The Impact of COVID-19 on Life Insurance and Healthcare
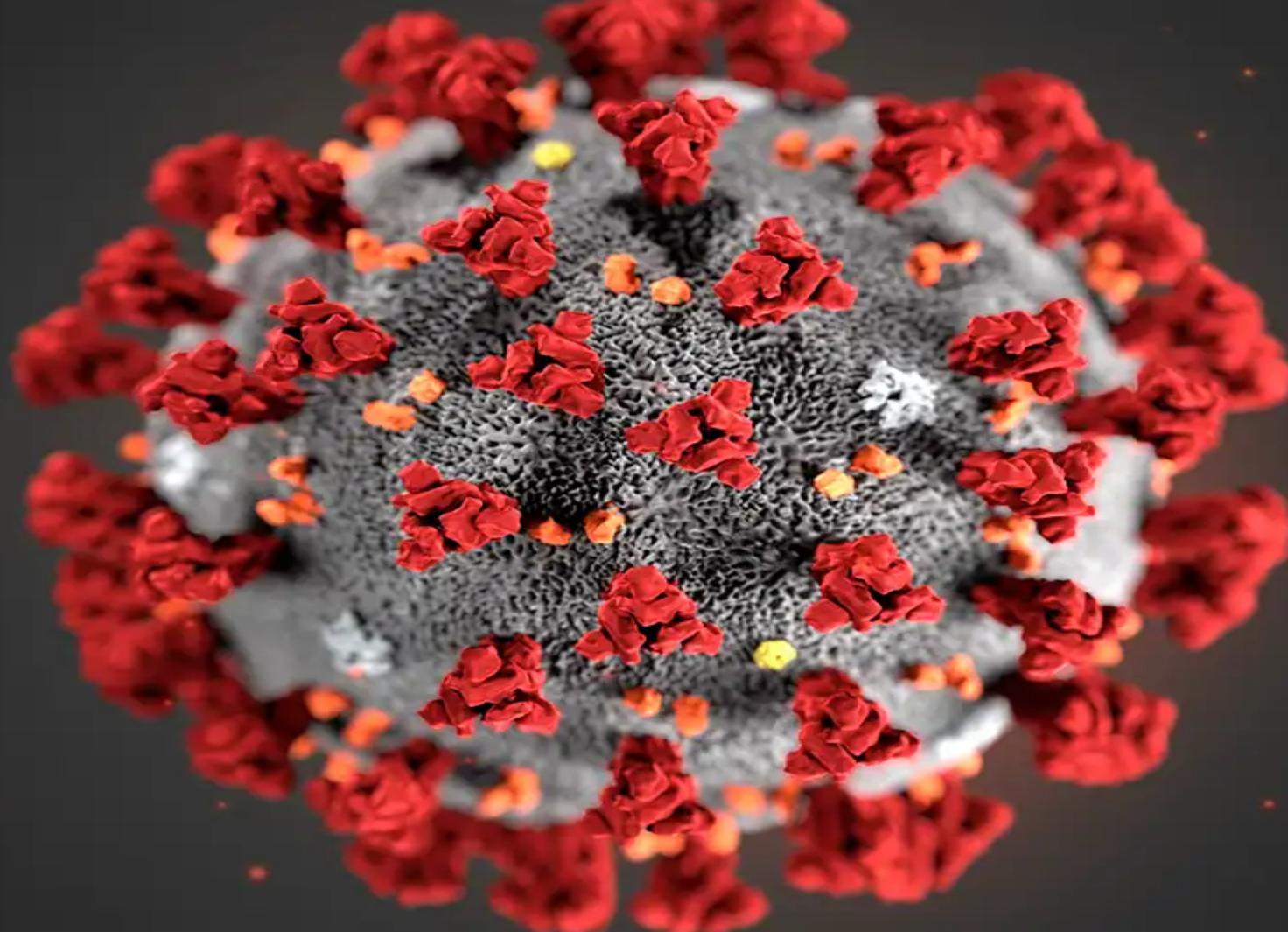
November 2, 2020

ACTUARIES' CLUB OF
BOSTON

ACHS
ACTUARIES' CLUB
OF HARTFORD & SPRINGFIELD
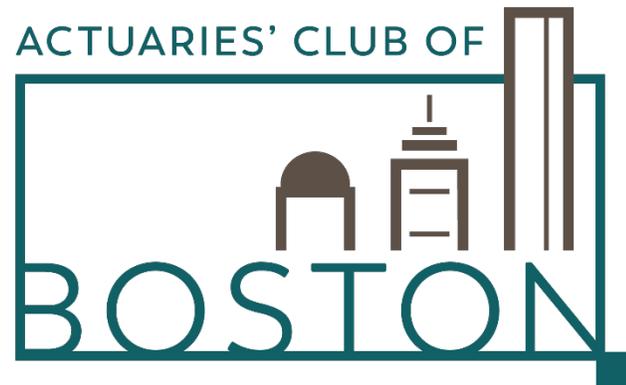
The webcast will begin momentarily…

Please hold questions until the end of the presentation

Questions can be submitted by unmuting your line at the end of the presentation
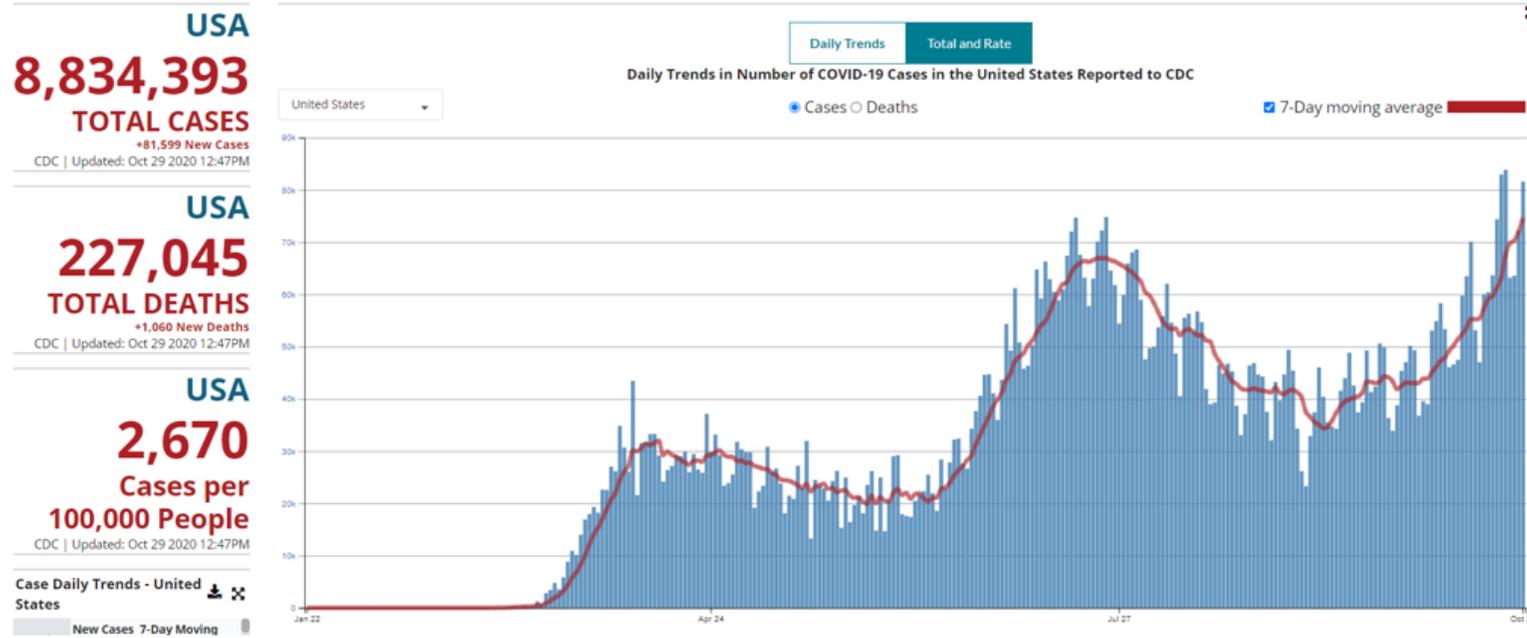
COVID-19 Life Mortality

