COVID-19 Mortality Data Release

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Board of Scientific Counselors Meeting

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COVID-19 Response Timeline

<u>February</u>

26   Decision made to develop certification guidance for COVID-19 deaths

<u>March</u>

4   Preliminary Guidance for Certifying COVID-19 Deaths Released

17-20   NCHS Cause of Death Coding System Updated

25   Launched COVID-19 Death Data and Reporting Guidance
https://www.cdc.gov/nchs/nvss/covid-19.htm

27   Prioritized manual coding of cause of death for jurisdictions with a high volume of COVID-19 deaths.

COVID-19 Response Timeline – continued

April

2   Final Guidance for Certifying COVID-19 Deaths Released

3   First Provisional COVID-19 Death Counts Released
           https://www.cdc.gov/nchs/nvss/vsrr/covid19/index.htm

16   Clinician Outreach and Communication Activity (COCA)
           webinar on Guidance for Certifying Deaths Due to
           Coronavirus Disease 2019 (COVID-19)

29   Excess Deaths Associated with COVID-19 Visualization
           Released

May

1   Redesigned Provisional COVID-19 Death Counts
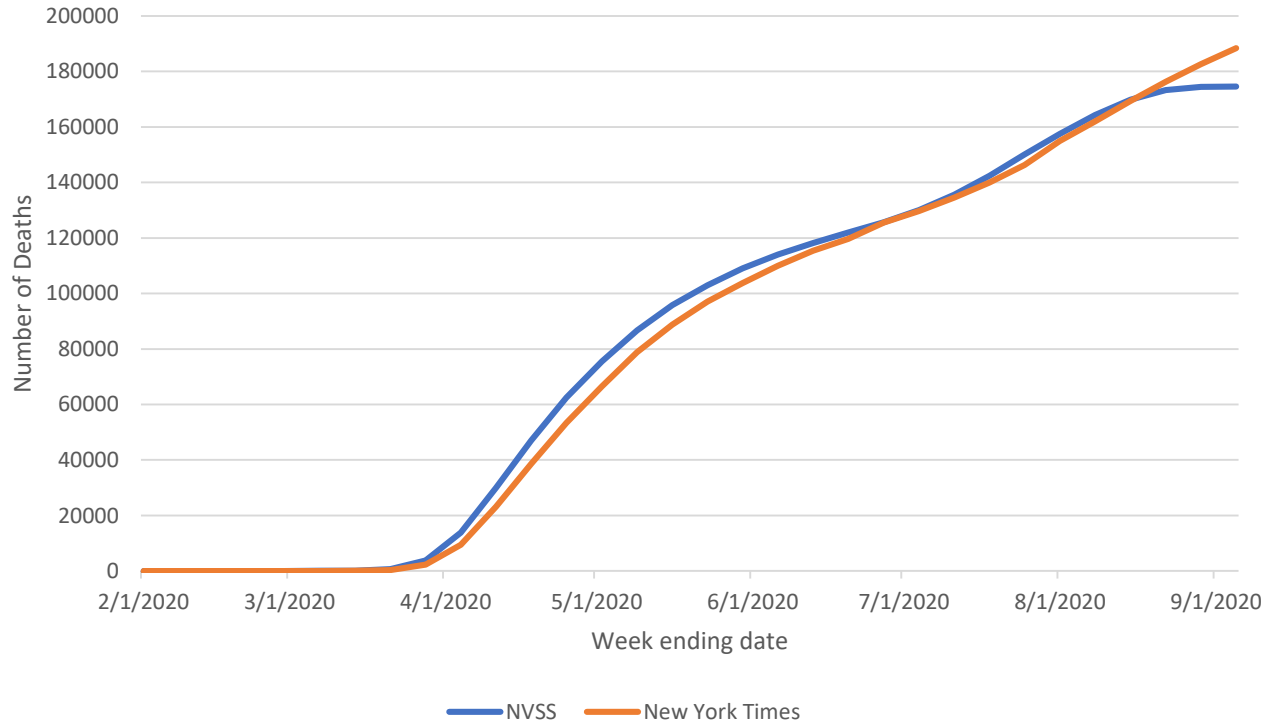
Provisional COVID-19 Death Counts by week

