provider facilities will be seen as gathering places for the ill. This has been observed in other extreme events, and has the short-term effect of driving down both insurer costs and hospital revenues.

2.2.3 Health Insurance Industry Exposures

Broadly, the U.S. payer mix includes traditional health insurers, self-insurers, public sector and out-of-pocket expenditures by insured and uninsured individuals. Providers also bear a burden in the form of charity care and unreimbursed charges. Different payers will face different liabilities depending on a pandemic's virulence and distribution by age. A pandemic that disproportionately affects the elderly will have a greater impact on Medicare, while a pandemic that impacts working age individuals will disproportionately impact traditional health insurers, self-insurers and the uninsured.

Assumptions for fully insured plans and self-insured plans were assumed to be largely similar, the primary difference being the number of insureds (100 million traditional versus 75 million self-insured) and employee out-of-pocket costs. Base population assumptions were adjusted for the assumed risk characteristics of the fully insured population, taking into account assumptions regarding the relative ratios of utilization, incidence and death for the insured population versus the general population.

2.3 Results

Gross costs by provider under different pandemic scenarios were calculated and then adjusted for the cost of care provided in ACFs and credited with savings

arising from deferred elective care. Estimated costs were then brought forward with inflation to 2010. These items, net of employee out-of-pocket costs and the impact of tax loss carry-forwards, were used to estimate net costs for fully insured plans presented in Table 1. A similar approach was taken for self-insured companies, presented in Table 2.

The total system estimated gross costs are presented in Table 3. Because this represents the aggregate costs to all payers, there is no adjustment for taxes or out-of-pocket costs. Netting fully insured and self-insured plan costs from the total leaves costs expected to be borne by the public sector (taxpayers), providers (charity and uncompensated care) and individuals (out-of-pocket and uninsured).

2.4 Scalability

The results of this research show potential costs for traditional health insurers in aggregate. Estimating potential impact for a particular health plan is a relatively straightforward exercise as results are fully scalable. All things being equal, a traditional health insurer with 5 million members would expect to incur 5 percent of the total costs for traditional health insurers (5 million / 100 million). While this approach would typically provide an adequate estimate, for a more tailored result reflecting an insurer's particular cost structure, demographic distribution and product mix, users are encouraged to use the company-specific spreadsheet tool to customize the results.

Table 1
Traditional Health Insurance Estimated Net Costs as of 2010
(Millions of Dollars)

	Gross Cost as of 2003 (Millions)		
	Seasonal	Moderate	Severe
Outpatient	$ 986	$ 3,833	$ 3,258
Hospital	1,669	4,924	28,213
Death	148	1,714	29,033
Gross Cost	2,802	10,471	60,504
ACF Cost Allocation	$ -	$ -	$ 795
Deferred Elective Care Allocation	$ -	$ 2,338	$ 18,986
Net 2003 Payer Cost	$ 2,802	$ 8,133	$ 42,314
Inflation 2003–2010	60.6%	60.6%	60.6%
Est 2010 Gross Cost	$ 4,500	$ 13,060	$ 67,947

Adjustment for Employee Out-Of-Pocket as of 2010 (Millions)

	Cases by Provider			Subscriber
	Seasonal	Moderate	Severe	OOP Pmnts
Outpatient	3,466,638	13,495,400	12,031,870	$ 50
Hospital	72,861	220,744	1,754,926	4,000
Deaths	1,582	20,261	458,997	4,000
OOP Payments	$ 471	$ 1,639	$ 9,457	*OOP x Cases*
as % of Total	10.5%	12.5%	13.9%	
Net Pre-Tax Cost (Millions)	$ 4,029	$ 11,421	$ 58,490	
Net After-Tax Cost	$ 2,619	$ 7,424	$ 38,018	
Diff. from Seasonal		$ 4,805	$ 35,399	

Table 2
Self-insured Plans Estimated Net Costs as of 2010
(Millions of Dollars)

	Gross Cost as of 2003 (Millions)		
	Seasonal	Moderate	Severe
Outpatient	$ 740	$ 2,875	$ 2,444
Hospital	1,251	3,693	21,160
Death	111	1,286	21,775
Gross Cost	2,102	7,853	45,378
ACF Cost Allocation	$ -	$ -	$ 597
Deferred Elective Care Allocation	$ -	$ 1,753	$ 14,239
Net 2003 Payer Cost	$ 2,102	$ 6,100	$ 31,735
Inflation 2003–2010	60.6%	60.6%	60.6%
Est 2010 Gross Cost	$ 3,375	$ 9,795	$ 50,960

Adjustment for Employee Out-Of-Pocket as of 2010 (Millions)

	Cases by Provider			Subscriber
	Seasonal	Moderate	Severe	OOP Pmnts
Outpatient	2,599,977	10,121,551	9,023,903	$ 40
Hospital	54,647	165,555	1,316,195	2,500
Deaths	1,188	15,197	344,248	2,500
OOP Payments	$ 244	$ 857	$ 4,512	*OOP x Cases*
as % of Total	7.2%	8.7%	8.9%	
Net Pre-Tax Cost (Millions)	$ 3,132	$ 8,938	$ 46,448	
Net After-Tax Cost	$ 2,036	$ 5,810	$ 30,191	
Diff. from Seasonal		$ 3,774	$ 28,156	

Table 3

Total System Estimated Costs as of 2010

(Millions of Dollars)

	Gross Cost as of 2003 (Millions)		
	Seasonal	Moderate	Severe
Outpatient	$ 3,146	$ 13,270	$ 10,354
Hospital	5,442	16,921	111,066
Death	1,932	12,132	105,171
Gross Cost	10,519	42,324	226,592
ACF Cost Allocation	$ -	$ -	$ 2,172
Deferred Elective Care Allocation	$ -	$ 11,649	$ 48,115
Net 2003 Payer Cost	$ 10,519	$ 30,674	$ 180,649
Inflation 2003–2010	60.6%	60.6%	60.6%
2010 Gross Cost	$ 16,892	$ 49,256	$ 290,082
Diff. from Seasonal		$ 32,365	$ 240,826
% of National Health Expenditures	0.6%	1.9%	11.2%
Deaths	42,005	213,045	1,944,149
Hospitalizations	298,226	889,388	7,912,135

2.5 Impact on Industry Surplus Levels

The identification of health insurance industry risk-based capital (RBC) and surplus levels is a complex exercise. Because annually renewable health

insurance is not a capital intensive exercise, companies do not generally announce the statistics in the same manner as life companies do. Public life insurance companies trade at a multiple of book value while health companies trade at a multiple of earnings, making the capitalization levels of less importance to the financial sector. In the marketplace, life companies need higher ratings (more capital) to sell their products, whereas health companies can and do compete effectively in the marketplace with ratings below "A-". Similar ratings would make it difficult for life insurance companies to compete in comparable markets.

Because of these gaps, creating surplus and RBC figures from publicly available information is not a clean calculation. The research focuses on the impact of a pandemic on major medical, while for many health companies this is not the only line of business they write. Further complicating the picture, life and property and casualty companies also write significant amounts of major medical coverage, and there are health insurance companies that do not file on NAIC blanks (e.g., California HMOs and Minnesota public health companies).

With these caveats, a very broad estimate of the capital and surplus backing major medical is approximately $80 billion. A ballpark estimate of RBC for non-profit health insurers is approximately 750 percent, while the RBC of for-profit health insurers might be reasonably estimated at approximately 500 percent. These RBC figures show the health industry to be well capitalized versus the life industry, which held approximately 400 percent of RBC in surplus in 2005. According to the life pandemic research, estimated claims of $64.3 billion in the severe scenario represented a reduction of approximately 25 percent of the industry's capital.[8] As estimated in this paper, net claims of $38.0 billion for the traditional health insurance industry represent almost 50 percent of the industry's capital, significantly more than the life industry under similar circumstances.

[8] Toole, Jim, op. cit.

However, this leaves the industry at approximately 375 percent of RBC for nonprofits and 250 percent of RBC for for-profits, demonstrating that the industry as a whole is capable of withstanding the blow of even a severe pandemic.

2.6 H1N1

As this report was being finalized, the United States was being swept by a novel H1N1 influenza virus. The system response to this challenge will bear out or refute some of the assumptions made in this research, including capacity questions. Other areas will come to light that have not specifically been considered in preparing this research.

The pandemic scenarios developed for this report are not intended to specifically demonstrate the impact of the H1N1 or any other particular influenza strain. Reporting through the end of 2009 indicates that while the attack rate of H1N1 may be higher than that used in the model, the severity (rate of hospitalization and deaths) is less than the moderate scenario (and possibly less than the seasonal scenario) presented herein. It is the rate of hospitalizations and deaths by age group that drives scenario costs, not the attack rate. Thus, the moderate scenario in this report might serve as the high end of an expected range for costs attributable to the 2009–2010 flu season (seasonal and H1N1 pandemic) based on information currently available. Individuals and groups who are interested in cost estimates using assumptions geared more specifically to expectations of the H1N1 strain are encouraged to modify the appropriate scenario assumptions using the individual company spreadsheet tool. The spreadsheet has been designed to flexibly accommodate the user's desired adjustments.

3. POTENTIAL IMPACT ON TRADITIONAL HEALTH INSURERS

This section describes the calculation of the impact of a pandemic on traditional health insurers, including methodology, assumptions driving the calculation of gross costs, and the adjustments to arrive at net costs for health insurers. The impacts of Medicare Advantage and reinsurance on results are also discussed.

3.1 Methodology

The calculation of gross costs by provider is based on estimates of provider charges and capacity by scenario developed in Section 5. The hospital capacity and gross costs are driven by pandemic scenario assumptions, discussed in Section 6 of the report. The chief scenario assumptions include scenario duration, mortality and morbidity by age, case distribution by provider and relative proportion of high risk to low risk populations by age.

Total deaths and influenza cases are estimated along with their distribution by age. Cases are further split by provider class and risk class. These calculations are shown in Exhibit 1, Page 3. Costs for the scenario as of 2003 are then calculated by age group and summarized by intensity of care (outpatient, hospital and death) and risk class (low, high) in Exhibit 1, Page 2. Gross costs by scenario and provider are then summarized on lines (1) – (4) of Exhibit 1, Page 1.

Gross costs are then adjusted by additional charges resulting from ACFs and credit for estimated savings resulting from deferred elective care. The development of these adjustments is discussed in Section 5 of the report and shown in Exhibit 2, pages 7 and 8. Gross costs as of 2003 are then modified to arrive at net costs as of 2010, taking into account employee out-of-pocket costs, medical inflation and tax value of net operating losses.

3.2 Gross Cost Assumptions

This section describes additional assumptions used to arrive at gross costs for the insurance industry, including exposures, population adjustment factors and ICU step-down percent.

3.2.1 Exposures

According to the Kaiser Family Foundation,[9] as of 2008 the approximate number of non-elderly is 265 million people. Subtracting 45 million uninsured, this leaves approximately 220 million non-elderly individuals with insurance. Of these, this research has estimated a distribution of approximately 100 million fully insured, 75 million self-insured, and 45 million publicly insured individuals (Medicaid, etc.). For simplicity and conservatism, the fully insured figures have been rounded high.

Distribution by age for fully insured and self-insured plans is not readily available. This research assumes a distribution of insureds in a manner identical to approximately 273 million individuals in the general population aged 0 to 69; traditional insurers and self-insured plans utilizing the modeling tool should base it on their own distribution. Rather than estimating declining percentages of working population for quinquennial age bands 65 to 80+, the distribution of insureds 65 to 69 was assumed to reflect the general population (with no retirements), with no insureds assumed for ages 70+.

3.2.2 Population Adjustment Factors

The population adjustment factors are used to adjust general population assumptions to better reflect the assumed utilization and risk characteristics of the fully insured population. Calculation of gross costs reflects modification to base population assumptions for the insured versus population mortality ratio,

[9] Kaiser Commission on Medicaid and the Uninsured/Urban Institute Analysis of 2009 ASEC Supplement to the CPS. "Health Insurance Coverage of the Nonelderly Population 2008." http://slides.kff.org/chart.aspx?ch=1213.

morbidity utilization and risk adjustments, and the assumed percentage of deaths occurring in the hospital. Each of these assumptions is discussed in more detail in Section 6 under “Pandemic Scenario Assumptions.”

3.2.3 ICU Step-Down Percent

The projections calculate overall hospital bed capacity as well as ICU bed capacity. Demand in excess of supply “steps down” to the next level of care. Excess hospital demand steps down to ACF sites and is developed on Exhibit 2, Page 7. Excess ICU demand steps down to regular hospital beds. The ICU step-down percent reflects the percentage of individuals requiring ICU care for which there is not adequate capacity at some point during the wave.

As a simplifying assumption, this research assumes all ICU cases are high risk (alternatively, ICU cases receive high risk levels of charges). Cases that exceed ICU capacity are stepped down from high risk to low risk hospital cases, the assumption being that these individuals will receive standard levels of care in a standard hospital bed.

The ICU step-down percent is derived from Exhibit 2, Page 3. Excess ICU demand for the duration of the wave is calculated in the Total Column, Line 33. The total ICU demand for the duration of the wave is calculated on Line 32. Dividing Line 33 by Line 32 yields the percentage of ICU patients that need to be stepped down. This factor is applied as a decrement to the number of hospital high risk cases. Assumed scenario deaths are not affected by the step-down adjustment.

3.3 Gross to Net Assumptions

This section describes the various assumptions that adjust the gross cost calculations to the net costs, including inflation, cost sharing and the impact of taxes.

3.3.1 Inflation

The claims data used to estimate provider charges in the report was effective 2003. The cumulative inflation used of 60.6 percent is based on CMS data from the Office of the Actuary and reflects an average assumed medical inflation rate of 7 percent from 2003 to 2010. The intent of this adjustment is to bring gross costs forward to a pandemic date of 2010. This presumes that inflation of services for influenza has increased at a rate similar to the overall medical inflation rate.

3.3.2 Cost Sharing

The impact on insurers has been reduced for the effect of cost sharing. Out-of-pocket costs per outpatient visit, hospitalization and death have been calculated separately based on broad estimates from Kaiser Family Foundation research on employer health benefits.[10] Cost sharing as a percent of claims has been presented to gauge the overall reasonableness of the assumptions. Individual companies utilizing this tool should replace these figures with estimates appropriate for their book of business.

3.3.3 Impact of Taxes

Claims are deductible from insurer income. To the extent operating losses due to a pandemic claim surge exceed current income, the impact will be ameliorated by the tax treatment of the resulting net operating losses (NOLs).

A corporate tax rate of 35 percent has been assumed in this analysis; the tax positions of individual companies will be different. The NOL adjustment assumes a going concern (tax deductions are of less value in bankruptcy); NOLs are also of value in a sale or merger. Although there may be companies that are not able

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[10] Kaiser Family Foundation. "Employer Health Benefits: 2008 Summary of Findings." September 2008. http://ehbs.kff.org/pdf/7790.pdf.

to make use of their NOLs, the paper assumes that the industry as a whole will be able to do so. The value of the NOL is calculated on an undiscounted basis. Individual companies using this methodology would need to make an appropriate adjustment for the time value of money. Because some insurers are nonprofit, tax savings are overstated in aggregate.

3.4 Medicare Advantage and Medigap

Traditional health insurers also bear risk for Medicare Advantage and Medigap plans. Based on the types of pandemic scenarios being modeled for this research, the net amount of exposure relative to the fully insured business was *de minimis*. This results from various factors, primary among them the credit resulting from the deferral of elective care by the elderly versus the lower average cost for influenza care at this age group. Additionally, assuming a 1918 "V\" curve, the number of cases over 65 is very low, although the same phenomenon was observed using the hypothetical "VV" distribution by age.

3.5 Reinsurance

Reinsurance for traditional health insurers is typically not material. The large plans, which control the bulk of the regional and national markets, choose to retain the vast majority of their major medical risk. Smaller insurers, which utilize reinsurance capacity, will wish to take reinsurance into account in modeling their particular blocks of business. Users of this report will need to examine their risk profile to determine the reinsurance considerations appropriate to their situation.

4. POTENTIAL IMPACT ON SELF-INSURED PLANS

Self-insurers are typically large- and medium-sized employers who, for various reasons, choose to assume the risk of providing employee health benefits rather than purchasing insurance from a traditional insurer. With the assistance of advisors, employers design and directly fund benefits, renting access to provider networks and paying service providers to administer their programs for them. In a sense, a self-insured company functions as a mini insurer but without the same level of regulatory oversight or capital requirements as a health insurer.

4.1 Methodology & Assumptions

The methodology used to model self-insured plans is identical to traditional insurers, described above. The assumptions used in modeling self-insured plans are the same, with two exceptions: the size of the population and employee out–of-pocket costs. Modeled population is 75 million covered individuals, distributed in a manner described previously. Based on the Kaiser study, employee out-of-pocket costs are somewhat lower than traditional insurance, reflecting plan types (no individual or small group self-insured plans, which tend to have higher out-of-pocket costs) and different benefit designs of self-insured plans versus traditional plans.

4.2 Reinsurance

Many larger self-insured plans choose to retain all of the major medical risk. However, many small to mid-size self-insured plans purchase stop loss specific and aggregate reinsurance. However, the results of this research suggest as a general rule that neither specific nor aggregate stop loss limits would be pierced. While some smaller plans may have specific limits under $50,000, the majority of self-insured plans have specific limits of $100,000 or more. In our model, the average gross cost per hospitalization (before inflation, out-of-pocket and NOL) is under $25,000, and an average gross cost per death under $100,000. Although there will no doubt be some specific reimbursements to plans on a case-by-case

basis, it seems reasonable to provide estimates as to total costs without regard to reflecting adjustments for potential reimbursements from reinsurers.

Aggregate stop loss limits are typically set at 120 percent to 125 percent of expected claims. For the given severe scenario, for a plan with 10,000 members, they would expect to incur less than $6.5 million of gross influenza claims. Assuming $6,000 in health care costs per capita, their annual expected claims would be in the $60 million range. Thus, the claims would be approximately 10 percent of expected and not pierce the limit. However, because of the sensitivity of morbidity, mortality and costs to demographics, individual plans would be advised to examine their reinsurance limits and make appropriate adjustments.

4.3 Enterprise Risk Management

The range of risks that a self-insured health plan poses to an employer has not been examined in actuarial literature from an enterprise risk perspective. Many plans have exposures across state lines, which will complicate communication, administration and response. Counterparty risk is a concern: third party administrators, including health insurers, help administer the claims of these companies, and provider networks are rented for employees. The large number of small businesses that service this sector make it difficult to draw broad conclusions.

It is important that self-insured plans examine the full range of risks posed by a pandemic, and make sure that the risks the company retains are acceptable and within a company's stated risk tolerances. Self-insurers and their service providers should consider what types of liabilities might emerge from a pandemic, including strain on cash flow and cash reserves during a period where the economic impacts are already a significant challenge.

5. POTENTIAL IMPACT ON HEALTH CARE PROVIDERS

The purpose of this section is to consider the impact of a pandemic on provider capacity and estimate service charges by age, provider type and risk class. Bed capacity will be affected by both the elasticity in hospital beds and consumer decisions to defer elective care. Reduction in staffing due to a pandemic has not been assumed to impact hospital capacity, reflecting the assumption that caregivers will respond to the emergency by staffing the highest level of care needed to support the system. This is a conservative assumption from the standpoint of costs to payers.

The cost of influenza care provided in ACFs and the financial impact of the deferral of elective care during a pandemic have also been estimated. Exhibit 2 details the numerous assumptions required for calculating hospital, ACF and outpatient capacity, charges and utilization by scenario.

5.1 Hospital Scenario Assumptions

The 1999/2000 influenza season was normal except for the fact that it presented several weeks earlier than usual, during the winter holiday periods of peak vacation. This resulted in crowded emergency rooms and ambulance diversions around the country, including 10 days in Los Angeles where three-fourths of the emergency departments in the city were so full that ambulances had to be rerouted.[11]

Different strategies were used to overcome the staff shortages, including canceled leave time, extra shifts and staff skipping breaks and meals. Bed shortages were dealt with by using alternative space, canceling elective surgery, providing for early discharges and drawing on other specialty departments for additional beds and staff. In some jurisdictions, city health officials petitioned

[11] Schoch-Spana, Monica, "Hospitals Buckled During Normal Flu Season; Implications for Bioterrorism Response." *Bio Defense Quarterly*. March 2000;1(4).

state and federal regulators to release staff beds from other specialties; regulators generally responded to these requests in an efficient manner. One institution shut down an outpatient clinic to bring nurses and technicians to its inpatient facility to deal with the surge, incurring financial hardship as a result.[12]

All the potential strategies under discussion for use during a pandemic were needed to address what was merely a shift in the timing of seasonal influenza in the United States. The fact that an annually occurring outbreak of infectious disease with comparatively low mortality rates created such hardships for the U.S. health care system is troublesome from a preparedness perspective.

5.1.1 Available Hospital Bed Capacity

Hospital capacity data has been derived from 2008 American Hospital Association (AHA) hospital statistics and includes general, special, rehabilitation/chronic and psychiatric beds. Staffed beds, at 947,000, are below licensed beds. Although the nursing shortage is a major contributor to capacity problems both now and for the foreseeable future,[13] staffing challenges have not been assumed to affect capacity or the amount of care delivered in different scenarios. From a cost standpoint this is a conservative assumption.

Available hospital bed capacity in the model is established as total hospital beds minus projected utilization by non-influenza patients. The result is the available bed capacity for influenza patients (or any other surge in demand). This simple formula has been refined to reflect intensive care bed capacity versus non-intensive care beds.[14] Based on Dr. Meltzer's FluSurge model,[15] ICU demand

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[12] Ibid.
[13] Bazzoli, Gloria J. et al. "Does U.S. Hospital Capacity need to be Expanded?" *Health Affairs*. November/December 2003;22(6):51.
[14] Halpern, Neil A. et al. "Critical Care Medicine in the United States 1985–2000: An analysis of bed numbers, use, and costs." *Critical Care Medicine*. 2004;32(6).
[15] Zhang, X., M. I. Meltzer, and P. Wortley. FluSurge2.0: a manual to assist state and local public health officials and hospital administrators in estimating the impact of an influenza pandemic on

has been estimated at 15 percent of patients in the moderate and severe scenarios. Although not used in the model, the total number of ventilators and ventilator demand from non-influenza patients has also been estimated to allow interested parties to utilize these results.

In order to determine available hospital capacity under different scenarios, the base staffed beds were modified for an increase in overall capacity. Under normal conditions, the available bed capacity is staffed hospital beds minus average daily inpatient utilization. However, total capacity is assumed to be somewhat elastic, as there is some flexibility both on behalf of hospital staff and regulatory officials to increase bed capacity. This reflects the fact that there are more licensed beds than staffed beds, and hospitals can stretch bed space under stress. Based on discussions with hospital administrators and judgment, this research assumes that hospitals could increase their total bed capacity by 10 percent under a moderate scenario and by 25 percent under a severe scenario. ICU bed capacity is assumed to increase 5 percent and 10 percent under the moderate and severe scenarios respectively. This is conservative from a total cost standpoint.

In addition to beds, the utilization by non-influenza patients has been adjusted to reflect the fact that some elective patients will choose to defer or cancel care rather than go to the hospital during a pandemic. Reports have shown that this deferral of care during a crisis is often not recaptured but is instead a net savings to the system.[16] This effect has been quantified by assuming a 5 percent reduction in individuals seeking elective services in a moderate scenario, and a 20 percent reduction in a severe scenario. ICU bed use and ventilator use have

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hospital surge capacity (Beta test version). Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; 2005. http://www.cdc.gov/flu/tools/flusurge/.

[16] These figures reflect information in the literature including experience with SARS, Hurricane Katrina, the 1989 Loma Prieta earthquake and information regarding the incidence of discretionary and/or unnecessary health care procedures in the United States.

been adjusted to a lesser extent, reflecting the fact that a greater proportion of ICU use is non-elective.

Hospital bed capacity assumptions are detailed in Exhibit 2, Page 1.

5.1.2 Staffing

The hospital staffing needs for a scenario are determined a priori. 2008 AHA information shows that 225,000 physicians and 1,370,000 nurses are employed by hospitals.[17] Per bed staff ratios have been adjusted based on expectations of staffing needs and response under different pandemic scenarios. Staff is decremented for illness at the same rate as the population, so as demand goes up, staff availability goes down. An additional factor is applied to the illness decrement rate to account for the fact some individuals will stay home to provide care to their family or community.

However, since the hospital setting is the highest intensity service provider, it has been assumed that physicians and nurses would be drawn from the overall pool of health professionals to adequately staff the needs of the hospitals. This assumes less critical health care resource needs (outpatient and ACFs) would be met with reduced staffing levels and increased use of volunteers rather than permit inadequate hospital staffing. This approach is conservative because it maximizes the services provided, charges and costs to insurers. To the extent that staff is not available and some individuals are instead treated in ACF or outpatient settings, this would be less expensive to the system.

Under a moderate scenario, the expectation is that staffing needs would increase commensurate with the increase in beds (e.g., staffing ratio is maintained). The rationale behind this is that individuals going to the hospital would expect the same level of attention and services in a moderate scenario that they would

[17] *AHA Hospital Statistics*, Health Forum LLC, 2008 Edition.

receive during seasonal flu conditions. At some point, there would be a change in expectations as the stress on the system would be too great as a result of staff absences and increasing numbers of patients. That point would not be reached in the moderate scenario.

Recall that hospital capacity is assumed to increase by 25 percent under the severe scenario. However, the per bed staff ratios decrease by 25 percent, so the number of physicians and nurses stays the same. This implies that fewer people are doing more in a crisis, not unlike the situation outlined regarding seasonal flu described earlier in this section.

Thus, it is assumed that non-hospital physicians and nurses are able to move seamlessly between provider settings and hospitals are able to bill their services in a manner similar to pre-pandemic patterns. The impact of this hydraulic is to reduce the pool of health care providers available to provide services to ACFs and outpatient care settings, increasing the average outpatient provider load.

Hospital staffing assumptions are detailed in Exhibit 2, Page 1.

5.1.3 Cost of Services

Costs per case of influenza by provider used in the model are based on the work of Dr. Noelle-Angelique Molinari, which measured the annual impact of seasonal influenza in the United States.[18] Her report estimated the cost per case of influenza using the Medstat Marketscan database from the years 2001 through 2003. The database is compiled from health insurance claims from 40 self-insured employers that represent all 50 states. Costs were inflated to 2003 prices using the medical care component of the Consumer Price Index.

[18] Molinari, op cit.

Costs have been broken out by outpatient, hospital and deaths. These categories are further refined by low risk and high risk individuals. Dr. Molinari presents the costs in five age ranges, which have been further broken out into quinquennial groups for use in this model. Costs by provider and risk group for a seasonal scenario have been tied to the Molinari work in aggregate and for the original age ranges used.

It is difficult to predict whether these relationships by age, provider and risk class would be consistent or vary under the stresses of a moderate or severe scenario. It has been assumed that the relationships that are demonstrated in the seasonal case would continue to hold true in the moderate and severe scenarios

Another important consideration is that with seasonal flu it was assumed that all influenza deaths were hospitalized. Thus, all deaths in the seasonal scenario received full charges, which are higher than for surviving hospital-only patients. Based on judgment, it has been assumed that 95 percent of deaths are hospitalized in the moderate scenario and 85 percent of deaths in the severe scenario receive charges. The most conservative assumption would be to assume that all deaths were hospitalized.

Because the costs were from the self-insured population, they may not be representative of the uninsured or publicly insured population. Because private reimbursement rates tend to be higher than public reimbursement rates, this might lead to overestimation of the cost per case of the publicly insured population (Medicare and Medicaid). Incidence and utilization may offset these factors.

Provider charges utilized by scenario, provider and risk group are detailed in Exhibit 2, Page 2.

5.1.4 Provider Utilization

Total number of hospitalizations is determined from the scenario assumptions as hospital-only cases plus the number of deaths that occur in the hospital. In order to estimate hospital bed demand in any given week, a weekly case distribution projection model was developed (Exhibit 2, Page 5) based on the FluSurge software. In order to determine the weekly demand for hospital beds, both the number of patients and their length of stay are needed. The length of stay has been broken out for ICU and non-ICU patients. Base ICU length of stay is assumed to be 10 days, twice the length of stay for non-ICU beds. Ventilator usage is assumed to be the same duration as the ICU length of stay.

High risk patients are assumed to be allocated to available ICU beds. Excess ICU demand steps down to normal hospital beds. High risk patients who step down to normal beds are assumed to receive lower intensity care, captured in the form of low risk patient charges. If there are inadequate hospital beds to meet total demand, the excess step down to ACFs. All users of ACFs are charged the same rate.