November 2, 2020

Brigitte Labrèche, FSA, FCIA, MAAA
Head of Strategic Actuarial Initiatives, Mass Mutual

Agenda

- Current U.S. Population COVID-19 Landscape

- U.S. Population COVID-19 Death Forecasts

- Mass Mutual's Forecast Views

- Understanding the Data

- Mass Mutual's COVID-19 Experience

- Insured COVID-19 Mortality vs. U.S. Population

- Watchlist Items

U.S. Statistics[1] as of October 29, 2020

USA
8,834,393
TOTAL CASES
+81,599 New Cases
CDC | Updated: Oct 29 2020 12:47PM

USA
227,045
TOTAL DEATHS
+1,060 New Deaths
CDC | Updated: Oct 29 2020 12:47PM

USA
2,670
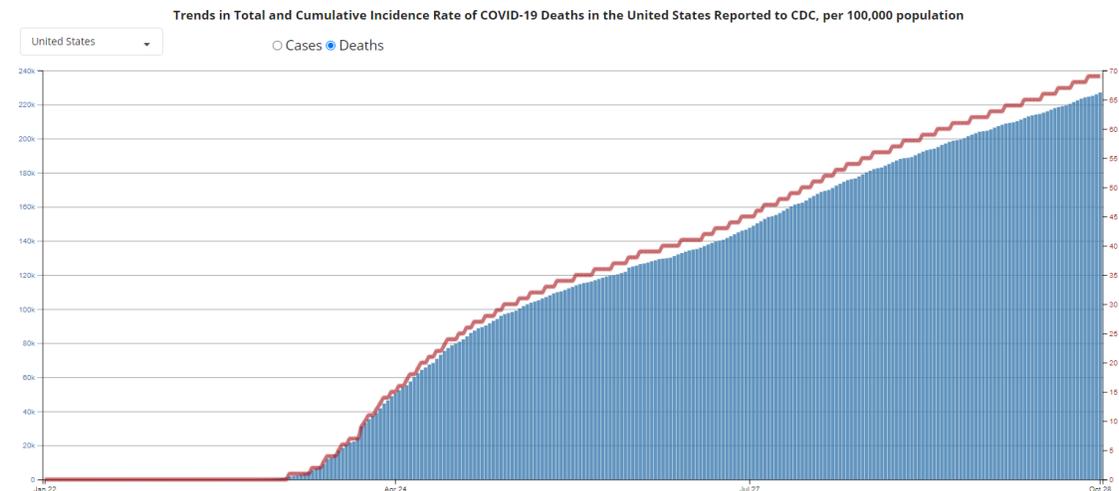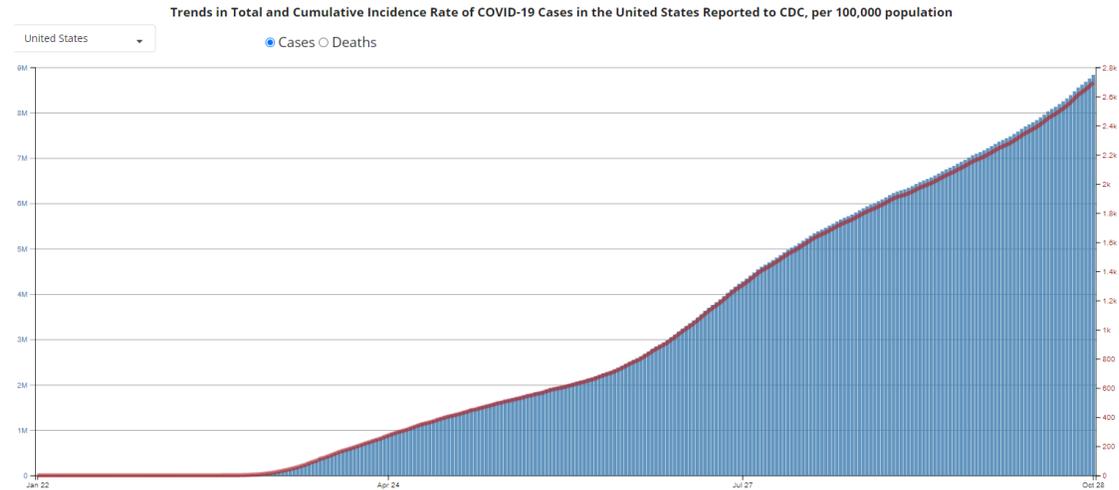Cases per 100,000 People
CDC | Updated: Oct 29 2020 12:47PM

- Initial wave was very concentrated in NYC with implementation of social distancing practices / mask wearing but counts largely underestimated given lack of testing

- 2nd wave more prominent in Southern states and where preventative measures were less common given lower infection rates than main states that were affected by 1st wave (CA, FL, TX, AZ)

- 3rd wave likely tied to back-to-school and seasonal change when outdoor activities are returning indoors but with concentrations in states less affected by the 1st 2 waves (ND, SD, WI)

[1]Source: CDC data as of October 29, 2020
https://covid.cdc.gov/covid-data-tracker/#trends_dailytrendscases

U.S. Statistics[1] as of October 29, 2020 (con't)

- While cumulative increase in U.S. case counts is largely linear, slight convexity observed in cumulative deaths

- In part driven by medical knowledge gained over last 6 months resulting is better treatment, possibly from earlier detection of disease and infection shift to younger/healthier population but also from massive NYC surge & recovery which remains un-duplicated

Trends in Total and Cumulative Incidence Rate of COVID-19 Cases in the United States Reported to CDC, per 100,000 population

United States

⦿ Cases ○ Deaths

Trends in Total and Cumulative Incidence Rate of COVID-19 Deaths in the United States Reported to CDC, per 100,000 population

United States

○ Cases ⦿ Deaths

IMHE COVID-19 U.S. Population Death Forecast[1]

- 1-year COVID-19 death forecasts are starting to emerge but still sparse with wide-range of results depending on assumptions

  - Based on the IHME, expect 296K to 349K deaths by December 31, 2020 and another 42K to 65K deaths in January, where range largely dependent on continuation of current social distancing / mask wearing practices and government actions which emphasize economy recovery vs health protective measures