Data as of September 8, 2020

Week ending date in which the death occurred	COVID-19 Deaths (U07.1)	Deaths from All Causes
Total	174,626	1,881,375
2/1/2020	0	58,568
2/8/2020	1	59,282
2/15/2020	0	58,688
2/22/2020	5	58,723
2/29/2020	9	59,149
3/7/2020	35	59,507
3/14/2020	52	58,303
3/21/2020	571	58,966
3/28/2020	3,151	62,853
4/4/2020	10,007	72,108
4/11/2020	16,160	78,837
4/18/2020	17,039	76,505
4/25/2020	15,401	73,569
5/2/2020	13,114	68,960
5/9/2020	11,141	66,521
5/16/2020	9,143	64,162

Week ending date in which the death occurred	COVID-19 Deaths (U07.1)	Deaths from All Causes
5/23/2020	7,136	61,266
5/30/2020	6,090	59,283
6/6/2020	4,961	58,406
6/13/2020	4,163	57,481
6/20/2020	3,771	57,301
6/27/2020	3,728	57,683
7/4/2020	4,383	58,557
7/11/2020	5,518	59,842
7/18/2020	6,820	60,431
7/25/2020	7,676	60,670
8/1/2020	7,393	59,372
8/8/2020	6,799	57,887
8/15/2020	5,535	54,280
8/22/2020	3,504	46,411
8/29/2020	1,192	30,152
9/5/2020	128	7,652

Comparison of Cumulative COVID-19 Death Counts by Data Source (as of 9/8/2020)

Provisional COVID-19 Death Counts: Demographic and Geographic Detail

Causes of Death
- COVID-19
- Pneumonia and Influenza (with and without COVID-19)
- Other Selected Causes of Death (with and without COVID-19)

Demographic Detail
- Sex
- Age
- Race/Hispanic origin

Time Detail
- Cumulative for pandemic
- Monthly
- Weekly

Geographic Detail
- National
- HHS Region
- Jurisdiction/state

Counts 1-9 suppressed
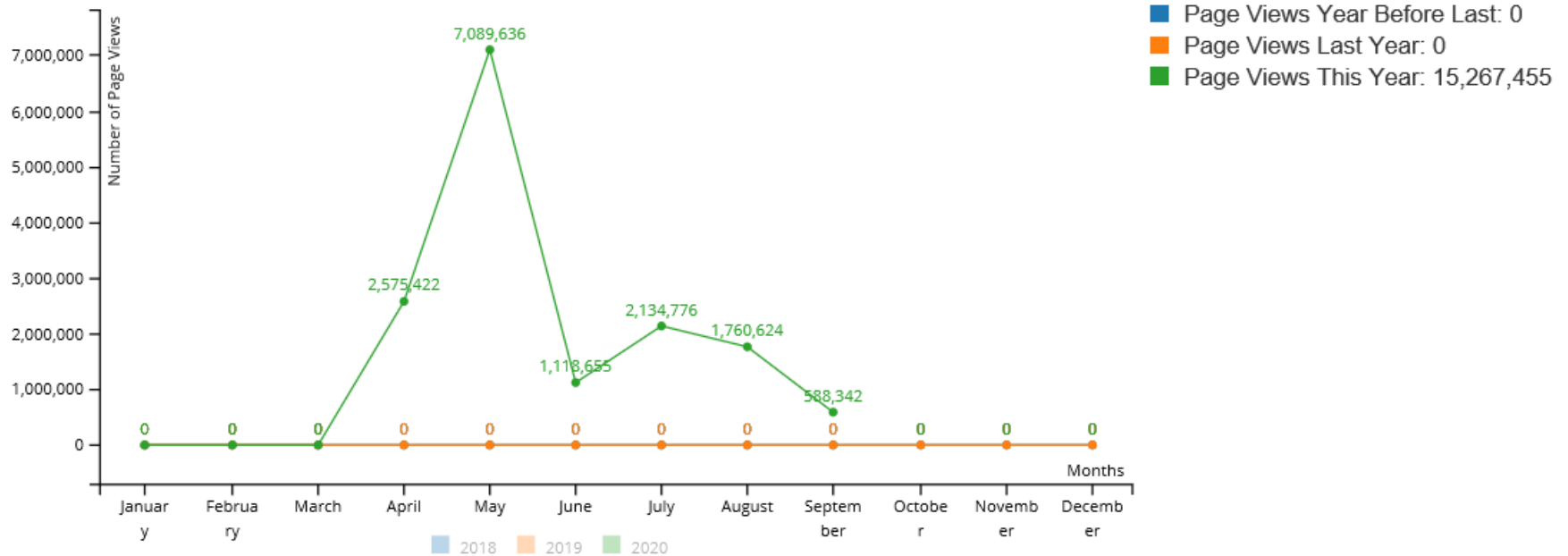
Provisional COVID-19 Death Counts… on the NCHS website

