

Overview of COVID-19: Actuarial Implications

Actuarial Research Conference

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Max J. Rudolph, FSA CFA CERA MAAA

Actuarial Practice: Look for Discontinuities

- Current environment is unprecedented
 - 130% debt to GDP
 - Near 0% interest rates
 - Record jobless
- Rules of thumb likely no longer work
- Use first principles for strategic analysis
- I wonder if...
 - Central banks will continue to be lender of last resort
 - A vaccine will provide lasting immunity
 - Trading partners and allies will evolve
 - Climate change will remind us of its presence
 - Prior pandemics were caused by coronavirus
 - Good time to review valuation methods (e.g., pension DB plans)

Leading Indicators

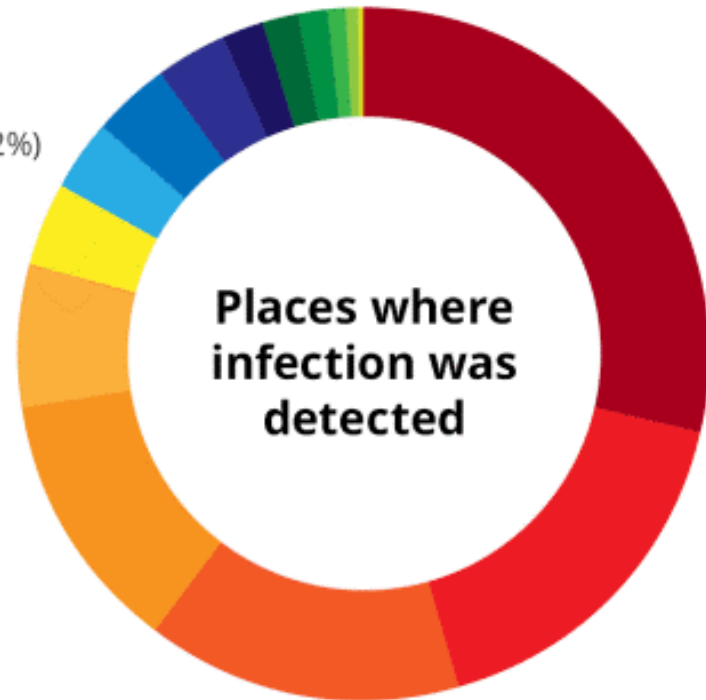
- Deaths
 - Hospitalizations
 - Cases
 - Tests
 - » Doctor visits/Google searches
- What comes next?
 - Learn from investors?
 - Count cars in parking lots
 - Trading volume in cleaning supplies
 - Walmart inventory of over the counter products
 - Test sewage

Respiratory Disease? Symptom Clusters

1. “flulike” with no fever
 - Headache, loss of smell, muscle pains, cough, sore throat, chest pain, no fever
2. “flulike” with fever
 - Headache, loss of smell, cough, sore throat, hoarseness, fever, loss of appetite
3. gastrointestinal
 - Headache, loss of smell, loss of appetite, diarrhea, sore throat, chest pain, no cough
4. severe level one, fatigue
 - Headache, loss of smell, cough, fever, hoarseness, chest pain, fatigue
5. severe level two, confusion
 - Headache, loss of smell, loss of appetite, cough, fever, hoarseness, sore throat, chest pain, fatigue, confusion, muscle pain
6. severe level three, abdominal and respiratory
 - Headache, loss of smell, loss of appetite, cough, fever, hoarseness, sore throat, chest pain, fatigue, confusion, muscle pain, shortness of breath, diarrhea, abdominal pain

Israeli Experience (Cases)

- **Educational institutions** 210 (28.8%)
- **Events** 123 (16.9%)
- **Places of worship** 106 (14.5%)
- **Recreational and leisure spots** 89 (12.2%)
- **Workplaces** 48 (6.6%)
- **Nursing homes** 28 (3.8%)
- **Shopping malls and stores** 26 (3.5%)
- **Medical institutions** 25 (3.4%)
- **Sport and exercise facilities** 24 (3.3%)
- **Public transportation** 14 (1.9%)
- **Outdoors** 12 (1.6%)
- **Army** 10 (1.3%)
- **Social gatherings** 7 (0.9%)
- **Pools and beaches** 4 (0.5%)
- **Beauty salons and barbershops** 1 (0.1%)

