

COVID-19

VIRTUAL SYMPOSIUM

The Future Comes Soon Enough – What Will Tomorrow Bring?

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SOCIETY OF ACTUARIES

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- **Do** leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
- **Do** alert SOA staff and/or legal counsel to any concerning discussions
- **Do** consult with legal counsel before raising any matter or making a statement that may involve competitively sensitive information.

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What to Expect



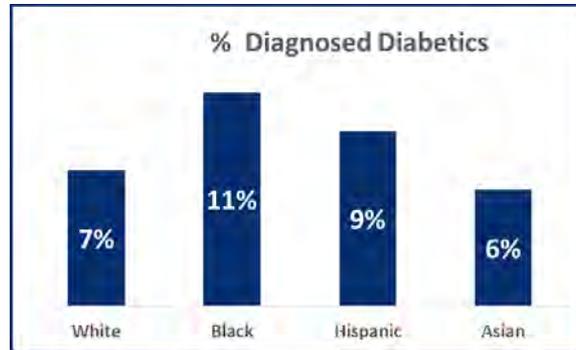
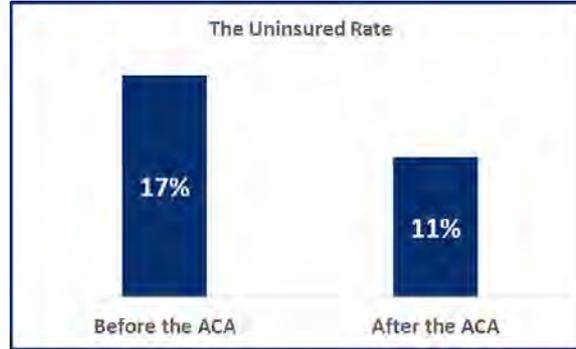
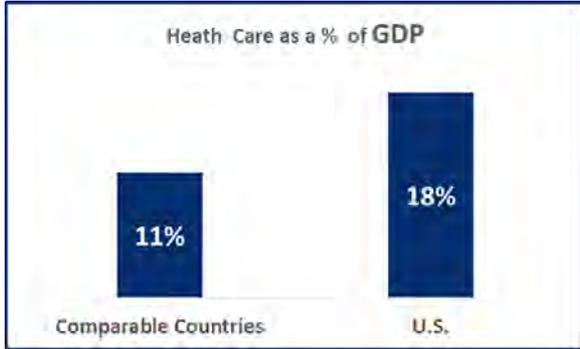
COVID-19

VIRTUAL SYMPOSIUM

The Future of U.S. Health Care



By the Numbers: Health Care in America



In the U.S. we spend more for health care than comparable countries.

But are we getting our money's worth?

The Dimensions of Health Care

Structure

It's Complicated

Interoperability Road map
Stakeholder Cooperation

The Disease Burden

Chronic Disease

Personal Diet and Exercise
Plans

The Delivery System

Prices

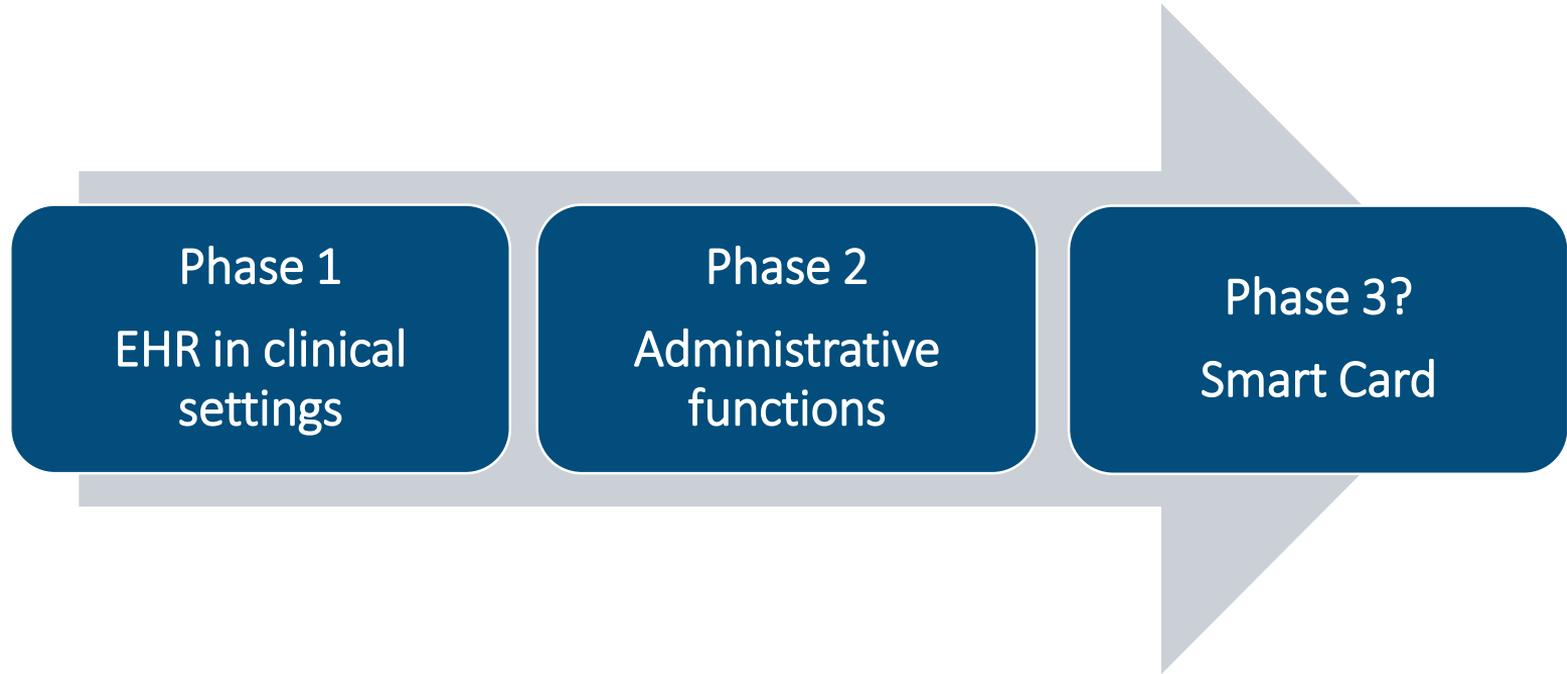
Alternate Payment
Methods
Alternate Delivery Systems

