Pandemics, Infectious Diseases, and the Coronavirus

Presenters:
Gina C. Guzman, MD, DBIM, FAAIM, FALU, FLMI
Achilles M. Natsis, FSA, MAAA

29 October 2020
SOCIETY OF ACTUARIES
Antitrust Compliance Guidelines

Active participation in the Society of Actuaries is an important aspect of membership. While the positive contributions of professional societies and associations are well-recognized and encouraged, association activities are vulnerable to close antitrust scrutiny. By their very nature, associations bring together industry competitors and other market participants.

The United States antitrust laws aim to protect consumers by preserving the free economy and prohibiting anti-competitive business practices; they promote competition. There are both state and federal antitrust laws, although state antitrust laws closely follow federal law. The Sherman Act, is the primary U.S. antitrust law pertaining to association activities. The Sherman Act prohibits every contract, combination or conspiracy that places an unreasonable restraint on trade. There are, however, some activities that are illegal under all circumstances, such as price fixing, market allocation and collusive bidding.

There is no safe harbor under the antitrust law for professional association activities. Therefore, association meeting participants should refrain from discussing any activity that could potentially be construed as having an anti-competitive effect. Discussions relating to product or service pricing, market allocations, membership restrictions, product standardization or other conditions on trade could arguably be perceived as a restraint on trade and may expose the SOA and its members to antitrust enforcement procedures.

While participating in all SOA in person meetings, webinars, teleconferences or side discussions, you should avoid discussing competitively sensitive information with competitors and follow these guidelines:

- Do not discuss prices for services or products or anything else that might affect prices
- Do not discuss what you or other entities plan to do in a particular geographic or product markets or with particular customers.
- Do not speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- 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.

Adherence to these guidelines involves not only avoidance of antitrust violations, but avoidance of behavior which might be so construed. These guidelines only provide an overview of prohibited activities. SOA legal counsel reviews meeting agenda and materials as deemed appropriate and any discussion that departs from the formal agenda should be scrutinized carefully. Antitrust compliance is everyone’s responsibility; however, please seek legal counsel if you have any questions or concerns.
Presentation Disclaimer

Presentations are intended for educational purposes only and do not replace independent professional judgment. Statements of fact and opinions expressed are those of the participants individually and, unless expressly stated to the contrary, are not the opinion or position of the Society of Actuaries, its cosponsors or its committees. The Society of Actuaries does not endorse or approve, and assumes no responsibility for, the content, accuracy or completeness of the information presented. Attendees should note that the sessions are audio-recorded and may be published in various media, including print, audio and video formats without further notice.
What to Expect

- Risks of the pandemic / how insurers can mitigate them across lines of business
- Morbidity, mental health, and mortality impacts across comprehensive medical, disability, and life insurance
- How can insurance companies protect themselves against future outbreaks and black swan events
- Key health characteristics of the COVID-19 outbreak
- 2020 impacts of COVID-19 on healthcare costs and the delivery system
- How might these impacts evolve in the year to come?
Poll:
How would you describe your current role?

1. Actuary - Health
2. Actuary – Life
3. Actuary – Living Benefits (DI, LTC, CI)
4. Actuary – Other / Non-traditional
5. Non-Actuary
Word Cloud:
In one word, what concerns you the most regarding the current COVID-19 pandemic?
Pandemic Risks, COVID-19, and the Insurance industry

Gina C. Guzman, MD, DBIM, FAAIM, FALU, FLMI

29 October 2020
Epidemiology 101

- Endemic
- Epidemic Outbreak
- Pandemic
History of Pandemics – global mortality

<table>
<thead>
<tr>
<th>Pandemic</th>
<th>Year(s)</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonine Plague</td>
<td>(165 AD)</td>
<td>5 million</td>
</tr>
<tr>
<td>Black Death</td>
<td>(1346-1353)</td>
<td>75-200 million</td>
</tr>
<tr>
<td>Russian Flu</td>
<td>(1889-1890)</td>
<td>1 million</td>
</tr>
<tr>
<td>Spanish Flu</td>
<td>(1918-1920)</td>
<td>50-100 million</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>(2005-2012)</td>
<td>36 million</td>
</tr>
<tr>
<td>Swine Flu (H1N1)</td>
<td>(2009-2010)</td>
<td>~300,000</td>
</tr>
</tbody>
</table>
History of Pandemics – United States mortality