The assumption has also been made that under the severe scenario the length of stay is reduced by 20 percent. This reflects the assumption that the hospitals will discharge patients more quickly to allow other sick individuals access to a higher intensity care. Discharged individuals would presumably step down to ACFs or home care. To reflect the reduced hospital stay, charges have been assumed to be reduced by one-half of the proportionate decrease in length of stay,[19] with no additional charges accruing from ACFs or home care settings.

Scenario totals and weekly provider utilization assumptions for the wave are presented in Exhibit 2, Pages 3 and 4.

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[19] .5 x (1 - (4 days / 5 days))= 10% charge reduction.

5.2 Alternate Care Facilities

Although modern health care and public health measures have greatly improved survival rates since 1918, the lack of hospital surge capacity may mean that many patients during a modern pandemic will receive care not dissimilar to that provided during the 1918 pandemic.[20] Many hospitals and emergency rooms lack the flexibility to deal with moderate surges in demand, let alone the types of spikes that are foreseen in a potential health crisis such as pandemic influenza.

ACFs are often considered in public sector pandemic preparedness plans as a means of addressing possible shortages of traditional medical facilities during a pandemic. Some have argued convincingly that rather than creating new health care facilities, it is more likely that during a pandemic the standards of care delivered in hospitals would change and patients would have access to fewer resources.[21] The severe scenario demonstrates the mechanics involved in incorporating ACFs in the modeling.

The projected weekly utilization of ACF overflow sites is detailed on Exhibit 2, Pages 3 and 4. The calculation of the estimated cost of ACF services is detailed on Exhibit 2, Page 7.

5.2.1 ACF Care Delivery Model

The identification of an ACF site does not change the basic calculus of limitations on physical materiel and the availability of licensed care providers to staff these centers. There is no consensus as to what levels of care ACFs will be providing and no history as to what they will be charging for their services. ACFs will be local entities born of local decision-making processes. In order to estimate

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[20] Hick, John L., and Daniel T. O'Laughlin. "Concept of Operations for Triage of Mechanical Ventilation in an Epidemic," *Academic Emergency Medicine*. 2006;13:223–229.

[21] Radonovich, L. J., P. D. Magalian, M. K. Hollingsworth, and G. Baracco. "Stockpiling Supplies for the Next Influenza Pandemic." *Emerging Infectious Diseases*. June 2009;15(6). www.cdc.gov/EID/content/15/6/e1.htm.

potential costs to insurers, one needs to determine a reasonable average level of care and estimate the cost for provision of that care.

Clarence Lam performed a review of federal and state pandemic plans and identified a variety of different models for ACF care delivery.[22] According to Mr. Lam, ACFs are best suited to function as: (1) primary triage sites; (2) alternative locations for isolation or quarantine; or (3) as recovery clinics to expedite the discharge of patients from hospitals. In each of these situations, it was recommended they be restricted to providing limited supportive care.

Mr. Lam recommended that communities and hospital leaders recognize hospitals as the focal point for all critically ill patients.[23] Hospitals should provide critical care and surgery and transfer non-influenza patients to appropriate outpatient settings as soon as possible while discharging influenza patients no longer requiring critical care to home or ACFs. As a corollary, medical assets and experienced medical personnel should remain deployed at hospitals where patients will require the greatest medical expertise. It was recommended that all mechanical ventilators be located at hospitals where difficult decisions as to the allocation of resources can be made on a consistent basis following ethical protocols promulgated by state and federal government leaders. This sort of "separation of powers" not only makes the triage more effective but also reduces the potential for emotional and possibly dangerous behaviors on the site of the ACF facility.

The need for IV fluids has been suggested as a possible differentiating factor between patients who could be stepped down to ACF or home care versus those who need ongoing hospitalization.[24] The importance of limiting ACF care to oral

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[22] Lam, Clarence et al. "The Prospect of Using Alternative Medical Care Facilities in an Influenza Pandemic." *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science*. 2006;4(4).
[23] Ibid.
[24] Ibid.

medications or oral hydration was emphasized. It was recommended that any respiratory distress associated with decreased oxygen levels be treated in a hospital acute care setting. In addition to the shortage of ventilators and experienced personnel to operate them, providing oxygen in an ACF environment raises significant safety issues that further recommend that critical care respiratory treatment be performed only in a controlled hospital environment.

5.2.2 Staffing

ACF staffing considerations are presented as a percentage of hospital staffing. This exercise assumes 20 percent of hospital physicians per bed for ACF and 40 percent for nurses. This exercise assumes that there are always enough ACF beds to meet demand, so doctors and nurses are assumed to fill the need, taking away from the pool available to provide outpatient services. It has also been assumed that volunteers will be available in ACF environments to assist with basic rehydration, cleaning and food needs.

5.2.3 Utilization

ACF utilization can derive from two sources: demand in excess of hospital capacity or hospital step-down prior to returning home. For this model, ACF overflow utilization is determined as the excess of hospital demand over hospital capacity. It is assumed that all high risk patients use hospital beds receiving the highest intensity care available, while low risk overflow patients fill remaining hospital capacity before being allocated to ACF sites. Overflow patients are assumed to receive ACF service charge rates, while step-down patients are assumed to receive hospital charges only. Only individuals receiving ACF charges are quantified for ACF utilization; early-discharge patients in the severe scenario have not been counted in the ACF utilization figures.

5.2.4 Cost of Service

Based on the description of care delivery above, it is clear that costs for an ACF stay should be less than a hospital facility but above the cost of an outpatient visit; where to draw the line is unclear. A skilled nursing facility is one possibility, but it is unlikely that the level of care at an ACF would reach this level during a severe pandemic, as skilled resources would be scarce due both to illness rates and the fact skilled assets would likely be deployed elsewhere.

A reasonable middle ground for identifying an appropriate cost model based on the intensity of care delivered is hospice. Hospice care agencies provide supportive and palliative care to individuals and their families at the end of life. Unlike hospitals and skilled nursing facilities, hospice agencies focus on comfort and quality of life rather than curative treatments.[25] As part of the caregiving model, most terminally ill patients receive some level of informal care from friends, family or hospice volunteers. From a level of care perspective, this model would likely be similar at an ACF during a pandemic.

Integrating hospice care into pandemic planning is by no means a new idea. The Agency for Healthcare Research and Quality (AHRQ) prepared a study for home health care issues and resources during an influenza pandemic. They cited the state of North Carolina and Seattle County Coalition as examples of effective integration of home health care into emergency response planning.[26] An average length of stay for influenza patients was assumed to be five days, comparable to a non-ICU hospital stay. CMS Medicare claims data found the median length of stay for hospice patients to be 15 days.

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[25] Hospice Association of America. "Hospice Facts and Statistics." March 2008

[26] Knebel, A., and S. J. Phillips, eds. Agency for Healthcare Research and Quality. "Home Health Care During an Influenza Pandemic: Issues and Resources." AHRQ Publication No. 08-0018. Rockville, Md., July 2008. www.flu.gov/professional/hospital/homehealth.html.

The hospice care model seems like an approach that in aggregate may well approximate the function and care delivery during a pandemic. Hospice is already well integrated into our health care system. As of 2007, there were 3,257 Medicare certified hospices, of which 562 were hospital-based (thus already included in the hospital capacity figures provided by the AHA). The National Hospice & Palliative Care Organization estimates 1.3 million patients received services from hospice in 2006, of which approximately 75 percent were Medicare patients. In 2000, approximately 10 percent of hospice primary payments came from private insurance.[27] This low figure is due to distribution of deaths by age, as over 90 percent of health plans offer a benefit for hospice, according to a 2000 study by the Medstat Group.[28]

Hospice reimbursement rates vary depending on the level of care received. Medicare rates effective Oct. 1, 2007 range from $135.11 for routine home care days, to $601.02 for general inpatient care days, to $788.55 for continuous home care days (which include an element of skilled nursing). The Hospice Association of America report shows hospice charges of $144 per covered day versus $572 in a skilled nursing facility, versus $5,549 per day for hospital inpatient charges in 2007.[29]

This research has utilized a charge of $500 per day, a reasonable assumption given the level of care provided. Under the conditions of a pandemic, it is likely that a significant number of ACF claims would never be filed. It is also possible that the uninsured would make disproportionate use of the ACF setting versus hospital care.

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[27] Hospice Association of America, op. cit.
[28] Jackson, B. et al. "Hospice Benefits and Utilization in the Large Employer Market." Washington, D.C.: The Medstat Group, March 2000.
[29] Hospice Association of America, op. cit.

5.3 Deferred Elective Care

Demand for influenza-related services spending "crowds out" other medical services during a pandemic. For individuals concerned about contracting influenza at a provider, elective surgery may suddenly become a lower priority. Experience shows there is very little catch-up of these services after large scale disturbances. This has proven to be the case after Katrina and other natural disasters.

As a rule, elective procedures are more expensive to insurers (and more profitable to hospitals) than illnesses. An estimate of the value of deferred elective care has been calculated using service costs from AHRQ Healthcare Cost & Utilization Project (HCUP)[30] and the elective deferral rates described previously in Section 5.1.1. The derivation of the estimated value of this deferred care is detailed on Exhibit 2, Page 8. Note also there is likely to be an upsurge in uncompensated care from uninsured and undocumented individuals utilizing hospital services. This will have an impact on hospital cash flow and finances, which varies by institution, but presumably will not have a direct impact on insurers.

5.4 Outpatient Scenario Assumptions

It has been implicitly assumed that the demand for outpatient services will be met. It is likely that hospitals will become the triage sites where individuals ranging from the "worried well" to the critically ill will go to be informed as to the best course of action. Hospitals provide almost 2 million outpatient services per day in the United States or an average of 325 per hospital according to the AHA.[31]

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[30] Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project. http://hcupnet.ahrq.gov.

[31] AHA Hospital Statistics, Health Forum LLC, 2008 Edition.

5.4.1 Capacity and Utilization

The starting point for the outpatient capacity assumptions is the health care staffing pool. The total number of physicians and nurses was taken from AHA data and adjusted for absences due to illness and a family care factor to account for individuals staying home to take care of family members. The hospital staffing needs are subtracted from the remaining healthy staff to come up with outpatient care providers. Outpatient care providers are further decremented by the number of staff needed to run ACFs. The number of outpatient providers is the total number of providers for all settings less hospital, less ACF, less illness and family care. This is shown in Exhibit 2, Page 3.

Patient demand is projected employing the same model used to estimate hospital cases, but with a different utilization curve. A Weibull distribution is used to reflect early utilization by the "worried well" early in the course of the pandemic (Exhibit 2, Page 6). Exhibit 2, Page 5 projects utilization and weekly physician caseloads. Note that this approach assumes all physicians see influenza patients, so caseloads are understated.

5.4.2 Cost of Service Estimate

Outpatient cases can have multiple visits, prescription drugs, lab tests, etc. Hospital cases also often include outpatient visits. Based on the methodology used in developing the charges, provider costs include the total number of visits per case. Thus, an outpatient cost of $250 might include two visits to the doctor, medicine and labs.

The charges used were developed under a seasonal scenario. It is difficult to predict whether these relationships by age, provider and risk class would be consistent or vary significantly under the stress of a moderate or severe scenario. Due to capacity constraints and concerns about social distancing, it is difficult to

predict whether the number of doctor visits per case would go up or down. It has been assumed that the relationships that are demonstrated in the seasonal case would continue to hold true in the moderate and severe scenarios for outpatient visits.

Outpatient charges utilized by scenario, provider and risk group are detailed in Exhibit 2, Page 2.

6. PANDEMIC SCENARIO ASSUMPTIONS

The process of developing the assumptions that drive the pandemic scenarios is described in this section. The core of the scenario assumptions are population deaths attributable to influenza and their distribution by age ("mortality curve"), the morbidity rate and distribution by age ("morbidity curve") and distribution of cases by provider type. These, along with the identification of at-risk groups and an assumption about the duration of the pandemic, form the basis of the specific pandemic scenarios.

Two scenarios were developed to support this research: a moderate scenario and a severe scenario. These scenarios are based on assumptions from U.S. government publications (e.g., the *Health and Human Services Pandemic Influenza Plan*[32] and the *Homeland Security Council's National Strategy for Pandemic Influenza Implementation Plan*[33]). A seasonal scenario was created for validation purposes and has been included for reference.

6.1 Mortality

The 1918 pandemic is the most severe influenza pandemic in modern history, perhaps ever. Given improvements in modern medicine, reduction in overall disease burden and improvements in sanitation and general living conditions, it seems reasonable to believe that the estimated influenza deaths per thousand in 1918 would serve as an upper bound for the additional deaths per thousand should a pandemic occur today. However, there are factors today that might affect the general population death rate negatively. The vulnerability of our society has changed dramatically with population growth, changing demographics, globalization and other concomitant variables.[34]

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[32] U.S. Department of Health and Human Services. "HHS Pandemic Influenza Plan." November 2005, p. 18.
[33] Homeland Security Council. "National Strategy for Pandemic Influenza Implementation Plan." May 2006, p. 1.
[34] Toole, Jim, op. cit., p. 16.

The severity of a pandemic is not a function of the attack rate (transmissibility) of the virus, which is believed to be relatively constant between pandemics. Instead, severity is linked to its virulence; e.g., its ability to produce severe illness requiring hospitalization or death.[35] There is no way of knowing what the virulence of the next pandemic might be, and how that would translate into mortality and morbidity rates.

Thus, two scenarios were developed consistent with U.S. government figures for planning purposes:

1. a moderate scenario resulting in approximately 209,000 U.S. deaths and
2. a severe scenario resulting in approximately 1.9 million U.S. deaths.

By comparison, the CDC estimates on average 36,000 deaths occur each year due to seasonal flu.[36] These pandemic scenario figures represent a sixfold increase in mortality under the moderate scenario and an increase of over 50 times under the severe scenario.

The population mortality rates utilized and curves by age were developed in the 2007 SOA report, "Potential Impact of Pandemic Influenza on the U.S. Life Insurance Industry."[37] An estimate of the relative mortality ratio of the insured population versus the general population was also derived and is used in this report. For this research, deaths are a fixed variable calculated prior to determining morbidity. Deaths receiving hospital care are assumed to be in addition to the hospital-only cases, increasing the total number of hospitalizations (and charges) assumed in the scenario. The percentage of deaths assumed to receive hospital care (and thus full charges) varies by scenario.

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[35] "National Strategy for Pandemic Influenza Implementation Plan," op. cit., p. 110.
[36] Thompson, William et al. "Mortality Associated with Influenza and Respiratory Syncytial Virus in the United States." *Journal of the American Medical Association.* 2003;289:179–186.
[37] Toole, Jim, op. cit., p. 15–24.

Details of the mortality assumptions and calculation are shown on Exhibit 3, Page 1.

6.2 Morbidity

There are two components of morbidity: attack rate and severity, both of which vary by age. The population exposed to morbidity is net of exposed deaths (number of deaths grossed up for the attack rate). The attack rate drives the total number of cases, while the severity drives the number of deaths and the distribution of total cases by provider (hospitalizations, ACF, outpatient and self-care). Cases are further separated into low and high risk groups, which drive costs.

6.2.1 Attack Rates

Accurate morbidity attack rates are much more difficult to estimate than mortality rates. Regional and national surveillance systems responsible for monitoring the prevalence of seasonal and pandemic influenza activity and the incidence of influenza cases are faced with challenges in identifying the total number of influenza cases. While public records are maintained for deaths by cause making it a relatively easy exercise to obtain incidence of deaths, no similar national public record keeping system is in place to capture overall influenza attack rates during a seasonal flu season, much less during the stress of a pandemic. Efforts to quantify incidence of influenza are further hindered by the fact that it is technically challenging and comparatively expensive to positively verify an influenza case; often "influenza-like illness" (ILI) is used as a proxy. It is now believed that seasonal influenza may actually be present in anywhere from 5 percent to as much as 20 percent of the population during any given season, but because of the difficulties in positively identifying the disease, actual numbers are not known.[38]

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[38] Centers for Disease Control and Prevention. "Seasonal Influenza." www.cdc.gov/flu/about/qa/disease.htm.

While seasonal estimates of influenza attack rates might be considered educated guesses, estimates of the number and distribution of flu cases during pandemics might best be characterized as speculation. This explains why one may see different sources citing the similar numbers of influenza deaths for a particular pandemic but widely varying numbers for the attack rates. Although efforts have been made by public health officials and researchers to derive this information, due to the many challenges involved, accurate morbidity rates from previous pandemics are not definitively known.

The distribution of morbidity by age for this research is based on the Molinari report on seasonal influenza, adjusted by scenario to reflect relative changes in death rates by age.[39] Actual factors used were smoothed and refined to conserve the total expected incidence rate for the scenario.

Details of the morbidity assumptions and calculation of cases by age are shown on Exhibit 3, Page 2.

6.2.2 Risk Adjustment Factor

The risk adjustment factor adjusts the assumed proportion of high risk individuals in the insured population versus the general population. The theory is that if an individual has health insurance, there is screening (both via the underwriting process and/or the fact that they are employed) that effectively excludes a portion of high risk individuals. The effect is not assumed to be as pronounced as with life insurance. In addition to the subscriber, families are also covered and there is a lesser selection effect on families than the subscriber.

The relative proportion of high risk individuals in the insured population has been assumed to be 15 percent less than that of the general population. Assuming 175

[39] Molinari, op. cit.

million insureds out of a total population of 300 million, this results in an occurrence of high risk individuals in the privately insured population at 92.5 percent of the population rate versus approximately 109 percent in the general population.

6.2.3 Utilization Adjustment Factor

The utilization adjustment modifies the entire insured population to reflect for the relative utilization of health care services between the insured versus the general population. This is a composite factor based on judgment that incorporates various adjustments, including relative utilization of health care resources, overall population health status, access to vaccine, prophylaxis and/or mitigation strategies. On a seasonal basis, the insured population is assumed to utilize resources at a rate 20 percent higher than the general population, 5 percent more during a moderate scenario, and 5 percent less during a severe scenario. The reduction reflects the assumption that the insured population will have better access to vaccines and prophylaxis, as well as more resources and information for managing both exposures and response.

6.2.4 Peak Wave Duration

In discussing a pandemic, many people think of waves, as this was one of the defining features of the 1918 pandemic. Attack rates range from 25 percent to 50 percent of the population becoming infected during the course of a pandemic. What percentage of the total cases present during a single wave, during a period of a year, or multiyear period further complicates an already difficult question. Clearly, provider capacity constraints will be significantly impacted by these assumptions.

A consensus seems to have formed around an attack rate of 30 percent.[40] It is by no means a given that the next pandemic would present in a similar manner; researchers agree there is no predictability in wave patterns. Combining various estimates aimed toward the objectives of estimating provider capacity and testing insurer solvency, a 50 percent total attack rate has been selected for both scenarios with 30 percent occurring during a peak wave (the modeling period). The distribution of cases by age for the moderate scenario is based on the seasonal work of Molinari.[41] Distribution of cases by age for the severe scenario reflects the V\ mortality curve (less at older ages, more at 20–40).

The modeling time frame is assumed to be the period of a peak wave, conceivably following a sentinel wave. Later waves have not been modeled under the assumption that the system would have an opportunity to "reset," and various mitigating factors would come online that were not assumed to be a factor in the modeling of the initial peak wave (vaccines, re-pricing, etc.).

A potential use of this research is to test for health insurer solvency under different pandemic scenarios. Counterintuitively, conservatism suggests using a longer duration for the wave in a stress test. The longer duration would allow for more capacity in the provider system for more individuals to receive high intensity treatment, increasing overall costs. This research has assumed a peak wave duration of three months for all scenarios.

6.3 Case Distribution by Provider

The number of people who become sick (cases) is calculated by multiplying the attack rate by the census population figures net of exposed individuals who died. In addition to the death rate, the virulence of the pandemic is captured by defining what types of services each case requires by provider class. Like

[40] The record is unclear as to whether this is for one wave or multiple waves. After discussions with experts, the consensus is that this figure represents the total attack rate for all waves.
[41] Molinari, op. cit.

mortality, virulence varies by age. This is manifested in assumptions regarding service utilization by provider class.

Five levels of care have been defined in the model, in order of intensity of care:

- Deaths—may occur in or out of the hospital
- Hospitalization—impairment such that hospitalization is sought
- ACF—hospital overflow capacity
- Outpatient—seeks outpatient care only
- Self-care—assumed not to seek treatment.

Estimates for hospitalizations under the moderate scenario were based on the HHS figure of 865,000.[42] In order to develop the severe scenario, the ratio of the increase in deaths from moderate to severe was applied to the moderate scenario hospitalizations, yielding severe scenario hospitalizations of approximately 7.9 million.

All cases are initially assigned to hospitalization, outpatient or self-care. Outpatient assumes outpatient services only, while hospitalization and deaths may include outpatient visits as well as time in the hospital. Based on the number of cases and wave duration, if there is more demand than capacity to provide services within the traditional care setting, this research assumes ACFs will be created to provide services at a rate appropriate for the services provided (as discussed in Section 5.2).

While the Molinari research more rigorously estimates the number of cases requiring hospitalizations, estimating pandemic influenza cases requiring outpatient treatment is more speculative. Although public health studies have been performed to estimate outpatient utilization during seasonal flu outbreaks,

[42] HHS Pandemic Influenza Plan, op. cit.

no public health system is in place to monitor outpatient visits, and collecting such data after the fact is a challenge.

Outpatient rates might be considered a pressure valve of sorts, with some flexibility to expand or contract to address the vast pool of individuals who have symptoms but waver between going to the hospital, seeing the doctor or relying on self-care. Fortunately, because of the amount of the charges involved, the results are less sensitive to the outpatient assumption. More importantly, outpatient providers may be required to fill staffing gaps in hospital or ACFs in high utilization scenarios, which are higher cost environments due to the intensity of care provided.

Details of the calculation of case distribution by provider are shown on Exhibit 3, Page 3.

6.4 High Risk Populations

Certain populations have higher risk of complications due to influenza, as well as higher morbidity and mortality. As defined by the CDC, these populations include individuals with chronic obstructive pulmonary disease (including asthma), cardiovascular disease, diabetes and other metabolic disorders, immunosuppression (including immunosuppression as a result of transplant medications, cancer chemotherapy or HIV), and end-stage renal disease (ESRD).[43] As a general rule these groups were not well represented during the 1918 pandemic, and although we can speculate, research on these groups is even more limited than the population in general.

Each of these populations has unique risk characteristics and will face special challenges during a pandemic. This research cannot begin to detail the complexities of ensuring continuity of care for high risk populations. The risk

[43] Centers for Disease Control and Prevention. MMWR, July 13, 2007, 56(RR-6), p. 21.

profiles and challenges faced by different high risk populations are described briefly. With this discussion as background, the approach taken to model at-risk populations is described.

6.4.1 Chronic Obstructive Pulmonary Disease (COPD) Disorders and Smoking

As of 2006, it was estimated that 22.9 million individuals had asthma, 9.5 million had chronic bronchitis and 4.1 million had emphysema.[44] Although the literature is clear that individuals with COPD disorders are at risk for serious morbidity as a result of influenza, figures are sketchy as to the degree of increased morbidity and mortality. Equally sparse is data showing that vaccinating asthma sufferers provides measurable relief from influenza.

According to a study in the *New England Journal of Medicine*, cigarette smoking is the strongest independent risk factor for pneumococcal disease among non-elderly adults.[45] Approximately 20 percent of Americans 18 and older (43 million) smoked in 2007,[46] with per capita cigarette consumption at an estimated three times the amount in 1918.[47] The potential impact of smoking on demand for services and costs in a pandemic is unknown.

6.4.2 Cardiovascular Disease

The CDC estimates that 24.1 million adults suffered from cardiovascular disorders other than hypertension in 2006. This resulted in 4.2 million hospital discharges with an average length of stay of 4.4 days. The American Heart Association and the CDC recommend that individuals with heart disease have annual influenza vaccinations, although there is not a large body of clinical research supporting it. In part, this lack of evidence is due to the fact that the

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[44] CDC National Health Interview Study, 2006.
[45] Nuorti, J. Pekka et al. "Cigarette Smoking and Invasive Pneumococcal Disease." *New England Journal of Medicine*. March 9, 2000;342(10):681–689.
[46] Centers for Disease Control and Prevention. MMWR, Nov. 14, 2008;57(45):1221–1226.
[47] Tobacco Situation and Outlook Report Yearbook. U.S. Department of Agriculture, October 2007.

mechanism by which influenza may cause cardiovascular events is not well understood.[48]

Another factor contributing to the uncertainty surrounding the impact of influenza on mortality in general and cardiovascular disease specifically is the use of death certificates as the primary source of data in clinical research. A heart attack that may have been triggered by influenza would likely be coded as acute myocardial infarction, with no mention of influenza as a contributing factor.[49] It has been estimated influenza may trigger as many as 92,000 of the 729,000 deaths attributed to heart disease each year.[50] In the majority of influenza epidemics (with the notable exception of the 1918 pandemic), cardiovascular deaths surpassed other causes of mortality, including deaths due to respiratory causes (such as pneumonia).[51]

6.4.3 Diabetes

According to the National Institutes of Health (NIH), prevalence of diabetes in the United States in 2005 was estimated to be 20.8 million. Of these, 14.6 million were diagnosed and an estimated 6.2 million additional diabetics were undiagnosed. It is estimated over 20 percent of all people age 60 and above have diabetes.[52]

Diabetes is a major risk factor for increased morbidity and mortality. People with diabetes have weakened immune systems, so they are more susceptible to

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[48] Davis, Matthew M. et al. "Influenza Vaccination as Secondary Prevention for Cardiovascular Disease." *Circulation*. 2006;114:1549–1553.
[49] Madjid, Mohammad et al. "Influenza Epidemics and Acute Respiratory Disease Activity are Associated with a Surge in Autopsy-Confirmed Coronary Heart Disease Death: Results of Eight Years of Autopsies and 34,892 Subjects." *European Heart Journal*. April 17, 2007, pp. 1–6.
[50] Madjid, Mohammad et al. "Influenza and Cardiovascular Disease: A New Opportunity for Prevention and the Need for Further Studies." *Circulation*. 2003;108:2730–2736.
[51] Eickhoff, Theodore C. et al. "Observations on Excess Mortality Associated with Epidemic Influenza." *Journal of the American Medical Association.* 1961;176:776–782.
[52] 1999–2004 National Health and Nutrition Examination Survey (NHANES), Centers for Disease Control and Prevention.

severe cases of the flu and its complications. It is estimated 10,000 to 30,000 diabetics die each year of flu- or pneumonia-related complications.[53] Over their lifetime, people with diabetes are almost three times as likely to die of the flu or pneumonia-related complications as people without diabetes.[54] According to the CDC, people with diabetes are six times more likely to be hospitalized with influenza, and death rates may increase between 5 percent and 15 percent.[55]

6.4.4 Immunodeficiency

There are three distinct immunodeficient populations: individuals receiving chemotherapy for cancer, individuals receiving immunosuppressive drugs for transplants and individuals suffering from autoimmune diseases (AIDS being primary among them). These populations are in addition to the very young and the elderly who have naturally occurring lower immune capacity (already reflected in influenza mortality and morbidity statistics by age).

Of these three groups, only the AIDS population has been accurately quantified and researched in the literature with respect to influenza. There are an estimated 1.2 million individuals living in the United States with HIV, including more than 400,000 who have full-blown AIDS. Studies show this population to be at high risk of death for pneumonia and influenza, and anecdotal reports suggest that influenza-related morbidity may be higher among persons with AIDS. Excess death rates due to pneumonia and influenza for persons with AIDS during the 1991–1994 influenza seasons were approximately 10 times higher than the general U.S. population and somewhat higher in individuals age 65 and older.[56]

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[53] Diabetes and Influenza Fact Sheet, Centers for Disease Control and Prevention, 1995.
[54] Ibid.
[55] Ibid.
[56] Lin, Joseph C., M.D., and Kristin L. Nichol, M.D., MPH. "Excess Mortality Due to Pneumonia or Influenza During Influenza Seasons Among Persons with Acquired Immunodeficiency Syndrome." *Archives of Internal Medicine*. 2001;161:441–446.

By comparison, the total number of U.S. transplants in 2007 was 28,000, over half of which were kidney transplants (discussed below). Information on numbers of individuals undergoing chemotherapy that results in immune suppression does not appear to be available.

6.4.5 End-Stage Renal Disease (ESRD)

At the end of 2006, the U.S. ESRD program was treating over 500,000 dialysis and transplant patients. Kidney emergency response planning for the ESRD community took a dramatic leap forward in 2005 when the Kidney Community Emergency Response Coalition (KCER) began maintaining coordinated preparedness and response frameworks for the kidney community in the event of emergency or disaster.[57] KCER is not associated with the large dialysis chains but is instead contracted by CMS, the primary payer for ESRD services in the United States, to provide this service to stakeholders in the kidney community.