- Worth noting that early convexity remain absent from actual experience since June and from forecast along today's continued environment ("Projection")

**399,163** COVID-19 deaths
based on Current projection scenario by February 1, 2021

Scenario ⓘ Projection ✕ Easing ✕ Masks ✕

Legend: Observed (smoothed) — Current projection — Mandates easing — Universal masks

All deaths specific to COVID-19 patients.
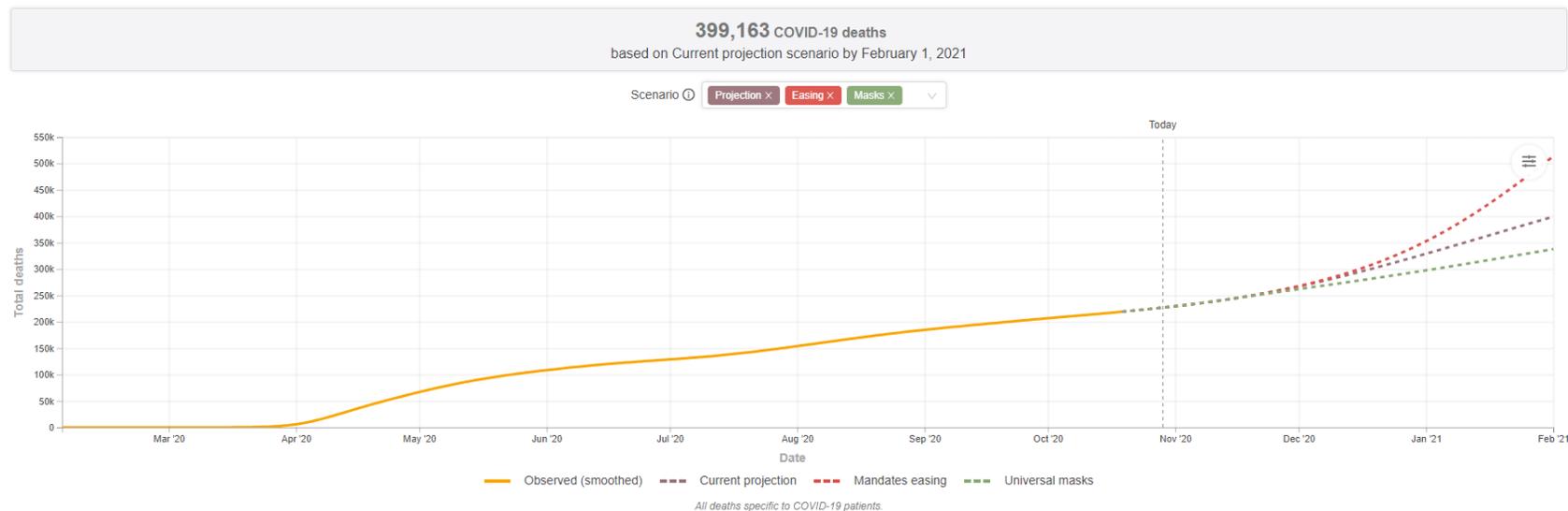
Mass Mutual's COVID-19 U.S. Population Death Forecast

- Forecast grounded in actuals, other external sources of forecast projections with largely linear emergence of cumulative death until vaccine is deemed widely available

- Important to provide range of scenarios and outcomes as too much uncertainty, unknowns and assumptions

U.S. Population Cumulative Deaths
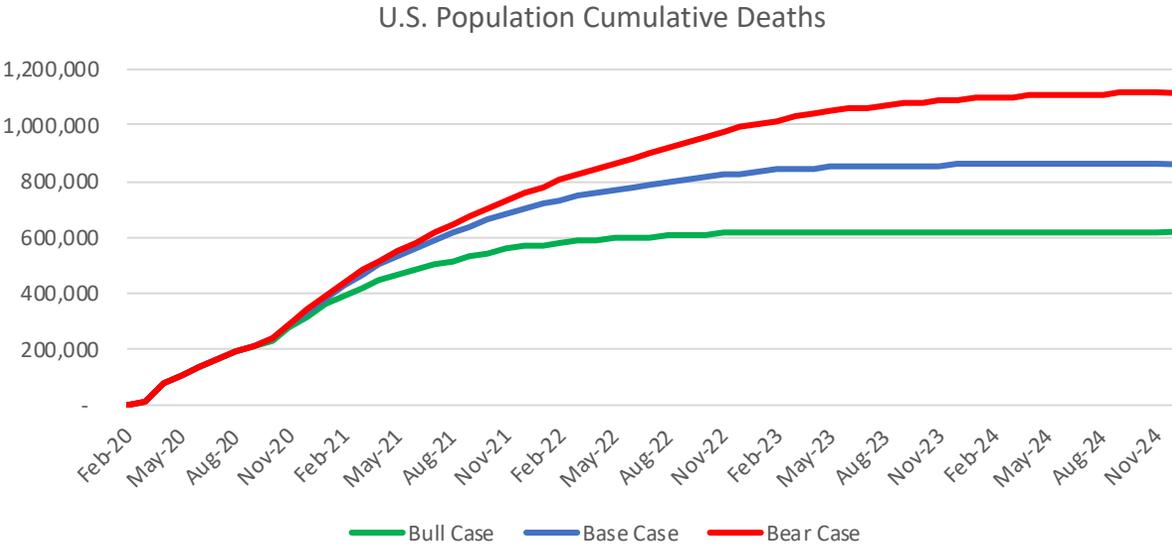
Bull Case: Vaccine widely available in 1st quarter of 2021, allowing activity to return to normal faster than anticipated. Life post-COVID looks very similar to pre-COVID

Base Case: Vaccine widely available by mid-2021 but additional wave in late 2020 disrupts activity around the U.S. Activity recovery is more gradual
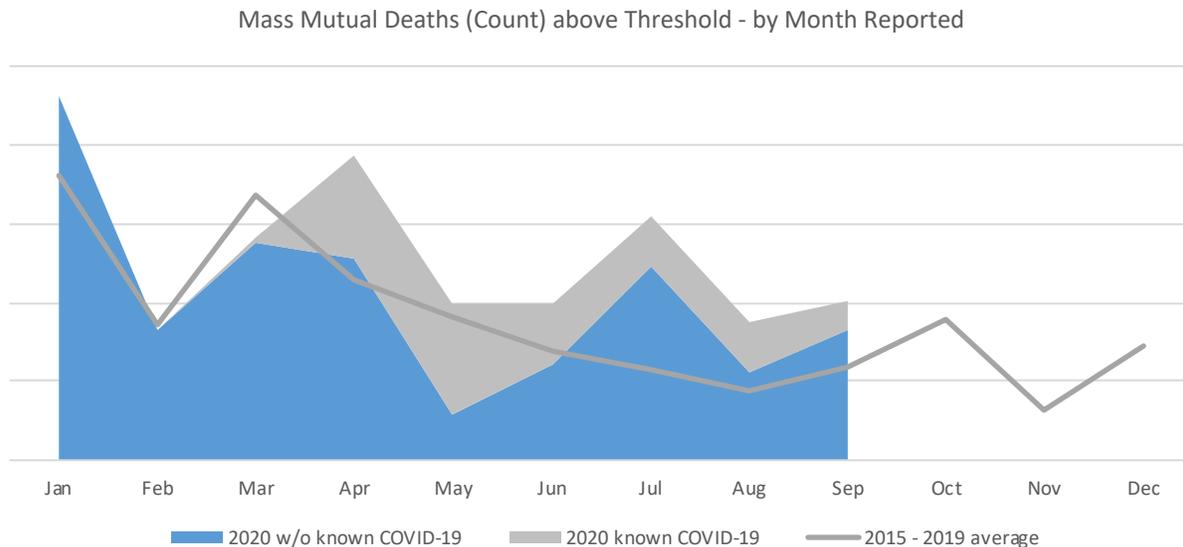
Bear Case: Recurring waves of infection cause severe medium-term disruption with no effective vaccine likely before 2022

Understanding the Data

- When using population data to make inferences for insured population, important to be aware of differences in exposures
  - Location, gender, age, target market/affluency, etc.