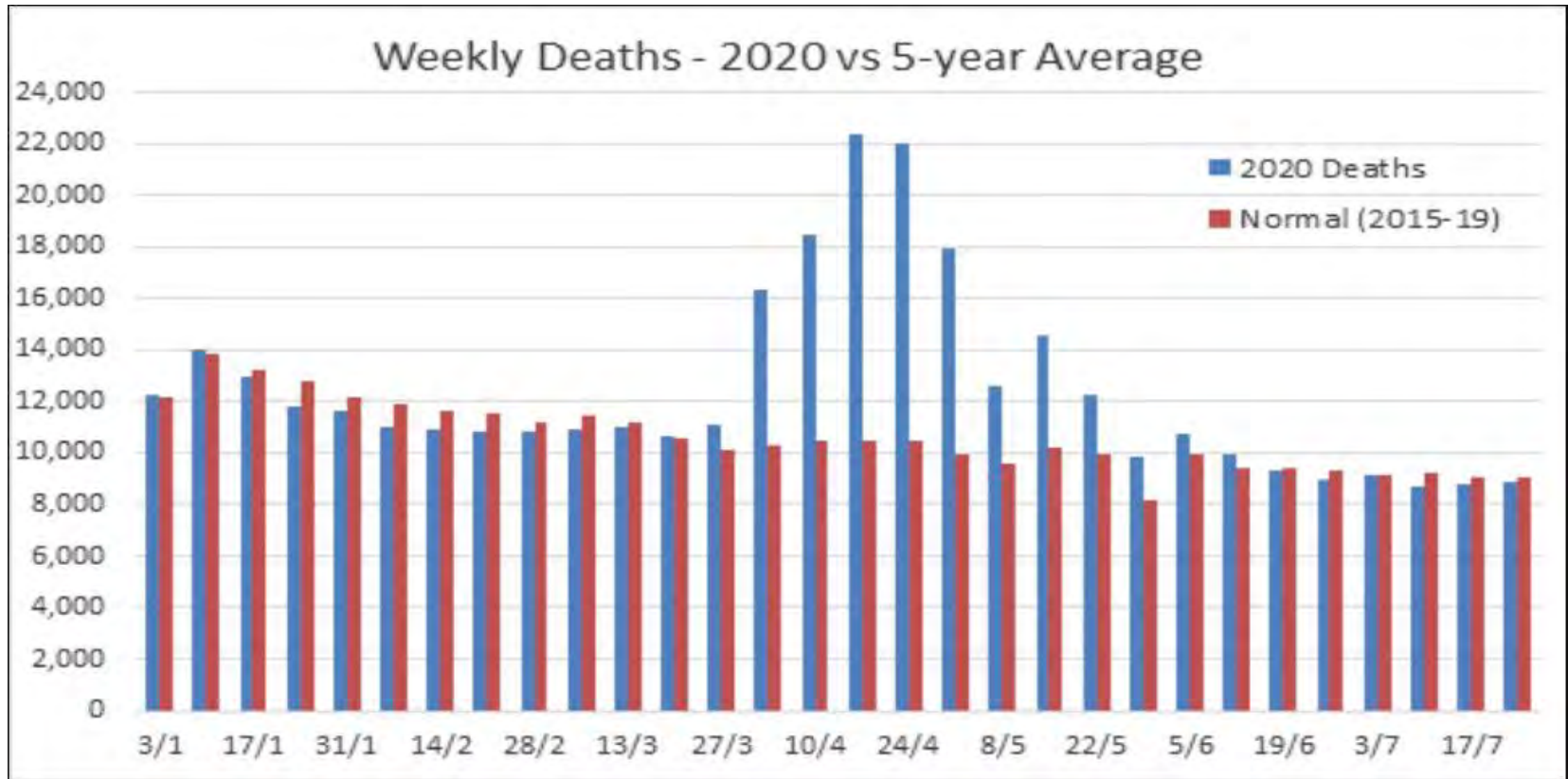


*Health Ministry data from 10.7-16.7, out of 727 patients who know where they were infected.
Does not include those infected at home