The KCER pandemic preparedness team goals are to develop and disseminate plans to help the kidney community maintain their ability to care for patients in the event of pandemic flu.[58] Although progress has been made in organizing, disseminating and maintaining this information and developing response and preparedness resources, there is not, as yet, a step-by-step guide for pandemic preparedness planning for dialysis providers or patients. As a result, concerned patients resort to networking and blogs to discuss emergency planning tips with their peers.

One of the most challenging items currently in development is with regard to ethical issues and decision making during a pandemic. Under normal conditions there is adequate dialysis capacity available, but similar to the ventilator capacity situation, it is unlikely there will be enough fully staffed dialysis machines to meet

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[57] "KCER Summit Report," Feb. 21, 2008.
[58] Ibid.

demand during a pandemic due to staff absences. KCER intends to prepare a document to assist dialysis providers in addressing ethical issues related to resource allocation, personal protection and civil liberties during a pandemic.[59]

6.4.6 Other High Risk Groups

As mentioned previously, the young and the old are known to be at higher risk of complications due to seasonal influenza. No special assumptions were developed for these groups because these risks are already incorporated into the mortality and morbidity curves by age. Additionally, the CDC recommends that pregnant women receive flu vaccinations. Although this research makes no distinctions based on sex, research into the 1918 pandemic showed markedly higher mortality among pregnant women as well as high rates of miscarriage.[60] H1N1 swine flu presented similarly.

6.5 Case Distribution by Risk Class

As discussed above, illness severity and mortality are greatest in high risk populations. Not surprisingly, so are health care costs for treating these cases.[61] Despite information gaps, other influenza models were refined to support analysis by risk class, primarily because modeling these groups is very important for developing vaccination strategies. The approach toward modeling high risk groups in this research is based on the work of Dr. Noelle-Angelique Molinari.

Rather than modeling specific high risk groups, all high risk groups are modeled together. Dr. Molinari's research notes that risk-specific rates of morbidity are not available and therefore the same morbidity rates are used for all individuals regardless of risk. After the total number of influenza cases is determined and split by provider type, cases are further split between low risk cases and high risk cases, which also vary by age. The split by age in this report is based on

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[59] Ibid.
[60] Barry, John. *The Great Influenza*. New York: Viking Penguin; 2004, p. 239.
[61] Molinari, op. cit. p. 5086.

hospitalization and outpatient estimates provided in the Molinari report and smoothed for judgment. Details of the assumptions and calculation of cases by risk class are shown on Exhibit 3, Page 4.

7. OTHER ISSUES

This research focuses on quantifying the economic effects of a pandemic. There are a myriad of issues that complicate this effort, and an even greater number of simplifying assumptions that have been made to bring this project to closure. While it is not possible to elaborate on all of them, several are presented here to provide further insight into how users might adjust assumptions to reflect future changes in the environment or differences in opinions as to baseline assumptions.

7.1 Geography

The approach utilized does not take into account regional or local variations in health care assets. The literature notes important distinctions between urban, suburban and rural access to care. The current system allocates the majority of health care assets such as hospitals in higher density settings. The quality and type of hospital can vary greatly between urban and suburban settings. Suburban hospitals often rely on the ability to transfer patients from rural clinics and low intensity hospital settings to fill high margin secondary and tertiary care beds. Given the increase in demand and potential challenges (including transportation issues), it is unclear whether these sorts of networks will continue to function in the same manner. While these issues are not likely to affect total utilization of health care resources, they might impact the distribution and availability of care.

It has been observed that incidence and severity of influenza can vary by geographic region, sometimes significantly. This has been observed in seasonal influenza as well as in pandemic influenza. It is unclear as to whether these variations are the result of virus mutations, local preparedness, mitigation actions or a combination of all three. For the purposes of this research, no variation by region is assumed. All regional peaks and valleys have been averaged and the results assumed to be homogeneous.

Users of this report could take regional variations or preparedness measures into account in developing their own assumptions. If these adjustments are desired, they may be incorporated in any number of ways through the basic pandemic assumptions or the capacity assumptions in the company-specific spreadsheet tool.

7.2 Mitigation and Intervention

This research has made the assumption that the duration of the pandemic wave will be completed in a time frame that will not allow for the development and large scale distribution of vaccines and antivirals that would materially impact the course of the pandemic. Also assumed are current levels of preparedness in providers that would allow for the throughput of cases as described in the model. The impact of improved communication techniques (radio, TV, Internet, etc.) and strategies for social distancing within populations have not been explicitly accounted for in the model. Individuals who believe that incidence and/or severity can be significantly reduced by these measures can take them into consideration in their own scenarios by modifying the overall morbidity (attack rate) and severity (case distributions).

That said, preparation saves lives. While these actions will not be able to prevent a pandemic, steps that delay the onset and reduce the peak of the pandemic lead to more open beds, more healthy doctors and nurses available to treat patients, and more supplies on hand. While somewhat qualitative in nature, adjustments for these factors can be incorporated into the base scenario assumptions through adjustments to overall assumptions as to mortality and morbidity rates, and more finely through the risk and utilization factors.

7.3 Supply Chain Disruption

Supply chain disruption could impact both the cost and availability of health care services, particularly in the severe scenario. Costs could be affected because

necessary inputs are unavailable for particular services or interventions. Likewise, the number of hospital beds could be reduced as a result of the lack of resources. The net impact would be suboptimal health outcomes and potentially a reduction in costs to the health system. Supply chain management is of particular interest to hospitals and beyond the scope of this research.

7.4 Provider Regulatory Issues

There are three primary types of hospital financial structures in the United States: for profit (stock), not-for-profit (501(c)) and public (government). In terms of both financing and patient mix, it is generally acknowledged that not-for-profit hospitals operate in a manner more consistent with for-profit hospitals than public hospitals. By comparison, health insurance payers' business models include stock insurers, not-for profit insurers and government-sponsored risk pooling mechanisms.

It is unclear how these different provider institutions would behave and interact during the stress of a pandemic, but stakeholder interests are different. As demonstrated, low margin influenza cases would crowd out higher margin elective surgery in some scenarios. Some hospitals might choose to fight in the courts to prevent their institution from being designated as a pandemic facility or primary triage unit for suspected influenza patients. These types of situations were observed during the SARS crisis and have been discussed in legal and academic literature.

The invocation of the Emergency Health Powers Act (coordination of public and private health assets by public health authorities in a declared emergency) would further complicate an already complicated situation. These new laws, passed in over 35 states in response to the challenges faced in 9/11, remain essentially untested. Ensuing legal battles could complicate efforts to manage treatment efforts and patient flow within communities.

7.5 Health Insurance Regulatory Issues

The response of regulators to an ongoing pandemic emergency will play a significant role in how a pandemic event ultimately impacts the industry. The industry is highly regulated. Historically, statutory guidelines have changed incrementally over time. It is unclear how the regulatory community might respond to issues caused by a severe pandemic.

Year-end reporting for companies might well be in the middle of a pandemic. Valuation actuaries are well aware of the challenges they face under the best of times; it may not be possible to meet the requirements of an unqualified actuarial opinion during these conditions. Would reporting deadlines be extended? Would actuaries sign qualified opinions, and what would the response of rating agencies be? How will actuaries, lacking historical data related to incurred but not reported (IBNR) claims during a pandemic, come to a conclusion as to setting their IBNR reserve? Would financially strapped companies be allowed to delay filing annual statements? What purpose would it serve to force premature judgment given the volatility in reserve estimates, asset values and statutory surplus? These and many other difficult issues would arise if a pandemic were to occur before or during year-end reporting cycles.

Under what circumstances would regulators allow for rate increases or permit nonrenewal by geographic region? During recovery, it is possible that there could be a surge in interest in insurance even as insurers may have limited surplus to underwrite risk. How regulators would view denial of coverage in these situations is clearly in uncharted waters.

The accounting and solvency issues previously discussed are better considered in advance than during the heat of the moment. There is no “emergency powers” act enabling an insurance commissioner to waive certain statutory requirements at his discretion or based on discrete triggers. If model legislation were

introduced that at least considered and covered some of these situations, it would give guidance to states as to how to respond. Individual state legislatures could then decide if, when and how to implement the model. Without a model response already considered, insurers will face a hodgepodge of uncoordinated and potentially conflicting regulatory responses. This could open the door for expensive litigation, taking away resources from claims and ultimately policyholders.

7.6 Expenses

The results demonstrate potential claim costs resulting from a pandemic. They do not take into account potentially increased levels of expenses that may be associated with the costs of processing increased claims volume. Private health insurers would need to process increased claims levels but it is unclear whether expenses would increase, and if so by how much.

For self-insured plans using third party administrators (TPAs), expenses are typically contracted on a per member per month charge. Thus, any expense risk would be borne by the TPA administering the business and would presumably not be passed through to the self-insured business in the current plan year. However, counterparty risk could be an issue and self-insured plans would be advised to work with their TPAs to ensure that claims are adjudicated in a timely fashion. How the overall increase in the volume of claims and the impact of a pandemic on available TPA workforce versus potentially delayed submission of claims from providers would ultimately impact expenses is unclear.

Due to these uncertainties, increased expense levels have not been incorporated into the costs. Individual payers will want to examine this assumption and come to their own conclusions and gross-up claims costs accordingly.

7.7 Other Financial Risks

In addition to the financial strain of claims payments quantified in this report, there are a number of additional financial risks that have not been taken into account in this model.

During a moderate to severe pandemic, interest rates and asset values might be affected. This might be comparable to a mild or moderate recession. While lower interest rates would help some asset values, the economic climate would reduce others. The net impact on an insurer's surplus is uncertain. Users of this report should take economic factors into consideration in performing their own modeling.

An economic downturn would compound an already challenging situation. Cash-strapped businesses might cut traditional insurance coverage or fall behind in payments. This would create cash flow strain for insurers just at the time when they most need it to pay claims. Self-insured businesses would be squeezed at both ends, facing increased claims costs while demand and productivity is down.

On the provider's side, hospitals may find themselves challenged administratively to keep up with the billing process due to claim volume and staff illness at the height of a pandemic. If this were to occur, the hospital industry has put forth that between delayed billings, providing influenza services and the downturn in revenue from deferral of elective care, some could find themselves in financial difficulties.[62] Some experts have suggested during discussions at industry meetings that in an emergency, hospitals and payers might wish to establish a

[62] Williams, Vickie. "Fluconomics—Preserving our Hospital Infrastructure during and after a Pandemic," Gonzaga University, bepress Legal Services; 2006.

temporary prospective payment plan similar to the PIP program for Medicare[63] in the 1980s.

Finally, it is important for traditional insurers and self-insurers to evaluate counterparty risk. Insurance companies that provide administrative-services-only support for self-insured plans need to quantify the actual exposure of the insurance company to unpaid claims should self-insured plans fail. Self-insurers are encouraged to examine their own financial situation to estimate additional counterparty risks that they may face that put the company at risk.

7.8 Business Continuity

Pandemic preparedness, a subset of the "all hazard" planning process, is becoming more ingrained in American business culture. Disaster planning is becoming a competitiveness issue, as vendors are being evaluated on their ability to continue providing services, not just price alone. This is, of course, consistent with enterprise risk management and the efficient frontier model, where investment decisions integrate price with risk and return. There are wide potential variations in the potential scenarios analyzed. A business continuity plan that is flexible and can adjust as conditions dictate will serve stakeholders best.

A full discussion of disaster recovery and business continuity planning is outside the scope of this research. Clearly, health insurers need to lead the way in pandemic business continuity planning and have demonstrated this both at the enterprise and industry level.[64] Self-insurers need to be aware of some of the special challenges they will face in running their businesses and benefits plans under these conditions. More emphasis needs to be placed on practical steps

[63] Periodic Interim Payment: A regular payment made to hospitals based on an estimate of annual revenue to help maintain cash flow until cost reports from the current cost reporting period are settled and an annual payment adjustment is made.

[64] Refer to resource list at http://www.ahip.org/content/default.aspx?bc=38|65|20358|20360

that should be taken to prepare for a pandemic, and, more importantly, how the health insurance industry can position itself for recovery.

7.9 Communication

It is important to realize that during this type of public health emergency, one must be skeptical about information, while realizing important decisions will have to be made without access to perfect data. Companies need to have a communication strategy before, during and after a pandemic for both internal customers (employees) and external customers (policyholders, shareholders, rating agencies and regulators). Companies need to decide how to position themselves to respond to the event—or the media may well decide for them. Given the speed and force with which events will unfold, prudent companies will not want to be responsible for developing strategies on the fly during an event or relying on the availability of their public relations assets. At the same time, flexibility of responses as the pandemic plays out is important.

To the extent it is available, solvency communications should be distributed to stakeholders long in advance. During a pandemic, companies will want to communicate with their employees and customers regularly. Companies will want to keep the channels of communication open and let interested parties know that they are staying abreast of the situation. Sample press releases should be prepared in advance for strategic points pre-, during and post-pandemic.

8. CONCLUSIONS

This research has attempted to quantify the impact of pandemic influenza on the health insurance industry while providing companies, regulators and guaranty associations with tools to help them plan for this eventuality. Critical areas for additional research have been cited, including identifying appropriate ranges for stress testing, further quantifying attack rates and distribution by age, costs by provider and payer, and the impact of a pandemic on provider capacity.

Like politics, all health care is local. This research is premised on the assumption of homogeneous distribution of resources and preparedness levels across the country. This is far from the truth. It is incumbent on any user interested in applying these results to their situation to spend time understanding the intricacies of the model before modifying assumptions to appropriately reflect their position.

But deskbound number crunching is only a start. Concern about the current H1N1 and H5N1 influenza subtypes should be leveraged to push the development of infrastructure and processes needed to mitigate the impact of a pandemic event or other surge on hospitals and public health infrastructure. Insurers should continue to take steps to expand their pandemic-specific business continuity efforts and discuss tactical responses to pre-pandemic, pandemic and recovery event stages. The recent experience of the H1N1 pandemic can serve to illustrate strengths and weaknesses of current plans, protocols and relationships and provide a timely opportunity for revisiting problematic areas.

This report is designed to inform the private insurance market as to the financial risks it might face in a pandemic. Businesses do not operate in closed systems; the best continuity plans can be derailed by lack of integration with local planning

efforts. Actuaries bring many assets to the table. Actuaries and their employers should be proactive in reaching out to local officials and take leadership roles in community planning efforts.

Finally, stakeholders need to consider how the industry as a whole will respond under the stress of a pandemic. The industry image will rest to some degree on the ability of all insurers, providers, regulators and guaranty associations to respond effectively to the many challenges a severe pandemic poses. It is my hope that this exercise has educated interested parties about the financial risks a pandemic poses, stimulated them to further consider the consequences of those risks and motivated them to take additional steps to mitigate those risks.

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Exhibits

Traditional Health Insurers Estimated Net Payer Costs as of 2010

		Gross Cost as of 2003 (Millions)		
		Seasonal	Moderate	Severe
(1)	Outpatient	$ 986	$ 3,833	$ 3,258
(2)	Hospital	1,669	4,924	28,213
(3)	Death	148	1,714	29,033
(4)	Gross Cost	2,802	10,471	60,504
(5)	ACF Cost Allocation	$ -	$ -	$ 795
(6)	Deferred Elective Care Allocation	$ -	$ 2,338	$ 18,986
(7)	Net 2003 Payer Cost	$ 2,802	$ 8,133	$ 42,314
(8)	Inflation 2003–2010	60.6%	60.6%	60.6%
(9)	**Est 2010 Gross Cost**	$ 4,500	$ 13,060	$ 67,947

Adjustment for Employee Out-Of-Pocket as of 2010 (Millions)

		Cases by Provider			Subscriber
		Seasonal	Moderate	Severe	OOP Pmnts
(10)	Outpatient	3,466,638	13,495,400	12,031,870	$ 50
(11)	Hospital	72,861	220,744	1,754,926	4,000
(12)	Deaths Hospital	1,582	20,261	458,997	4,000
(13)	**OOP Payments**	$ 471	$ 1,639	$ 9,457	*OOP x Cases*
(14)	*as % of Total*	10.5%	12.5%	13.9%	
(15)	**Net Pre-Tax Cost** (Millions)	$ 4,029	$ 11,421	$ 58,490	
(16)	**Net After-Tax Cost**	$ 2,619	$ 7,424	$ 38,018	
(17)	*Diff. from Seasonal*		$ 4,805	$ 35,399	

Row Notes:

(1) Exhibit 1, Page 2: Column (3) + Column (12)
(2) Exhibit 1, Page 2: Column (6) + Column (15)
(3) Exhibit 1, Page 2: Column (9) + Column (18)
(4) (1) + (2) + (3)
(5) Exhibit 2, Page 7: Column (6) * Fully Insured Population / Population 0 to 69
(6) Exhibit 2, Page 8: Column (10) * Fully Insured Population / Total Private Insurance
(7) (4) + (5) - (6)
(8) Inflation rate based on annual 7% increase
(9) (7) * (8)
(10) Exhibit 1, Page 2: Column (1) + Column (10)
(11) Exhibit 1, Page 2: Column (4) + Column (13)
(12) Exhibit 1, Page 2: Column (7) + Column (16)
(13) Sum of Rows (10), (11), and (12): (Cases by Provider) * (Employee OOP Costs)
(14) (13) / (9)
(15) (13) - (9)
(16) (15) * (1 - 0.35)

Traditional Health Insurers Costs by Provider and Risk Class

Age Range	Outpatient - Low Risk Cases (1)	Charge (2)	Total Costs (3)	Hospitalizations - Low Risk Cases (4)	Charge (5)	Total Costs (6)	Deaths - Low Risk Deaths (7)	Charge (8)	Total Costs (9)
0 - 4	1,208,992	180	217,618,560	32,216	11,000	354,376,000	2,881	35,000	100,835,000
5 - 9	915,573	150	137,335,950	1,994	14,500	28,913,000	283	25,000	7,075,000
10 - 14	881,211	150	132,181,650	2,158	14,500	31,291,000	307	25,000	7,675,000
15 - 19	870,057	150	130,508,550	2,131	14,500	30,899,500	303	25,000	7,575,000
20 - 24	825,931	180	148,667,580	4,055	18,500	75,017,500	302	75,000	22,650,000
25 - 29	772,935	180	139,128,300	5,692	18,500	105,302,000	421	75,000	31,575,000
30 - 34	815,233	180	146,741,940	8,005	18,500	148,092,500	590	75,000	44,250,000
35 - 39	836,294	180	150,532,920	10,264	18,500	189,884,000	911	75,000	68,325,000
40 - 44	910,274	180	163,849,320	13,407	18,500	248,029,500	1,316	75,000	98,700,000
45 - 49	831,359	180	149,644,620	16,369	18,500	302,826,500	1,902	90,000	171,180,000
50 - 54	775,482	250	193,870,500	20,429	22,500	459,652,500	2,371	120,000	284,520,000
55 - 59	643,981	250	160,995,250	19,191	22,500	431,797,500	2,825	120,000	339,000,000
60 - 64	499,918	250	124,979,500	19,051	22,500	428,647,500	2,855	120,000	342,600,000
65 - 69	397,590	225	89,457,750	17,288	12,500	216,100,000	2,804	60,000	168,240,000
70 - 74	-	225	-	-	11,500	-	-	35,500	-
75 - 79	-	225	-	-	11,500	-	-	35,500	-
80 - 84	-	225	-	-	11,500	-	-	35,500	-
85+	-	225	-	-	11,500	-	-	35,500	-
Total	11,184,830		2,085,512,390	172,250		3,050,829,000	20,071		1,694,200,000

Age Range	Outpatient - High Risk Cases (10)	Charge (11)	Total Costs (12)	Hospitalizations - High Risk Cases (13)	Charge (14)	Total Costs (15)	Deaths - High Risk Deaths (16)	Charge (17)	Total Costs (18)
0 - 4	58,295	625	36,434,375	1,488	77,500	115,320,000	5	250,000	1,250,000
5 - 9	93,879	625	58,674,375	196	40,000	7,840,000	1	150,000	150,000
10 - 14	90,356	625	56,472,500	212	40,000	8,480,000	1	150,000	150,000
15 - 19	89,212	625	55,757,500	209	40,000	8,360,000	1	150,000	150,000
20 - 24	133,338	800	106,670,400	624	45,000	28,080,000	2	75,000	150,000
25 - 29	124,783	800	99,826,400	877	45,000	39,465,000	2	75,000	150,000
30 - 34	131,611	800	105,288,800	1,233	45,000	55,485,000	3	75,000	225,000
35 - 39	135,011	800	108,008,800	1,581	45,000	71,145,000	5	75,000	375,000
40 - 44	146,955	800	117,564,000	2,065	45,000	92,925,000	7	75,000	525,000
45 - 49	188,714	800	150,971,200	3,535	45,000	159,075,000	14	90,000	1,260,000
50 - 54	232,947	800	186,357,600	5,821	40,000	232,840,000	22	120,000	2,640,000
55 - 59	308,653	800	246,922,400	8,664	40,000	346,560,000	37	120,000	4,440,000
60 - 64	293,602	800	234,881,600	10,495	40,000	419,800,000	43	120,000	5,160,000
65 - 69	283,214	650	184,089,100	11,494	25,000	287,350,000	47	60,000	2,820,000
70 - 74	-	500	-	-	15,000	-	-	35,500	-
75 - 79	-	500	-	-	15,000	-	-	35,500	-
80 - 84	-	500	-	-	15,000	-	-	35,500	-
85+	-	500	-	-	15,000	-	-	35,500	-
Total	2,310,570		1,747,919,050	48,494		1,872,725,000	190		19,445,000

Column Notes:

(1) Exhibit 1, Page 3: Column (21)
(2) Exhibit 2, Page 2: Column (1)
(3) (1) * (2)
(4) Exhibit 1, Page 3: Column (23)
(5) Exhibit 2, Page 2: Column (5)
(6) (4) * (5)
(7) Exhibit 1, Page 3: Column (24)
(8) Exhibit 2, Page 2: Column (9)
(9) (7) * (8)
(10) Exhibit 1, Page 3: Column (26)
(11) Exhibit 2, Page 2: Column (13)
(12) (10) * (11)
(13) Exhibit 1, Page 3: Column (27)
(14) Exhibit 2, Page 2: Column (17)
(15) (13) * (14)
(16) Exhibit 1, Page 3: Column (28)
(17) Exhibit 2, Page 2: Column (21)
(18) (16) * (17)

Traditional Health Insurers Case Distribution by Provider and Risk Class

Covered Members (1)	100,000,000	Utilization Adjustment (3)	102.5%	ICU Stepdown % (5)	4.0%	
Insured vs Pop Mortality Ratio (2)	57.1%	Risk Adjustment (4)	92.5%	% Deaths in Hospital (6)	95.0%	

Age Range	Distribution by Age By Age (7)	Distribution by Age Members (8)	Mortality Rate (9)	XS Deaths (10)	# Cases Net of Deaths (11)	*Case Distribution by Provider Type* Not Seeking (12)	Outpatient (13)	Hospital (14)	*Number of Cases by Provider Type* Not Seeking (15)	Outpatient (16)	Hospital (17)
0 - 4	7.5%	7,500,000	0.405	3,038	2,246,962	42.1%	56.4%	1.5%	945,971	1,267,287	33,704
5 - 9	7.3%	7,300,000	0.041	299	2,189,701	53.8%	46.1%	0.1%	1,178,059	1,009,452	2,190
10 - 14	7.9%	7,900,000	0.041	324	2,369,676	58.9%	41.0%	0.1%	1,395,739	971,567	2,370
15 - 19	7.8%	7,800,000	0.041	320	2,339,680	58.9%	41.0%	0.1%	1,378,072	959,269	2,340
20 - 24	7.8%	7,800,000	0.041	320	2,339,680	58.8%	41.0%	0.2%	1,375,732	959,269	4,679
25 - 29	7.3%	7,300,000	0.061	445	2,189,555	58.7%	41.0%	0.3%	1,285,269	897,718	6,569
30 - 34	7.7%	7,700,000	0.081	624	2,309,376	58.6%	41.0%	0.4%	1,353,294	946,844	9,238
35 - 39	7.9%	7,900,000	0.122	964	2,369,036	58.5%	41.0%	0.5%	1,385,886	971,305	11,845
40 - 44	8.6%	8,600,000	0.162	1,393	2,578,607	58.4%	41.0%	0.6%	1,505,906	1,057,229	15,472
45 - 49	8.3%	8,300,000	0.243	2,017	2,487,983	58.2%	41.0%	0.8%	1,448,006	1,020,073	19,904
50 - 54	7.3%	7,300,000	0.345	2,519	2,187,481	52.7%	46.1%	1.2%	1,152,802	1,008,429	26,250
55 - 59	6.2%	6,200,000	0.486	3,013	1,856,987	47.2%	51.3%	1.5%	876,498	952,634	27,855
60 - 64	4.7%	4,700,000	0.649	3,050	1,406,950	41.5%	56.4%	2.1%	583,884	793,520	29,546
65 - 69	3.7%	3,700,000	0.811	3,001	1,106,999	35.9%	61.5%	2.6%	397,413	680,804	28,782
70 - 74	0.0%	-	1.216	-	-	25.6%	71.8%	2.6%	-	-	-
75 - 79	0.0%	-	2.027	-	-	15.4%	82.0%	2.6%	-	-	-
80 - 84	0.0%	-	3.041	-	-	15.4%	82.0%	2.6%	-	-	-
85+	0.0%	-	4.075	-	-	15.4%	82.0%	2.6%	-	-	-
	100.0%	100,000,000		21,327	29,978,673				16,262,531	13,495,400	220,744

Age Range	Percent Low Risk (18)	Percent High Risk (19)	*Low Risk Cases by Provider Type* Not Seeking (20)	Outpatient (21)	ACF (22)	Hospital (23)	Dths Hosp (24)	*High Risk Cases by Provider Type* Not Seeking (25)	Outpatient (26)	Hospital (27)	Dths Hosp (28)
0 - 4	95%	4.6%	902,456	1,208,992	-	32,216	2,881	43,515	58,295	1,488	5
5 - 9	91%	9.3%	1,068,500	915,573	-	1,994	283	109,559	93,879	196	1
10 - 14	91%	9.3%	1,265,935	881,211	-	2,158	307	129,804	90,356	212	1
15 - 19	91%	9.3%	1,249,911	870,057	-	2,131	303	128,161	89,212	209	1
20 - 24	86%	13.9%	1,184,505	825,931	-	4,055	302	191,227	133,338	624	2
25 - 29	86%	13.9%	1,106,617	772,935	-	5,692	421	178,652	124,783	877	2
30 - 34	86%	13.9%	1,165,186	815,233	-	8,005	590	188,108	131,611	1,233	3
35 - 39	86%	13.9%	1,193,248	836,294	-	10,264	911	192,638	135,011	1,581	5
40 - 44	86%	13.9%	1,296,585	910,274	-	13,407	1,316	209,321	146,955	2,065	7
45 - 49	82%	18.5%	1,180,125	831,359	-	16,369	1,902	267,881	188,714	3,535	14
50 - 54	77%	23.1%	886,505	775,482	-	20,429	2,371	266,297	232,947	5,821	22
55 - 59	68%	32.4%	592,513	643,981	-	19,191	2,825	283,985	308,653	8,664	37
60 - 64	63%	37.0%	367,847	499,918	-	19,051	2,855	216,037	293,602	10,495	43
65 - 69	58%	41.6%	232,089	397,590	-	17,288	2,804	165,324	283,214	11,494	47
70 - 74	54%	46.3%	-	-	-	-	-	-	-	-	-
75 - 79	49%	50.9%	-	-	-	-	-	-	-	-	-
80 - 84	49%	50.9%	-	-	-	-	-	-	-	-	-
85+	49%	50.9%	-	-	-	-	-	-	-	-	-
Total			13,692,022	11,184,830	-	172,250	20,071	2,570,509	2,310,570	48,494	190

Column Notes:

(1) Fully Insured Population
(2) Exhibit 3, Page 1: Column (3)
(3) Exhibit 3, Page 2: Column (4)
(4) Exhibit 3, Page 2: Column (3)
(5) 1 - Exh 2, Page 5 Total: (Row 31 / Row 32)
(6) Exhibit 2, Page 1: Column (23)
(7) Based on Exhibit 3, Page 1: Column (4)
(8) (7) * (1)
(9) (2) * (Exhibit 3, Page 1: Column (13))
(10) (8) * (9) / 1000
(11) (Exhibit 3, Page 2: Column (1)) * (8) - (9)
(12) 1 - (13) - (14)
(13) (3) * Exhibit 3, Page 3: Column (4)
(14) (3) * Exhibit 3, Page 3: Column (5)
(15) (11) * (12)
(16) (11) * (13)
(17) (11) * (14)
(18) 1- (19)
(19) (4) * Exhibit 3, Page 4: Column (2)
(20) (15) * (18)
(21) (16) * (18)
(22) Exhibit 3, Page 2: Column (2)) / (1) * Population 0 to 69
(23) (17) - (22) - (27)
(24) (10) * (6) - (28)
(25) (15) * (19)
(26) (16) * (19)
(27) (17) * (19) * (1 - (5))
(28) (5) * (6) * (10) * (19)