- Also important to understand lag the data is subject to
  - CDC
    - 3-week average as travel time from illness to death
    - Additional reporting lag from non-hospital deaths, delays in data transmission, etc.
  - Insurance Companies
    - Typical lag in incurred-but-not-reported
      - Most claims get reported within 2 to 3 months or death but may take 6 months to complete and even more in the COLI/BOLI markets
      - Once reported, further lag in identifying cause of death which on average, may take another 2 to 3 months

- Keep ASOP 23 in mind!!!

Mass Mutual Experience through September 30, 2020[1]

- Total deaths incurred are known but allocation by cause of death is not fully known
- Excess mortality is relative to 5-year historical average
- Excess April claim count driven by COVID-19 – deemed fully developed
- May experience driven by improved baseline mortality offset by excess mortality from COVID-19
  - Suspected to originate from social distancing practices benefiting insured population materially more than U.S. population
- July mortality materially higher than historical average and suspecting in part due to COVID-19 from more Southern states where rise in reported cases started in mid-June
- August and September excess mortality appears to be COVID driven

Mass Mutual Deaths (Count) above Threshold - by Month Reported

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

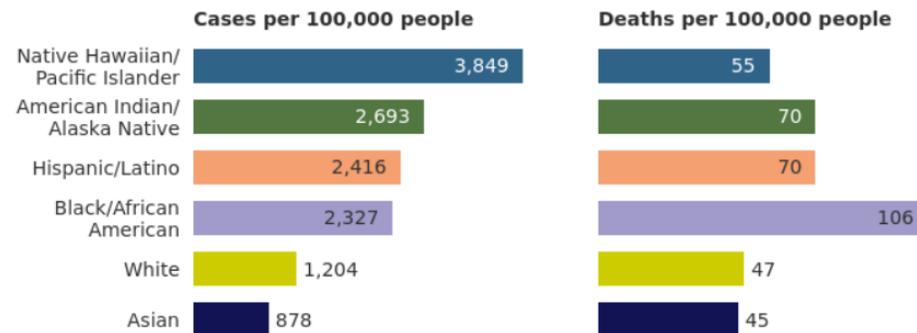■ 2020 w/o known COVID-19   ■ 2020 known COVID-19   — 2015 - 2019 average

COVID-19 experience takes several months to develop as cause of death often occurs post-incurral date as claim adjudication process runs its course

[1] Known COVID-19 claims as of October 23, 2020

COVID-19 Mortality U.S. Population vs. Insured Population

- Through April/May, COVID-19 mortality affected affluent vs non-affluent population similarly as most contagion occurred in March prior to social distancing practices were widely adopted

- Since then, COVID-19 has impacted communities very differently

In the **United States**, through October 29, Native Hawaiians/Pacific Islanders were most likely to have contracted COVID-19. Black/African American people were most likely to have died.

	Cases per 100,000 people	Deaths per 100,000 people
Native Hawaiian/Pacific Islander	3,849	55
American Indian/Alaska Native	2,693	70
Hispanic/Latino	2,416	70
Black/African American	2,327	106
White	1,204	47
Asian	878	45

Notes: Nationwide, 51 of 56 states and territories report race/ethnicity information for cases and 50 of 56 report race/ethnicity for deaths. Graphic includes demographic data from all states and territories that report, using standard Census categories where possible, and scaled to the total US population for each Census category. Race categories may overlap with Hispanic/Latino ethnicity. Some rates are underestimated due to lack of reporting of race and ethnicity categories for COVID-19 cases and deaths.

BOSTON UNIVERSITY

The COVID Tracking Project

- Underlying this data are likely variances in levels of education and affluence that may translate into an insured population which likely has greater means to work-from-home, lives in less densely populated areas, has access to better healthcare and is less reliant on nursing homes

- For Mass Mutual's insured population demographics, we continue to expect lower insured COVID-19 mortality vs. U.S. population and more favorable correlation than all cause insured vs. U.S. population mortality but monitoring closely

Source: https://covidtracking.com/race/infection-and-mortality-data

Watchlist Items

- How will back to school impact mortality?
  - Main concern is mass-spreading of illness when symptoms are dormant and how quickly schools will respond and be able to contact directly affected families for preventative quarantine
  - Potential for infection rate within insured population to mirror general population unless adoption of in-person/hybrid/remote learning varies between both groups

- How does migration from outdoors to indoors as weather cools affect spread of illness especially if social-distancing practices are not strictly and widely adopted?

- Timing of vaccine availability and effectiveness overtime
  - Good news is virus mutation is slow (at least so far)
  - If/when available, timing for mass-production
  - Willingness of getting vaccinated

- Health deterioration for those who contracted COVID-19 and recovered
  - Various studies show lasting heart inflammation post-recovery
  - Significant amount of blood cloths
  - Will need to watch for increase in heart and stroke related deaths over-time which could hint to future mortality deterioration
  - Converse position could be taken around Darwin effect such that overall mortality remains unchanged

The Impacts of COVID-19 on the Healthcare Industry

Jim Dolstad FCA, ASA, MAAA

Vice President, Optum Advisory Services

OPTUM®

Initial learnings

- **Actuaries, data scientists and clinicians can work well together**

- **Actuaries professionally collaborated across companies to serve the needs of the industry and their stakeholders in a time of crisis**

- **Additional pressure on models and our work when new element of keeping members and workforce safe came into play immediately**