Multisystem inflammatory syndrome

- Different from COVID19?
- Viral then inflammatory
- Not just lungs
- Liver/kidney/COVID toes/blood clots/mental acuity/heart/gastrointestinal
- Cytokine storm (body attacks itself) – ARDS (acute respiratory distress syndrome)
- Smell/taste and now hearing?

UK (ONS) - New Data, New Questions



Similarities to 1918 Influenza

- Reopen too soon
- Age distribution important
- Disease mutates
- Post pandemic issues
 - Inflammation
 - Disability
 - Organs (heart, brain)
- Not - fertility
- http://rudolph-financial.com/Pandemic_articles.html

Impact on Actuarial Practice Areas

US CDC Moderate Pandemic Scenario (200,000 deaths)

Life Insurers

- Assets
- Interest rate guarantees
- Annuities drive business model

Health Insurers

- Likely short-term positive because of deferred care
- LTC/Disability – longer term issues

Pension Plans

- Assets – defaults/downgrades
- Returns
- Employment disruption

Property/Casualty Insurers

- Contract language – business interruption
- Legislation – systemic risk
- Auto refunds

Evolving Practices

Risk Management

- Scams/fraud
- Food security – higher order

Health Care Practices

- Telemedicine
- Supply chain – international and just-in-time
- Surge capacity lacking
- Isolation, mental health, physical abuse

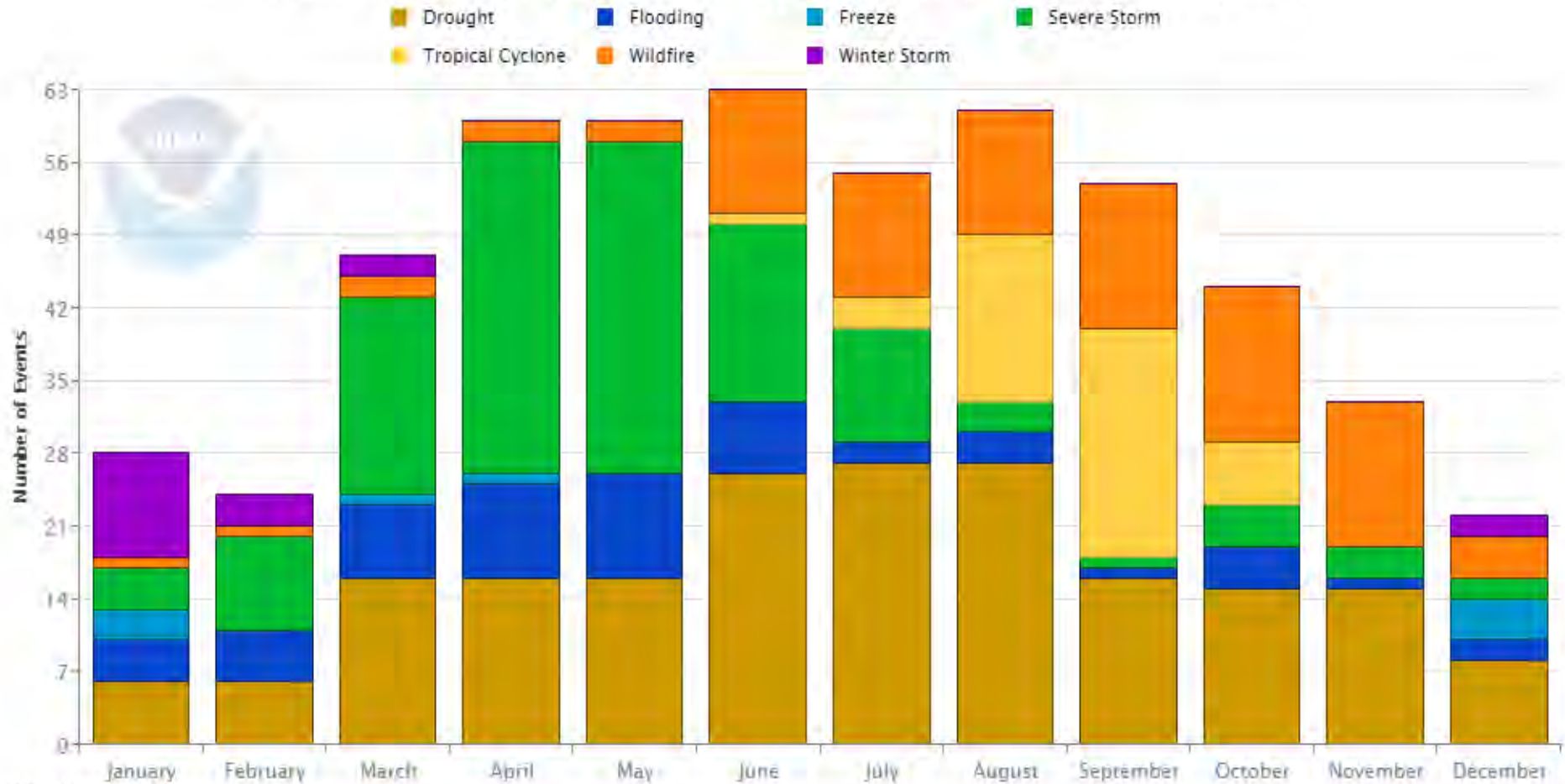
Best Addressed With Deterministic Stress Tests