New Data Sources, New Technology, Enhanced Analytics

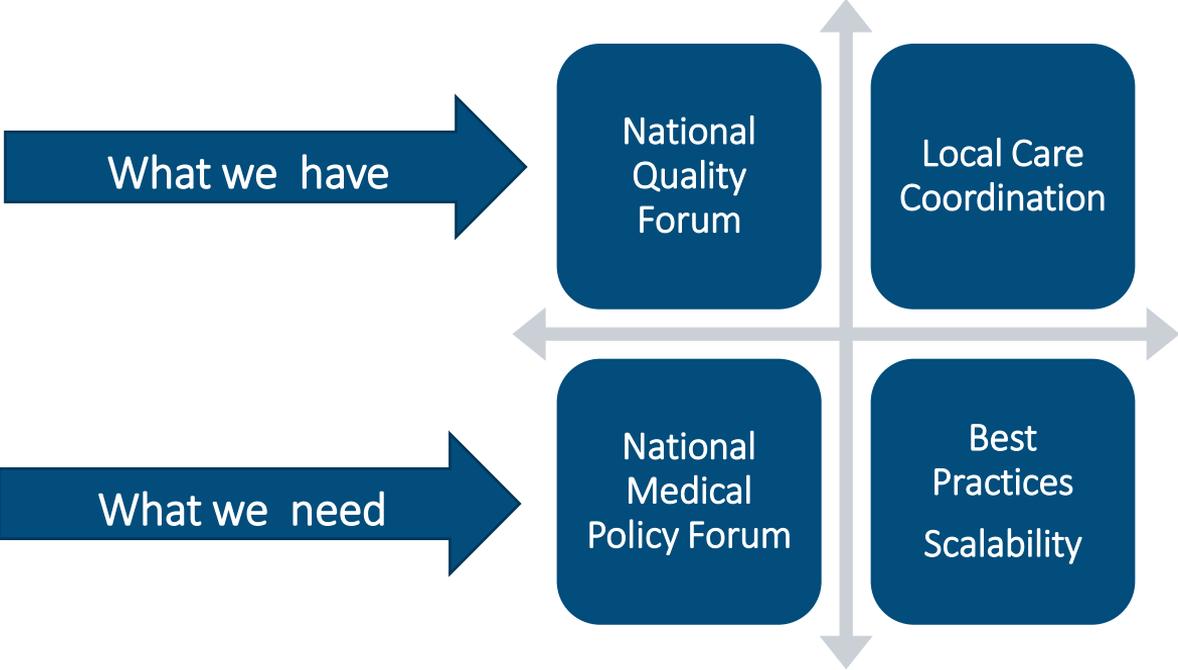
Health System Overview

Business	Primary Funding	Major Risk Taker	Plan Suite Design	Primary Eligibility Owner	Claims Adjudication and Provider Contracting
Individual Insurance	• Policyholder	• Health Plan	• Health Plan	• Health Plan	• Health Plan
Group Insurance	• Employer	• Health Plan	• Health Plan	• Employer	• Health Plan
Self-Insured	• Employer	• Employer	• Employer	• Employer	• Health Plan
Traditional Medicare	• CMS	• CMS	• CMS	• CMS	• Medicare Administrative Contractors
Medicare Advantage	• CMS	• Health Plan	• Health Plan	• CMS	• Health Plan
Fee-for-Service Medicaid	• CMS/State	• CMS/State	• State	• State	• State determined
Managed Medicaid	• CMS/State	• Health Plan	• Health Plan	• State	• Health Plan