Self-insured Estimated Net Payer Cost as of 2010

		Gross Cost as of 2003 (Millions)		
		Seasonal	Moderate	Severe
(1)	Outpatient	$ 740	$ 2,875	$ 2,444
(2)	Hospital	1,251	3,693	21,160
(3)	Death	111	1,286	21,775
(4)	Gross Cost	2,102	7,853	45,378
(5)	ACF Cost Allocation	$ -	$ -	$ 597
(6)	Deferred Elective Care Allocation	$ -	$ 1,753	$ 14,239
(7)	Net 2003 Payer Cost	$ 2,102	$ 6,100	$ 31,735
(8)	Inflation 2003–2010	60.6%	60.6%	60.6%
(9)	**Est 2010 Gross Cost**	$ 3,375	$ 9,795	$ 50,960

Adjustment for Employee Out-Of-Pocket as of 2010 (Millions)

		Cases by Provider			Subscriber
		Seasonal	Moderate	Severe	OOP Pmnts
(10)	Outpatient	2,599,977	10,121,551	9,023,903	$ 40
(11)	Hospital	54,647	165,555	1,316,195	2,500
(12)	Deaths Hospital	1,188	15,197	344,248	2,500
(13)	**OOP Payments**	$ 244	$ 857	$ 4,512	*OOP x Cases*
(14)	*as % of Total*	7.2%	8.7%	8.9%	
(15)	**Net Pre-Tax Cost** (Millions)	$ 3,132	$ 8,938	$ 46,448	
(16)	**Net After-Tax Cost**	$ 2,036	$ 5,810	$ 30,191	
(17)	*Diff. from Seasonal*		$ 3,774	$ 28,156	

Row Notes:

(1) Exhibit 1, Page 5: Column (3) + Column (12)
(2) Exhibit 1, Page 5: Column (6) + Column (15)
(3) Exhibit 1, Page 5: Column (9) + Column (18)
(4) (1) + (2) + (3)
(5) Exhibit 2, Page 7: Column (6) * Self-insured Population / Population 0 to 69
(6) Exhibit 2, Page 8: Column (10) * Self-insured Population / Total Private Insurance
(7) (4) + (5) - (6)
(8) Inflation rate based on annual 7% increase
(9) (7) * (8)
(10) Exhibit 1, Page 5: Column (1) + Column (10)
(11) Exhibit 1, Page 5: Column (4) + Column (13)
(12) Exhibit 1, Page 5: Column (7) + Column (16)
(13) Sum of Rows (10), (11), and (12): (Cases by Provider) * (Employee OOP Costs)
(14) (13) / (9)
(15) (13) - (9)
(16) (15) * (1 - 0.35)

Self-insured Costs by Provider and Risk Class

Age Range	Outpatient - Low Risk Cases (1)	Charge (2)	Total Costs (3)	Hospitalizations - Low Risk Cases (4)	Charge (5)	Total Costs (6)	Deaths - Low Risk Deaths (7)	Charge (8)	Total Costs (9)
0 - 4	906,744	180	163,213,920	24,162	11,000	265,782,000	2,160	35,000	75,600,000
5 - 9	686,680	150	103,002,000	1,495	14,500	21,677,500	212	25,000	5,300,000
10 - 14	660,908	150	99,136,200	1,618	14,500	23,461,000	230	25,000	5,750,000
15 - 19	652,543	150	97,881,450	1,598	14,500	23,171,000	227	25,000	5,675,000
20 - 24	619,448	180	111,500,640	3,042	18,500	56,277,000	227	75,000	17,025,000
25 - 29	579,701	180	104,346,180	4,269	18,500	78,976,500	315	75,000	23,625,000
30 - 34	611,425	180	110,056,500	6,004	18,500	111,074,000	443	75,000	33,225,000
35 - 39	627,220	180	112,899,600	7,699	18,500	142,431,500	683	75,000	51,225,000
40 - 44	682,706	180	122,887,080	10,056	18,500	186,036,000	987	75,000	74,025,000
45 - 49	623,520	180	112,233,600	12,277	18,500	227,124,500	1,426	90,000	128,340,000
50 - 54	581,612	250	145,403,000	15,321	22,500	344,722,500	1,778	120,000	213,360,000
55 - 59	482,986	250	120,746,500	14,393	22,500	323,842,500	2,119	120,000	254,280,000
60 - 64	374,938	250	93,734,500	14,288	22,500	321,480,000	2,142	120,000	257,040,000
65 - 69	298,192	225	67,093,200	12,965	12,500	162,062,500	2,102	60,000	126,120,000
70 - 74	-	225	-	-	11,500	-	-	35,500	-
75 - 79	-	225	-	-	11,500	-	-	35,500	-
80 - 84	-	225	-	-	11,500	-	-	35,500	-
85+	-	225	-	-	11,500	-	-	35,500	-
Total	8,388,623		1,564,134,370	129,187		2,288,118,500	15,051		1,270,590,000

Age Range	Outpatient - High Risk Cases (10)	Charge (11)	Total Costs (12)	Hospitalizations - High Risk Cases (13)	Charge (14)	Total Costs (15)	Deaths - High Risk Deaths (16)	Charge (17)	Total Costs (18)
0 - 4	43,721	625	27,325,625	1,116	77,500	86,490,000	4	250,000	1,000,000
5 - 9	70,409	625	44,005,625	147	40,000	5,880,000	1	150,000	150,000
10 - 14	67,767	625	42,354,375	159	40,000	6,360,000	1	150,000	150,000
15 - 19	66,909	625	41,818,125	157	40,000	6,280,000	1	150,000	150,000
20 - 24	100,004	800	80,003,200	468	45,000	21,060,000	1	75,000	75,000
25 - 29	93,587	800	74,869,600	657	45,000	29,565,000	2	75,000	150,000
30 - 34	98,708	800	78,966,400	924	45,000	41,580,000	2	75,000	150,000
35 - 39	101,259	800	81,007,200	1,185	45,000	53,325,000	4	75,000	300,000
40 - 44	110,216	800	88,172,800	1,548	45,000	69,660,000	6	75,000	450,000
45 - 49	141,535	800	113,228,000	2,651	45,000	119,295,000	11	90,000	990,000
50 - 54	174,710	800	139,768,000	4,366	40,000	174,640,000	17	120,000	2,040,000
55 - 59	231,490	800	185,192,000	6,498	40,000	259,920,000	28	120,000	3,360,000
60 - 64	220,202	800	176,161,600	7,871	40,000	314,840,000	32	120,000	3,840,000
65 - 69	212,411	650	138,067,150	8,621	25,000	215,525,000	36	60,000	2,160,000
70 - 74	-	500	-	-	15,000	-	-	35,500	-
75 - 79	-	500	-	-	15,000	-	-	35,500	-
80 - 84	-	500	-	-	15,000	-	-	35,500	-
85+	-	500	-	-	15,000	-	-	35,500	-
Total	1,732,928		1,310,939,700	36,368		1,404,420,000	146		14,965,000

Column Notes:

(1) Exhibit 1, Page 6: Column (21)
(2) Exhibit 2, Page 2: Column (1)
(3) (1) * (2)
(4) Exhibit 1, Page 6: Column (23)
(5) Exhibit 2, Page 2: Column (5)
(6) (4) * (5)
(7) Exhibit 1, Page 6: Column (24)
(8) Exhibit 2, Page 2: Column (9)
(9) (7) * (8)
(10) Exhibit 1, Page 6: Column (26)
(11) Exhibit 2, Page 2: Column (13)
(12) (10) * (11)
(13) Exhibit 1, Page 6: Column (27)
(14) Exhibit 2, Page 2: Column (17)
(15) (13) * (14)
(16) Exhibit 1, Page 6: Column (28)
(17) Exhibit 2, Page 2: Column (21)
(18) (16) * (17)

Self-insured Case Distribution by Provider and Risk Class

Covered Members (1)	75,000,000	Utilization Adjustment (3)	102.5%	ICU Stepdown % (5)	4.0%	
Insured vs Pop Mortality Ratio (2)	57.1%	Risk Adjustment (4)	92.5%	% Deaths in Hospital (6)	95.0%	

Age Range	Distribution by Age By Age (7)	Members (8)	Mortality Rate (9)	XS Deaths (10)	# Cases Net of Deaths (11)	*Case Distribution by Provider Type* Not Seeking (12)	Outpatient (13)	Hospital (14)	*Number of Cases by Provider Type* Not Seeking (15)	Outpatient (16)	Hospital (17)
0 - 4	7.5%	5,625,000	0.405	2,278	1,685,222	42.1%	56.4%	1.5%	709,478	950,465	25,278
5 - 9	7.3%	5,475,000	0.041	224	1,642,276	53.8%	46.1%	0.1%	883,544	757,089	1,642
10 - 14	7.9%	5,925,000	0.041	243	1,777,257	58.9%	41.0%	0.1%	1,046,804	728,675	1,777
15 - 19	7.8%	5,850,000	0.041	240	1,754,760	58.9%	41.0%	0.1%	1,033,554	719,452	1,755
20 - 24	7.8%	5,850,000	0.041	240	1,754,760	58.8%	41.0%	0.2%	1,031,799	719,452	3,510
25 - 29	7.3%	5,475,000	0.061	334	1,642,166	58.7%	41.0%	0.3%	963,951	673,288	4,926
30 - 34	7.7%	5,775,000	0.081	468	1,732,032	58.6%	41.0%	0.4%	1,014,971	710,133	6,928
35 - 39	7.9%	5,925,000	0.122	723	1,776,777	58.5%	41.0%	0.5%	1,039,415	728,479	8,884
40 - 44	8.6%	6,450,000	0.162	1,045	1,933,955	58.4%	41.0%	0.6%	1,129,430	792,922	11,604
45 - 49	8.3%	6,225,000	0.243	1,513	1,865,987	58.2%	41.0%	0.8%	1,086,004	765,055	14,928
50 - 54	7.3%	5,475,000	0.345	1,889	1,640,611	52.7%	46.1%	1.2%	864,602	756,322	19,687
55 - 59	6.2%	4,650,000	0.486	2,260	1,392,740	47.2%	51.3%	1.5%	657,373	714,476	20,891
60 - 64	4.7%	3,525,000	0.649	2,288	1,055,212	41.5%	56.4%	2.1%	437,913	595,140	22,159
65 - 69	3.7%	2,775,000	0.811	2,251	830,249	35.9%	61.5%	2.6%	298,059	510,603	21,586
70 - 74	0.0%	-	1.216	-	-	25.6%	71.8%	2.6%	-	-	-
75 - 79	0.0%	-	2.027	-	-	15.4%	82.0%	2.6%	-	-	-
80 - 84	0.0%	-	3.041	-	-	15.4%	82.0%	2.6%	-	-	-
85+	0.0%	-	4.075	-	-	15.4%	82.0%	2.6%	-	-	-
	100.0%	75,000,000		15,996	22,484,004				12,196,897	10,121,551	165,555

Age Range	Percent Low Risk (18)	Percent High Risk (19)	*Low Risk Cases by Provider Type* Not Seeking (20)	Outpatient (21)	ACF (22)	Hospital (23)	Dths Hosp (24)	*High Risk Cases by Provider Type* Not Seeking (25)	Outpatient (26)	Hospital (27)	Dths Hosp (28)
0 - 4	95%	4.6%	676,842	906,744	-	24,162	2,160	32,636	43,721	1,116	4
5 - 9	91%	9.3%	801,374	686,680	-	1,495	212	82,170	70,409	147	1
10 - 14	91%	9.3%	949,451	660,908	-	1,618	230	97,353	67,767	159	1
15 - 19	91%	9.3%	937,433	652,543	-	1,598	227	96,121	66,909	157	1
20 - 24	86%	13.9%	888,379	619,448	-	3,042	227	143,420	100,004	468	1
25 - 29	86%	13.9%	829,962	579,701	-	4,269	315	133,989	93,587	657	2
30 - 34	86%	13.9%	873,890	611,425	-	6,004	443	141,081	98,708	924	2
35 - 39	86%	13.9%	894,936	627,220	-	7,699	683	144,479	101,259	1,185	4
40 - 44	86%	13.9%	972,439	682,706	-	10,056	987	156,991	110,216	1,548	6
45 - 49	82%	18.5%	885,093	623,520	-	12,277	1,426	200,911	141,535	2,651	11
50 - 54	77%	23.1%	664,879	581,612	-	15,321	1,778	199,723	174,710	4,366	17
55 - 59	68%	32.4%	444,384	482,986	-	14,393	2,119	212,989	231,490	6,498	28
60 - 64	63%	37.0%	275,885	374,938	-	14,288	2,142	162,028	220,202	7,871	32
65 - 69	58%	41.6%	174,066	298,192	-	12,965	2,102	123,993	212,411	8,621	36
70 - 74	54%	46.3%	-	-	-	-	-	-	-	-	-
75 - 79	49%	50.9%	-	-	-	-	-	-	-	-	-
80 - 84	49%	50.9%	-	-	-	-	-	-	-	-	-
85+	49%	50.9%	-	-	-	-	-	-	-	-	-
Total			10,269,013	8,388,623	-	129,187	15,051	1,927,884	1,732,928	36,368	146

Column Notes:

(1) Self-insured Population
(2) Exhibit 3, Page 1: Column (3)
(3) Exhibit 3, Page 2: Column (4)
(4) Exhibit 3, Page 2: Column (3)
(5) 1 - Exh 2, Page 5 Total: (Row 31 / Row 32)
(6) Exhibit 2, Page 1: Column (23)
(7) Based on Exhibit 3, Page 1: Column (4)
(8) (7) * (1)
(9) (2) * (Exhibit 3, Page 1: Column (13))
(10) (8) * (9) / 1000
(11) (Exhibit 3, Page 2: Column (1)) * (8) - (9)
(12) 1 - (13) - (14)
(13) (3) * Exhibit 3, Page 3: Column (4)
(14) (3) * Exhibit 3, Page 3: Column (5)
(15) (11) * (12)
(16) (11) * (13)
(17) (11) * (14)
(18) 1- (19)
(19) (4) * Exhibit 3, Page 4: Column (2)
(20) (15) * (18)
(21) (16) * (18)
(22) Exhibit 3, Page 2: Column (2)) / (1) * Population 0 to 69
(23) (17) - (22) - (27)
(24) (10) * (6) - (28)
(25) (15) * (19)
(26) (16) * (19)
(27) (17) * (19) * (1 - (5))
(28) (5) * (6) * (10) * (19)

Total System Estimated Gross Costs as of 2010

		Gross Cost as of 2003 (Millions)		
		Seasonal	Moderate	Severe
(1)	Outpatient	$ 3,146	$ 13,270	$ 10,354
(2)	Hospital	5,442	16,921	111,066
(3)	Death	1,932	12,132	105,171
(4)	Gross Cost	10,519	42,324	226,592
(5)	ACF Cost Allocation	$ -	$ -	$ 2,172
(6)	Deferred Elective Care Allocation	$ -	$ 11,649	$ 48,115
(7)	Net 2003 Payer Cost	$ 10,519	$ 30,674	$ 180,649
(8)	Inflation 2003–2010	60.6%	60.6%	60.6%
(9)	**2010 Gross Cost**	$ 16,892	$ 49,256	$ 290,082
(10)	*Diff. from Seasonal*		$ 32,365	$ 240,826
(11)	% of National Health Expenditures	0.6%	1.9%	11.2%
(12)	Deaths	42,005	213,045	1,944,149
(13)	Hospitalizations	298,226	889,388	7,912,135

Row Notes:

(1) Exhibit 1, Page 8: Column (4) + Column (14)
(2) Exhibit 1, Page 8: Column (7) + Column (17)
(3) Exhibit 1, Page 8: Column (10) + Column (20)
(4) (1) + (2) + (3)
(5) Exhibit 2, Page 7: Column (6)
(6) Exhibit 2, Page 8: Column (11)
(7) (4) + (5) - (6)
(8) Insurance inflation rate based on annual 7% increase since 2003
(9) (7) * (8)
(11) (9) / 2010 NHE = $2.6 trillion based on 2009 NHE projections
(12) Exhibit 3, Page 1, Col 14
(13) Exhibit 3, Page 3, Col 8

Total Costs by Provider and Risk Group

Age Range	Percent Low Risk	Outpatient - Low Risk			Hospitalizations - Low Risk			Deaths - Low Risk		
		Cases	Charge	Total Costs	Cases	Charge	Total Costs	Deaths	Charge	Total Costs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0 - 4	95.0%	4,809,809	180	865,765,647	131,453	11,000	1,445,984,232	13,139	35,000	459,866,382
5 - 9	90.0%	3,041,209	150	456,181,335	8,146	14,500	118,116,188	1,216	25,000	30,396,757
10 - 14	90.0%	2,332,465	150	349,869,780	7,029	14,500	101,914,700	1,311	25,000	32,783,749
15 - 19	90.0%	1,943,651	150	291,547,620	5,857	14,500	84,926,732	1,286	25,000	32,139,778
20 - 24	85.0%	1,857,056	180	334,270,116	9,351	18,500	172,992,464	1,228	75,000	92,123,577
25 - 29	85.0%	1,731,954	180	311,751,729	13,081	18,500	242,005,752	1,727	75,000	129,497,028
30 - 34	85.0%	1,812,327	180	326,218,797	18,251	18,500	337,639,356	2,398	75,000	179,851,946
35 - 39	85.0%	1,863,347	180	335,402,469	23,456	18,500	433,938,072	3,699	75,000	277,438,409
40 - 44	85.0%	2,040,240	180	367,243,146	30,819	18,500	570,159,344	5,402	75,000	405,131,167
45 - 49	80.0%	1,841,590	180	331,486,272	37,200	18,500	688,205,920	7,317	90,000	658,545,352
50 - 54	75.0%	1,710,690	250	427,672,500	44,300	22,500	996,759,000	8,571	120,000	1,028,574,474
55 - 59	65.0%	1,392,128	250	348,032,100	42,663	22,500	959,924,880	8,863	120,000	1,063,527,114
60 - 64	60.0%	1,268,459	250	317,114,850	47,356	22,500	1,065,501,360	8,328	120,000	999,363,590
65 - 69	55.0%	1,252,775	225	281,874,409	53,907	12,500	673,839,700	7,547	60,000	452,808,316
70 - 74	50.0%	1,132,569	225	254,828,025	42,067	11,500	483,770,040	8,793	35,500	312,148,694
75 - 79	45.0%	1,131,170	225	254,513,239	37,077	11,500	426,385,684	11,490	35,500	407,885,880
80 - 84	45.0%	903,868	225	203,370,244	29,627	11,500	340,710,132	12,931	35,500	459,041,465
85+	45.0%	785,138	225	176,656,140	25,735	11,500	295,956,272	15,145	35,500	537,657,676
Total		32,850,446		6,233,798,417	607,376		9,438,729,828	120,391		7,558,781,354

Age Range	Percent High Risk	Outpatient - High Risk			Hospitalizations - High Risk			Deaths - High Risk		
		Cases	Charge	Total Costs	Cases	Charge	Total Costs	Deaths	Charge	Total Costs
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
0 - 4	5.0%	253,148	625	158,217,406	6,628	77,500	513,661,320	692	250,000	172,882,098
5 - 9	10.0%	337,912	625	211,195,063	865	40,000	34,602,240	135	150,000	20,264,505
10 - 14	10.0%	259,163	625	161,976,750	746	40,000	29,856,000	146	150,000	21,855,833
15 - 19	10.0%	215,961	625	134,975,750	622	40,000	24,879,360	143	150,000	21,426,519
20 - 24	15.0%	327,716	800	262,172,640	1,573	45,000	70,787,520	217	75,000	16,257,102
25 - 29	15.0%	305,639	800	244,511,160	2,201	45,000	99,027,360	305	75,000	22,852,417
30 - 34	15.0%	319,822	800	255,857,880	3,070	45,000	138,160,080	423	75,000	31,738,579
35 - 39	15.0%	328,826	800	263,060,760	3,946	45,000	177,564,960	653	75,000	48,959,719
40 - 44	15.0%	360,042	800	288,033,840	5,185	45,000	233,305,920	953	75,000	71,493,735
45 - 49	20.0%	460,398	800	368,318,080	8,840	45,000	397,785,600	1,829	90,000	164,636,338
50 - 54	25.0%	570,230	800	456,184,000	13,990	40,000	559,584,000	2,857	120,000	342,858,158
55 - 59	35.0%	749,608	800	599,686,080	21,589	40,000	863,546,880	4,772	120,000	572,668,446
60 - 64	40.0%	845,640	800	676,511,680	29,520	40,000	1,180,815,360	5,552	120,000	666,242,393
65 - 69	45.0%	1,024,998	650	666,248,603	41,000	25,000	1,024,995,600	6,175	60,000	370,479,531
70 - 74	50.0%	1,132,569	500	566,284,500	38,831	15,000	582,465,600	8,793	35,500	312,148,694
75 - 79	55.0%	1,382,541	500	691,270,525	41,476	15,000	622,139,760	14,043	35,500	498,527,187
80 - 84	55.0%	1,104,727	500	552,363,625	33,142	15,000	497,130,480	15,804	35,500	561,050,679
85+	55.0%	959,614	500	479,806,800	28,789	15,000	431,830,080	18,511	35,500	657,137,160
Total		10,938,553		7,036,675,141	282,012		7,482,138,120	82,002		4,573,479,093

Column Notes:

(1) 1 - (11)
(2) (1) * (Exhibit 3, Page 3: Column (7))
(3) Exhibit 2, Page 2: Column (1)
(4) (2) * (3)
(5) (1) * (Exhibit 3, Page 3: Column (8)) - (Exhibit 2, Page 7: Column (2)) + (15) * ICU Stepdown % / (1 - ICUStepdown %)
(6) Exhibit 2, Page 2: Column (5)
(7) (5) * (6)
(8) (1) * (Exhibit 3, Page 1: Column (14)) * (Exhibit 2, Page 1: Row (23))
(9) Exhibit 2, Page 2: Column (9)
(11) Exhibit 3, Page 4: Column (2)
(12) (11) * (Exhibit 3, Page 3: Column (7))
(13) Exhibit 2, Page 2: Column (13)
(14) (12) * (13)
(15) (11) * (Exhibit 3, Page 3: Column (8)) * (1 - ICUStepdown %)
(16) Exhibit 2, Page 2: Column (17)
(17) (15) * (16)
(18) (11) * (Exhibit 3, Page 1: Column (14)) * (Exhibit 2, Page 1: Row (23))
(19) Exhibit 2, Page 2: Column (21)
(20) (18) * (19)

Provider Scenario Assumptions

Capacity and Staffing by Provider

						Multiple of Seasonal	
	Hospital Capacity Assumptions						
	Total Capacity	**Selected**	**Seasonal**	**Moderate**	**Severe**	*Moderate*	*Severe*
(1)	Total Hospital Beds	1,041,700	947,000	1,041,700	1,183,750	110%	125%
(2)	Total ICU Beds	94,500	90,000	94,500	99,000	105%	110%
(3)	Total Non-ICU Beds	947,200	857,000	947,200	1,084,750		
(4)	Total Ventilators	110,000	110,000	110,000	110,000		
	Average Utilization for Non-Influenza Patients						
(5)	Average Daily Inpatients	620,350	653,000	620,350	522,400	95%	80%
(6)	ICU Bed Use	64,125	67,500	64,125	60,750	95%	90%
(7)	Non-ICU Bed Use	556,225	585,500	556,225	461,650		
(8)	Ventilator Use	80,750	85,000	80,750	76,500	95%	90%
	Available Capacity for Influenza Patients						
(9)	Hospital Beds	421,350	294,000	421,350	661,350		
(10)	ICU Beds	30,375	22,500	30,375	38,250		
(11)	Non-ICU Beds	390,975	271,500	390,975	623,100		
(12)	Ventilators	29,250	25,000	29,250	33,500		
	Hospital Staffing Considerations						
(13)	# Physicians	247,500	225,000	247,500	225,000	110%	100%
(14)	Physicians Per Bed	0.24	0.24	0.24	0.19		
(15)	# Nurses	1,507,000	1,370,000	1,507,000	1,370,000	110%	100%
(16)	Nurses Per Bed	1.45	1.45	1.45	1.16		
	Hospital Utilization Assumptions						
(17)	Non-ICU Length of Stay	5.0	5.0	5.0	4.0	100%	80%
(18)	ICU Length of Stay	10.0	10.0	10.0	8.0	100%	80%
(19)	Ventilator Length of Stay	10.0	10.0	10.0	8.0	100%	80%
(20)	Hospital Charge Adj.*	10%	0%	10%	50%		
(21)	% Needing ICU Care	15.0%	7.5%	15.0%	15.0%		
(22)	% Needing Ventilators	15.0%	7.5%	15.0%	15.0%		
(23)	% of Deaths Hospitalized	95%	100%	95%	85%	95%	85%
	ACF Considerations						
(24)	Physicians Per Bed	0.07	0.24	0.07	0.04	30%	20%
(25)	Nurses Per Bed	0.87	1.45	0.87	0.46	60%	40%
(26)	Length of Stay	5.0	5.0	5.0	5.0	100%	100%
(27)	Per Diem Charge	500	500	500	500	100%	100%
	Outpatient Capacity Assumptions						
(28)	Total Physicians	920,000	920,000	920,000	966,000	100%	105%
(29)	Total Nurses	2,500,000	2,500,000	2,500,000	2,750,000	100%	110%
(30)	Family Care Factor	1.0	0.5	1.0	1.5	200%	300%

* Reduction in hospital charges as a percentage of reduction in non - ICU length of stay.