- CDC Severe pandemic scenario (2 million deaths)
- Negative rates
- Stagflation
- U.S. election Nov 2020
- Oil supply shock
- Cluster of events
- Antibiotic resistance

Potential US Natural Disaster Clusters

- Additional risk events stress insurer and reinsurer solvency
- Table top exercises - include emergency management teams along with other experts
- Watch for evacuation events
 - Wild fires
 - Hurricanes/cyclones
 - Earthquakes
 - Floods
- Other events (e.g., Beirut explosion)

United States Billion-Dollar Disaster Types By Month 1980-2020 (CPI-Adjusted)



Updated: July 8, 2020

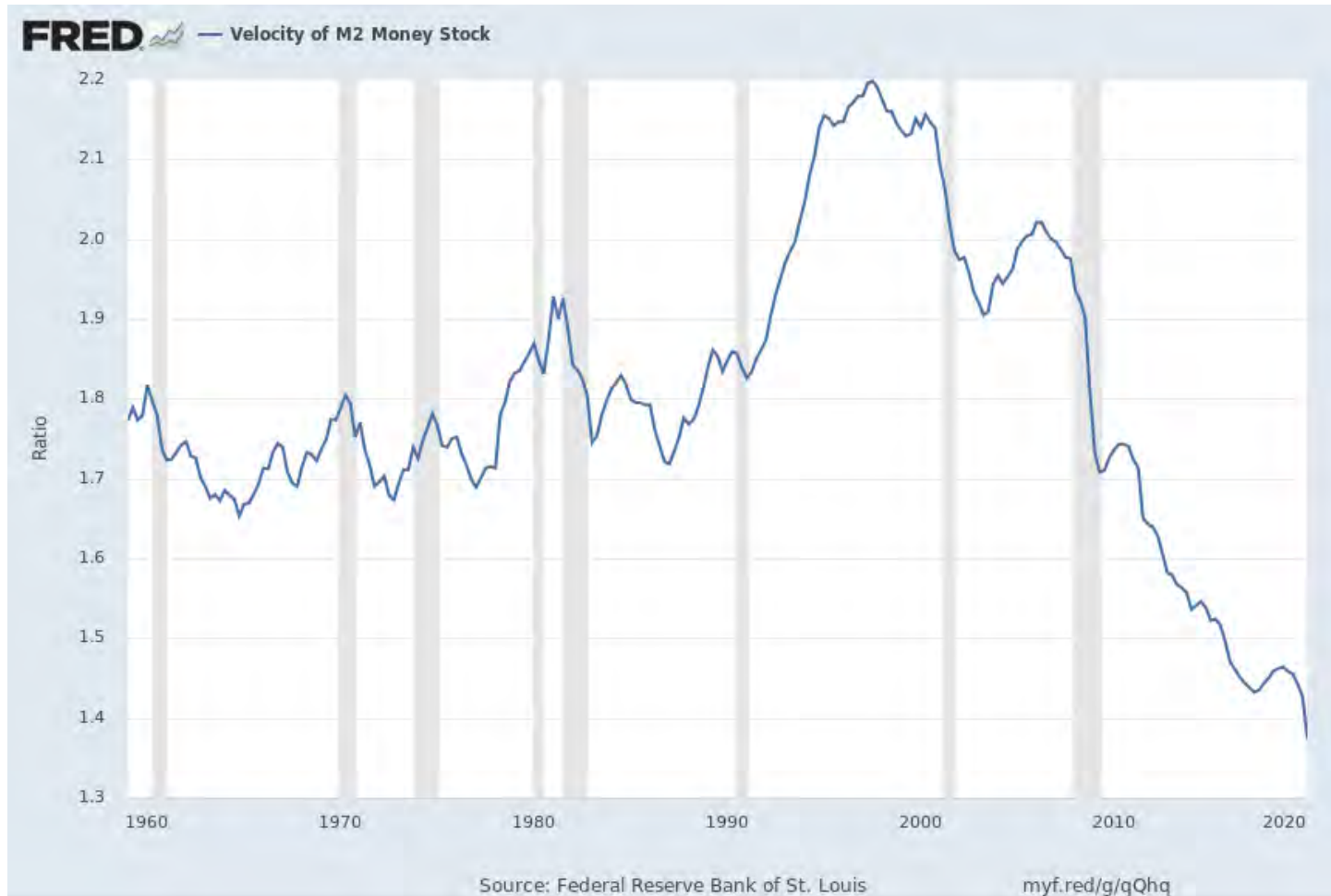
US Unemployment



Gold



US Velocity of Money



Stimulus

- US GDP down 9.5% in 2nd quarter
- $GDP = Consumption + Inv + Govt + Exp$
 - 2nd quarter government stimulus \$3tn
 - 3rd quarter – G smaller as programs stop (?)
 - One time check, \$600/week, PPP, job loss becomes permanent
 - Non cash
 - Forbearance, eviction moratorium, student loan freeze

Financial Thoughts

- Revisit
 - Auto stabilizers – local level of unemployment (with consistent unemployment payments)
 - European unemployment furlough system (proactive)
 - Separate health care from employment
 - Allow creative destruction
- I wonder if...
 - Defaults will spike
 - Interest rates will stay low
 - Bubbles will burst (e.g., BBB-, CLO)
 - Liquidity will dry up
 - Stagflation/depression

Future Thesis Topics

- Will COVID19 evolve into a common cold? How long will it take?
- Fertility rates down – role of economics, climate, health
- Lengthy recovery even if mild symptoms
- Long-term impact of symptom clusters
- Mental health/suicides/drug overdoses
- Why no excess cases in stewardesses or day care workers
- Youth summer camps
- Child vaccinations – impact of missed timing
- Is risk reduction as simple as wearing masks?
- Mask requirement – all, exemptions, some, none – what is best?
- Role of race vs. built up economic imbalances
- Office vacancy rate, campus (vs. high rise) to avoid elevators
- Acceleration of long trends (e.g., telehealth, retail decline)
- Resilience (don't deplete disaster funds, lower debt/GDP)

Thank you!



Max J. Rudolph, FSA CFA CERA MAAA

max.rudolph@rudolph-financial.com

Twitter @maxrudolph
Omaha, Nebraska, USA
(402) 895-0829

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