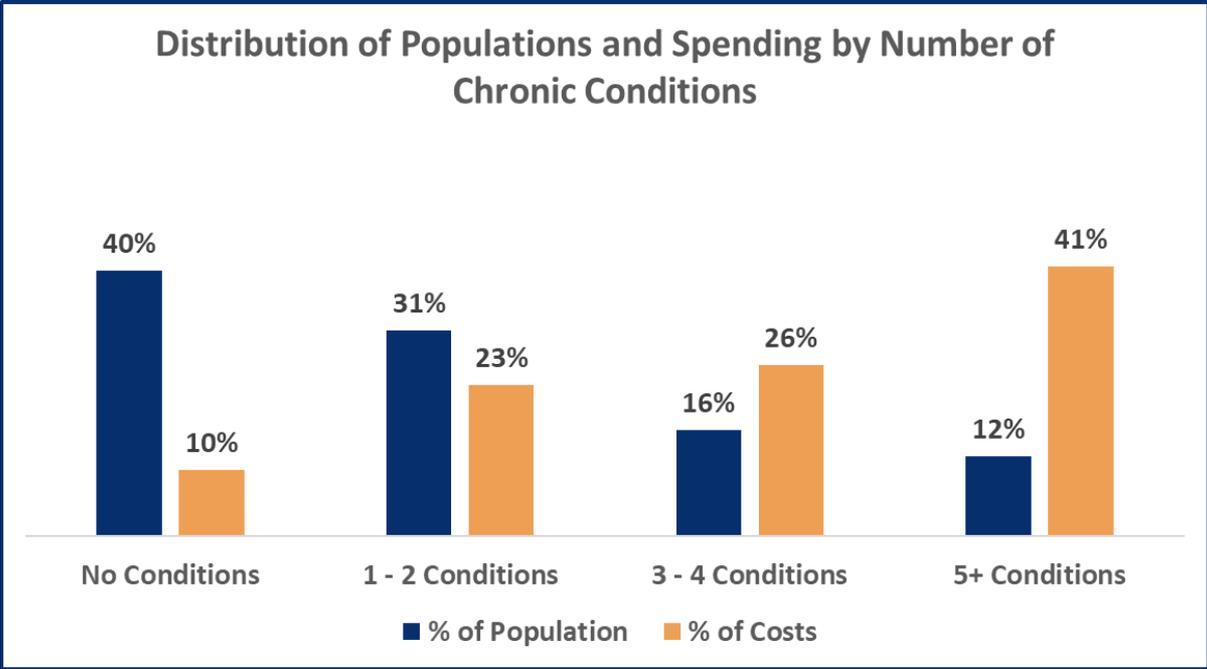
The Interoperability Roadmap



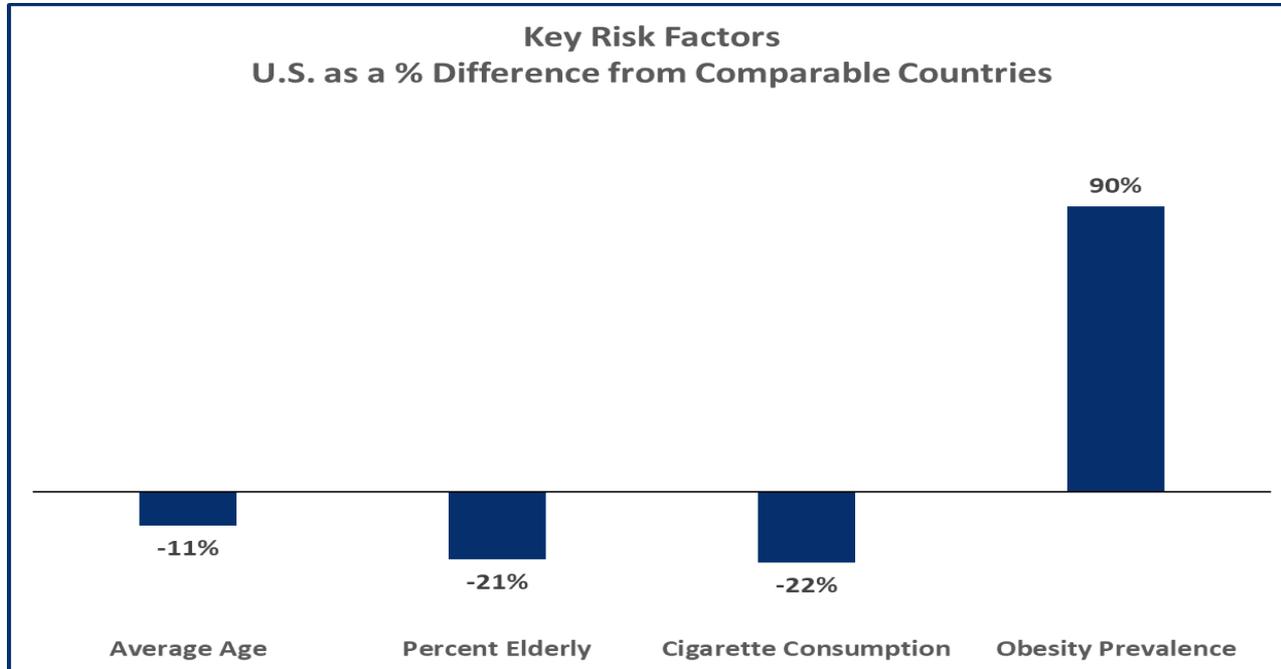
Stakeholder Cooperation