Provider Scenario Assumptions

Provider Charges By Scenario, Provider, and Risk Group

Age Range	Outpatient - Low Risk				Hospitalizations - Low Risk				Deaths - Low Risk			
	Selected (1)	Mild (2)	Moderate (3)	Severe (4)	Selected (5)	Mild (6)	Moderate* (7)	Severe* (8)	Selected (9)	Mild (10)	Moderate* (11)	Severe* (12)
0 - 4	180	180	180	180	11,000	11,000	11,000	9,900	35,000	35,000	35,000	31,500
5 - 9	150	150	150	150	14,500	14,500	14,500	13,050	25,000	25,000	25,000	22,500
10 - 14	150	150	150	150	14,500	14,500	14,500	13,050	25,000	25,000	25,000	22,500
15 - 19	150	150	150	150	14,500	14,500	14,500	13,050	25,000	25,000	25,000	22,500
20 - 24	180	180	180	180	18,500	18,500	18,500	16,650	75,000	75,000	75,000	67,500
25 - 29	180	180	180	180	18,500	18,500	18,500	16,650	75,000	75,000	75,000	67,500
30 - 34	180	180	180	180	18,500	18,500	18,500	16,650	75,000	75,000	75,000	67,500
35 - 39	180	180	180	180	18,500	18,500	18,500	16,650	75,000	75,000	75,000	67,500
40 - 44	180	180	180	180	18,500	18,500	18,500	16,650	75,000	75,000	75,000	67,500
45 - 49	180	180	180	180	18,500	18,500	18,500	16,650	90,000	90,000	90,000	81,000
50 - 54	250	250	250	250	22,500	22,500	22,500	20,250	120,000	120,000	120,000	108,000
55 - 59	250	250	250	250	22,500	22,500	22,500	20,250	120,000	120,000	120,000	108,000
60 - 64	250	250	250	250	22,500	22,500	22,500	20,250	120,000	120,000	120,000	108,000
65 - 69	225	225	225	225	12,500	12,500	12,500	11,250	60,000	60,000	60,000	54,000
70 - 74	225	225	225	225	11,500	11,500	11,500	10,350	35,500	35,500	35,500	31,950
75 - 79	225	225	225	225	11,500	11,500	11,500	10,350	35,500	35,500	35,500	31,950
80 - 84	225	225	225	225	11,500	11,500	11,500	10,350	35,500	35,500	35,500	31,950
85+	225	225	225	225	11,500	11,500	11,500	10,350	35,500	35,500	35,500	31,950

Age Range	Outpatient - High Risk				Hospitalizations - High Risk				Deaths - High Risk			
	Selected (13)	Mild (14)	Moderate (15)	Severe (16)	Selected (17)	Mild (18)	Moderate* (19)	Severe* (20)	Selected (21)	Mild (22)	Moderate* (23)	Severe* (24)
0 - 4	625	625	625	625	77,500	77,500	77,500	69,750	250,000	250,000	250,000	225,000
5 - 9	625	625	625	625	40,000	40,000	40,000	36,000	150,000	150,000	150,000	135,000
10 - 14	625	625	625	625	40,000	40,000	40,000	36,000	150,000	150,000	150,000	135,000
15 - 19	625	625	625	625	40,000	40,000	40,000	36,000	150,000	150,000	150,000	135,000
20 - 24	800	800	800	800	45,000	45,000	45,000	40,500	75,000	75,000	75,000	67,500
25 - 29	800	800	800	800	45,000	45,000	45,000	40,500	75,000	75,000	75,000	67,500
30 - 34	800	800	800	800	45,000	45,000	45,000	40,500	75,000	75,000	75,000	67,500
35 - 39	800	800	800	800	45,000	45,000	45,000	40,500	75,000	75,000	75,000	67,500
40 - 44	800	800	800	800	45,000	45,000	45,000	40,500	75,000	75,000	75,000	67,500
45 - 49	800	800	800	800	45,000	45,000	45,000	40,500	90,000	90,000	90,000	81,000
50 - 54	800	800	800	800	40,000	40,000	40,000	36,000	120,000	120,000	120,000	108,000
55 - 59	800	800	800	800	40,000	40,000	40,000	36,000	120,000	120,000	120,000	108,000
60 - 64	800	800	800	800	40,000	40,000	40,000	36,000	120,000	120,000	120,000	108,000
65 - 69	650	650	650	650	25,000	25,000	25,000	22,500	60,000	60,000	60,000	54,000
70 - 74	500	500	500	500	15,000	15,000	15,000	13,500	35,500	35,500	35,500	31,950
75 - 79	500	500	500	500	15,000	15,000	15,000	13,500	35,500	35,500	35,500	31,950
80 - 84	500	500	500	500	15,000	15,000	15,000	13,500	35,500	35,500	35,500	31,950
85+	500	500	500	500	15,000	15,000	15,000	13,500	35,500	35,500	35,500	31,950

* Adjusted by 1/2 of the assumed reduction of length in hospital stay, if any (see Exhibit 2, Page 1)

Provider Scenario Assumptions

Provider Utilization by Week

			Week of Scenario					
	Pandemic Influenza Cases	**Total**	**1**	**2**	**3**	**4**	**5**	**6**
(1)	Hospital Case Distribution		1.9%	3.7%	6.5%	9.9%	13.0%	15.0%
(2)	Hospital Non-ICU Cases	928,014	17,632	34,337	60,321	91,873	120,642	139,202
(3)	Hospital ICU Cases	163,767	3,112	6,059	10,645	16,213	21,290	24,565
(4)	Total Hospital Cases (w/ Deaths)	1,091,781	20,744	40,396	70,966	108,086	141,932	163,767
(5)	Outpatient Case Distribution		7.4%	25.9%	15.7%	11.2%	8.6%	6.9%
(6)	Outpatient Cases	43,788,999	3,240,386	11,341,351	6,874,873	4,904,368	3,765,854	3,021,441
(7)	Provider Case Distribution		1.9%	3.7%	6.5%	9.9%	13.0%	15.0%
(8)	Physician Cases (Hosp + Out)	137,667	2,616	5,094	8,948	13,629	17,897	20,650
(9)	Nurse Cases (Hosp + Out)	374,095	7,108	13,842	24,316	37,035	48,632	56,114
	Weekly Hospital Bed Demand							
(10)	Hospital Non-ICU Bed Demand		12,594	24,526	43,086	65,624	86,173	99,430
(11)	Hospital ICU Bed Demand		3,112	7,393	13,242	20,775	28,238	33,689
(12)	Total Hospital Demand		15,706	31,919	56,328	86,399	114,411	133,119
(13)	Hospital Capacity		421,350	421,350	421,350	421,350	421,350	421,350
(14)	ACF Demand	-	-	-	-	-	-	-
(15)	ACF Staffing - Physician	0.07	-	-	-	-	-	-
(16)	ACF Staffing - Nurses	0.87	-	-	-	-	-	-
	Outpatient Physician Capacity							
(17)	Total Physician Capacity	920,000	920,000	920,000	920,000	920,000	920,000	920,000
(18)	Hospital Demand	247,500	247,500	247,500	247,500	247,500	247,500	247,500
(19)	ACF Demand		-	-	-	-	-	-
(20)	Weekly Physician Illnesses		2,616	5,094	8,948	13,629	17,897	20,650
(21)	Family Care Absences	1.0	2,616	5,094	8,948	13,629	17,897	20,650
(22)	Physicians Remaining		667,268	662,312	654,604	645,242	636,706	631,200
(23)	Weekly Outpatient Caseload		4.9	17.1	10.5	7.6	5.9	4.8
	Outpatient Nurse Capacity							
(24)	Total Nurse Capacity	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000
(25)	Hospital Needs	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000
(26)	ACF Needs		-	-	-	-	-	-
(27)	Weekly Nurse Illnesses		7,108	13,842	24,316	37,035	48,632	56,114
(28)	Family Care Absences	1.0	7,108	13,842	24,316	37,035	48,632	56,114
(29)	Nurses Remaining		978,784	965,316	944,368	918,930	895,736	880,772
(30)	Weekly Outpatient Caseload		3.3	11.7	7.3	5.3	4.2	3.4
	ICU Capacity							
(31)	ICU Bed Capacity	394,875	30,375	30,375	30,375	30,375	30,375	30,375
(32)	ICU Demand	233,954	3,112	7,393	13,242	20,775	28,238	33,689
(33)	Excess ICU Demand	9,475	-	-	-	-	-	3,314
	Ventilator Capacity							
(34)	Ventilator Capacity	351,000	29,250	29,250	29,250	29,250	29,250	29,250
(35)	Patients Needing Ventilators	163,768	3,112	6,059	10,645	16,213	21,290	24,565
(36)	Excess Ventilator Demand	-	-	-	-	-	-	-
	Deaths							
(37)	Total # of deaths from influenza	213,046	-	-	4,048	7,883	13,848	21,091
(38)	# of influenza deaths in hospital	202,394	-	-	3,846	7,489	13,156	20,036

Provider Scenario Assumptions

Provider Utilization by Week

		Week of Scenario							
	Pandemic Influenza Cases	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
(1)	Hospital Case Distribution	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%	0.0%	0.0%
(2)	Hospital Non-ICU Cases	139,202	120,642	91,873	60,321	34,337	17,632	-	-
(3)	Hospital ICU Cases	24,565	21,290	16,213	10,645	6,059	3,112	-	-
(4)	Total Hospital Cases (w/ Deaths)	163,767	141,932	108,086	70,966	40,396	20,744	-	-
(5)	Outpatient Case Distribution	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%	0.0%	0.0%
(6)	Outpatient Cases	2,495,973	2,101,872	1,839,138	1,576,404	1,401,248	1,226,092	-	-
(7)	Provider Case Distribution	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%	0.0%	0.0%
(8)	Physician Cases (Hosp + Out)	20,650	17,897	13,629	8,948	5,094	2,616	-	-
(9)	Nurse Cases (Hosp + Out)	56,114	48,632	37,035	24,316	13,842	7,108	-	-
	Weekly Hospital Bed Demand								
(10)	Hospital Non-ICU Bed Demand	99,430	86,173	65,624	43,086	24,526	12,594	-	-
(11)	Hospital ICU Bed Demand	35,093	31,818	25,337	17,593	10,621	5,709	1,334	-
(12)	Total Hospital Demand	134,523	117,991	90,961	60,679	35,147	18,303	1,334	-
(13)	Hospital Capacity	421,350	421,350	421,350	421,350	421,350	421,350	421,350	-
(14)	ACF Demand	-	-	-	-	-	-	-	-
(15)	ACF Staffing - Physician	-	-	-	-	-	-	-	-
(16)	ACF Staffing - Nurses	-	-	-	-	-	-	-	-
	Outpatient Physician Capacity								
(17)	Total Physician Capacity	920,000	920,000	920,000	920,000	920,000	920,000	920,000	920,000
(18)	Hospital Demand	247,500	247,500	247,500	247,500	247,500	247,500	247,500	247,500
(19)	ACF Demand	-	-	-	-	-	-	-	-
(20)	Weekly Physician Illnesses	20,650	17,897	13,629	8,948	5,094	2,616	-	-
(21)	Family Care Absences	20,650	17,897	13,629	8,948	5,094	2,616	-	-
(22)	Physicians Remaining	631,200	636,706	645,242	654,604	662,312	667,268	672,500	672,500
(23)	Weekly Outpatient Caseload	4.0	3.3	2.9	2.4	2.1	1.8	-	-
	Outpatient Nurse Capacity								
(24)	Total Nurse Capacity	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000
(25)	Hospital Needs	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000	1,507,000
(26)	ACF Needs	-	-	-	-	-	-	-	-
(27)	Weekly Nurse Illnesses	56,114	48,632	37,035	24,316	13,842	7,108	-	-
(28)	Family Care Absences	56,114	48,632	37,035	24,316	13,842	7,108	-	-
(29)	Nurses Remaining	880,772	895,736	918,930	944,368	965,316	978,784	993,000	993,000
(30)	Weekly Outpatient Caseload	2.8	2.3	2.0	1.7	1.5	1.3	-	-
	ICU Capacity								
(31)	ICU Bed Capacity	30,375	30,375	30,375	30,375	30,375	30,375	30,375	-
(32)	ICU Demand	35,093	31,818	25,337	17,593	10,621	5,709	1,334	-
(33)	Excess ICU Demand	4,718	1,443	-	-	-	-	-	-
	Ventilator Capacity								
(34)	Ventilator Capacity	29,250	29,250	29,250	29,250	29,250	29,250	-	-
(35)	Patients Needing Ventilators	24,565	21,290	16,213	10,645	6,059	3,112	-	-
(36)	Excess Ventilator Demand	-	-	-	-	-	-	-	-
	Deaths								
(37)	Total # of deaths from influenza	27,696	31,957	31,957	27,696	21,091	13,848	7,883	4,048
(38)	# of influenza deaths in hospital	26,311	30,359	30,359	26,311	20,036	13,156	7,489	3,846

Provider Scenario Assumptions
Provider Case Distribution

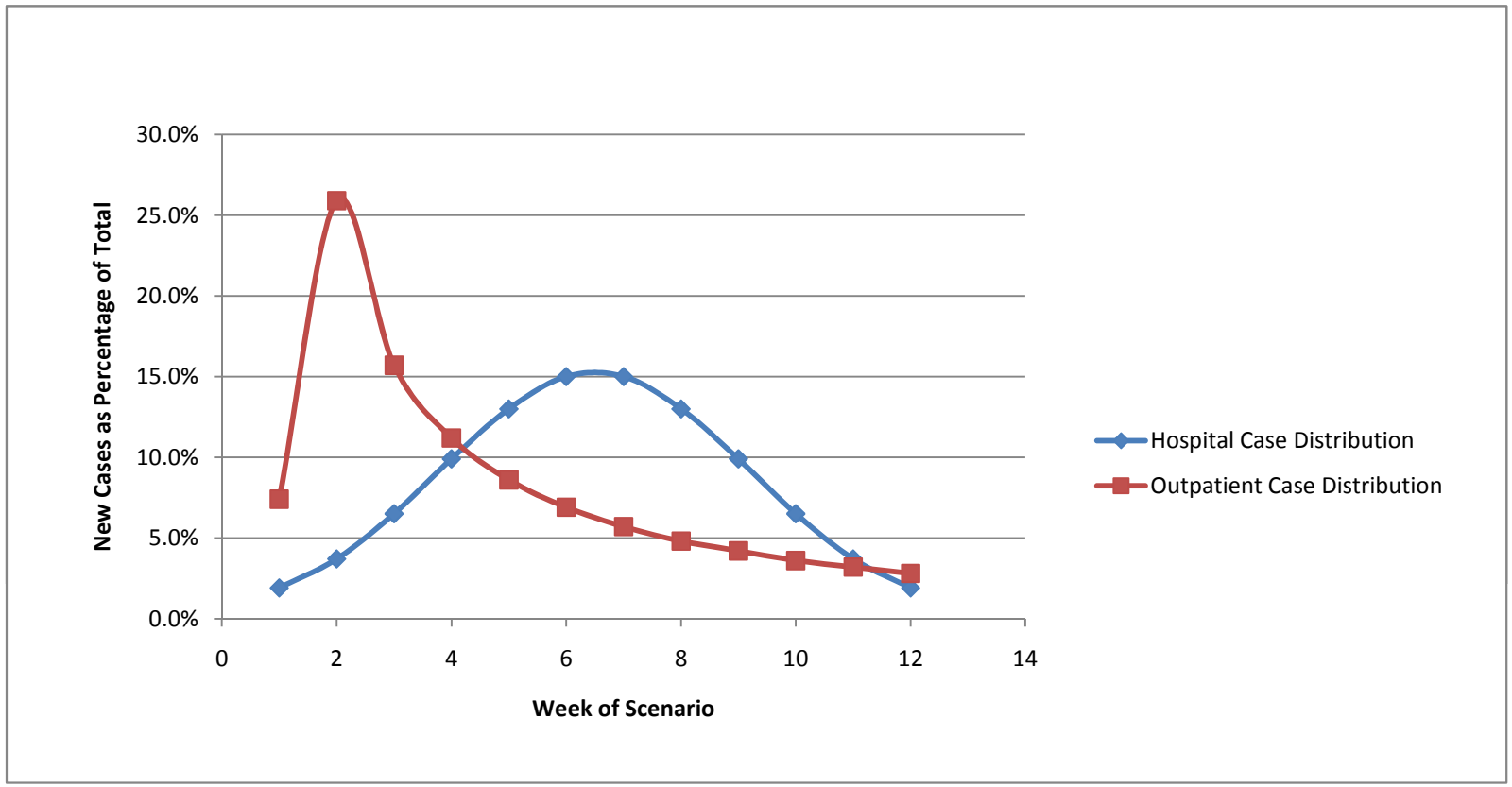
	Week of Scenario											
Hospital Case Distribution	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Distribution 1: Normal	1.9%	3.7%	6.5%	9.9%	13.0%	15.0%	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%
Distribution 2: Weibull	7.4%	25.9%	15.7%	11.2%	8.6%	6.9%	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%
Selected	1.9%	3.7%	6.5%	9.9%	13.0%	15.0%	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%

	Week of Scenario											
Outpatient Case Distribution	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Distribution 1: Normal	1.9%	3.7%	6.5%	9.9%	13.0%	15.0%	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%
Distribution 2: Weibull	7.4%	25.9%	15.7%	11.2%	8.6%	6.9%	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%
Selected	7.4%	25.9%	15.7%	11.2%	8.6%	6.9%	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%

Distribution Input Parameters

Normal Std Deviation Factor	4.5	*Based on Meltzer*
Weibull Alpha	0.4	*Informed by 2009 H1N1*
Weibull Beta	3.0	*Informed by 2009 H1N1*

Provider Scenario Assumptions
Provider Case Distribution



Provider Scenario Assumptions
Alternate Care Facility Costs

Age Range	Distribution (1)	Cases (2)	Length of Stay (3)	Per Diem Charge (4)	Per Stay Charge (5)	Total Charges (6)
0 - 4	0.0%	-	5	$ 500	$ 2,500	-
5 - 9	0.0%	-	5	500	2,500	-
10 - 14	0.0%	-	5	500	2,500	-
15 - 19	1.8%	-	5	500	2,500	$ -
20 - 24	2.9%	-	5	500	2,500	-
25 - 29	4.0%	-	5	500	2,500	-
30 - 34	5.6%	-	5	500	2,500	-
35 - 39	7.3%	-	5	500	2,500	-
40 - 44	9.5%	-	5	500	2,500	-
45 - 49	11.5%	-	5	500	2,500	-
50 - 54	13.6%	-	5	500	2,500	-
55 - 59	13.0%	-	5	500	2,500	-
60 - 64	14.4%	-	5	500	2,500	-
65 - 69	16.3%	-	5	500	2,500	-
70 - 74	0.0%	-	5	500	2,500	-
75 - 79	0.0%	-	5	500	2,500	-
80 - 84	0.0%	-	5	500	2,500	-
85+	0.0%	-	5	500	2,500	-
Total	100%	-				$ -

Column Notes:

(1) Based on low risk hospital distribution
(2) (1) x ACF demand (Exhibit 2, Page 3, Total)
(3) Based on literature review and judgment
(4) Based on literature review and judgment
(5) (3) x (4)
(6) (2) x (5)

Provider Scenario Assumptions
Estimated Value of Deferred Elective Care

		Net Vacancies	Hospital Bed Demand Scenario	Base
(1)	Bed Vacancies	32,650	620,350	653,000

		Private Ins.	Other
(2)	Elective Care Distribution	33.0%	67.0%
(3)	Deferrals by Payer	10,775	21,876
(4)	Avg. Procedure Cost	$ 25,753	$ 29,600

		Private Ins.	Other
(5)	% of Wave Deferring	66.7%	66.7%
(6)	Length of Period Deferring	8	8
(7)	Length of Period (Days)	56	56
(8)	Average Length of Stay	3.8	4.8
(9)	Number of Deferrals	158,861	255,342
(10)	Estimated Value of Deferrals by Payer	$ 4,091,095,800	$ 7,558,116,503
(11)	Est. Total for Wave	$ 11,649,212,303	

Column Notes:

(1) Excess of base bed demand minus scenario bed demand (see Exhibit 2, Page 1)
(2) Distribution of elective care by payor (HCUP data)
(3) (1) x (2)
(4) Average cost of elective procedure\ by payer (HCUP data)
(5) Percentage of wave assumed to be deferring elective care
(6) (5) x Wave Duration (assumes beginning and end of wave not impacted)
(7) (6) x 7
(8) Average length of stay for elective care by payer (HCUP data)
(9) (3) x (7) / (8)
(10) (4) x (9)
(11) Sum by payer

Pandemic Scenario Assumptions
Mortality Distribution

		Seasonal	Moderate	Severe
Population XS Deaths per 1000 (1)	0.71	0.14	0.71	6.48
Distribution by Age (2)	M	*Seasonal "S", Moderate "U" curve, Severe "VV", or 1918 "V\"*		
Mortality Ratio of Insured vs Gen Pop (3)	57.1%	57.1%	57.1%	76.9%

		Distribution of Mortality by Age									
		Seasonal		Moderate "U" Curve		Severe "VV " Curve		1918 "V\ " Curve		Mortality	Total
Age Range	Population (4)	Percentage (5)	Excess qx (6)	Percentage (7)	Excess qx (8)	Percentage (9)	Excess qx (10)	Percentage (11)	Excess qx (12)	Selected (13)	XS Deaths (14)
0 - 4	20,504,919	5%	0.036	100%	0.710	100%	0.710	177%	1.255	0.710	14,558
5 - 9	20,029,162	1%	0.006	10%	0.071	35%	0.249	35%	0.251	0.071	1,422
10 - 14	21,602,009	1%	0.006	10%	0.071	35%	0.249	35%	0.251	0.071	1,534
15 - 19	21,177,681	1%	0.006	10%	0.071	85%	0.604	106%	0.753	0.071	1,504
20 - 24	21,424,399	1%	0.007	10%	0.071	125%	0.888	153%	1.087	0.071	1,521
25 - 29	19,983,531	2%	0.014	15%	0.107	180%	1.278	224%	1.589	0.107	2,138
30 - 34	20,913,321	3%	0.021	20%	0.142	180%	1.278	224%	1.589	0.142	2,970
35 - 39	21,507,166	4%	0.028	30%	0.213	100%	0.710	130%	0.920	0.213	4,581
40 - 44	23,554,480	5%	0.036	40%	0.284	75%	0.533	106%	0.753	0.284	6,689
45 - 49	22,600,601	10%	0.071	60%	0.426	45%	0.320	82%	0.585	0.426	9,628
50 - 54	19,917,402	30%	0.213	85%	0.604	40%	0.284	59%	0.418	0.604	12,030
55 - 59	16,845,766	60%	0.426	120%	0.852	48%	0.341	47%	0.335	0.852	14,353
60 - 64	12,861,425	100%	0.710	160%	1.136	75%	0.533	35%	0.251	1.136	14,611
65 - 69	10,171,582	175%	1.243	200%	1.420	95%	0.675	24%	0.167	1.420	14,444
70 - 74	8,690,804	350%	2.485	300%	2.130	140%	0.994	24%	0.167	2.130	18,511
75 - 79	7,570,871	850%	6.035	500%	3.550	190%	1.349	12%	0.084	3.550	26,877
80 - 84	5,680,255	1400%	9.940	750%	5.325	285%	2.024	12%	0.084	5.325	30,247
85+	4,964,626	1450%	10.295	1005%	7.136	385%	2.734	12%	0.084	7.136	35,428
Total	300,000,000		**0.71**		**0.71**		**0.71**		**0.71**		213,045

Column Notes:

(1) From Life report; based on HHS figures
(2) Selected mortality curve (mortality distribution by age)
(3) Relative impact of pandemic on insured vs general population; includes difference in ratio of high risk individuals, ability to social distance, impact of mitigation, interventions, etc.
(4) 300mm distributed based on US Census projected as of 2004
(5) Seasonal distribution based on Molinari
(7) Hypothetical distribution based on data from 1957 and 1968
(8) (7) x (1)
(9) Hypothetical distribution extrapolating historic data from 1918, 1957 and 1968
(10) (9) x (1)
(11) Hypothetical distribution based on data from 1918
(12) (11) x (1)
(13) Selected scenario excess qx by age

Pandemic Scenario Assumptions
Morbidity Distribution

		Seasonal	Moderate	Severe	
Morbidity (1)	30.0%	8.4%	30.0%	30.0%	
Distribution by Age (2)	M	*Seasonal "S", Moderate "U" curve, Severe "VV", or 1918 "V\"*			
Risk Adjustment Insured vs Gen Pop (3)	92.5%				
Utilization Adjustment Insured vs Gen Pop (4)	102.5%	Seasonal 107.5%	Moderate 102.5%	Severe 97.5%	
Wave Duration (5)	12.0	12	12	12	*Weeks for wave to pass (6 - 24)*

		Distribution of Morbidity by Age									
	Population	Seasonal		Moderate "U" Curve		Severe "VV " Curve		1918 "V\ " Curve		Morbidity	Total
Age Range	Net of Deaths	Percentage	Morbidity	Percentage	Morbidity	Percentage	Morbidity	Percentage	Morbidity	Selected	Cases
	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
0 - 4	20,456,391	240%	72.0%	150%	45.0%	150%	45.0%	200%	60.0%	45.0%	9,205,376
5 - 9	20,024,422	135%	40.5%	125%	37.5%	100%	30.0%	75%	22.5%	37.5%	7,509,158
10 - 14	21,596,897	95%	28.5%	100%	30.0%	75%	22.5%	75%	22.5%	30.0%	6,479,069
15 - 19	21,172,669	85%	25.5%	85%	25.5%	75%	22.5%	75%	22.5%	25.5%	5,399,031
20 - 24	21,419,329	85%	25.5%	85%	25.5%	90%	27.0%	100%	30.0%	25.5%	5,461,929
25 - 29	19,976,404	85%	25.5%	85%	25.5%	150%	45.0%	150%	45.0%	25.5%	5,093,983
30 - 34	20,903,422	85%	25.5%	85%	25.5%	150%	45.0%	175%	52.5%	25.5%	5,330,373
35 - 39	21,491,896	85%	25.5%	85%	25.5%	150%	45.0%	175%	52.5%	25.5%	5,480,433
40 - 44	23,532,182	85%	25.5%	85%	25.5%	150%	45.0%	150%	45.0%	25.5%	6,000,706
45 - 49	22,568,508	80%	24.0%	85%	25.5%	90%	27.0%	100%	30.0%	25.5%	5,754,970
50 - 54	19,877,302	75%	22.5%	85%	25.5%	75%	22.5%	75%	22.5%	25.5%	5,068,712
55 - 59	16,797,924	75%	22.5%	85%	25.5%	50%	15.0%	45%	13.5%	25.5%	4,283,471
60 - 64	12,812,723	75%	22.5%	100%	30.0%	50%	15.0%	25%	7.5%	30.0%	3,843,817
65 - 69	10,123,437	80%	24.0%	125%	37.5%	50%	15.0%	15%	4.5%	37.5%	3,796,289
70 - 74	8,629,099	100%	30.0%	125%	37.5%	50%	15.0%	10%	3.0%	37.5%	3,235,912
75 - 79	7,481,282	115%	34.5%	140%	42.0%	50%	15.0%	10%	3.0%	42.0%	3,142,139
80 - 84	5,579,430	125%	37.5%	150%	45.0%	50%	15.0%	10%	3.0%	45.0%	2,510,744
85+	4,846,534	125%	37.5%	150%	45.0%	50%	15.0%	10%	3.0%	45.0%	2,180,940
Total	299,289,849		**30.0%**		**30.0%**		**30.0%**		**30.2%**		89,777,052

Column Notes:

(1) Seasonal from Molinari; moderate & severe based on HHS
(2) Selected morbidity curve (morbidity distribution by age)
(3) Relative proportion of high risk individuals for insured vs general population
(4) Relative intensity of utilization of services for insureds vs general population
(5) Weeks for a wave to pass. Longer is conservative - allows more services and higher resulting costs.
(6) Census population net of deaths and their proportionate exposures
(7) Based on Molinari
(8) (7) x (1)
(9) Based on moderate distribution of deaths
(10) (9) x (1)
(11) Based on severe "VV" distribution of deaths
(12) (11) x (1)
(13) Based on severe "V\" distribution of deaths
(14) (13) x (1)
(15) Selected scenario morbidity by age
(16) (15) x (6)

Pandemic Scenario Assumptions
Case Distribution by Provider Type

Age Range	Population Net of Deaths (1)	Total Cases (2)	*Case Distribution by Provider Type*			*Number of Cases by Provider Type*		
			Not Seeking (3)	Outpatient (4)	Hospital (5)	Not Seeking (6)	Outpatient (7)	Hospital (8)
0 - 4	20,456,391	9,205,376	43.5%	55.0%	1.5%	4,004,339	5,062,957	138,081
5 - 9	20,024,422	7,509,158	54.9%	45.0%	0.1%	4,121,026	3,379,121	9,011
10 - 14	21,596,897	6,479,069	59.9%	40.0%	0.1%	3,879,667	2,591,628	7,775
15 - 19	21,172,669	5,399,031	59.9%	40.0%	0.1%	3,232,940	2,159,612	6,479
20 - 24	21,419,329	5,461,929	59.8%	40.0%	0.2%	3,266,234	2,184,772	10,924
25 - 29	19,976,404	5,093,983	59.7%	40.0%	0.3%	3,041,108	2,037,593	15,282
30 - 34	20,903,422	5,330,373	59.6%	40.0%	0.4%	3,176,902	2,132,149	21,321
35 - 39	21,491,896	5,480,433	59.5%	40.0%	0.5%	3,260,858	2,192,173	27,402
40 - 44	23,532,182	6,000,706	59.4%	40.0%	0.6%	3,564,419	2,400,282	36,004
45 - 49	22,568,508	5,754,970	59.2%	40.0%	0.8%	3,406,942	2,301,988	46,040
50 - 54	19,877,302	5,068,712	53.9%	45.0%	1.2%	2,729,501	2,280,920	58,290
55 - 59	16,797,924	4,283,471	48.5%	50.0%	1.5%	2,077,483	2,141,736	64,252
60 - 64	12,812,723	3,843,817	43.0%	55.0%	2.0%	1,652,841	2,114,099	76,876
65 - 69	10,123,437	3,796,289	37.5%	60.0%	2.5%	1,423,608	2,277,773	94,907
70 - 74	8,629,099	3,235,912	27.5%	70.0%	2.5%	889,876	2,265,138	80,898
75 - 79	7,481,282	3,142,139	17.5%	80.0%	2.5%	549,874	2,513,711	78,553
80 - 84	5,579,430	2,510,744	17.5%	80.0%	2.5%	439,380	2,008,595	62,769
85+	4,846,534	2,180,940	17.5%	80.0%	2.5%	381,665	1,744,752	54,524
Total	299,289,849	89,777,052				45,098,663	43,788,999	889,388