“Typical” Pandemic Planning

• Assumption: occur every 10-68 years (or 200 years?)
• U.S. National Strategy for Pandemic Influenza
• Business Continuity Plans
  • Customer perspective – Business as usual, Claims payments
  • Employee perspective
• Pandemic Scenario testing (actuarial, SOA models)
• Health Care System Considerations: HHS projections
What about COVID-19?

- Transmission
- Diagnosis
- Treatment
- Prevention
What about COVID-19?

Droplets vs. Aerosols
Asymptomatic transmission
Superspreading
What about COVID-19?

**Transmission**  
**Diagnosis**  
**Treatment**  
**Prevention**

Droplets vs. Aerosols  
Asymptomatic transmission  
Superspreading

COVID-19 tests not readily available  
Who to test and when  
Asymptomatic contacts
What about COVID-19?

- Transmission
- Diagnosis
- Treatment
- Prevention

- Droplets vs. Aerosols
- Asymptomatic transmission
- Superspreading

COVID-19 tests not readily available
Who to test and when
Asymptomatic contacts

No Vaccine
No baseline immunity
What about COVID-19?

Transmission

Droplets vs. Aerosols
Asymptomatic transmission
Superspreading

Diagnosis

COVID-19 tests not readily available
Who to test and when
Asymptomatic contacts

Treatment

No effective treatment to date

Prevention

No Vaccine
No baseline immunity
Transmission - Superspreading at the same $R_0$ level

$R_0=2$ in both transmission settings

Basic reproductive number $R_0$ is indicating the average number of people to which a single infected person will transmit the virus.
Transmission - Superspreading at the same $R_0$ level

$R_0=2$ in both transmission settings

Basic reproductive number $R_0$ is indicating the average number of people to which a single infected person will transmit the virus.

For SARS-CoV-2 it more and more looks like that only around 20% of those infected pass on the virus and cause 80% of all new infections.
Basic reproductive number $R_0$ is indicating the average number of people to which a single infected person will transmit the virus.

For SARS-CoV-2 it more and more looks like that only around 20% of those infected pass on the virus and cause 80% of all new infections.
## Medical scientific response

<table>
<thead>
<tr>
<th>Evidence-based Research</th>
<th>“Normal”</th>
<th>COVID-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preclinical</td>
<td>10-year process for FDA approval</td>
<td>Rapidly evolving</td>
</tr>
<tr>
<td>Phase 1 – safety</td>
<td>25-30% make it to Phase 3</td>
<td>Overwhelming</td>
</tr>
<tr>
<td>Phase 2 – efficacy, side effects</td>
<td>$2.6B</td>
<td>Exponential # of articles</td>
</tr>
<tr>
<td>Phase 3 – efficacy, effectiveness, safety</td>
<td>Randomized controlled trials</td>
<td>Daily publications</td>
</tr>
<tr>
<td>Phase 4 – post approval surveillance</td>
<td>Peer-reviewed journals</td>
<td>Preprint BioRxiv</td>
</tr>
<tr>
<td></td>
<td></td>
<td># of RCT is low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-peer reviewed</td>
</tr>
<tr>
<td>Vaccine Development</td>
<td>&gt;10 years</td>
<td>Operation Warp Speed</td>
</tr>
<tr>
<td>Exploratory stage</td>
<td>$ 500 million</td>
<td>Mar 2020 – Jan 2021</td>
</tr>
<tr>
<td>Pre-clinical</td>
<td></td>
<td>$ 10B USD</td>
</tr>
<tr>
<td>Clinical development (3 phases)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory review and approval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
COVID-19 and comorbid risk