COVID-19 Death Data and Resources (aka the NCHS COVID-19 Mortality Homepage)
https://www.cdc.gov/nchs/nvss/covid-19.htm

- Daily Updates of Totals by Week and State
  https://www.cdc.gov/nchs/nvss/vsrr/covid19/index.htm
- Weekly Updates by Select Demographic and Geographic Characteristics
  https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm
- Health Disparities: Race and Hispanic Origin
  https://www.cdc.gov/nchs/nvss/vsrr/covid19/health_disparities.htm
- Excess Deaths Associated with COVID-19
  https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm
- Provisional Death Counts for Coronavirus Disease (COVID-19): Index of COVID-19 Surveillance and Ad-hoc Data Files
  https://www.cdc.gov/nchs/covid19/covid-19-mortality-data-files.htm
- Technical Notes
  https://www.cdc.gov/nchs/nvss/vsrr/covid19/tech_notes.htm

Daily Updates of Totals by Week and State – Page Views

https://www.cdc.gov/nchs/nvss/vsrr/covid19/index.htm
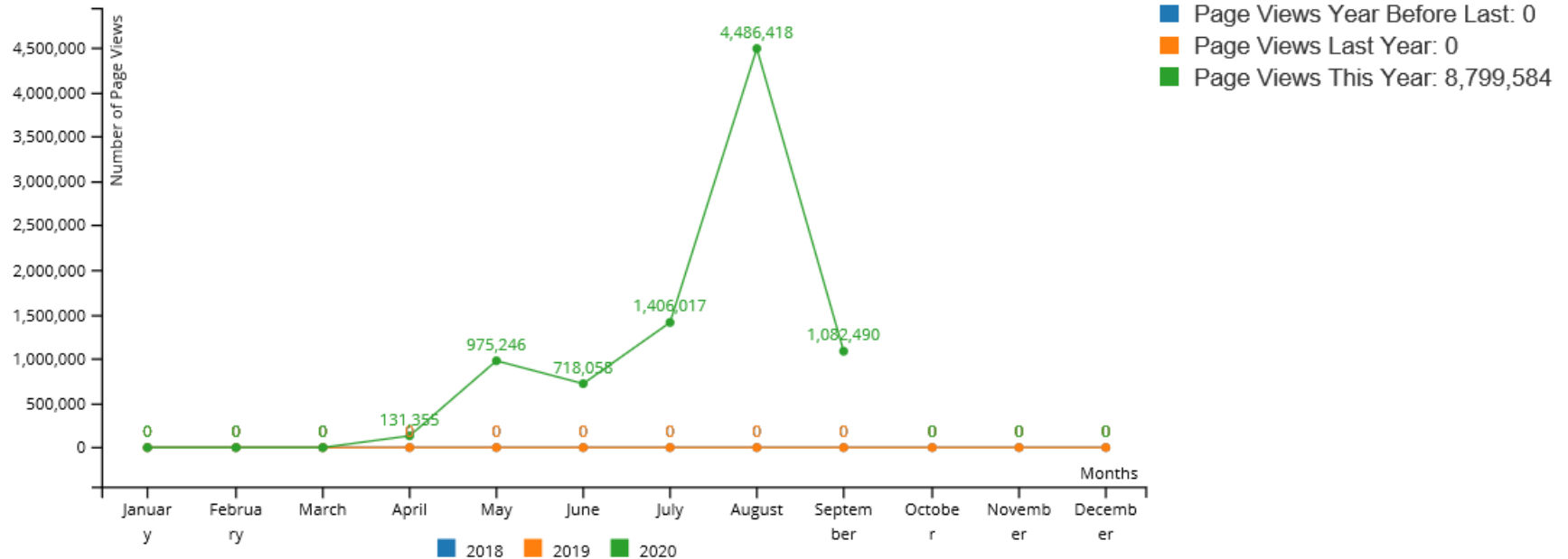
Weekly Updates by Select Demographic and Geographic Characteristics – Page Views