Range	*Seasonal*			*Moderate "U" Curve*			*Severe "VV " Curve*			*1918 "V\ " Curve*		
	Not Seeking (9)	Outpatient (10)	Hospital (11)	Not Seeking (12)	Outpatient (13)	Hospital (14)	Not Seeking (15)	Outpatient (16)	Hospital (17)	Not Seeking (18)	Outpatient (19)	Hospital (20)
0 - 4	51.1%	47.5%	1.40%	43.5%	55.0%	1.50%	30.0%	55.0%	15.00%	30.0%	55.0%	15.00%
5 - 9	62.4%	37.5%	0.06%	54.9%	45.0%	0.12%	51.5%	45.0%	3.50%	56.5%	40.0%	3.50%
10 - 14	64.9%	35.0%	0.06%	59.9%	40.0%	0.12%	56.5%	40.0%	3.50%	56.5%	40.0%	3.50%
15 - 19	64.9%	35.0%	0.06%	59.9%	40.0%	0.12%	53.0%	40.0%	7.00%	53.0%	40.0%	7.00%
20 - 24	64.9%	35.0%	0.10%	59.8%	40.0%	0.20%	49.0%	40.0%	11.00%	45.0%	45.0%	10.00%
25 - 29	64.8%	35.0%	0.20%	59.7%	40.0%	0.30%	46.0%	40.0%	14.00%	42.0%	45.0%	13.00%
30 - 34	64.7%	35.0%	0.30%	59.6%	40.0%	0.40%	46.0%	40.0%	14.00%	42.0%	45.0%	13.00%
35 - 39	64.6%	35.0%	0.40%	59.5%	40.0%	0.50%	49.0%	40.0%	11.00%	45.0%	45.0%	10.00%
40 - 44	64.4%	35.0%	0.60%	59.4%	40.0%	0.60%	53.0%	40.0%	7.00%	48.0%	45.0%	7.00%
45 - 49	64.1%	35.0%	0.90%	59.2%	40.0%	0.80%	55.0%	40.0%	5.00%	50.0%	45.0%	5.00%
50 - 54	56.0%	42.5%	1.50%	53.9%	45.0%	1.15%	51.5%	45.0%	3.50%	51.5%	45.0%	3.50%
55 - 59	55.5%	42.5%	2.00%	48.5%	50.0%	1.50%	46.5%	50.0%	3.50%	62.5%	35.0%	2.50%
60 - 64	55.0%	42.5%	2.50%	43.0%	55.0%	2.00%	40.0%	55.0%	5.00%	73.5%	25.0%	1.50%
65 - 69	36.5%	60.0%	3.50%	37.5%	60.0%	2.50%	33.0%	60.0%	7.00%	84.0%	15.0%	1.00%
70 - 74	25.5%	70.0%	4.50%	27.5%	70.0%	2.50%	23.0%	70.0%	7.00%	84.0%	15.0%	1.00%
75 - 79	15.5%	80.0%	4.50%	17.5%	80.0%	2.50%	13.0%	80.0%	7.00%	84.0%	15.0%	1.00%
80 - 84	15.5%	80.0%	4.50%	17.5%	80.0%	2.50%	13.0%	80.0%	7.00%	84.0%	15.0%	1.00%
85+	15.5%	80.0%	4.50%	17.5%	80.0%	2.50%	13.0%	80.0%	7.00%	84.0%	15.0%	1.00%

Column Notes:

(1) Exhibit 3, Page 2 Column 6
(2) Exhibit 3, Page 2 Column 16
(3) Based on Scenario
(4) Based on Scenario
(5) Based on Scenario
(6) (3) x (2)
(7) (4) x (2)
(8) (5) x (2)
(9) 1 - (10) - (11)
(10) Based on Molinari research
(11) Based on Molinari research
(12) 1 - (13) - (14)
(13) Based on ratio of moderate vs seasonal morbidity & judgment
(14) Based on ratio of moderate vs seasonal deaths & judgment
(15) 1 - (16) - (17)
(16) Based on ratio of severe vs moderate morbidity by age & judgment
(17) Based on ratio of severe vs moderate mortality by age & judgment
(18) 1 - (19) - (20)
(19) Based on ratio of 1918 vs moderate morbidity by age & judgment
(20) Based on ratio of 1918 vs moderate mortality by age & judgment

Pandemic Scenario Assumptions
Case Distribution by Risk Class

Age Range	Percent Low Risk (1)	Percent High Risk (2)	*Number of Cases by Provider Type* Not Seeking (3)	Outpatient (4)	Hospital (5)	*Low Risk Cases by Provider Type* Not Seeking (6)	Outpatient (7)	Hospital (8)	*High Risk Cases by Provider Type* Not Seeking (9)	Outpatient (10)	Hospital (11)
0 - 4	95%	5%	4,004,339	5,062,957	138,081	3,804,122	4,809,809	131,177	200,217	253,148	6,904
5 - 9	90%	10%	4,121,026	3,379,121	9,011	3,708,923	3,041,209	8,110	412,103	337,912	901
10 - 14	90%	10%	3,879,667	2,591,628	7,775	3,491,700	2,332,465	6,998	387,967	259,163	778
15 - 19	90%	10%	3,232,940	2,159,612	6,479	2,909,646	1,943,651	5,831	323,294	215,961	648
20 - 24	85%	15%	3,266,234	2,184,772	10,924	2,776,299	1,857,056	9,285	489,935	327,716	1,639
25 - 29	85%	15%	3,041,108	2,037,593	15,282	2,584,942	1,731,954	12,990	456,166	305,639	2,292
30 - 34	85%	15%	3,176,902	2,132,149	21,321	2,700,367	1,812,327	18,123	476,535	319,822	3,198
35 - 39	85%	15%	3,260,858	2,192,173	27,402	2,771,729	1,863,347	23,292	489,129	328,826	4,110
40 - 44	85%	15%	3,564,419	2,400,282	36,004	3,029,756	2,040,240	30,603	534,663	360,042	5,401
45 - 49	80%	20%	3,406,942	2,301,988	46,040	2,725,554	1,841,590	36,832	681,388	460,398	9,208
50 - 54	75%	25%	2,729,501	2,280,920	58,290	2,047,126	1,710,690	43,718	682,375	570,230	14,573
55 - 59	65%	35%	2,077,483	2,141,736	64,252	1,350,364	1,392,128	41,764	727,119	749,608	22,488
60 - 64	60%	40%	1,652,841	2,114,099	76,876	991,705	1,268,459	46,126	661,136	845,640	30,750
65 - 69	55%	45%	1,423,608	2,277,773	94,907	782,984	1,252,775	52,199	640,624	1,024,998	42,708
70 - 74	50%	50%	889,876	2,265,138	80,898	444,938	1,132,569	40,449	444,938	1,132,569	40,449
75 - 79	45%	55%	549,874	2,513,711	78,553	247,443	1,131,170	35,349	302,431	1,382,541	43,204
80 - 84	45%	55%	439,380	2,008,595	62,769	197,721	903,868	28,246	241,659	1,104,727	34,523
85+	45%	55%	381,665	1,744,752	54,524	171,749	785,138	24,536	209,916	959,614	29,988
Total			45,098,663	43,788,999	889,388	36,737,068	32,850,446	595,626	8,361,595	10,938,553	293,762

Column Notes:

(1) 1 - (2)
(2) Based on Molinari research
(3) Exhibit 3, Page 3, Column 6
(4) Exhibit 3, Page 3, Column 7
(5) Exhibit 3, Page 3, Column 8
(6) (1) x (3)
(7) (1) x (4)
(8) (1) x (5)
(9) (2) x (3)
(10) (2) x (4)
(11) (2) x (5)

Traditional Health Insurers Estimated Net Payer Costs as of 2010

		Gross Cost as of 2003 (Millions)		
		Seasonal	Moderate	Severe
(1)	Outpatient	$ 986	$ 3,833	$ 3,258
(2)	Hospital	1,669	4,924	28,213
(3)	Death	148	1,714	29,033
(4)	Gross Cost	2,802	10,471	60,504
(5)	ACF Cost Allocation	$ -	$ -	$ 795
(6)	Deferred Elective Care Allocation	$ -	$ 2,338	$ 18,986
(7)	Net 2003 Payer Cost	$ 2,802	$ 8,133	$ 42,314
(8)	Inflation 2003–2010	60.6%	60.6%	60.6%
(9)	**Est 2010 Gross Cost**	$ 4,500	$ 13,060	$ 67,947

Adjustment for Employee Out-Of-Pocket as of 2010 (Millions)

		Cases by Provider			Subscriber
		Seasonal	Moderate	Severe	OOP Pmnts
(10)	Outpatient	3,466,638	13,495,400	12,031,870	$ 50
(11)	Hospital	72,861	220,744	1,754,926	4,000
(12)	Deaths Hospital	1,582	20,261	458,997	4,000
(13)	**OOP Payments**	$ 471	$ 1,639	$ 9,457	*OOP x Cases*
(14)	*as % of Total*	10.5%	12.5%	13.9%	
(15)	**Net Pre-Tax Cost** (Millions)	$ 4,029	$ 11,421	$ 58,490	
(16)	**Net After-Tax Cost**	$ 2,619	$ 7,424	$ 38,018	
(17)	*Diff. from Seasonal*		$ 4,805	$ 35,399	

Row Notes:

(1) Exhibit 1, Page 2: Column (3) + Column (12)
(2) Exhibit 1, Page 2: Column (6) + Column (15)
(3) Exhibit 1, Page 2: Column (9) + Column (18)
(4) (1) + (2) + (3)
(5) Exhibit 2, Page 7: Column (6) * Fully Insured Population / Population 0 to 69
(6) Exhibit 2, Page 8: Column (10) * Fully Insured Population / Total Private Insurance
(7) (4) + (5) - (6)
(8) Inflation rate based on annual 7% increase
(9) (7) * (8)
(10) Exhibit 1, Page 2: Column (1) + Column (10)
(11) Exhibit 1, Page 2: Column (4) + Column (13)
(12) Exhibit 1, Page 2: Column (7) + Column (16)
(13) Sum of Rows (10), (11), and (12): (Cases by Provider) * (Employee OOP Costs)
(14) (13) / (9)
(15) (13) - (9)
(16) (15) * (1 - 0.35)

Traditional Health Insurers Costs by Provider and Risk Class

Age Range	Outpatient - Low Risk Cases (1)	Charge (2)	Total Costs (3)	Hospitalizations - Low Risk Cases (4)	Charge (5)	Total Costs (6)	Deaths - Low Risk Deaths (7)	Charge (8)	Total Costs (9)
0 - 4	1,116,756	180	201,016,080	314,898	9,900	3,117,490,200	54,247	31,500	1,708,780,500
5 - 9	770,122	150	115,518,300	72,164	13,050	941,740,200	10,185	22,500	229,162,500
10 - 14	833,419	150	125,012,850	78,096	13,050	1,019,152,800	11,022	22,500	247,995,000
15 - 19	813,152	150	121,972,800	133,322	13,050	1,739,852,100	32,648	22,500	734,580,000
20 - 24	861,973	180	155,155,140	180,772	16,650	3,009,853,800	45,460	67,500	3,068,550,000
25 - 29	796,998	180	143,459,640	196,393	16,650	3,269,943,450	62,187	67,500	4,197,622,500
30 - 34	840,668	180	151,320,240	196,847	16,650	3,277,502,550	65,595	67,500	4,427,662,500
35 - 39	876,530	180	157,775,400	158,339	16,650	2,636,344,350	38,959	67,500	2,629,732,500
40 - 44	958,012	180	172,442,160	125,832	16,650	2,095,102,800	34,700	67,500	2,342,250,000
45 - 49	878,682	180	158,162,760	97,164	16,650	1,617,780,600	25,074	81,000	2,030,994,000
50 - 54	732,091	250	183,022,750	61,504	20,250	1,245,456,000	15,141	108,000	1,635,228,000
55 - 59	425,404	250	106,351,000	38,191	20,250	773,367,750	9,447	108,000	1,020,276,000
60 - 64	215,473	250	53,868,250	18,290	20,250	370,372,500	5,135	108,000	554,580,000
65 - 69	94,273	225	21,211,425	9,497	11,250	106,841,250	2,571	54,000	138,834,000
70 - 74	-	225	-	-	10,350	-	-	31,950	-
75 - 79	-	225	-	-	10,350	-	-	31,950	-
80 - 84	-	225	-	-	10,350	-	-	31,950	-
85+	-	225	-	-	10,350	-	-	31,950	-
Total	10,213,553		1,866,288,795	1,681,309		25,220,800,350	412,371		24,966,247,500

Age Range	Outpatient - High Risk Cases (10)	Charge (11)	Total Costs (12)	Hospitalizations - High Risk Cases (13)	Charge (14)	Total Costs (15)	Deaths - High Risk Deaths (16)	Charge (17)	Total Costs (18)
0 - 4	53,848	625	33,655,000	3,960	69,750	276,210,000	1,885	225,000	424,125,000
5 - 9	78,965	625	49,353,125	1,859	36,000	66,924,000	742	135,000	100,170,000
10 - 14	85,455	625	53,409,375	2,011	36,000	72,396,000	803	135,000	108,405,000
15 - 19	83,377	625	52,110,625	3,925	36,000	141,300,000	2,378	135,000	321,030,000
20 - 24	139,157	800	111,325,600	8,387	40,500	339,673,500	5,134	67,500	346,545,000
25 - 29	128,667	800	102,933,600	10,050	40,500	407,025,000	7,023	67,500	474,052,500
30 - 34	135,718	800	108,574,400	10,601	40,500	429,340,500	7,408	67,500	500,040,000
35 - 39	141,507	800	113,205,600	8,529	40,500	345,424,500	4,400	67,500	297,000,000
40 - 44	154,662	800	123,729,600	6,468	40,500	261,954,000	3,919	67,500	264,532,500
45 - 49	199,456	800	159,564,800	6,011	40,500	243,445,500	3,915	81,000	317,115,000
50 - 54	219,913	800	175,930,400	4,599	36,000	165,564,000	3,071	108,000	331,668,000
55 - 59	203,892	800	163,113,600	3,875	36,000	139,500,000	2,927	108,000	316,116,000
60 - 64	126,547	800	101,237,600	2,100	36,000	75,600,000	1,900	108,000	205,200,000
65 - 69	67,153	650	43,649,450	1,242	22,500	27,945,000	1,121	54,000	60,534,000
70 - 74	-	500	-	-	13,500	-	-	31,950	-
75 - 79	-	500	-	-	13,500	-	-	31,950	-
80 - 84	-	500	-	-	13,500	-	-	31,950	-
85+	-	500	-	-	13,500	-	-	31,950	-
Total	1,818,317		1,391,792,775	73,617		2,992,302,000	46,626		4,066,533,000

Column Notes:

(1) Exhibit 1, Page 3: Column (21)
(2) Exhibit 2, Page 2: Column (1)
(3) (1) * (2)
(4) Exhibit 1, Page 3: Column (23)
(5) Exhibit 2, Page 2: Column (5)
(6) (4) * (5)
(7) Exhibit 1, Page 3: Column (24)
(8) Exhibit 2, Page 2: Column (9)
(9) (7) * (8)
(10) Exhibit 1, Page 3: Column (26)
(11) Exhibit 2, Page 2: Column (13)
(12) (10) * (11)
(13) Exhibit 1, Page 3: Column (27)
(14) Exhibit 2, Page 2: Column (17)
(15) (13) * (14)
(16) Exhibit 1, Page 3: Column (28)
(17) Exhibit 2, Page 2: Column (21)
(18) (16) * (17)

Traditional Health Insurers Case Distribution by Provider and Risk Class

Covered Members (1)	100,000,000	Utilization Adjustment (3)	97.5%	ICU Stepdown % (5)	73.0%	
Insured vs Pop Mortality Ratio (2)	76.9%	Risk Adjustment (4)	92.5%	% Deaths in Hospital (6)	85.0%	

Age Range	Distribution by Age		Mortality		# Cases	*Case Distribution by Provider Type*			*Number of Cases by Provider Type*		
	By Age	Members	Rate	XS Deaths	Net of Deaths	Not Seeking	Outpatient	Hospital	Not Seeking	Outpatient	Hospital
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
0 - 4	7.5%	7,500,000	8.805	66,038	2,183,962	31.8%	53.6%	14.6%	694,500	1,170,604	318,858
5 - 9	7.3%	7,300,000	1.761	12,855	2,177,145	57.6%	39.0%	3.4%	1,254,036	849,087	74,023
10 - 14	7.9%	7,900,000	1.761	13,912	2,356,088	57.6%	39.0%	3.4%	1,357,107	918,874	80,107
15 - 19	7.8%	7,800,000	5.283	41,207	2,298,793	54.2%	39.0%	6.8%	1,245,946	896,529	156,318
20 - 24	7.8%	7,800,000	7.631	59,522	2,280,478	46.3%	43.9%	9.8%	1,055,861	1,001,130	223,487
25 - 29	7.3%	7,300,000	11.154	81,424	2,108,576	43.4%	43.9%	12.7%	915,122	925,665	267,789
30 - 34	7.7%	7,700,000	11.154	85,886	2,224,114	43.4%	43.9%	12.7%	965,265	976,386	282,462
35 - 39	7.9%	7,900,000	6.457	51,010	2,318,990	46.3%	43.9%	9.8%	1,073,692	1,018,037	227,261
40 - 44	8.6%	8,600,000	5.283	45,434	2,534,566	49.3%	43.9%	6.8%	1,249,541	1,112,674	172,350
45 - 49	8.3%	8,300,000	4.109	34,105	2,455,895	51.2%	43.9%	4.9%	1,257,418	1,078,138	120,339
50 - 54	7.3%	7,300,000	2.935	21,426	2,168,574	52.7%	43.9%	3.4%	1,142,838	952,004	73,732
55 - 59	6.2%	6,200,000	2.348	14,558	1,845,442	63.5%	34.1%	2.4%	1,171,856	629,296	44,291
60 - 64	4.7%	4,700,000	1.761	8,277	1,401,723	74.1%	24.4%	1.5%	1,038,677	342,020	21,026
65 - 69	3.7%	3,700,000	1.174	4,344	1,105,656	84.4%	14.6%	1.0%	933,174	161,426	11,057
70 - 74	0.0%	-	1.174	-	-	84.4%	14.6%	1.0%	-	-	-
75 - 79	0.0%	-	0.587	-	-	84.4%	14.6%	1.0%	-	-	-
80 - 84	0.0%	-	0.587	-	-	84.4%	14.6%	1.0%	-	-	-
85+	0.0%	-	0.587	-	-	84.4%	14.6%	1.0%	-	-	-
	100.0%	100,000,000		539,998	29,460,002				15,355,033	12,031,870	2,073,100

Age Range	Percent Low Risk	Percent High Risk	*Low Risk Cases by Provider Type*					*High Risk Cases by Provider Type*			
	(18)	(19)	Not Seeking (20)	Outpatient (21)	ACF (22)	Hospital (23)	Dths Hosp (24)	Not Seeking (25)	Outpatient (26)	Hospital (27)	Dths Hosp (28)
0 - 4	95%	4.6%	662,553	1,116,756	-	314,898	54,247	31,947	53,848	3,960	1,885
5 - 9	91%	9.3%	1,137,411	770,122	-	72,164	10,185	116,625	78,965	1,859	742
10 - 14	91%	9.3%	1,230,896	833,419	-	78,096	11,022	126,211	85,455	2,011	803
15 - 19	91%	9.3%	1,130,073	813,152	19,071	133,322	32,648	115,873	83,377	3,925	2,378
20 - 24	86%	13.9%	909,096	861,973	34,328	180,772	45,460	146,765	139,157	8,387	5,134
25 - 29	86%	13.9%	787,920	796,998	61,346	196,393	62,187	127,202	128,667	10,050	7,023
30 - 34	86%	13.9%	831,093	840,668	75,014	196,847	65,595	134,172	135,718	10,601	7,408
35 - 39	86%	13.9%	924,449	876,530	60,393	158,339	38,959	149,243	141,507	8,529	4,400
40 - 44	86%	13.9%	1,075,855	958,012	40,050	125,832	34,700	173,686	154,662	6,468	3,919
45 - 49	82%	18.5%	1,024,796	878,682	17,164	97,164	25,074	232,622	199,456	6,011	3,915
50 - 54	77%	23.1%	878,842	732,091	7,629	61,504	15,141	263,996	219,913	4,599	3,071
55 - 59	68%	32.4%	792,175	425,404	2,225	38,191	9,447	379,681	203,892	3,875	2,927
60 - 64	63%	37.0%	654,367	215,473	636	18,290	5,135	384,310	126,547	2,100	1,900
65 - 69	58%	41.6%	544,974	94,273	318	9,497	2,571	388,200	67,153	1,242	1,121
70 - 74	54%	46.3%	-	-	-	-	-	-	-	-	-
75 - 79	49%	50.9%	-	-	-	-	-	-	-	-	-
80 - 84	49%	50.9%	-	-	-	-	-	-	-	-	-
85+	49%	50.9%	-	-	-	-	-	-	-	-	-
Total			12,584,500	10,213,553	318,174	1,681,309	412,371	2,770,533	1,818,317	73,617	46,626

Column Notes:

(1) Fully Insured Population
(2) Exhibit 3, Page 1: Column (3)
(3) Exhibit 3, Page 2: Column (4)
(4) Exhibit 3, Page 2: Column (3)
(5) 1 - Exh 2, Page 5 Total: (Row 31 / Row 32)
(6) Exhibit 2, Page 1: Column (23)
(7) Based on Exhibit 3, Page 1: Column (4)
(8) (7) * (1)
(9) (2) * (Exhibit 3, Page 1: Column (13))
(10) (8) * (9) / 1000
(11) (Exhibit 3, Page 2: Column (1)) * (8) - (9)
(12) 1 - (13) - (14)
(13) (3) * Exhibit 3, Page 3: Column (4)
(14) (3) * Exhibit 3, Page 3: Column (5)
(15) (11) * (12)
(16) (11) * (13)
(17) (11) * (14)
(18) 1- (19)
(19) (4) * Exhibit 3, Page 4: Column (2)
(20) (15) * (18)
(21) (16) * (18)
(22) Exhibit 3, Page 2: Column (2)) / (1) * Population 0 to 69
(23) (17) - (22) - (27)
(24) (10) * (6) - (28)
(25) (15) * (19)
(26) (16) * (19)
(27) (17) * (19) * (1 - (5))
(28) (5) * (6) * (10) * (19)

Self-insured Estimated Net Payer Cost as of 2010

		Gross Cost as of 2003 (Millions)		
		Seasonal	Moderate	Severe
(1)	Outpatient	$ 740	$ 2,875	$ 2,444
(2)	Hospital	1,251	3,693	21,160
(3)	Death	111	1,286	21,775
(4)	Gross Cost	2,102	7,853	45,378
(5)	ACF Cost Allocation	$ -	$ -	$ 597
(6)	Deferred Elective Care Allocation	$ -	$ 1,753	$ 14,239
(7)	Net 2003 Payer Cost	$ 2,102	$ 6,100	$ 31,735
(8)	Inflation 2003–2010	60.6%	60.6%	60.6%
(9)	**Est 2010 Gross Cost**	$ 3,375	$ 9,795	$ 50,960

Adjustment for Employee Out-Of-Pocket as of 2010 (Millions)

		Cases by Provider			Subscriber
		Seasonal	Moderate	Severe	OOP Pmnts
(10)	Outpatient	2,599,977	10,121,551	9,023,903	$ 40
(11)	Hospital	54,647	165,555	1,316,195	2,500
(12)	Deaths Hospital	1,188	15,197	344,248	2,500
(13)	**OOP Payments**	$ 244	$ 857	$ 4,512	*OOP x Cases*
(14)	*as % of Total*	7.2%	8.7%	8.9%	
(15)	**Net Pre-Tax Cost** (Millions)	$ 3,132	$ 8,938	$ 46,448	
(16)	**Net After-Tax Cost**	$ 2,036	$ 5,810	$ 30,191	
(17)	*Diff. from Seasonal*		$ 3,774	$ 28,156	

Row Notes:

(1) Exhibit 1, Page 5: Column (3) + Column (12)
(2) Exhibit 1, Page 5: Column (6) + Column (15)
(3) Exhibit 1, Page 5: Column (9) + Column (18)
(4) (1) + (2) + (3)
(5) Exhibit 2, Page 7: Column (6) * Self-insured Population / Population 0 to 69
(6) Exhibit 2, Page 8: Column (10) * Self-insured Population / Total Private Insurance
(7) (4) + (5) - (6)
(8) Inflation rate based on annual 7% increase
(9) (7) * (8)
(10) Exhibit 1, Page 5: Column (1) + Column (10)
(11) Exhibit 1, Page 5: Column (4) + Column (13)
(12) Exhibit 1, Page 5: Column (7) + Column (16)
(13) Sum of Rows (10), (11), and (12): (Cases by Provider) * (Employee OOP Costs)
(14) (13) / (9)
(15) (13) - (9)
(16) (15) * (1 - 0.35)

Self-insured Costs by Provider and Risk Class

Age Range	Outpatient - Low Risk Cases (1)	Charge (2)	Total Costs (3)	Hospitalizations - Low Risk Cases (4)	Charge (5)	Total Costs (6)	Deaths - Low Risk Deaths (7)	Charge (8)	Total Costs (9)
0 - 4	837,567	180	150,762,060	236,174	9,900	2,338,122,600	40,685	31,500	1,281,577,500
5 - 9	577,591	150	86,638,650	54,123	13,050	706,305,150	7,639	22,500	171,877,500
10 - 14	625,064	150	93,759,600	58,571	13,050	764,351,550	8,267	22,500	186,007,500
15 - 19	609,864	150	91,479,600	99,990	13,050	1,304,869,500	24,487	22,500	550,957,500
20 - 24	646,480	180	116,366,400	135,578	16,650	2,257,373,700	34,095	67,500	2,301,412,500
25 - 29	597,748	180	107,594,640	147,294	16,650	2,452,445,100	46,641	67,500	3,148,267,500
30 - 34	630,502	180	113,490,360	147,636	16,650	2,458,139,400	49,196	67,500	3,320,730,000
35 - 39	657,397	180	118,331,460	118,755	16,650	1,977,270,750	29,219	67,500	1,972,282,500
40 - 44	718,510	180	129,331,800	94,375	16,650	1,571,343,750	26,025	67,500	1,756,687,500
45 - 49	659,011	180	118,621,980	72,873	16,650	1,213,335,450	18,806	81,000	1,523,286,000
50 - 54	549,068	250	137,267,000	46,129	20,250	934,112,250	11,356	108,000	1,226,448,000
55 - 59	319,053	250	79,763,250	28,643	20,250	580,020,750	7,085	108,000	765,180,000
60 - 64	161,604	250	40,401,000	13,717	20,250	277,769,250	3,852	108,000	416,016,000
65 - 69	70,704	225	15,908,400	7,123	11,250	80,133,750	1,928	54,000	104,112,000
70 - 74	-	225	-	-	10,350	-	-	31,950	-
75 - 79	-	225	-	-	10,350	-	-	31,950	-
80 - 84	-	225	-	-	10,350	-	-	31,950	-
85+	-	225	-	-	10,350	-	-	31,950	-
Total	7,660,163		1,399,716,200	1,260,981		18,915,592,950	309,281		18,724,842,000

Age Range	Outpatient - High Risk Cases (10)	Charge (11)	Total Costs (12)	Hospitalizations - High Risk Cases (13)	Charge (14)	Total Costs (15)	Deaths - High Risk Deaths (16)	Charge (17)	Total Costs (18)
0 - 4	40,386	625	25,241,250	2,970	69,750	207,157,500	1,414	225,000	318,150,000
5 - 9	59,224	625	37,015,000	1,394	36,000	50,184,000	556	135,000	75,060,000
10 - 14	64,092	625	40,057,500	1,509	36,000	54,324,000	602	135,000	81,270,000
15 - 19	62,533	625	39,083,125	2,944	36,000	105,984,000	1,783	135,000	240,705,000
20 - 24	104,368	800	83,494,400	6,291	40,500	254,785,500	3,850	67,500	259,875,000
25 - 29	96,501	800	77,200,800	7,538	40,500	305,289,000	5,267	67,500	355,522,500
30 - 34	101,788	800	81,430,400	7,951	40,500	322,015,500	5,556	67,500	375,030,000
35 - 39	106,130	800	84,904,000	6,397	40,500	259,078,500	3,300	67,500	222,750,000
40 - 44	115,996	800	92,796,800	4,851	40,500	196,465,500	2,939	67,500	198,382,500
45 - 49	149,592	800	119,673,600	4,508	40,500	182,574,000	2,936	81,000	237,816,000
50 - 54	164,935	800	131,948,000	3,449	36,000	124,164,000	2,303	108,000	248,724,000
55 - 59	152,919	800	122,335,200	2,906	36,000	104,616,000	2,195	108,000	237,060,000
60 - 64	94,911	800	75,928,800	1,575	36,000	56,700,000	1,425	108,000	153,900,000
65 - 69	50,365	650	32,737,250	931	22,500	20,947,500	841	54,000	45,414,000
70 - 74	-	500	-	-	13,500	-	-	31,950	-
75 - 79	-	500	-	-	13,500	-	-	31,950	-
80 - 84	-	500	-	-	13,500	-	-	31,950	-
85+	-	500	-	-	13,500	-	-	31,950	-
Total	1,363,740		1,043,846,125	55,214		2,244,285,000	34,967		3,049,659,000

Column Notes:

(1) Exhibit 1, Page 6: Column (21)
(2) Exhibit 2, Page 2: Column (1)
(3) (1) * (2)
(4) Exhibit 1, Page 6: Column (23)
(5) Exhibit 2, Page 2: Column (5)
(6) (4) * (5)
(7) Exhibit 1, Page 6: Column (24)
(8) Exhibit 2, Page 2: Column (9)
(9) (7) * (8)
(10) Exhibit 1, Page 6: Column (26)
(11) Exhibit 2, Page 2: Column (13)
(12) (10) * (11)
(13) Exhibit 1, Page 6: Column (27)
(14) Exhibit 2, Page 2: Column (17)
(15) (13) * (14)
(16) Exhibit 1, Page 6: Column (28)
(17) Exhibit 2, Page 2: Column (21)
(18) (16) * (17)