- **An even greater appreciation for data quality**

An uncertain future, although more disruption inevitable

NUMBER INFECTED

SECOND WAVE OPTIONS

Large wave

Oscillating wave

Hot spots

Balance

Urgent COVID-19-specific needs

Plan and execute for future relevance
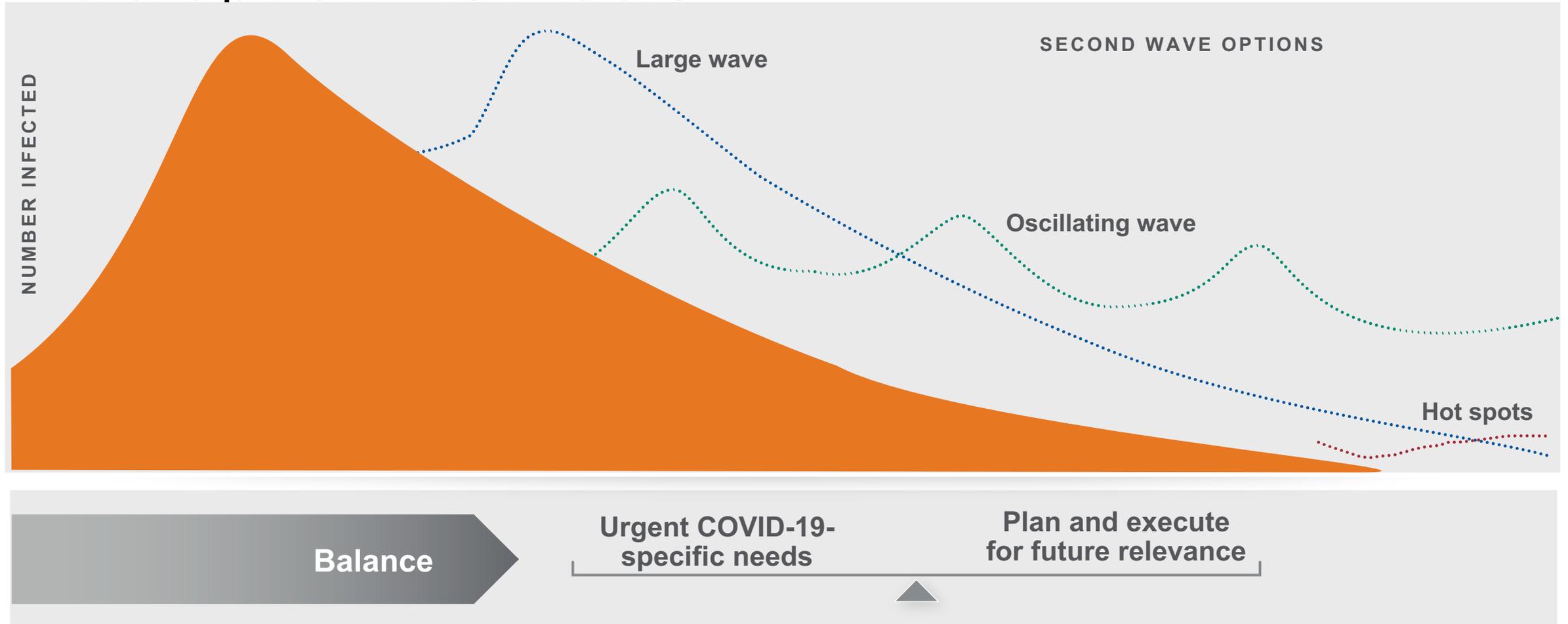
COVID-19 Impact – What we know

- **A small percentage of counties continue to drive the majority of cases**
- **The abatement of services impacted the entire country**
- **The recovery curves vary by county based on numerous factors**
- **Current spikes are generally unpredictable**
- **Future waves may occur and extend the current backlog challenges**
- **County level granularity will decrease the likelihood of over or underrating a specific group or block of business**
- **The economic downturn is changing the mix by line of business and provider group reimbursement**

Top COVID Requests from Payers

- **MA and ACA risk adjustment**
- **Impact on 2022 Renewals**
- **Value based care models**
- **Financial forecasting for 2020 through 2022**

- **Implications on traditional actuarial formulas given variances in relationship to baseline at various points in time**
- **Impact of LOB shifts at market level**
- **Impact on scores from risk engines**

Membership shifts by LOB vary by County

States have significant variances in LOB shifts based on whether or not they are a Medicaid Expansion State

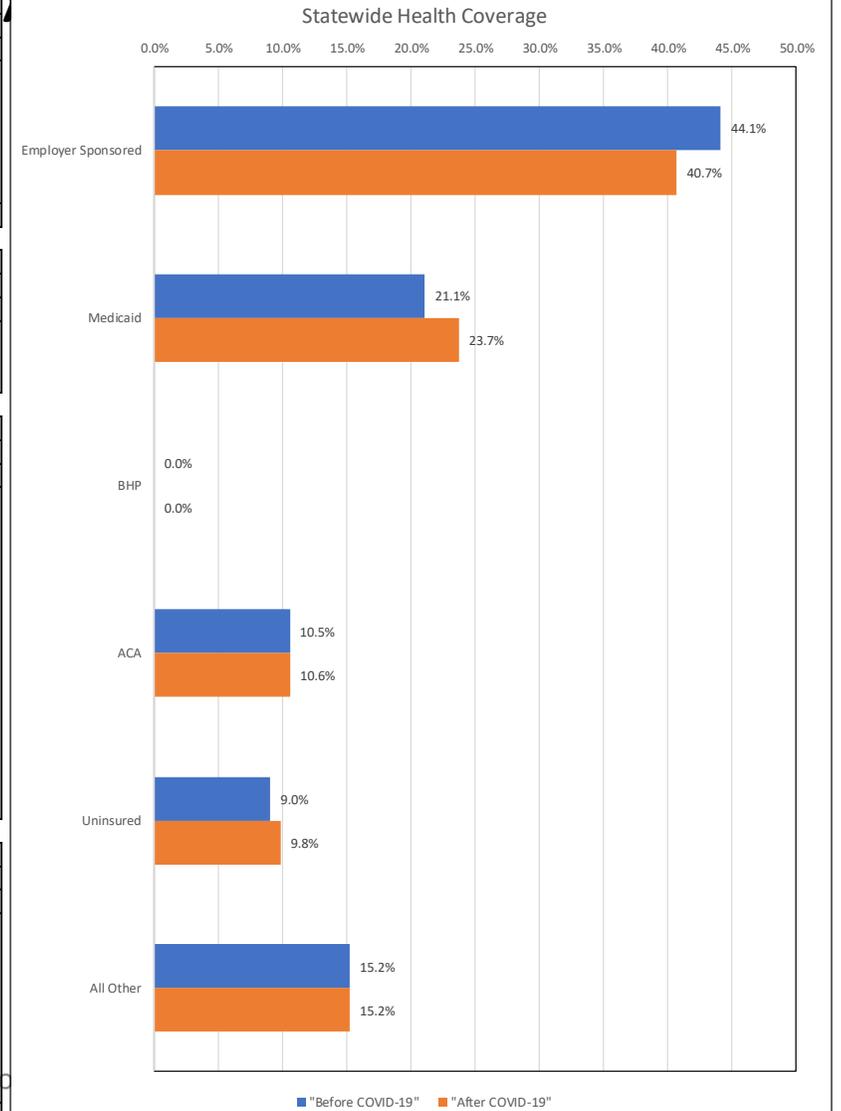Within a given state based on variances by industry and other factors

Shifts from commercial reimbursement to Medicare, Medicaid, or uninsured has a direct impact on provider income

Health Coverage [Pre-Covid] -- American Community Survey

	County		State	
Employer Sponsored	4,142.0	41.0%	17,195.1	44.1%
Medicaid	2,410.2	23.9%	8,217.2	21.1%
ACA	1,045.8	10.3%	4,109.4	10.5%
Uninsured	1,187.8	11.8%	3,527.5	9.0%
All Other	1,319.8	13.1%	5,933.5	15.2%
Total	10,105.7	100.0%	38,982.8	100.0%