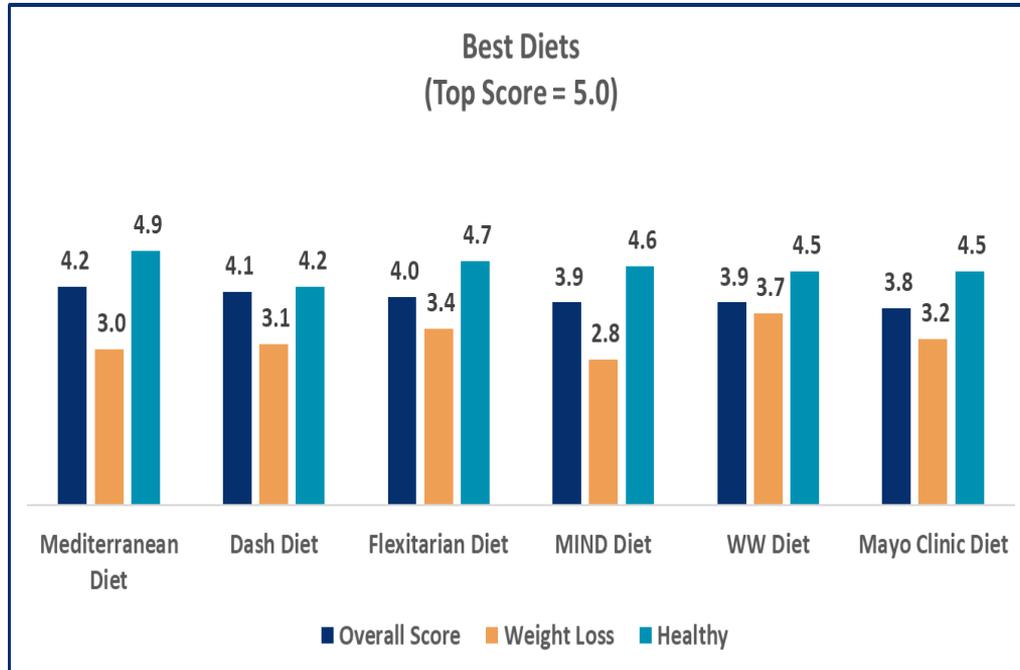
Chronic Disease Burden



Risk Factors



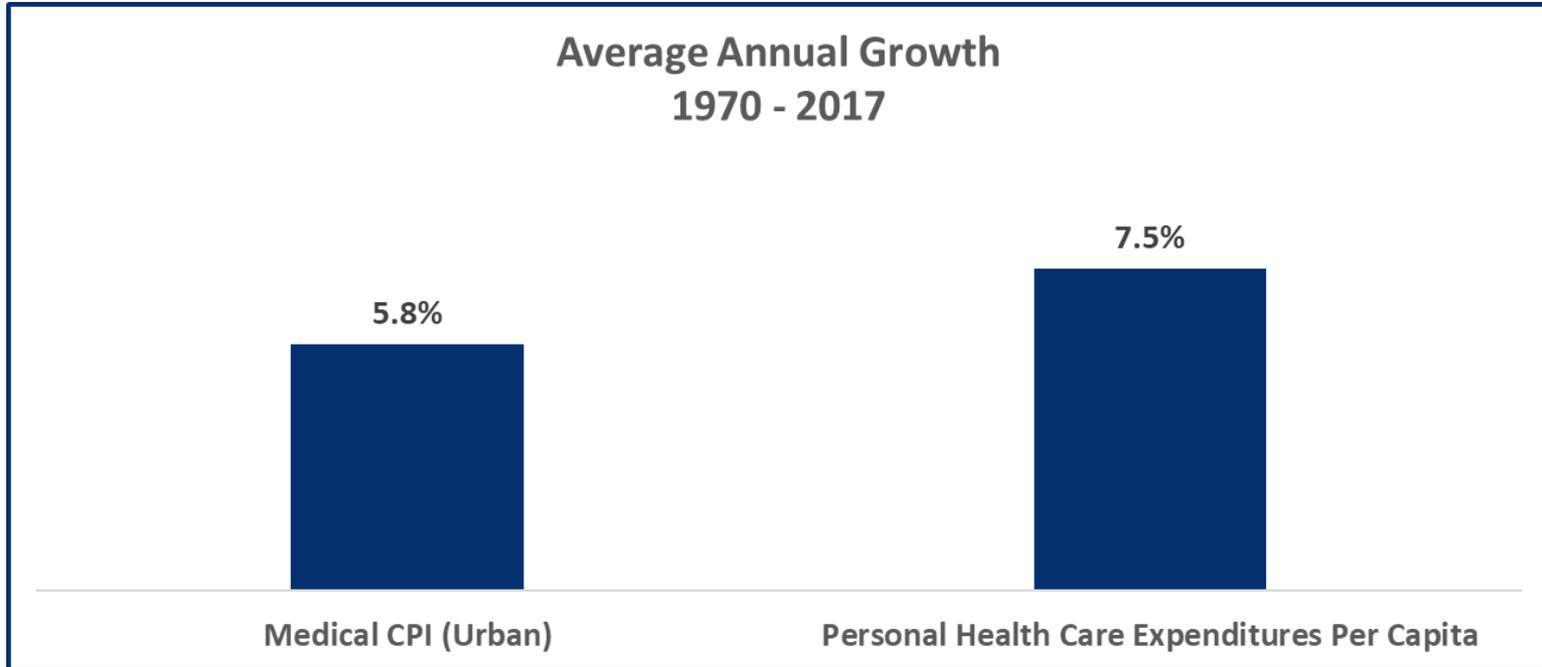
Why Is It So Hard to Lose Weight?