https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm

Page Views Year Before Last: 0
Page Views Last Year: 0
Page Views This Year: 8,799,584

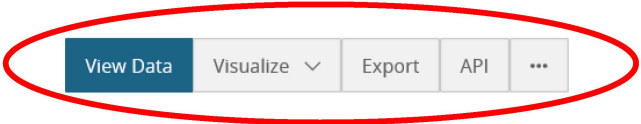# Provisional COVID-19 Death Counts: on Data.CDC.gov

More detailed versions of all data tables on the webpages are simultaneously posted on Data.CDC.gov

- Export (i.e. download) in a variety of formats
- API Access - provides programmatic access to this dataset including the ability to filter, query, and aggregate data
- Visualization tools

Data.CDC.gov

Health Disparities: Race and Hispanic Origin

https://www.cdc.gov/nchs/nvss/vsrr/covid19/health_disparities.htm

Indicators available to illustrate potential differences in the burden of deaths due to COVID-19 by race and ethnicity

- **Count of COVID-19 deaths:** Number of deaths due to COVID-19 reported for each race and Hispanic origin group

- **Distribution of COVID-19 deaths (%):** Deaths for each group as a percent of the total number of COVID-19 deaths reported

- **Unweighted distribution of population (%):** Population of each group as a percent of the total population

- **Weighted distribution of population (%):** Population of each group as percent of the total population after accounting for how the race and Hispanic origin population is distributed in relation to the geographic areas impacted by COVID-19

Count and percent of COVID-19 deaths and weighted and unweighted population distributions by race and Hispanic origin

Updated September 9, 2020

Jurisdiction of Residence ▼	Indicator	Non-Hispanic White	Non-Hispanic Black or African American	Non-Hispanic American Indian or Alaska Native[2]	Non-Hispanic Asian[3]	Hispanic or Latino	Other[4]
United States	Count of COVID-19 deaths	90,298	37,655	1,738	7,584	36,544	2,047
	Distribution of COVID-19 deaths (%)	51.3	21.4	1.0	4.3	20.8	1.2
	Unweighted distribution of population (%)	60.1	12.5	0.7	5.8	18.5	2.4
	Weighted distribution of population (%)	40.5	15.5	0.3	10.0	31.7	2.0

Percent of COVID-19 deaths and weighted and unweighted population distributions by race and Hispanic origin

Unadjusted for age

● Distribution of COVID-19 deaths (%) ● Unweighted distribution of population (%) ● Weighted distribution of population (%)