• Cancer
• Chronic kidney disease
• COPD (chronic obstructive pulmonary disease)
• Immunocompromised states from solid organ transplant
• Obesity (BMI ≥ 30)
• Serious heart conditions (heart failure, CAD, cardiomyopathies)
• Type 2 diabetes mellitus
• Sickle cell disease

Per CDC as of July 17, 2020
Obesity as a COVID-19 risk factor

Annals of Internal Medicine. Published online: 12 August 2020
doi:10.7326/M20-3742

https://www.acponline.org
Treatment – where are we?

• SOLIDARITY trial (WHO) to identify drugs which might improve outcome
  Remdesivir | Favipiravir | Lopinavir/Ritonavir | Hydroxychloroquine/chloroquine
• Dexamethasone and other glucocorticoids
• Monoclonal antibodies
• Convalescent plasma
• IL-6 pathway inhibitors
Vaccine development

• Research activities on developing a vaccine are underway
• 43 candidate vaccines in clinical evaluation; 11 in phase 3 trials
• Candidates most advanced:
  ❖ MODERNA® (mRNA-1273)
  ❖ BioNTech & Pfizer (mRNA BNT162b2)
  ❖ University of Oxford & Astra-Zeneca® (adenovirus vaccine vector)
• Projection: a successful candidate to market in approximately 10-15 months

As of 30 Sep 2020
What do we know now?

• COVID comorbid risk is heavily dependent on infection rate
• Long term immunity uncertain
• No vaccine yet
• No clear effective treatment regimen
• Treatment investigations progressing rapidly, but properly designed RCTs take time
• Long term effect of confinement and economic problems still unclear
• Wear your mask!
Insurance Value Chain

Sales & Marketing
- Distribution
- Agents
- Customer Engagement
- Application Forms

Underwriting
- Requirements
- Paramed
- Blood/Urine
- APS
- Telephone interview
- UW Review

Policy Issue
- Policy Delivery
- Signatures
- Payment
- Admin

Post-Issue
- Claims
- Customer Service
## COVID-19 impact on the insurance industry

### Business Continuity: getting the business written and administered

<table>
<thead>
<tr>
<th>Life - mortality</th>
<th>Disability - morbidity</th>
<th>P &amp; C and others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early mortality claims</td>
<td>Direct cause from [infection with disease]</td>
<td>Financial loss from event cancellations</td>
</tr>
<tr>
<td>Co-morbid risks</td>
<td>Physical inactivity – increased obesity, emotional eating?</td>
<td>Business interruption Contingency business</td>
</tr>
<tr>
<td>Increase in Suicide rates?</td>
<td>Mental health</td>
<td></td>
</tr>
<tr>
<td>Delayed medical care</td>
<td>Economic impact – significant increase in [unemployment]</td>
<td>Reduced car accident claims</td>
</tr>
<tr>
<td>Screening for cancer and CV diseases, elective surgery were postponed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Insurance Risk & Mitigation

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business continuity</td>
<td>BCP planning &amp; Pandemic scenario testing</td>
</tr>
<tr>
<td></td>
<td><strong>Catalyst for innovation</strong></td>
</tr>
<tr>
<td></td>
<td>Multidisciplinary collaborative response</td>
</tr>
<tr>
<td>Rapidly evolving, overwhelming medical literature</td>
<td><strong>Strong medical consulting team</strong></td>
</tr>
<tr>
<td></td>
<td>Rigorous R&amp;D</td>
</tr>
<tr>
<td>Second or third wave?</td>
<td><strong>Be prepared</strong> – likely to last 18-24 months in a series of waves as herd immunity develops or vaccine released</td>
</tr>
<tr>
<td>Increased mortality claims</td>
<td>COVID UW guidelines, tighter financial UW</td>
</tr>
<tr>
<td></td>
<td>Pricing increases?</td>
</tr>
<tr>
<td>Increased morbidity/disability claims</td>
<td>Scope, resource, and <strong>define a strategy</strong>; monitor lapses Increase reserves</td>
</tr>
<tr>
<td>Employee health</td>
<td>Infection control, mask strategies, social distancing, WFH, flexible hours, encourage PTO, video calls, HR counseling programs, vaccinations</td>
</tr>
</tbody>
</table>
COVID-19: A Health Perspective