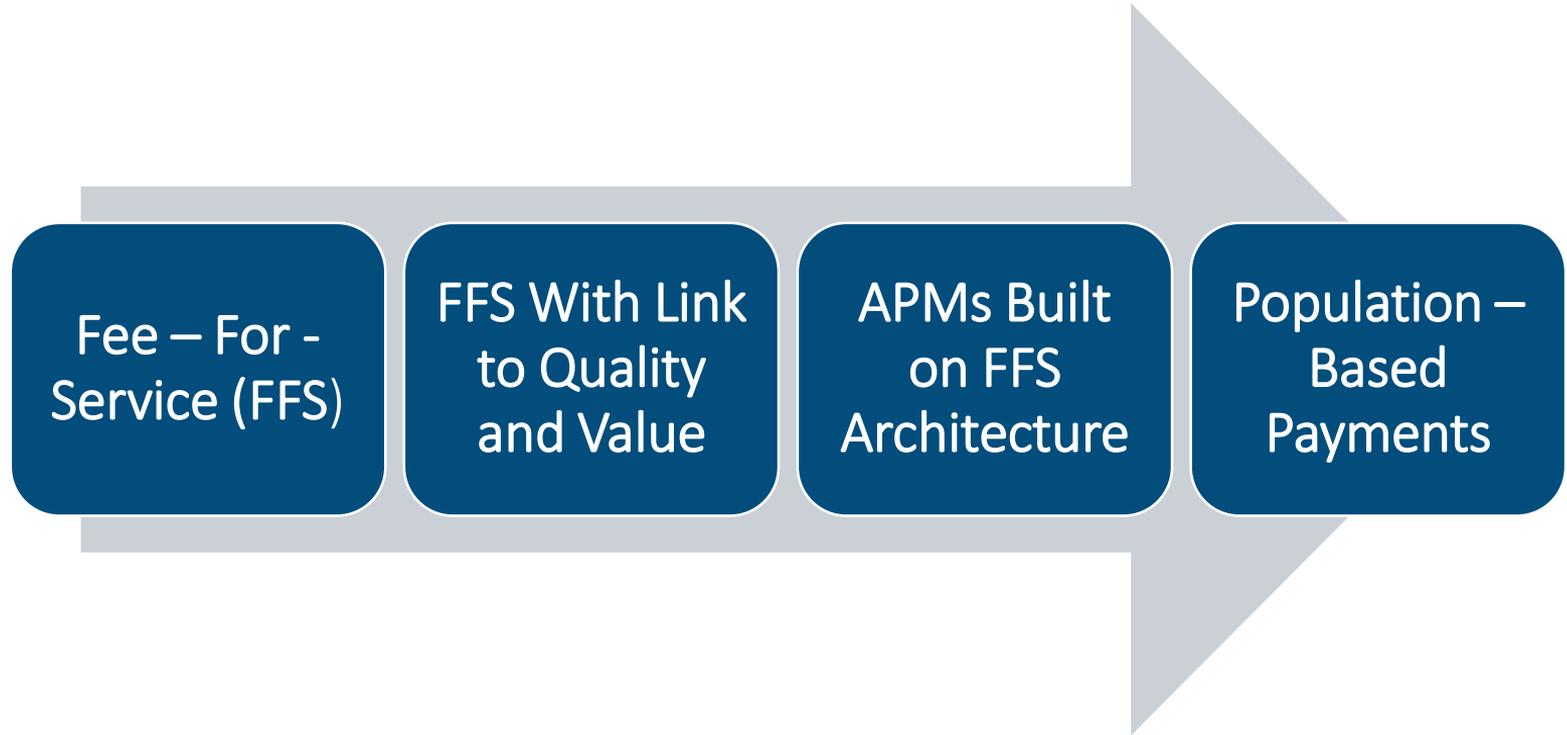
What role will new technologies play?

- *Exercise trackers*
- *Continuous glucose monitors*
- *Weight loss apps*

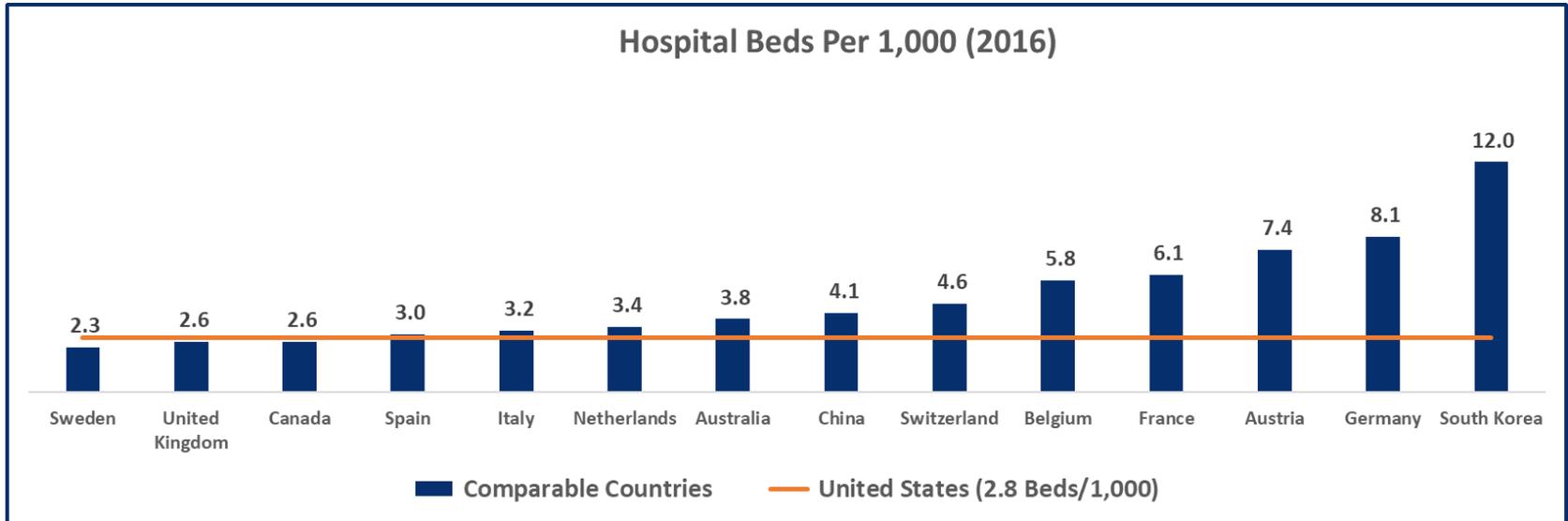
Prices, Prices, Prices



Alternate Payment Methods



Do We Have Enough Resources?



- On an on-going basis?
- During a crisis?