Projected Unemployment [Post-Covid]

	County		State	
Total Unemployed	807.7	19.5%	2,589.8	15.1%
With Employer Sponsored	419.1	51.9%	1,343.8	51.9%

Coverage Changes [Post-Covid]

	County		State	
Eligible for Medicaid	319.9	76.3%	1,025.8	76.3%
Enroll in Medicaid	319.9	100.0%	1,025.8	100.0%
Eligible for BHP (MN & NY)	0.0	0.0%	0.0	0.0%
Enroll in BHP	0.0	0.0%	0.0	0.0%
Eligible for ACA with Subsidy	9.2	2.2%	29.5	2.2%
Enroll in ACA with Subsidy	1.6	17.0%	5.0	17.0%
Eligible for ACA without Subsidy	90.0	21.5%	288.6	21.5%
Enroll in ACA without Subsidy	1.8	2.0%	5.8	2.0%
Newly Uninsured	95.8	22.9%	307.2	22.9%

Projected Health Coverage [Post-Covid]

	County		State	
Employer Sponsored	3,722.9	36.8%	15,851.3	40.7%
Medicaid	2,730.2	27.0%	9,243.0	23.7%
BHP	0.0	0.0%	0.0	0.0%
ACA	1,049.2	10.4%	4,120.2	10.6%
Uninsured	1,283.6	12.7%	3,834.8	9.8%
All Other	1,319.8	13.1%	5,933.5	15.2%
Total	10,105.7	100.0%	38,982.8	100.0%

Statewide Health Coverage

Employer Sponsored: 44.1% (Before COVID-19), 40.7% (After COVID-19)
Medicaid: 21.1% (Before), 23.7% (After)
BHP: 0.0% (Before), 0.0% (After)
ACA: 10.5% (Before), 10.6% (After)
Uninsured: 9.0% (Before), 9.8% (After)
All Other: 15.2% (Before), 15.2% (After)

Legend: ■ "Before COVID-19" ■ "After COVID-19"

Outpatient utilization — Big drops, but on the rebound

Ambulatory visits **dropped** by almost **60%** by early April. While telehealth visits increased rapidly, it did little to compensate for the overall drop in outpatient visits. In-person visits are driving the rebound in utilization with a larger rebound among adults.
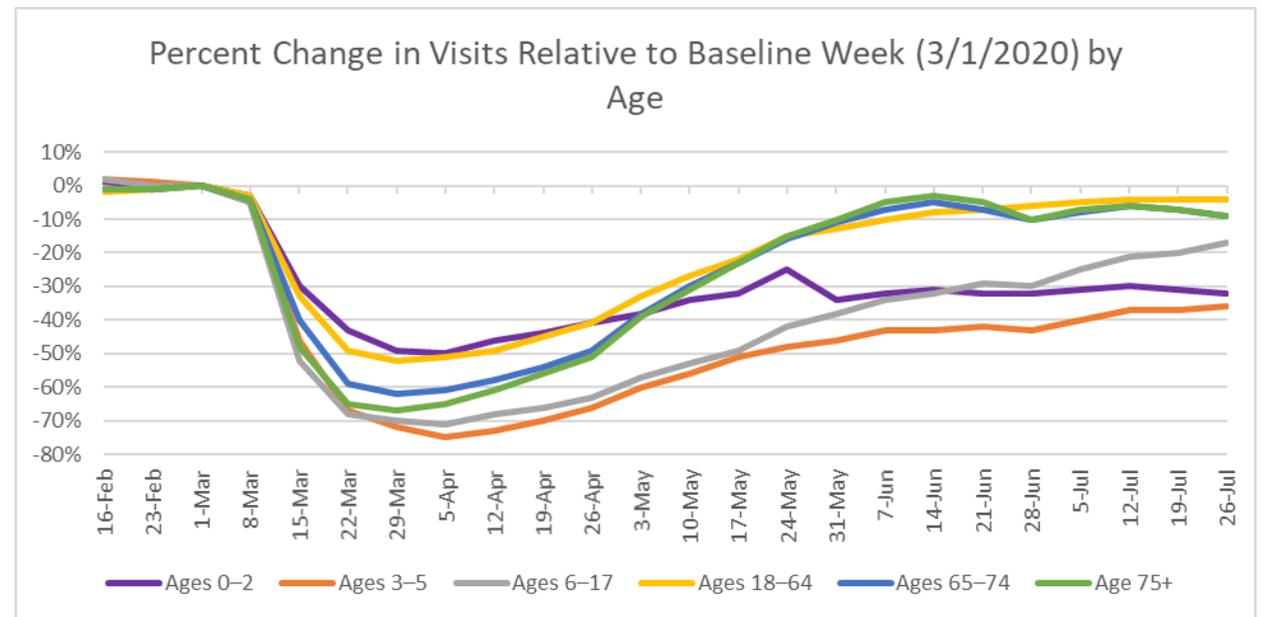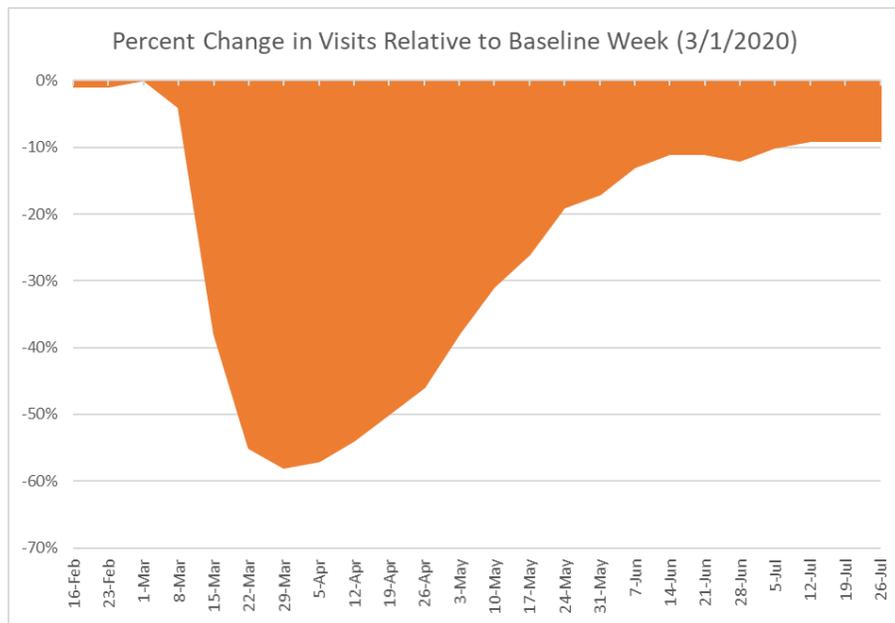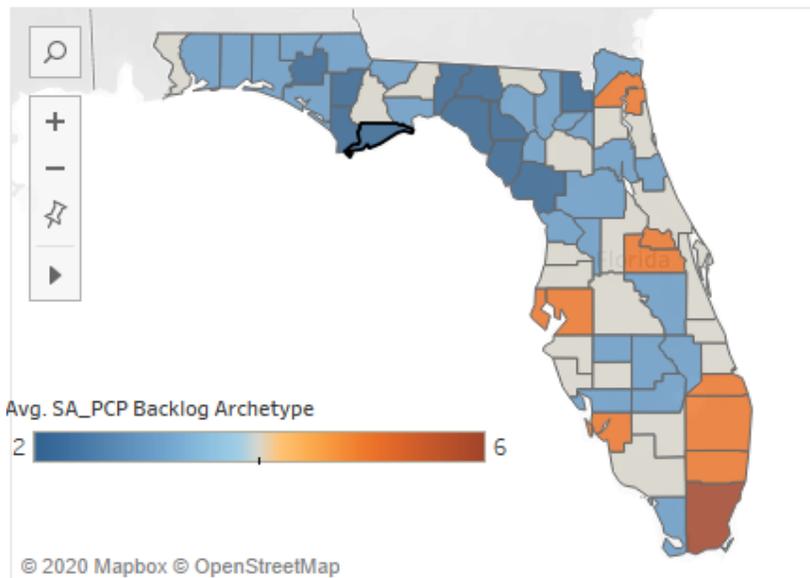