Self-insured Case Distribution by Provider and Risk Class

Covered Members (1)	75,000,000	Utilization Adjustment (3)	97.5%	ICU Stepdown % (5)	73.0%	
Insured vs Pop Mortality Ratio (2)	76.9%	Risk Adjustment (4)	92.5%	% Deaths in Hospital (6)	85.0%	

Age Range	Distribution by Age By Age (7)	Distribution by Age Members (8)	Mortality Rate (9)	XS Deaths (10)	# Cases Net of Deaths (11)	*Case Distribution by Provider Type* Not Seeking (12)	Outpatient (13)	Hospital (14)	*Number of Cases by Provider Type* Not Seeking (15)	Outpatient (16)	Hospital (17)
0 - 4	7.5%	5,625,000	8.805	49,528	1,637,972	31.8%	53.6%	14.6%	520,875	877,953	239,144
5 - 9	7.3%	5,475,000	1.761	9,641	1,632,859	57.6%	39.0%	3.4%	940,527	636,815	55,517
10 - 14	7.9%	5,925,000	1.761	10,434	1,767,066	57.6%	39.0%	3.4%	1,017,830	689,156	60,080
15 - 19	7.8%	5,850,000	5.283	30,906	1,724,094	54.2%	39.0%	6.8%	934,459	672,397	117,238
20 - 24	7.8%	5,850,000	7.631	44,641	1,710,359	46.3%	43.9%	9.8%	791,896	750,848	167,615
25 - 29	7.3%	5,475,000	11.154	61,068	1,581,432	43.4%	43.9%	12.7%	686,341	694,249	200,842
30 - 34	7.7%	5,775,000	11.154	64,414	1,668,086	43.4%	43.9%	12.7%	723,949	732,290	211,847
35 - 39	7.9%	5,925,000	6.457	38,258	1,739,242	46.3%	43.9%	9.8%	805,269	763,527	170,446
40 - 44	8.6%	6,450,000	5.283	34,075	1,900,925	49.3%	43.9%	6.8%	937,156	834,506	129,263
45 - 49	8.3%	6,225,000	4.109	25,579	1,841,921	51.2%	43.9%	4.9%	943,064	808,603	90,254
50 - 54	7.3%	5,475,000	2.935	16,069	1,626,431	52.7%	43.9%	3.4%	857,129	714,003	55,299
55 - 59	6.2%	4,650,000	2.348	10,918	1,384,082	63.5%	34.1%	2.4%	878,892	471,972	33,218
60 - 64	4.7%	3,525,000	1.761	6,208	1,051,292	74.1%	24.4%	1.5%	779,007	256,515	15,769
65 - 69	3.7%	2,775,000	1.174	3,258	829,242	84.4%	14.6%	1.0%	699,880	121,069	8,292
70 - 74	0.0%	-	1.174	-	-	84.4%	14.6%	1.0%	-	-	-
75 - 79	0.0%	-	0.587	-	-	84.4%	14.6%	1.0%	-	-	-
80 - 84	0.0%	-	0.587	-	-	84.4%	14.6%	1.0%	-	-	-
85+	0.0%	-	0.587	-	-	84.4%	14.6%	1.0%	-	-	-
	100.0%	75,000,000		404,997	22,095,003				11,516,274	9,023,903	1,554,824

Age Range	Percent Low Risk (18)	Percent High Risk (19)	*Low Risk Cases by Provider Type* Not Seeking (20)	Outpatient (21)	ACF (22)	Hospital (23)	Dths Hosp (24)	*High Risk Cases by Provider Type* Not Seeking (25)	Outpatient (26)	Hospital (27)	Dths Hosp (28)
0 - 4	95%	4.6%	496,915	837,567	-	236,174	40,685	23,960	40,386	2,970	1,414
5 - 9	91%	9.3%	853,058	577,591	-	54,123	7,639	87,469	59,224	1,394	556
10 - 14	91%	9.3%	923,172	625,064	-	58,571	8,267	94,658	64,092	1,509	602
15 - 19	91%	9.3%	847,554	609,864	14,304	99,990	24,487	86,905	62,533	2,944	1,783
20 - 24	86%	13.9%	681,822	646,480	25,746	135,578	34,095	110,074	104,368	6,291	3,850
25 - 29	86%	13.9%	590,940	597,748	46,010	147,294	46,641	95,401	96,501	7,538	5,267
30 - 34	86%	13.9%	623,320	630,502	56,260	147,636	49,196	100,629	101,788	7,951	5,556
35 - 39	86%	13.9%	693,337	657,397	45,294	118,755	29,219	111,932	106,130	6,397	3,300
40 - 44	86%	13.9%	806,891	718,510	30,037	94,375	26,025	130,265	115,996	4,851	2,939
45 - 49	82%	18.5%	768,597	659,011	12,873	72,873	18,806	174,467	149,592	4,508	2,936
50 - 54	77%	23.1%	659,132	549,068	5,721	46,129	11,356	197,997	164,935	3,449	2,303
55 - 59	68%	32.4%	594,131	319,053	1,669	28,643	7,085	284,761	152,919	2,906	2,195
60 - 64	63%	37.0%	490,774	161,604	477	13,717	3,852	288,233	94,911	1,575	1,425
65 - 69	58%	41.6%	408,730	70,704	238	7,123	1,928	291,150	50,365	931	841
70 - 74	54%	46.3%	-	-	-	-	-	-	-	-	-
75 - 79	49%	50.9%	-	-	-	-	-	-	-	-	-
80 - 84	49%	50.9%	-	-	-	-	-	-	-	-	-
85+	49%	50.9%	-	-	-	-	-	-	-	-	-
Total			9,438,373	7,660,163	238,629	1,260,981	309,281	2,077,901	1,363,740	55,214	34,967

Column Notes:

(1) Self-insured Population
(2) Exhibit 3, Page 1: Column (3)
(3) Exhibit 3, Page 2: Column (4)
(4) Exhibit 3, Page 2: Column (3)
(5) 1 - Exh 2, Page 5 Total: (Row 31 / Row 32)
(6) Exhibit 2, Page 1: Column (23)
(7) Based on Exhibit 3, Page 1: Column (4)
(8) (7) * (1)
(9) (2) * (Exhibit 3, Page 1: Column (13))
(10) (8) * (9) / 1000
(11) (Exhibit 3, Page 2: Column (1)) * (8) - (9)
(12) 1 - (13) - (14)
(13) (3) * Exhibit 3, Page 3: Column (4)
(14) (3) * Exhibit 3, Page 3: Column (5)
(15) (11) * (12)
(16) (11) * (13)
(17) (11) * (14)
(18) 1- (19)
(19) (4) * Exhibit 3, Page 4: Column (2)
(20) (15) * (18)
(21) (16) * (18)
(22) Exhibit 3, Page 2: Column (2)) / (1) * Population 0 to 69
(23) (17) - (22) - (27)
(24) (10) * (6) - (28)
(25) (15) * (19)
(26) (16) * (19)
(27) (17) * (19) * (1 - (5))
(28) (5) * (6) * (10) * (19)

Total System Estimated Gross Costs as of 2010

		Gross Cost as of 2003 (Millions)		
		Seasonal	Moderate	Severe
(1)	Outpatient	$ 3,146	$ 13,270	$ 10,354
(2)	Hospital	5,442	16,921	111,066
(3)	Death	1,932	12,132	105,171
(4)	Gross Cost	10,519	42,324	226,592
(5)	ACF Cost Allocation	$ -	$ -	$ 2,172
(6)	Deferred Elective Care Allocation	$ -	$ 11,649	$ 48,115
(7)	Net 2003 Payer Cost	$ 10,519	$ 30,674	$ 180,649
(8)	Inflation 2003–2010	60.6%	60.6%	60.6%
(9)	**2010 Gross Cost**	$ 16,892	$ 49,256	$ 290,082
(10)	*Diff. from Seasonal*		$ 32,365	$ 240,826
(11)	% of National Health Expenditures	0.6%	1.9%	11.2%
(12)	Deaths	42,005	213,045	1,944,149
(13)	Hospitalizations	298,226	889,388	7,912,135

Row Notes:

(1) Exhibit 1, Page 8: Column (4) + Column (14)
(2) Exhibit 1, Page 8: Column (7) + Column (17)
(3) Exhibit 1, Page 8: Column (10) + Column (20)
(4) (1) + (2) + (3)
(5) Exhibit 2, Page 7: Column (6)
(6) Exhibit 2, Page 8: Column (11)
(7) (4) + (5) - (6)
(8) Insurance inflation rate based on annual 7% increase since 2003
(9) (7) * (8)
(11) (9) / 2010 NHE = $2.6 trillion based on 2009 NHE projections
(12) Exhibit 3, Page 1, Col 14
(13) Exhibit 3, Page 3, Col 8

Total Costs by Provider and Risk Group

Age Range	Percent Low Risk	Outpatient - Low Risk Cases	Charge	Total Costs	Hospitalizations - Low Risk Cases	Charge	Total Costs	Deaths - Low Risk Deaths	Charge	Total Costs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0 - 4	95.0%	6,182,946	180	1,112,930,244	1,751,045	9,900	17,335,349,381	189,586	31,500	5,971,956,416
5 - 9	90.0%	1,609,978	150	241,496,640	152,300	13,050	1,987,512,364	35,088	22,500	789,481,968
10 - 14	90.0%	1,736,406	150	260,460,900	164,259	13,050	2,143,579,180	37,843	22,500	851,478,288
15 - 19	90.0%	1,676,110	150	251,416,440	265,028	13,050	3,458,613,443	111,300	22,500	2,504,258,131
20 - 24	85.0%	2,377,132	180	427,883,778	502,555	16,650	8,367,535,747	153,599	67,500	10,367,958,818
25 - 29	85.0%	3,273,369	180	589,206,366	899,929	16,650	14,983,813,221	209,410	67,500	14,135,189,785
30 - 34	85.0%	3,996,617	180	719,391,006	1,098,457	16,650	18,289,302,532	219,154	67,500	14,792,869,257
35 - 39	85.0%	4,198,022	180	755,643,897	888,144	16,650	14,787,600,747	130,480	67,500	8,807,425,223
40 - 44	85.0%	3,961,471	180	713,064,762	586,240	16,650	9,760,897,573	116,914	67,500	7,891,723,894
45 - 49	80.0%	2,397,393	180	431,530,704	268,116	16,650	4,464,135,463	82,113	81,000	6,651,186,014
50 - 54	75.0%	1,493,234	250	373,308,563	123,568	20,250	2,502,258,541	48,466	108,000	5,234,302,208
55 - 59	65.0%	512,110	250	128,027,575	44,882	20,250	908,852,744	28,415	108,000	3,068,835,475
60 - 64	60.0%	143,587	250	35,896,650	11,072	20,250	224,210,876	15,021	108,000	1,622,252,692
65 - 69	55.0%	37,570	225	8,453,239	3,133	11,250	35,242,268	7,261	54,000	392,105,484
70 - 74	50.0%	19,455	225	4,377,375	2,244	10,350	23,223,434	5,640	31,950	180,201,659
75 - 79	45.0%	15,292	225	3,440,678	1,929	10,350	19,961,502	2,210	31,950	70,594,796
80 - 84	45.0%	11,473	225	2,581,470	1,448	10,350	14,982,143	1,658	31,950	52,965,695
85+	45.0%	10,028	225	2,256,255	1,265	10,350	13,096,155	1,449	31,950	46,292,792
Total		33,652,191		6,061,366,541	6,765,613		99,320,167,310	1,395,609		83,431,078,595

Age Range	Percent High Risk	Outpatient - High Risk Cases	Charge	Total Costs	Hospitalizations - High Risk Cases	Charge	Total Costs	Deaths - High Risk Deaths	Charge	Total Costs
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
0 - 4	5.0%	325,418	625	203,386,375	23,963	69,750	1,671,391,908	9,978	225,000	2,245,096,397
5 - 9	10.0%	178,886	625	111,804,000	4,226	36,000	152,143,272	3,899	135,000	526,321,312
10 - 14	10.0%	192,934	625	120,583,750	4,558	36,000	164,090,124	4,205	135,000	567,652,192
15 - 19	10.0%	186,234	625	116,396,500	8,800	36,000	316,784,520	12,367	135,000	1,669,505,421
20 - 24	15.0%	419,494	800	335,595,120	25,170	40,500	1,019,371,088	27,106	67,500	1,829,639,791
25 - 29	15.0%	577,653	800	462,122,640	45,057	40,500	1,824,807,650	36,955	67,500	2,494,445,256
30 - 34	15.0%	705,285	800	564,228,240	55,012	40,500	2,227,995,862	38,674	67,500	2,610,506,339
35 - 39	15.0%	740,827	800	592,661,880	44,450	40,500	1,800,210,461	23,026	67,500	1,554,251,510
40 - 44	15.0%	699,083	800	559,266,480	29,361	40,500	1,189,140,244	20,632	67,500	1,392,657,158
45 - 49	20.0%	599,348	800	479,478,560	17,980	40,500	728,207,577	20,528	81,000	1,662,796,503
50 - 54	25.0%	497,745	800	398,195,800	10,453	36,000	376,295,220	16,155	108,000	1,744,767,403
55 - 59	35.0%	275,752	800	220,601,360	5,318	36,000	191,450,952	15,300	108,000	1,652,449,871
60 - 64	40.0%	95,724	800	76,579,520	1,551	36,000	55,827,792	10,014	108,000	1,081,501,795
65 - 69	45.0%	30,739	650	19,980,383	553	22,500	12,449,498	5,941	54,000	320,813,578
70 - 74	50.0%	19,455	500	9,727,500	350	13,500	4,727,565	5,640	31,950	180,201,659
75 - 79	55.0%	18,690	500	9,345,050	336	13,500	4,540,759	2,701	31,950	86,282,528
80 - 84	55.0%	14,023	500	7,011,400	252	13,500	3,408,075	2,026	31,950	64,735,849
85+	55.0%	12,256	500	6,128,100	221	13,500	2,979,059	1,771	31,950	56,580,079
Total		5,589,548		4,293,092,658	277,611		11,745,821,624	256,918		21,740,204,642

Column Notes:

(1) 1 - (11)
(2) (1) * (Exhibit 3, Page 3: Column (7))
(3) Exhibit 2, Page 2: Column (1)
(4) (2) * (3)
(5) (1) * (Exhibit 3, Page 3: Column (8)) - (Exhibit 2, Page 7: Column (2)) + (15) * ICU Stepdown % / (1 - ICUStepdown %)
(6) Exhibit 2, Page 2: Column (5)
(7) (5) * (6)
(8) (1) * (Exhibit 3, Page 1: Column (14)) * (Exhibit 2, Page 1: Row (23))
(9) Exhibit 2, Page 2: Column (9)
(11) Exhibit 3, Page 4: Column (2)
(12) (11) * (Exhibit 3, Page 3: Column (7))
(13) Exhibit 2, Page 2: Column (13)
(14) (12) * (13)
(15) (11) * (Exhibit 3, Page 3: Column (8)) * (1 - ICUStepdown %)
(16) Exhibit 2, Page 2: Column (17)
(17) (15) * (16)
(18) (11) * (Exhibit 3, Page 1: Column (14)) * (Exhibit 2, Page 1: Row (23))
(19) Exhibit 2, Page 2: Column (21)
(20) (18) * (19)

Provider Scenario Assumptions

Capacity and Staffing by Provider

						Multiple of Seasonal	
	Hospital Capacity Assumptions						
	Total Capacity	**Selected**	**Seasonal**	**Moderate**	**Severe**	*Moderate*	*Severe*
(1)	Total Hospital Beds	1,183,750	947,000	1,041,700	1,183,750	110%	125%
(2)	Total ICU Beds	99,000	90,000	94,500	99,000	105%	110%
(3)	Total Non-ICU Beds	1,084,750	857,000	947,200	1,084,750		
(4)	Total Ventilators	110,000	110,000	110,000	110,000		
	Average Utilization for Non-Influenza Patients						
(5)	Average Daily Inpatients	522,400	653,000	620,350	522,400	95%	80%
(6)	ICU Bed Use	60,750	67,500	64,125	60,750	95%	90%
(7)	Non-ICU Bed Use	461,650	585,500	556,225	461,650		
(8)	Ventilator Use	76,500	85,000	80,750	76,500	95%	90%
	Available Capacity for Influenza Patients						
(9)	Hospital Beds	661,350	294,000	421,350	661,350		
(10)	ICU Beds	38,250	22,500	30,375	38,250		
(11)	Non-ICU Beds	623,100	271,500	390,975	623,100		
(12)	Ventilators	33,500	25,000	29,250	33,500		
	Hospital Staffing Considerations						
(13)	# Physicians	225,000	225,000	247,500	225,000	110%	100%
(14)	Physicians Per Bed	0.19	0.24	0.24	0.19		
(15)	# Nurses	1,370,000	1,370,000	1,507,000	1,370,000	110%	100%
(16)	Nurses Per Bed	1.16	1.45	1.45	1.16		
	Hospital Utilization Assumptions						
(17)	Non-ICU Length of Stay	4.0	5.0	5.0	4.0	100%	80%
(18)	ICU Length of Stay	8.0	10.0	10.0	8.0	100%	80%
(19)	Ventilator Length of Stay	8.0	10.0	10.0	8.0	100%	80%
(20)	Hospital Charge Adj.*	50%	0%	10%	50%		
(21)	% Needing ICU Care	15.0%	7.5%	15.0%	15.0%		
(22)	% Needing Ventilators	15.0%	7.5%	15.0%	15.0%		
(23)	% of Deaths Hospitalized	85%	100%	95%	85%	95%	85%
	ACF Considerations						
(24)	Physicians Per Bed	0.04	0.24	0.07	0.04	30%	20%
(25)	Nurses Per Bed	0.46	1.45	0.87	0.46	60%	40%
(26)	Length of Stay	5.0	5.0	5.0	5.0	100%	100%
(27)	Per Diem Charge	500	500	500	500	100%	100%
	Outpatient Capacity Assumptions						
(28)	Total Physicians	966,000	920,000	920,000	966,000	100%	105%
(29)	Total Nurses	2,750,000	2,500,000	2,500,000	2,750,000	100%	110%
(30)	Family Care Factor	1.5	0.5	1.0	1.5	200%	300%

* Reduction in hospital charges as a percentage of reduction in non - ICU length of stay.

Provider Scenario Assumptions

Provider Charges By Scenario, Provider, and Risk Group

Age Range	Outpatient - Low Risk				Hospitalizations - Low Risk				Deaths - Low Risk			
	Selected (1)	Mild (2)	Moderate (3)	Severe (4)	Selected (5)	Mild (6)	Moderate* (7)	Severe* (8)	Selected (9)	Mild (10)	Moderate* (11)	Severe* (12)
0 - 4	180	180	180	180	9,900	11,000	11,000	9,900	31,500	35,000	35,000	31,500
5 - 9	150	150	150	150	13,050	14,500	14,500	13,050	22,500	25,000	25,000	22,500
10 - 14	150	150	150	150	13,050	14,500	14,500	13,050	22,500	25,000	25,000	22,500
15 - 19	150	150	150	150	13,050	14,500	14,500	13,050	22,500	25,000	25,000	22,500
20 - 24	180	180	180	180	16,650	18,500	18,500	16,650	67,500	75,000	75,000	67,500
25 - 29	180	180	180	180	16,650	18,500	18,500	16,650	67,500	75,000	75,000	67,500
30 - 34	180	180	180	180	16,650	18,500	18,500	16,650	67,500	75,000	75,000	67,500
35 - 39	180	180	180	180	16,650	18,500	18,500	16,650	67,500	75,000	75,000	67,500
40 - 44	180	180	180	180	16,650	18,500	18,500	16,650	67,500	75,000	75,000	67,500
45 - 49	180	180	180	180	16,650	18,500	18,500	16,650	81,000	90,000	90,000	81,000
50 - 54	250	250	250	250	20,250	22,500	22,500	20,250	108,000	120,000	120,000	108,000
55 - 59	250	250	250	250	20,250	22,500	22,500	20,250	108,000	120,000	120,000	108,000
60 - 64	250	250	250	250	20,250	22,500	22,500	20,250	108,000	120,000	120,000	108,000
65 - 69	225	225	225	225	11,250	12,500	12,500	11,250	54,000	60,000	60,000	54,000
70 - 74	225	225	225	225	10,350	11,500	11,500	10,350	31,950	35,500	35,500	31,950
75 - 79	225	225	225	225	10,350	11,500	11,500	10,350	31,950	35,500	35,500	31,950
80 - 84	225	225	225	225	10,350	11,500	11,500	10,350	31,950	35,500	35,500	31,950
85+	225	225	225	225	10,350	11,500	11,500	10,350	31,950	35,500	35,500	31,950

Age Range	Outpatient - High Risk				Hospitalizations - High Risk				Deaths - High Risk			
	Selected (13)	Mild (14)	Moderate (15)	Severe (16)	Selected (17)	Mild (18)	Moderate* (19)	Severe* (20)	Selected (21)	Mild (22)	Moderate* (23)	Severe* (24)
0 - 4	625	625	625	625	69,750	77,500	77,500	69,750	225,000	250,000	250,000	225,000
5 - 9	625	625	625	625	36,000	40,000	40,000	36,000	135,000	150,000	150,000	135,000
10 - 14	625	625	625	625	36,000	40,000	40,000	36,000	135,000	150,000	150,000	135,000
15 - 19	625	625	625	625	36,000	40,000	40,000	36,000	135,000	150,000	150,000	135,000
20 - 24	800	800	800	800	40,500	45,000	45,000	40,500	67,500	75,000	75,000	67,500
25 - 29	800	800	800	800	40,500	45,000	45,000	40,500	67,500	75,000	75,000	67,500
30 - 34	800	800	800	800	40,500	45,000	45,000	40,500	67,500	75,000	75,000	67,500
35 - 39	800	800	800	800	40,500	45,000	45,000	40,500	67,500	75,000	75,000	67,500
40 - 44	800	800	800	800	40,500	45,000	45,000	40,500	67,500	75,000	75,000	67,500
45 - 49	800	800	800	800	40,500	45,000	45,000	40,500	81,000	90,000	90,000	81,000
50 - 54	800	800	800	800	36,000	40,000	40,000	36,000	108,000	120,000	120,000	108,000
55 - 59	800	800	800	800	36,000	40,000	40,000	36,000	108,000	120,000	120,000	108,000
60 - 64	800	800	800	800	36,000	40,000	40,000	36,000	108,000	120,000	120,000	108,000
65 - 69	650	650	650	650	22,500	25,000	25,000	22,500	54,000	60,000	60,000	54,000
70 - 74	500	500	500	500	13,500	15,000	15,000	13,500	31,950	35,500	35,500	31,950
75 - 79	500	500	500	500	13,500	15,000	15,000	13,500	31,950	35,500	35,500	31,950
80 - 84	500	500	500	500	13,500	15,000	15,000	13,500	31,950	35,500	35,500	31,950
85+	500	500	500	500	13,500	15,000	15,000	13,500	31,950	35,500	35,500	31,950

* Adjusted by 1/2 of the assumed reduction of length in hospital stay, if any (see Exhibit 2, Page 1)

Provider Scenario Assumptions

Provider Utilization by Week

			Week of Scenario					
	Pandemic Influenza Cases	**Total**	**1**	**2**	**3**	**4**	**5**	**6**
(1)	Hospital Case Distribution		1.9%	3.7%	6.5%	9.9%	13.0%	15.0%
(2)	Hospital Non-ICU Cases	8,129,962	154,469	300,809	528,448	804,866	1,056,895	1,219,494
(3)	Hospital ICU Cases	1,434,699	27,259	53,084	93,255	142,035	186,511	215,205
(4)	Total Hospital Cases (w/ Deaths)	9,564,661	181,728	353,893	621,703	946,901	1,243,406	1,434,699
(5)	Outpatient Case Distribution		7.4%	25.9%	15.7%	11.2%	8.6%	6.9%
(6)	Outpatient Cases	39,241,739	2,903,889	10,163,610	6,160,953	4,395,075	3,374,790	2,707,680
(7)	Provider Case Distribution		1.9%	3.7%	6.5%	9.9%	13.0%	15.0%
(8)	Physician Cases (Hosp + Out)	158,096	3,004	5,850	10,276	15,651	20,552	23,714
(9)	Nurse Cases (Hosp + Out)	450,065	8,551	16,652	29,254	44,556	58,508	67,510
	Weekly Hospital Bed Demand							
(10)	Hospital Non-ICU Bed Demand		88,268	171,891	301,970	459,923	603,940	696,854
(11)	Hospital ICU Bed Demand		27,259	56,978	100,838	155,357	206,802	241,849
(12)	Total Hospital Demand		115,527	228,869	402,808	615,280	810,742	938,703
(13)	Hospital Capacity		661,350	661,350	661,350	661,350	661,350	661,350
(14)	ACF Demand	868,043	-	-	-	-	149,392	277,353
(15)	ACF Staffing - Physician	0.04	-	-	-	-	5,976	11,094
(16)	ACF Staffing - Nurses	0.46	-	-	-	-	68,720	127,582
	Outpatient Physician Capacity							
(17)	Total Physician Capacity	966,000	966,000	966,000	966,000	966,000	966,000	966,000
(18)	Hospital Demand	225,000	225,000	225,000	225,000	225,000	225,000	225,000
(19)	ACF Demand		-	-	-	-	5,976	11,094
(20)	Weekly Physician Illnesses		3,004	5,850	10,276	15,651	20,552	23,714
(21)	Family Care Absences	1.5	4,506	8,775	15,414	23,477	30,828	35,571
(22)	Physicians Remaining		733,490	726,375	715,310	701,873	683,644	670,621
(23)	Weekly Outpatient Caseload		4.0	14.0	8.6	6.3	4.9	4.0
	Outpatient Nurse Capacity							
(24)	Total Nurse Capacity	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000
(25)	Hospital Needs	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000
(26)	ACF Needs		-	-	-	-	68,720	127,582
(27)	Weekly Nurse Illnesses		8,551	16,652	29,254	44,556	58,508	67,510
(28)	Family Care Absences	1.5	12,827	24,978	43,881	66,834	87,762	101,265
(29)	Nurses Remaining		1,358,622	1,338,370	1,306,865	1,268,610	1,165,010	1,083,643
(30)	Weekly Outpatient Caseload		2.1	7.6	4.7	3.5	2.9	2.5
	ICU Capacity							
(31)	ICU Bed Capacity	497,250	38,250	38,250	38,250	38,250	38,250	38,250
(32)	ICU Demand	1,639,654	27,259	56,978	100,838	155,357	206,802	241,849
(33)	Excess ICU Demand	1,191,159	-	18,728	62,588	117,107	168,552	203,599
	Ventilator Capacity							
(34)	Ventilator Capacity	402,000	33,500	33,500	33,500	33,500	33,500	33,500
(35)	Patients Needing Ventilators	1,434,698	27,259	53,084	93,255	142,035	186,511	215,205
(36)	Excess Ventilator Demand	1,045,180	-	19,584	59,755	108,535	153,011	181,705
	Deaths							
(37)	Total # of deaths from influenza	1,944,148	-	-	36,939	71,933	126,370	192,471
(38)	# of influenza deaths in hospital	1,652,526	-	-	31,398	61,143	107,415	163,600