Alternate Delivery Systems



Phase 1: Fact-Finding, Partners

*What can we do
about the cost of
health care?*

*To control health care costs,
call in the actuaries*
BenefitsPro, January 22, 2019



Our Partners

- Kaiser Family Foundation
- Healthcare Finance Management Association
- Conference of Consulting Actuaries

www.soa.org/initiative1811

Phase 2: Analysis and Action

Initiative 18|11

Brian Pauley, Joan Barrett

5/50

Achilles Natsis

Managed Care 3.0

Sarah Osborne



Pharmacy

Greg Warren

Case Studies

Karen Shelton

Technology

Sudha Shenoy

<https://theactuarymagazine.org/category/web-exclusives/actuarial-perspectives-on-prescription-drug-financing/>

Phase 3: Preparing for the Future



Social Determinants
of Health



Data and Analytics



COVID



Suggestions?

What Are We
Missing?

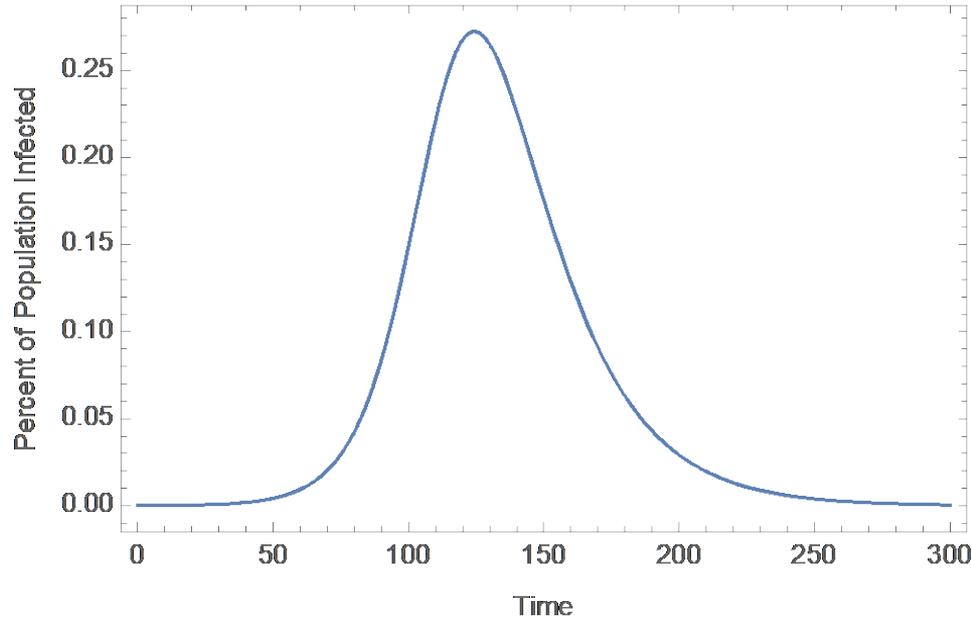
Forecasting COVID-19 in 2020 and beyond



Epidemiological Considerations

- SARS-CoV2 (COVID-19) fits the pattern of many classical respiratory viruses
- Susceptibility → Infected but not infectious (latent) → Infectious → Immune
- Diseases that fit this class are modeled with “SEIR” models
- Many modifications can be made to this framework to more closely match the epidemiology
 - E.g., asymptomatic classes, pre-symptomatic transmission, quarantine, spatial networks

Dynamics of a (Basic) SEIR Model



Classic epidemic peak.

AUC is determined by “ R_0 ” (basic reproductive number).

The wave front is determined by the difference in transmission rate and recovery rate.

Back of the Envelope

- R0 for COVID-19 is thought to be ~2.5 producing an AUC/total outbreak size of 89%, but estimates vary (R0 of 2 would yield 80%)
- The undocumented (silent) fraction of the epidemic is estimated to be 85%
- Median hospitalization of 25%
- A ballpark estimate of 11M hospitalizations in the US

Age group (yrs) (no. of cases)	%*		
	Hospitalization	ICU admission	Case-fatality
0-19 (123)	1.6-2.5	0	0
20-44 (705)	14.3-20.8	2.0-4.2	0.1-0.2
45-54 (429)	21.2-28.3	5.4-10.4	0.5-0.8
55-64 (429)	20.5-30.1	4.7-11.2	1.4-2.6
65-74 (409)	28.6-43.5	8.1-18.8	2.7-4.9
75-84 (210)	30.5-58.7	10.5-31.0	4.3-10.5
≥85 (144)	31.3-70.3	6.3-29.0	10.4-27.3
Total (2,449)	20.7-31.4	4.9-11.5	1.8-3.4