Achilles M. Natsis, FSA, MAAA

29 October 2020
Pandemics, Infections Diseases and the Coronavirus – A Health Perspective

- Key Health Characteristics of the COVID-19 Outbreak
- Main Impacts of COVID-19 on the Health Delivery System
- Guidelines for Projecting Future Health Care Costs in a Pandemic:
Pandemics, Infections Diseases and the Coronavirus – A Health Perspective

- Costs Dependent on Infection rate and hospitalization rates
  - Local / Regional spikes or second waves can drive up infection rates
  - Costs Heavily skewed towards older members with co-morbidities

- Overall Hospitalization rates have come down since April
  - Locations with outbreaks have seen higher hospitalizations

- Ventilator use has decreased dramatically while ICU % of Hospitalization has been relatively steady
ER Conversion to Admission Slide by Age

Hospitalizations by Date and Age Group

ICU and Ventilation Rates per Hospital Admission

COVID-19 Impacts on the Healthcare Delivery System

• Reductions in Volume to Services
  • Services Impacted
    • CDC / CMS guidelines were implemented
    • Hospital and Professional Services dropped significantly
    • Elective and Preventive Services Dropped off the most
    • Shifting to telemedicine helped mitigate drop-off
  • Timing of return of service
    • Some return of Services Delayed
      • Emergency
      • Preventive
      • Areas with local outbreaks
    • Other services rebounded more quickly
      • Screenings
      • Treating Chronic Conditions
      • Some elective surgeries
Reduction in Hospital Volume By Service Category

- Cumulative Monthly Deficits Varied by Major Service Category
  - Inpatient = -0.8
  - Observation = -1.2
  - Emergency = -1.7
  - Outpatient = -1.1

Cumulative Monthly Volume Deficits by Service Type

- Cumulative March 20 – August 15 Deficit was 1.21 months
- 1.09 Months of Deficit were from March 20 – July 16
- COVID claims came through Infectious diseases and represent a small fraction of total claims.
- Higher Deficits in “Elective” Subgroups
- Lower Deficits in “Chronic” Subgroups

Telehealth Use on Eligible Office Visits

- Greatest use of telemedicine includes:
  - FQHCs
  - Psychiatry
  - Consultations, check ins, and follow-ups
COVID-19 Impacts on Future Healthcare Costs

- Disruptions to Base Claims due to COVID
  - Direct COVID costs (+)
  - Reductions due to foregone and deferred services (-)
    - Exceed Direct COVID costs
  - Membership changes obscuring claims (+) or (-)
  - Costs of Testing (+)
COVID-19 Impacts on Future Healthcare Costs

• Impacts on future periods
  • Extent of Future waves impact:
    • Direct COVID Costs: Hospitalization (+)
    • Increased BH/SA Costs (+)
    • Testing (+)
    • Vaccines (+)
    • Level of Service reductions (-)
  • Recoupment of Deferred Services (+)
    • Potential for higher acuity of due to untreated chronic conditions
  • Increased Unit Cost Trends due to Provider Hardships (+)
  • Potential Permanent changes in cost characteristics
    • Less Use of ER (-)
    • Greater use of telehealth (+)
COVID-19 Impacts on Future Healthcare Costs

- Link to SOA Model on Projecting Future Health Care Costs:
  - [https://www.soa.org/resources/research-reports/2020/covid-19-cost-model/](https://www.soa.org/resources/research-reports/2020/covid-19-cost-model/)