Provider Scenario Assumptions

Provider Utilization by Week

		Week of Scenario							
	Pandemic Influenza Cases	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
(1)	Hospital Case Distribution	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%	0.0%	0.0%
(2)	Hospital Non-ICU Cases	1,219,494	1,056,895	804,866	528,448	300,809	154,469	-	-
(3)	Hospital ICU Cases	215,205	186,511	142,035	93,255	53,084	27,259	-	-
(4)	Total Hospital Cases (w/ Deaths)	1,434,699	1,243,406	946,901	621,703	353,893	181,728	-	-
(5)	Outpatient Case Distribution	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%	0.0%	0.0%
(6)	Outpatient Cases	2,236,779	1,883,603	1,648,153	1,412,703	1,255,736	1,098,769	-	-
(7)	Provider Case Distribution	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%	0.0%	0.0%
(8)	Physician Cases (Hosp + Out)	23,714	20,552	15,651	10,276	5,850	3,004	-	-
(9)	Nurse Cases (Hosp + Out)	67,510	58,508	44,556	29,254	16,652	8,551	-	-
	Weekly Hospital Bed Demand								
(10)	Hospital Non-ICU Bed Demand	696,854	603,940	459,923	301,970	171,891	88,268	-	-
(11)	Hospital ICU Bed Demand	245,949	217,255	168,679	113,546	66,406	34,842	3,894	-
(12)	Total Hospital Demand	942,803	821,195	628,602	415,516	238,297	123,110	3,894	-
(13)	Hospital Capacity	661,350	661,350	661,350	661,350	661,350	661,350	661,350	-
(14)	ACF Demand	281,453	159,845	-	-	-	-	-	-
(15)	ACF Staffing - Physician	11,258	6,394	-	-	-	-	-	-
(16)	ACF Staffing - Nurses	129,468	73,529	-	-	-	-	-	-
	Outpatient Physician Capacity								
(17)	Total Physician Capacity	966,000	966,000	966,000	966,000	966,000	966,000	966,000	966,000
(18)	Hospital Demand	225,000	225,000	225,000	225,000	225,000	225,000	225,000	225,000
(19)	ACF Demand	11,258	6,394	-	-	-	-	-	-
(20)	Weekly Physician Illnesses	23,714	20,552	15,651	10,276	5,850	3,004	-	-
(21)	Family Care Absences	35,571	30,828	23,477	15,414	8,775	4,506	-	-
(22)	Physicians Remaining	670,457	683,226	701,873	715,310	726,375	733,490	741,000	741,000
(23)	Weekly Outpatient Caseload	3.3	2.8	2.3	2.0	1.7	1.5	-	-
	Outpatient Nurse Capacity								
(24)	Total Nurse Capacity	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000	2,750,000
(25)	Hospital Needs	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000	1,370,000
(26)	ACF Needs	129,468	73,529	-	-	-	-	-	-
(27)	Weekly Nurse Illnesses	67,510	58,508	44,556	29,254	16,652	8,551	-	-
(28)	Family Care Absences	101,265	87,762	66,834	43,881	24,978	12,827	-	-
(29)	Nurses Remaining	1,081,757	1,160,201	1,268,610	1,306,865	1,338,370	1,358,622	1,380,000	1,380,000
(30)	Weekly Outpatient Caseload	2.1	1.6	1.3	1.1	0.9	0.8	-	-
	ICU Capacity								
(31)	ICU Bed Capacity	38,250	38,250	38,250	38,250	38,250	38,250	38,250	-
(32)	ICU Demand	245,949	217,255	168,679	113,546	66,406	34,842	3,894	-
(33)	Excess ICU Demand	207,699	179,005	130,429	75,296	28,156	-	-	-
	Ventilator Capacity								
(34)	Ventilator Capacity	33,500	33,500	33,500	33,500	33,500	33,500	-	-
(35)	Patients Needing Ventilators	215,205	186,511	142,035	93,255	53,084	27,259	-	-
(36)	Excess Ventilator Demand	181,705	153,011	108,535	59,755	19,584	-	-	-
	Deaths								
(37)	Total # of deaths from influenza	252,739	291,622	291,622	252,739	192,471	126,370	71,933	36,939
(38)	# of influenza deaths in hospital	214,828	247,879	247,879	214,828	163,600	107,415	61,143	31,398

Provider Scenario Assumptions
Provider Case Distribution

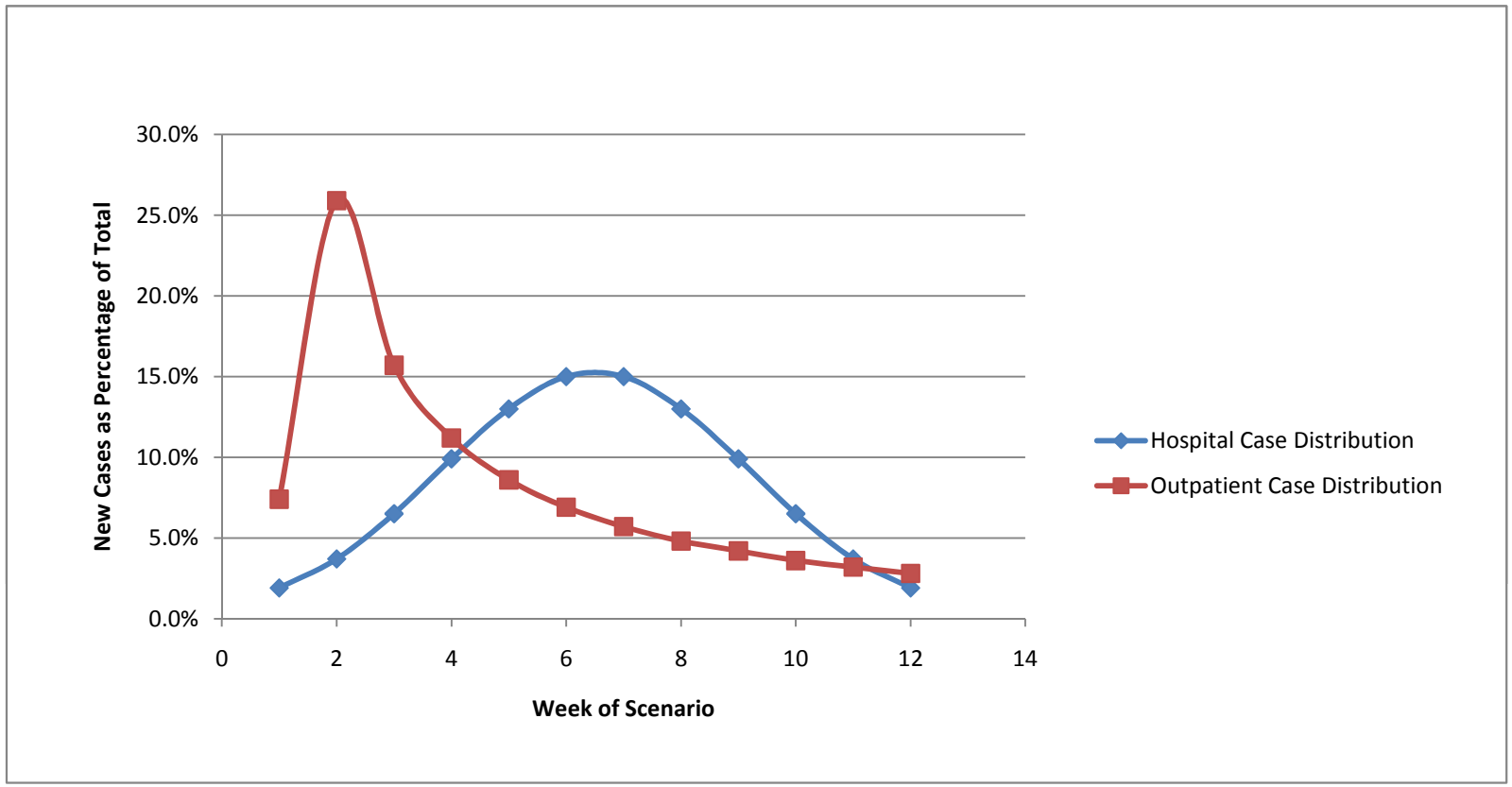
	Week of Scenario											
Hospital Case Distribution	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Distribution 1: Normal	1.9%	3.7%	6.5%	9.9%	13.0%	15.0%	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%
Distribution 2: Weibull	7.4%	25.9%	15.7%	11.2%	8.6%	6.9%	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%
Selected	1.9%	3.7%	6.5%	9.9%	13.0%	15.0%	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%

	Week of Scenario											
Outpatient Case Distribution	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Distribution 1: Normal	1.9%	3.7%	6.5%	9.9%	13.0%	15.0%	15.0%	13.0%	9.9%	6.5%	3.7%	1.9%
Distribution 2: Weibull	7.4%	25.9%	15.7%	11.2%	8.6%	6.9%	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%
Selected	7.4%	25.9%	15.7%	11.2%	8.6%	6.9%	5.7%	4.8%	4.2%	3.6%	3.2%	2.8%

Distribution Input Parameters

Normal Std Deviation Factor	4.5	*Based on Meltzer*
Weibull Alpha	0.4	*Informed by 2009 H1N1*
Weibull Beta	3.0	*Informed by 2009 H1N1*

Provider Scenario Assumptions
Provider Case Distribution



Provider Scenario Assumptions
Alternate Care Facility Costs

Age Range	Distribution (1)	Cases (2)	Length of Stay (3)	Per Diem Charge (4)	Per Stay Charge (5)	Total Charges (6)
0 - 4	0.0%	-	5	$ 500	$ 2,500	-
5 - 9	0.0%	-	5	500	2,500	-
10 - 14	0.0%	-	5	500	2,500	-
15 - 19	6.0%	52,083	5	500	2,500	$ 130,206,450
20 - 24	10.8%	93,749	5	500	2,500	234,371,610
25 - 29	19.3%	167,532	5	500	2,500	418,830,748
30 - 34	23.6%	204,858	5	500	2,500	512,145,370
35 - 39	19.0%	164,928	5	500	2,500	412,320,425
40 - 44	12.6%	109,373	5	500	2,500	273,433,545
45 - 49	5.4%	46,874	5	500	2,500	117,185,805
50 - 54	2.4%	20,833	5	500	2,500	52,082,580
55 - 59	0.7%	6,076	5	500	2,500	15,190,753
60 - 64	0.2%	1,736	5	500	2,500	4,340,215
65 - 69	0.1%	868	5	500	2,500	2,170,108
70 - 74	0.0%	-	5	500	2,500	-
75 - 79	0.0%	-	5	500	2,500	-
80 - 84	0.0%	-	5	500	2,500	-
85+	0.0%	-	5	500	2,500	-
Total	100%	868,043				$ 2,172,277,608

Column Notes:

(1) Based on low risk hospital distribution
(2) (1) x ACF demand (Exhibit 2, Page 3, Total)
(3) Based on literature review and judgment
(4) Based on literature review and judgment
(5) (3) x (4)
(6) (2) x (5)

Provider Scenario Assumptions
Estimated Value of Deferred Elective Care

		Net Vacancies	Hospital Bed Demand Scenario	Base
(1)	Bed Vacancies	130,600	522,400	653,000

		Private Ins.	Other
(2)	Elective Care Distribution	67.0%	33.0%
(3)	Deferrals by Payer	87,502	43,098
(4)	Avg. Procedure Cost	$ 25,753	$ 29,600

		Private Ins.	Other
(5)	% of Wave Deferring	66.7%	66.7%
(6)	Length of Period Deferring	8	8
(7)	Length of Period (Days)	56	56
(8)	Average Length of Stay	3.8	4.8
(9)	Number of Deferrals	1,290,148	503,061
(10)	Estimated Value of Deferrals by Payer	$ 33,224,656,804	$ 14,890,617,588
(11)	Est. Total for Wave	$ 48,115,274,392	

Column Notes:

(1) Excess of base bed demand minus scenario bed demand (see Exhibit 2, Page 1)
(2) Distribution of elective care by payor (HCUP data)
(3) (1) x (2)
(4) Average cost of elective procedure\ by payer (HCUP data)
(5) Percentage of wave assumed to be deferring elective care
(6) (5) x Wave Duration (assumes beginning and end of wave not impacted)
(7) (6) x 7
(8) Average length of stay for elective care by payer (HCUP data)
(9) (3) x (7) / (8)
(10) (4) x (9)
(11) Sum by payer

Pandemic Scenario Assumptions
Mortality Distribution

		Seasonal	Moderate	Severe
Population XS Deaths per 1000 (1)	6.48	0.14	0.71	6.48
Distribution by Age (2)	V\	*Seasonal "S", Moderate "U" curve, Severe "VV", or 1918 "V\"*		
Mortality Ratio of Insured vs Gen Pop (3)	76.9%	57.1%	57.1%	76.9%

		Distribution of Mortality by Age									
		Seasonal		Moderate "U" Curve		Severe "VV " Curve		1918 "V\ " Curve		Mortality	Total
Age Range	Population	Percentage	Excess qx	Percentage	Excess qx	Percentage	Excess qx	Percentage	Excess qx	Selected	XS Deaths
	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
0 - 4	20,504,919	5%	0.324	100%	6.480	100%	6.480	177%	11.450	11.450	234,781
5 - 9	20,029,162	1%	0.058	10%	0.648	35%	2.268	35%	2.290	2.290	45,867
10 - 14	21,602,009	1%	0.058	10%	0.648	35%	2.268	35%	2.290	2.290	49,469
15 - 19	21,177,681	1%	0.058	10%	0.648	85%	5.508	106%	6.870	6.870	145,491
20 - 24	21,424,399	1%	0.065	10%	0.648	125%	8.100	153%	9.923	9.923	212,594
25 - 29	19,983,531	2%	0.130	15%	0.972	180%	11.664	224%	14.504	14.504	289,841
30 - 34	20,913,321	3%	0.194	20%	1.296	180%	11.664	224%	14.504	14.504	303,327
35 - 39	21,507,166	4%	0.259	30%	1.944	100%	6.480	130%	8.397	8.397	180,596
40 - 44	23,554,480	5%	0.324	40%	2.592	75%	4.860	106%	6.870	6.870	161,819
45 - 49	22,600,601	10%	0.648	60%	3.888	45%	2.916	82%	5.343	5.343	120,755
50 - 54	19,917,402	30%	1.944	85%	5.508	40%	2.592	59%	3.817	3.817	76,025
55 - 59	16,845,766	60%	3.888	120%	7.776	48%	3.110	47%	3.053	3.053	51,430
60 - 64	12,861,425	100%	6.480	160%	10.368	75%	4.860	35%	2.290	2.290	29,453
65 - 69	10,171,582	175%	11.340	200%	12.960	95%	6.156	24%	1.527	1.527	15,532
70 - 74	8,690,804	350%	22.680	300%	19.440	140%	9.072	24%	1.527	1.527	13,271
75 - 79	7,570,871	850%	55.080	500%	32.400	190%	12.312	12%	0.763	0.763	5,777
80 - 84	5,680,255	1400%	90.720	750%	48.600	285%	18.468	12%	0.763	0.763	4,334
85+	4,964,626	1450%	93.960	1005%	65.124	385%	24.948	12%	0.763	0.763	3,788
Total	300,000,000		**6.48**		**6.48**		**6.48**		**6.48**		1,944,149

Column Notes:

(1) From Life report; based on HHS figures
(2) Selected mortality curve (mortality distribution by age)
(3) Relative impact of pandemic on insured vs general population; includes difference in ratio of high risk individuals, ability to social distance, impact of mitigation, interventions, etc.
(4) 300mm distributed based on US Census projected as of 2004
(5) Seasonal distribution based on Molinari
(7) Hypothetical distribution based on data from 1957 and 1968
(8) (7) x (1)
(9) Hypothetical distribution extrapolating historic data from 1918, 1957 and 1968
(10) (9) x (1)
(11) Hypothetical distribution based on data from 1918
(12) (11) x (1)
(13) Selected scenario excess qx by age

Pandemic Scenario Assumptions
Morbidity Distribution

		Seasonal	Moderate	Severe	
Morbidity (1)	30.0%	8.4%	30.0%	30.0%	
Distribution by Age (2)	V\	*Seasonal "S", Moderate "U" curve, Severe "VV", or 1918 "V\"*			
Risk Adjustment Insured vs Gen Pop (3)	92.5%				
Utilization Adjustment Insured vs Gen Pop (4)	97.5%	Seasonal 107.5%	Moderate 102.5%	Severe 97.5%	
Wave Duration (5)	12.0	12	12	12	*Weeks for wave to pass (6 - 24)*

Distribution of Morbidity by Age

Age Range	Population Net of Deaths (6)	Seasonal Percentage (7)	Seasonal Morbidity (8)	Moderate "U" Curve Percentage (9)	Moderate "U" Curve Morbidity (10)	Severe "VV " Curve Percentage (11)	Severe "VV " Curve Morbidity (12)	1918 "V\ " Curve Percentage (13)	1918 "V\ " Curve Morbidity (14)	Morbidity Selected (15)	Total Cases (16)
0 - 4	19,722,315	240%	72.0%	150%	45.0%	150%	45.0%	200%	60.0%	60.0%	11,833,389
5 - 9	19,876,273	135%	40.5%	125%	37.5%	100%	30.0%	75%	22.5%	22.5%	4,472,161
10 - 14	21,437,114	95%	28.5%	100%	30.0%	75%	22.5%	75%	22.5%	22.5%	4,823,351
15 - 19	20,692,712	85%	25.5%	85%	25.5%	75%	22.5%	75%	22.5%	22.5%	4,655,860
20 - 24	20,715,751	85%	25.5%	85%	25.5%	90%	27.0%	100%	30.0%	30.0%	6,214,725
25 - 29	19,017,394	85%	25.5%	85%	25.5%	150%	45.0%	150%	45.0%	45.0%	8,557,827
30 - 34	19,902,232	85%	25.5%	85%	25.5%	150%	45.0%	175%	52.5%	52.5%	10,448,672
35 - 39	20,905,180	85%	25.5%	85%	25.5%	150%	45.0%	175%	52.5%	52.5%	10,975,220
40 - 44	23,015,082	85%	25.5%	85%	25.5%	150%	45.0%	150%	45.0%	45.0%	10,356,787
45 - 49	22,198,084	80%	24.0%	85%	25.5%	90%	27.0%	100%	30.0%	30.0%	6,659,425
50 - 54	19,663,986	75%	22.5%	85%	25.5%	75%	22.5%	75%	22.5%	22.5%	4,424,397
55 - 59	16,674,332	75%	22.5%	85%	25.5%	50%	15.0%	45%	13.5%	13.5%	2,251,035
60 - 64	12,763,249	75%	22.5%	100%	30.0%	50%	15.0%	25%	7.5%	7.5%	957,244
65 - 69	10,119,809	80%	24.0%	125%	37.5%	50%	15.0%	15%	4.5%	4.5%	455,391
70 - 74	8,646,568	100%	30.0%	125%	37.5%	50%	15.0%	10%	3.0%	3.0%	259,397
75 - 79	7,551,616	115%	34.5%	140%	42.0%	50%	15.0%	10%	3.0%	3.0%	226,548
80 - 84	5,665,808	125%	37.5%	150%	45.0%	50%	15.0%	10%	3.0%	3.0%	169,974
85+	4,951,999	125%	37.5%	150%	45.0%	50%	15.0%	10%	3.0%	3.0%	148,560
Total	293,519,505		**30.0%**		**30.0%**		**29.8%**		**29.9%**		87,889,963

Column Notes:

(1) Seasonal from Molinari; moderate & severe based on HHS
(2) Selected morbidity curve (morbidity distribution by age)
(3) Relative proportion of high risk individuals for insured vs general population
(4) Relative intensity of utilization of services for insureds vs general population
(5) Weeks for a wave to pass. Longer is conservative - allows more services and higher resulting costs.
(6) Census population net of deaths and their proportionate exposures
(7) Based on Molinari
(8) (7) x (1)
(9) Based on moderate distribution of deaths
(10) (9) x (1)
(11) Based on severe "VV" distribution of deaths
(12) (11) x (1)
(13) Based on severe "V\" distribution of deaths
(14) (13) x (1)
(15) Selected scenario morbidity by age
(16) (15) x (6)

Pandemic Scenario Assumptions
Case Distribution by Provider Type

Age Range	Population Net of Deaths (1)	Total Cases (2)	*Case Distribution by Provider Type*			*Number of Cases by Provider Type*		
			Not Seeking (3)	Outpatient (4)	Hospital (5)	Not Seeking (6)	Outpatient (7)	Hospital (8)
0 - 4	19,722,315	11,833,389	30.0%	55.0%	15.0%	3,550,017	6,508,364	1,775,008
5 - 9	19,876,273	4,472,161	56.5%	40.0%	3.5%	2,526,771	1,788,864	156,526
10 - 14	21,437,114	4,823,351	56.5%	40.0%	3.5%	2,725,193	1,929,340	168,817
15 - 19	20,692,712	4,655,860	53.0%	40.0%	7.0%	2,467,606	1,862,344	325,910
20 - 24	20,715,751	6,214,725	45.0%	45.0%	10.0%	2,796,626	2,796,626	621,473
25 - 29	19,017,394	8,557,827	42.0%	45.0%	13.0%	3,594,287	3,851,022	1,112,518
30 - 34	19,902,232	10,448,672	42.0%	45.0%	13.0%	4,388,442	4,701,902	1,358,327
35 - 39	20,905,180	10,975,220	45.0%	45.0%	10.0%	4,938,849	4,938,849	1,097,522
40 - 44	23,015,082	10,356,787	48.0%	45.0%	7.0%	4,971,258	4,660,554	724,975
45 - 49	22,198,084	6,659,425	50.0%	45.0%	5.0%	3,329,713	2,996,741	332,971
50 - 54	19,663,986	4,424,397	51.5%	45.0%	3.5%	2,278,564	1,990,979	154,854
55 - 59	16,674,332	2,251,035	62.5%	35.0%	2.5%	1,406,897	787,862	56,276
60 - 64	12,763,249	957,244	73.5%	25.0%	1.5%	703,574	239,311	14,359
65 - 69	10,119,809	455,391	84.0%	15.0%	1.0%	382,528	68,309	4,554
70 - 74	8,646,568	259,397	84.0%	15.0%	1.0%	217,893	38,910	2,594
75 - 79	7,551,616	226,548	84.0%	15.0%	1.0%	190,300	33,982	2,265
80 - 84	5,665,808	169,974	84.0%	15.0%	1.0%	142,778	25,496	1,700
85+	4,951,999	148,560	84.0%	15.0%	1.0%	124,790	22,284	1,486
Total	293,519,505	87,889,963				40,736,086	39,241,739	7,912,135

Range	*Seasonal*			*Moderate "U" Curve*			*Severe "VV " Curve*			*1918 "V\ " Curve*		
	Not Seeking (9)	Outpatient (10)	Hospital (11)	Not Seeking (12)	Outpatient (13)	Hospital (14)	Not Seeking (15)	Outpatient (16)	Hospital (17)	Not Seeking (18)	Outpatient (19)	Hospital (20)
0 - 4	51.1%	47.5%	1.40%	43.5%	55.0%	1.50%	30.0%	55.0%	15.00%	30.0%	55.0%	15.00%
5 - 9	62.4%	37.5%	0.06%	54.9%	45.0%	0.12%	51.5%	45.0%	3.50%	56.5%	40.0%	3.50%
10 - 14	64.9%	35.0%	0.06%	59.9%	40.0%	0.12%	56.5%	40.0%	3.50%	56.5%	40.0%	3.50%
15 - 19	64.9%	35.0%	0.06%	59.9%	40.0%	0.12%	53.0%	40.0%	7.00%	53.0%	40.0%	7.00%
20 - 24	64.9%	35.0%	0.10%	59.8%	40.0%	0.20%	49.0%	40.0%	11.00%	45.0%	45.0%	10.00%
25 - 29	64.8%	35.0%	0.20%	59.7%	40.0%	0.30%	46.0%	40.0%	14.00%	42.0%	45.0%	13.00%
30 - 34	64.7%	35.0%	0.30%	59.6%	40.0%	0.40%	46.0%	40.0%	14.00%	42.0%	45.0%	13.00%
35 - 39	64.6%	35.0%	0.40%	59.5%	40.0%	0.50%	49.0%	40.0%	11.00%	45.0%	45.0%	10.00%
40 - 44	64.4%	35.0%	0.60%	59.4%	40.0%	0.60%	53.0%	40.0%	7.00%	48.0%	45.0%	7.00%
45 - 49	64.1%	35.0%	0.90%	59.2%	40.0%	0.80%	55.0%	40.0%	5.00%	50.0%	45.0%	5.00%
50 - 54	56.0%	42.5%	1.50%	53.9%	45.0%	1.15%	51.5%	45.0%	3.50%	51.5%	45.0%	3.50%
55 - 59	55.5%	42.5%	2.00%	48.5%	50.0%	1.50%	46.5%	50.0%	3.50%	62.5%	35.0%	2.50%
60 - 64	55.0%	42.5%	2.50%	43.0%	55.0%	2.00%	40.0%	55.0%	5.00%	73.5%	25.0%	1.50%
65 - 69	36.5%	60.0%	3.50%	37.5%	60.0%	2.50%	33.0%	60.0%	7.00%	84.0%	15.0%	1.00%
70 - 74	25.5%	70.0%	4.50%	27.5%	70.0%	2.50%	23.0%	70.0%	7.00%	84.0%	15.0%	1.00%
75 - 79	15.5%	80.0%	4.50%	17.5%	80.0%	2.50%	13.0%	80.0%	7.00%	84.0%	15.0%	1.00%
80 - 84	15.5%	80.0%	4.50%	17.5%	80.0%	2.50%	13.0%	80.0%	7.00%	84.0%	15.0%	1.00%
85+	15.5%	80.0%	4.50%	17.5%	80.0%	2.50%	13.0%	80.0%	7.00%	84.0%	15.0%	1.00%

Column Notes:

(1) Exhibit 3, Page 2 Column 6
(2) Exhibit 3, Page 2 Column 16
(3) Based on Scenario
(4) Based on Scenario
(5) Based on Scenario
(6) (3) x (2)
(7) (4) x (2)
(8) (5) x (2)
(9) 1 - (10) - (11)
(10) Based on Molinari research
(11) Based on Molinari research
(12) 1 - (13) - (14)
(13) Based on ratio of moderate vs seasonal morbidity & judgment
(14) Based on ratio of moderate vs seasonal deaths & judgment
(15) 1 - (16) - (17)
(16) Based on ratio of severe vs moderate morbidity by age & judgment
(17) Based on ratio of severe vs moderate mortality by age & judgment
(18) 1 - (19) - (20)
(19) Based on ratio of 1918 vs moderate morbidity by age & judgment
(20) Based on ratio of 1918 vs moderate mortality by age & judgment

Pandemic Scenario Assumptions
Case Distribution by Risk Class

Age Range	Percent Low Risk (1)	Percent High Risk (2)	*Number of Cases by Provider Type* Not Seeking (3)	Outpatient (4)	Hospital (5)	*Low Risk Cases by Provider Type* Not Seeking (6)	Outpatient (7)	Hospital (8)	*High Risk Cases by Provider Type* Not Seeking (9)	Outpatient (10)	Hospital (11)
0 - 4	95%	5%	3,550,017	6,508,364	1,775,008	3,372,516	6,182,946	1,686,258	177,501	325,418	88,750
5 - 9	90%	10%	2,526,771	1,788,864	156,526	2,274,094	1,609,978	140,873	252,677	178,886	15,653
10 - 14	90%	10%	2,725,193	1,929,340	168,817	2,452,674	1,736,406	151,935	272,519	192,934	16,882
15 - 19	90%	10%	2,467,606	1,862,344	325,910	2,220,845	1,676,110	293,319	246,761	186,234	32,591
20 - 24	85%	15%	2,796,626	2,796,626	621,473	2,377,132	2,377,132	528,252	419,494	419,494	93,221
25 - 29	85%	15%	3,594,287	3,851,022	1,112,518	3,055,144	3,273,369	945,640	539,143	577,653	166,878
30 - 34	85%	15%	4,388,442	4,701,902	1,358,327	3,730,176	3,996,617	1,154,578	658,266	705,285	203,749
35 - 39	85%	15%	4,938,849	4,938,849	1,097,522	4,198,022	4,198,022	932,894	740,827	740,827	164,628
40 - 44	85%	15%	4,971,258	4,660,554	724,975	4,225,569	3,961,471	616,229	745,689	699,083	108,746
45 - 49	80%	20%	3,329,713	2,996,741	332,971	2,663,770	2,397,393	266,377	665,943	599,348	66,594
50 - 54	75%	25%	2,278,564	1,990,979	154,854	1,708,923	1,493,234	116,141	569,641	497,745	38,714
55 - 59	65%	35%	1,406,897	787,862	56,276	914,483	512,110	36,579	492,414	275,752	19,697
60 - 64	60%	40%	703,574	239,311	14,359	422,144	143,587	8,615	281,430	95,724	5,744
65 - 69	55%	45%	382,528	68,309	4,554	210,390	37,570	2,505	172,138	30,739	2,049
70 - 74	50%	50%	217,893	38,910	2,594	108,947	19,455	1,297	108,947	19,455	1,297
75 - 79	45%	55%	190,300	33,982	2,265	85,635	15,292	1,019	104,665	18,690	1,246
80 - 84	45%	55%	142,778	25,496	1,700	64,250	11,473	765	78,528	14,023	935
85+	45%	55%	124,790	22,284	1,486	56,156	10,028	669	68,635	12,256	817
Total			40,736,086	39,241,739	7,912,135	34,140,870	33,652,191	6,883,945	6,595,216	5,589,548	1,028,190

Column Notes:

(1) 1 - (2)
(2) Based on Molinari research
(3) Exhibit 3, Page 3, Column 6
(4) Exhibit 3, Page 3, Column 7
(5) Exhibit 3, Page 3, Column 8
(6) (1) x (3)
(7) (1) x (4)
(8) (1) x (5)
(9) (2) x (3)
(10) (2) x (4)
(11) (2) x (5)