Source: *MMWR* 69(12);343-346

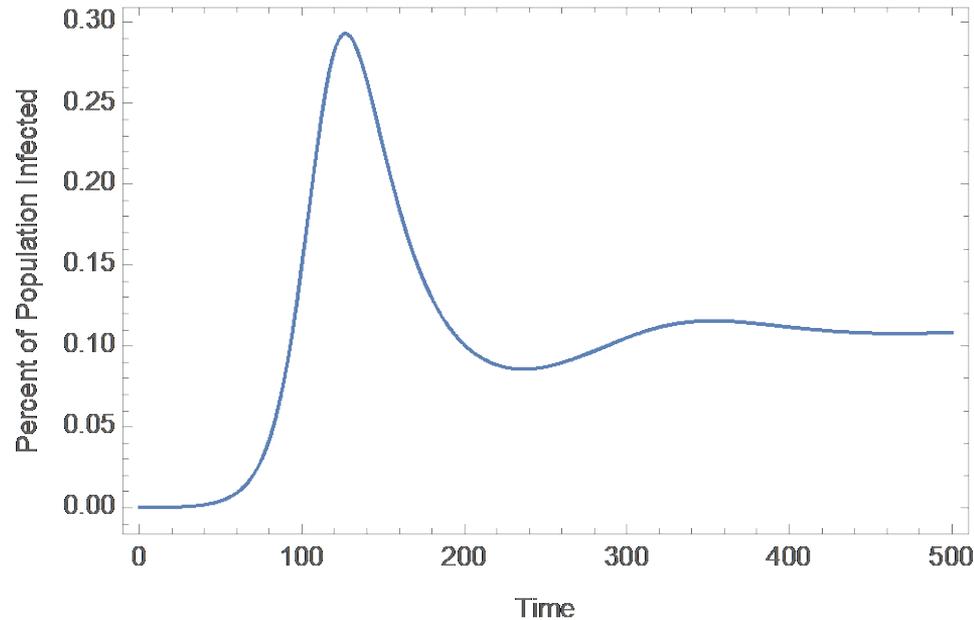
Setting Policy

- Forecasting efforts seek to provide policy makers with the who, when, and where of COVID's impact
- Often asked to judge the implications of various policies under consideration
 - E.g., enacting social distancing orders in various locations, closing schools
- The objective function (public health, economic, years of life lost, etc) is tailored to application
- Compliance is a black box

The Good, The Bad, and The Ugly

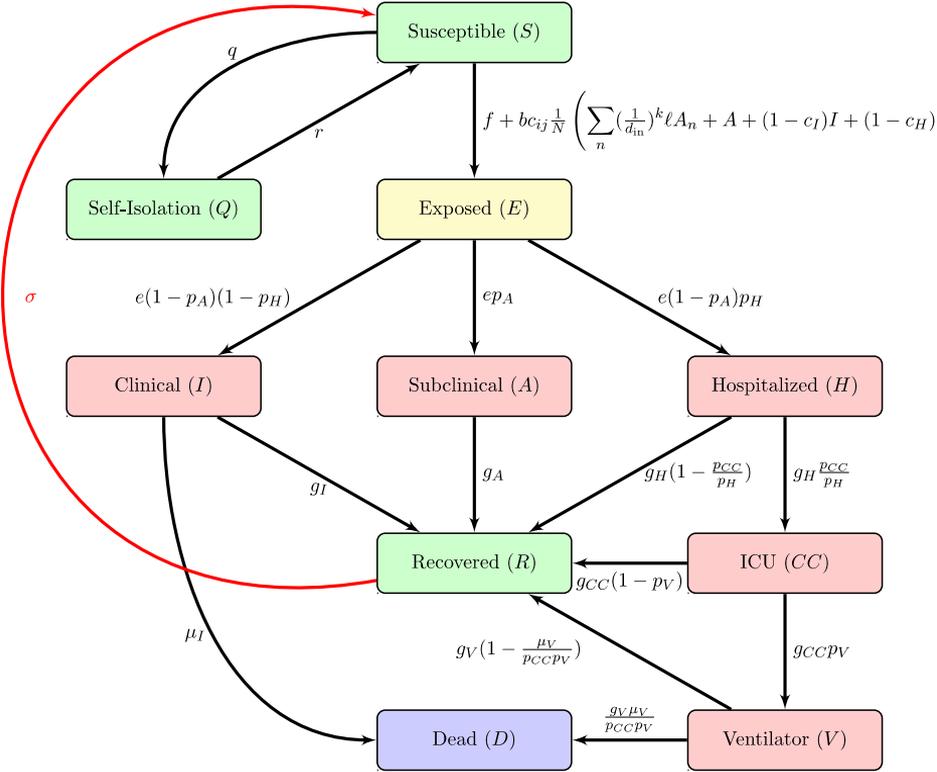
- Social distancing is a stalling mechanism (no change in AUC)
- The data are really bad (vs. weather)
- Little to no testing of non-clinical cases
- Initial distancing measures temporarily reduced health care burden
- Models have predicted current resurgence (for some time)
- Ensemble models seem promising
- Public health at odds with other interests
- New therapeutics are needed to decrease expected burden
- Treatment is improving

The Scary—Is There Immunity? (post-2020)



- Antibody studies have yielded mixed results
- Development of efficacious vaccines relies on long term immunity
- Without prolonged immunity, endemicity occurs
- Models have been applied to longer term scenarios (e.g. *Science* 368(6493), 860-868.)

An Actual Model



The following equations describe the time derivatives for our model. First, define the force of infection on the j -th age group in the i -th population at time t as $\mathcal{F}_{i,j}$:

$$\mathcal{F}_{i,j} \equiv \frac{b}{N_i + \phi_i} \sum_k c_{j,k} (\phi_{i,k} + \xi_j (A_{i,k}, I_{i,k}, H_{j,k})), \quad (1)$$

where k indexes the age group coming into contact with age group j (see Table 1 for definitions of parameters and variables). The variable ϕ is the effect of movement between cities and is defined as

$$\phi_i \equiv \sum_k \phi_{i,k} \equiv \sum_k \sum_n \left[d_{i,n}^p \ell_k A_{n,k} \right]. \quad (2)$$