Percent Change in Visits Relative to Baseline Week (3/1/2020)

Percent Change in Visits Relative to Baseline Week (3/1/2020) by Age

Ages 0–2 · Ages 3–5 · Ages 6–17 · Ages 18–64 · Ages 65–74 · Age 75+

PCP backlogs will go deep into 2021 in many counties

PCP backlogs differ significantly by county. Telehealth offers significant opportunity to close gaps and relieve some of the backlog. CMS requires visits be both audio and visual to be used for coding, so understanding a member's ability to enable the video portion of the visit is imperative to success.

PCP Backlog: Archetype

Avg. SA_PCP Backlog Archetype
2 — 6

© 2020 Mapbox © OpenStreetMap

Telehealth Propensity

Avg. Telehealth Propensity
3.395 — 5.731

© 2020 Mapbox © OpenStreetMap
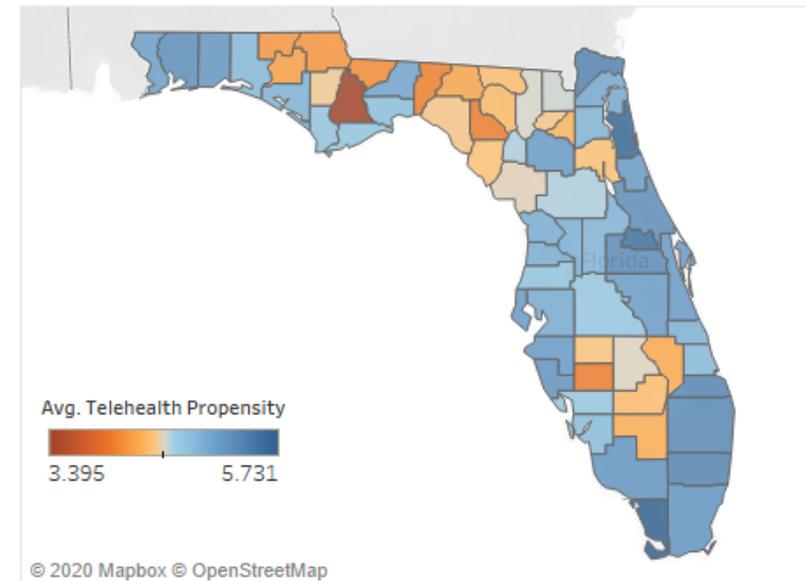
Illustrative Recovery Curve at County/Service Level

| PCP Office Visits	2020-01	2020-02	2020-03	2020-04	2020-05	2020-06	2020-07	2020-08	2020-09	2020-10	2020-11	2020-12
Baseline Cost (PMPM)	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00
Eliminated	$0.00	$0.00	-$5.97	-$10.80	-$6.24	-$4.24	-$2.45	-$1.62	-$1.07	-$1.60	-$2.40	-$3.06
Deferred	$0.00	$0.00	-$2.41	-$5.20	-$3.01	-$1.71	-$0.82	-$0.54	-$0.36	-$0.53	-$0.80	-$1.23
Target Cost	**$25.00**	**$25.00**	**$16.63**	**$9.00**	**$15.75**	**$19.05**	**$21.73**	**$22.84**	**$23.58**	**$22.87**	**$21.80**	**$20.71**
Supply Cap (PMPM)	$25.00	$25.00	$16.63	$9.00	$20.25	$22.56	$23.75	$23.75	$23.75	$23.75	$23.75	$22.56
Demand (PMPM)		$25.00	$16.63	$9.11	$16.43	$20.93	$23.68	$24.57	$25.23	$24.13	$22.77	$21.46
PMPM Cap	**$25.00**	**$25.00**	**$16.63**	**$9.00**	**$16.43**	**$20.93**	**$23.68**	**$23.75**	**$23.75**	**$23.75**	**$22.77**	**$21.46**
Backlog			$2.41	$7.61	$10.61	$11.64	$10.57	$9.16	$8.61	$8.97	$8.89	$9.15
Return	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.68**	**$1.89**	**$1.95**	**$0.91**	**$0.17**	**$0.88**	**$0.97**	**$0.75**

COVID-19 Impact on 2022 Renewals

- Assuming COVID-19 hits and remains at endemic state shortly only modest adjustments will be necessary at a national level

- At a county level, the variance can be in excess of 10 percentage points

- Additional waves in the fall may further increase and lengthen the geographic disparities on completeness of claims

Experience Period	% of Baseline
March 2020 to February 2021	96.1%
April 2020 to March 2021	95.9%
May 2020 to April 2021	95.6%
June 2020 to May 2021	96.8%
July 2020 to June 2021	99.7%

Daily Infected per 100K
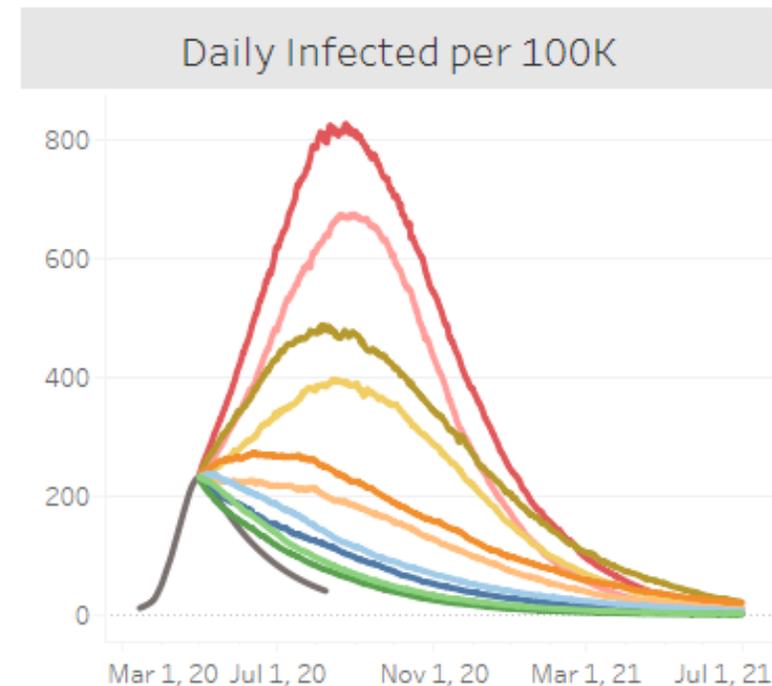
Three anchoring assumptions define this future