With these definitions, we can write down the entire system of equations as

$$\begin{aligned} \dot{S}_{i,j} &= -S_{i,j} (\mathcal{F}_{i,j} + f_{i,j} + q_j) + r_j Q_{i,j} + \sigma_j R_{i,j} \\ \dot{Q}_{i,j} &= q_j S_{i,j} - r_j Q_{i,j} \\ \dot{E}_{i,j} &= S_{i,j} (\mathcal{F}_{i,j} + f) - e(E_{i,j}) \\ \dot{\Theta}_{i,j} &= e(E_{i,j}) - g(\Theta_{i,j}) - \mu(\Theta_{i,j}) \\ \dot{C}_{i,j} &= g(\Theta_{i,j}) \cdot \chi_j \hat{\mathbf{k}} - \nu_j C_{i,j} \\ \dot{V}_{i,j} &= \nu_j \alpha_j C_{i,j} - \zeta_j V_{i,j} \\ \dot{R}_{i,j} &= g(\Theta_{i,j}) \cdot (\hat{\mathbf{i}} + \hat{\mathbf{j}} + (1 - \chi_j) \hat{\mathbf{k}}) + \nu_j (1 - \alpha_j) C_{i,j} + \zeta_j (1 - \lambda_j) V_{i,j} \\ \dot{D}_{i,j} &= \zeta_j \lambda_j V_{i,j} + \mu(\Theta_{i,j}) \end{aligned} \quad (3)$$

Rating for COVID-19 Healthcare Costs in 2021 and Beyond



Rating for COVID-19 in 2021 and Beyond

- COVID-19 has **upended healthcare markets** and the US economy
- Volatility and uncertainty present an **extraordinary challenge** for rate development
- In my role at Milliman, I have helped commercial health plans and others navigate these choppy waters
- The following slides describe **key considerations** for commercial health plans and others when rating and planning for the impact of COVID-19 on healthcare costs in **2021 and beyond**
- Adapted and updated from an April 2020 whitepaper I coauthored with my colleagues Doug Norris and Thomas Murawksi¹
- Data and knowledge have evolved, but the **key considerations still stand**

1. <https://us.milliman.com/en/insight/COVID19-Considerations-for-commercial-health-insurance-rates-in-2021-and-beyond>

Rating Considerations, 2021+

1. Acute **treatment, testing** and **vaccination** for COVID-19
 - Incidence and cost of acute COVID-19 infections
 - Evolving treatments and costs thereof
 - Vaccine availability and cost
2. **Access** and **demand** for healthcare
 - Disrupted access to and utilization of care
 - Pent up demand and lasting changes in utilization patterns
3. Lasting impacts on **population health**
 - Health problems following COVID-19 recovery?
 - Complications from missed maintenance and preventive care?
 - Tobacco use and rating factors



Rating Considerations, 2021+



4. Economic impacts on enrollment and utilization of care

- Over 74% of US health coverage tied to employment or income
- Historic spike in unemployment – loss of income / employer sponsored insurance (ESI)
- Shifts in enrollment towards public payers and uninsured
- Utilization patterns sensitive to economic status and source of coverage

5. Disruptions to **provider networks**

- Provider finances upended
 - Deferred/foregone elective care, shift to public payers, disrupted operations, capital expenditures
- \$175 billion CARES Act Provider Relief fund distribution has been delayed
- Hundreds of hospitals have furloughed or laid off staff
- 2021 reimbursement increases?
- Risk sharing contracts

Rating Considerations, 2021+

6. Operational impacts

- Payment processing and reserving
- Care management
- Risk score capture
- General and administrative expenses

7. Future considerations

- Unwinding 2020 disruptions from experience rating and other studies / time series
- Medical Loss Ratios



8. Setting a point estimate when the future is uncertain



- Filings require point estimate, but **range of potential outcomes** is great and outside of issuers' control
 - **Costs could drop:** continued deferral/avoidance of care, influx of healthy enrollees from employer coverage, low incidence of infection, subsidized vaccine, minimal impact of secondary cost drivers
 - **Costs could increase:** pent-up demand, testing and treatment of sustained outbreak, non-subsidized vaccine, adverse selection among enrollees, secondary impacts to population health and provider reimbursement
- **Competitive pressures** may encourage **groupthink and bias** in rate setting exercises
 - Among first 13 markets to report 2021 rates, **73% of issuers filed no impact**¹
 - Perhaps “wait-and-see,” but is driving **emerging consensus of small/neutral impact**
 - Competitive pressures present **Prisoner’s Dilemma**: Market share at risk when rating higher than competitors
 - Could resolve through **state-mandated rate load**, but with its own downsides/risks
- Favorable 2020 financial performance may encourage aggressive 2021 rates due to **Medical Loss Ratio** rules

1. <https://us.milliman.com/en/insight/the-preliminary-reported-impact-of-covid19-on-aca-premiums>

Data Reliance and Limitations

- This presentation (“Rating for COVID-19 Healthcare Costs in 2021 and Beyond”) is intended to provide an educational overview of considerations for healthcare payers related to the potential impact of COVID-19 on health insurance costs and revenue requirements in 2021 and beyond. It is not meant to represent an exhaustive list of all relevant considerations nor predict which outcomes are most likely to happen. The discussion within is premised on the current understanding of the spread of COVID-19, including assumptions as to how many people are infected in a population, how severe those infections are across the population, and actions taken to limit infection.
- Scientific knowledge of these items is incomplete and new data on the spread of COVID-19 in the United States is still emerging. In addition, actions taken by governmental authorities and the healthcare system related to the COVID-19 pandemic are rapidly changing. Consequently, considerations for health plans and their relative importance will evolve as new information becomes available and new actions are taken by the authorities and other stakeholders. Due to the limited information available on the pandemic, any analysis is subject to a substantially greater than usual level of uncertainty.
- The opinions expressed in this presentation are attributable to the author, Jeff Milton-Hall, and not Milliman or the Society of Actuaries as a whole. The information herein is intended for educational purposes, and represents the author’s best estimates at the time of publication based on available information; actual results will vary. Emerging experience should be monitored and adjustments made as necessary.
- Jeff Milton-Hall is a member of the American Academy of Actuaries, and meets its qualification standards to provide this analysis.



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