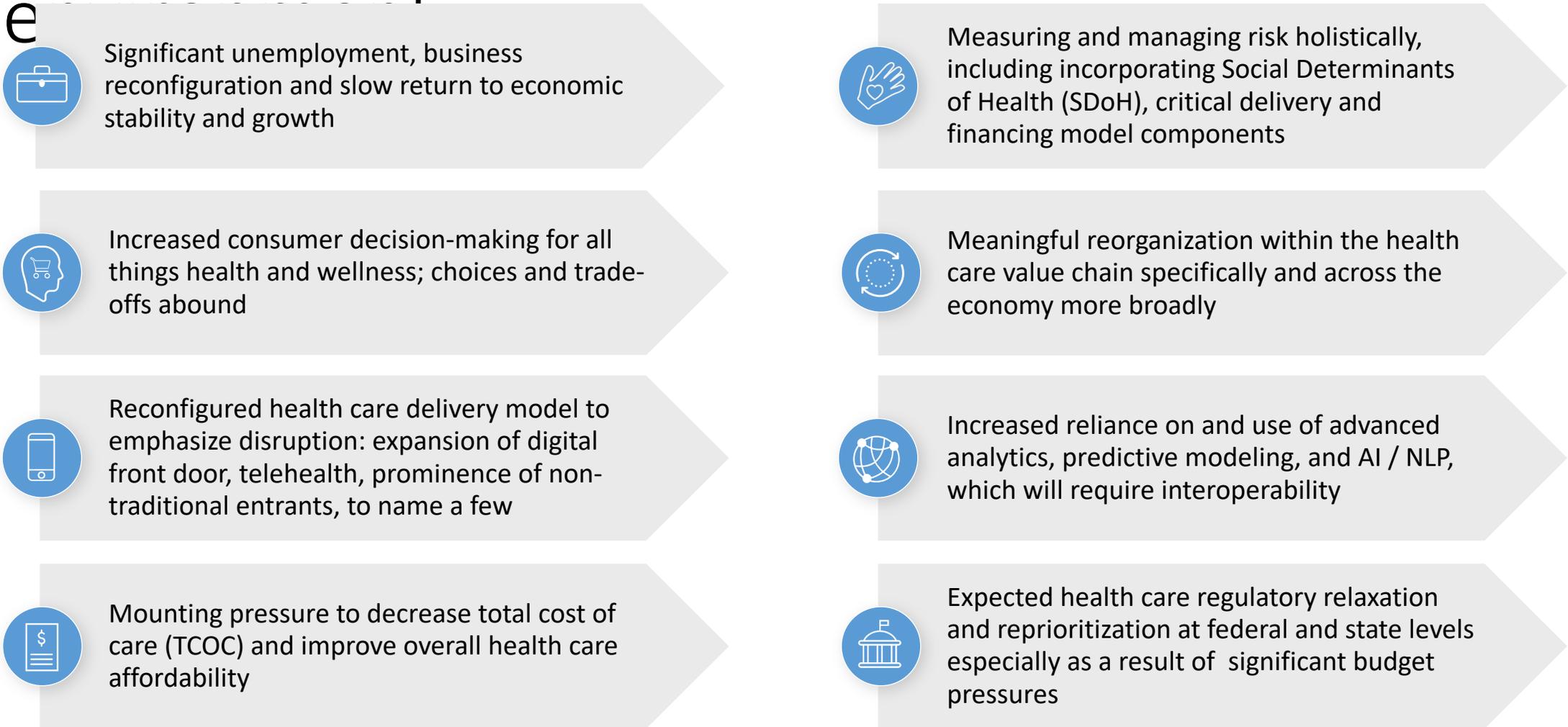| Economic reality	Duration of COVID-19-specific impact	Permanent change
A global / US economic pull-back, with a slow recovery, will continue for the next ~3 years	The immediate impacts of COVID-19 will be felt for at least one-to-three years, including efforts of persistent distancing and recurring outbreaks Disease epidemiology will impact decision-making and will require organizations to pivot and adapt based on oscillating disease prevalence	The impacts of the effects and changes since the outbreak will result in some permanent change to the health care industry — the tried and true solutions pre-pandemic may no longer be applicable in our new environment

Eight macro features depict our new environment

Significant unemployment, business reconfiguration and slow return to economic stability and growth

Increased consumer decision-making for all things health and wellness; choices and trade-offs abound

Reconfigured health care delivery model to emphasize disruption: expansion of digital front door, telehealth, prominence of non-traditional entrants, to name a few

Mounting pressure to decrease total cost of care (TCOC) and improve overall health care affordability

Measuring and managing risk holistically, including incorporating Social Determinants of Health (SDoH), critical delivery and financing model components

Meaningful reorganization within the health care value chain specifically and across the economy more broadly

Increased reliance on and use of advanced analytics, predictive modeling, and AI / NLP, which will require interoperability

Expected health care regulatory relaxation and reprioritization at federal and state levels especially as a result of significant budget pressures

The bottom line: Two truths prevail

- No matter who you are, who you serve, or how you won in the past

The dollars won't be there ➔ **The delivery models must change**

- Rising unemployment
- Higher Medicaid /IEX mix
- Procedures down (for now) / lost (forever)
- Federal / state budget shortfalls

- Pricing pressures and uncertainty
- Reduced risk adjustments
- Reduced throughput
- Consumer price elasticity
- Lower investment returns

- Space / safety / flow considerations
- Interoperability
- Sustainable future of primary care
- Site of service optimization
- Actuarial modeling changes
- Telehealth as a new normal

- Personalized medicine
- Non-traditional sites of care
- Need for care management
- Role and delivery of screenings and diagnostics
- Fundamental changes to payment models

Disruptive funding change | **Delivery system reform**

Intense need to evolve operations to be
relevant, **coordinated**, and **simplified**

What will success look like?

- Health plans must lower medical spend and admin costs, foster innovation, achieve member-centricity, and scale analytics

Asset alignment	Cost	Operating excellence
• Target LOB balancing	• Accelerate TCOC / risk offerings / medical cost management programs	• Intensely focus on actuarial modeling and pricing across product portfolio; lean in more to partners
• Optimize core operational functions	• Rigorously examine and reduce internal administrative cost structure	• Develop new, lower cost service and operational models

Technology	Keeping members healthy	Growth
• Develop data governance framework	• Develop alternative ways for members to access care	• Facilitate accurate and timely risk-scoring to capture risk-based payments
• Enhance analytics and predictive capabilities; scale with business; accelerate access to near-real time data	• Address gaps in care	• Design innovative payment models, networks, and provider partnerships
	• Deliver targeted education and support	• Enable capabilities to meet demand at scale for digital service offerings
	• Demonstrate and/or reposition plan to serve as a trusted partner through expanded, differentiated engagement programs	

Orange text – Today's priorities. Black text – Tomorrow's priorities.