Age-standardized

Excess Deaths Associated with COVID-19

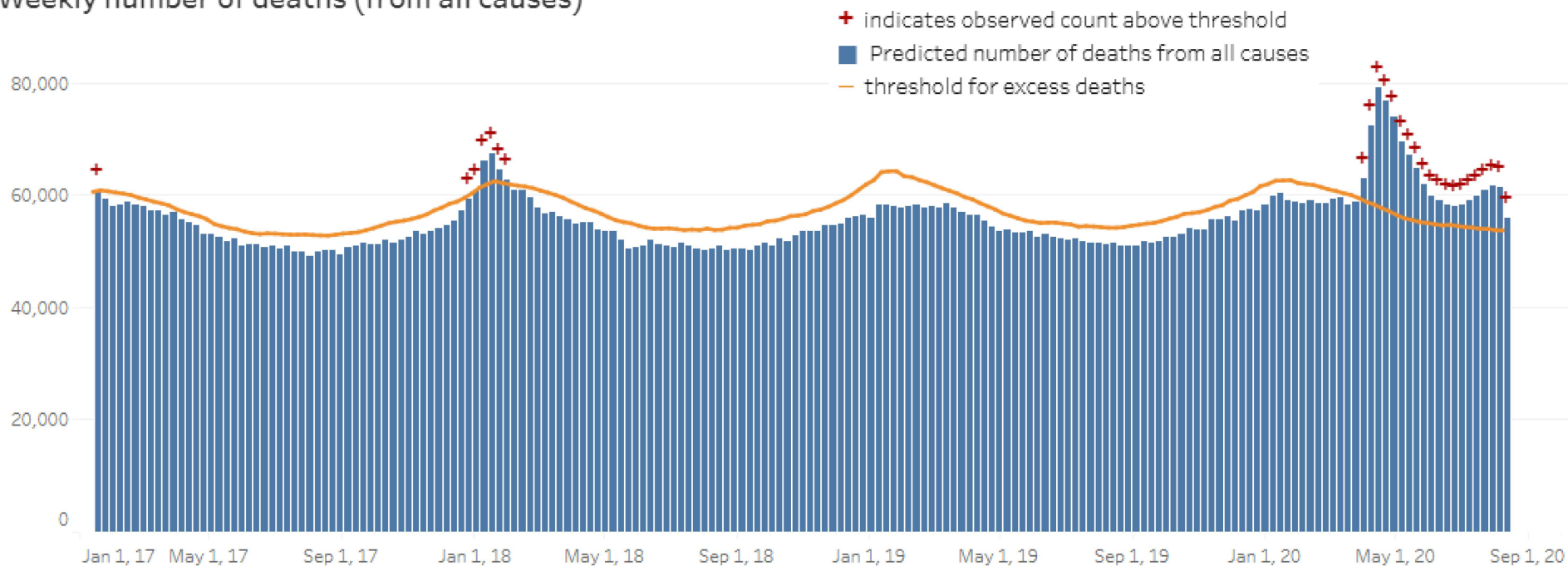https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm

Methods

- Use existing algorithm (R package 'surveillance')* to model the expected weekly number of deaths
  - Weekly counts of deaths from 2013 to date
  - Over-dispersed Poisson regression models with spline terms to account for seasonal patterns
- Generate the expected number(s) of deaths by jurisdiction and week
  - The average expected number
  - The upper bound of the 95% prediction interval
- Excess = observed - expected

* Noufaily et al., 2012 (https://onlinelibrary.wiley.com/doi/pdf/10.1002/sim.5595) and Salmon, Schumacher, Hohle, 2016 (https://www.jstatsoft.org/article/view/v070i10)

Excess deaths associated with COVID-19

Weekly number of deaths (from all causes)

+ indicates observed count above threshold
■ Predicted number of deaths from all causes
— threshold for excess deaths

https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm

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Excess deaths with and without COVID-19

Weekly number of deaths
Comparing excess deaths including/excluding COVID-19

+ indicates observed count above threshold
■ Predicted number of deaths from all causes, including COVID-19
■ Predicted number of deaths from all causes, excluding COVID-19
— threshold for excess deaths

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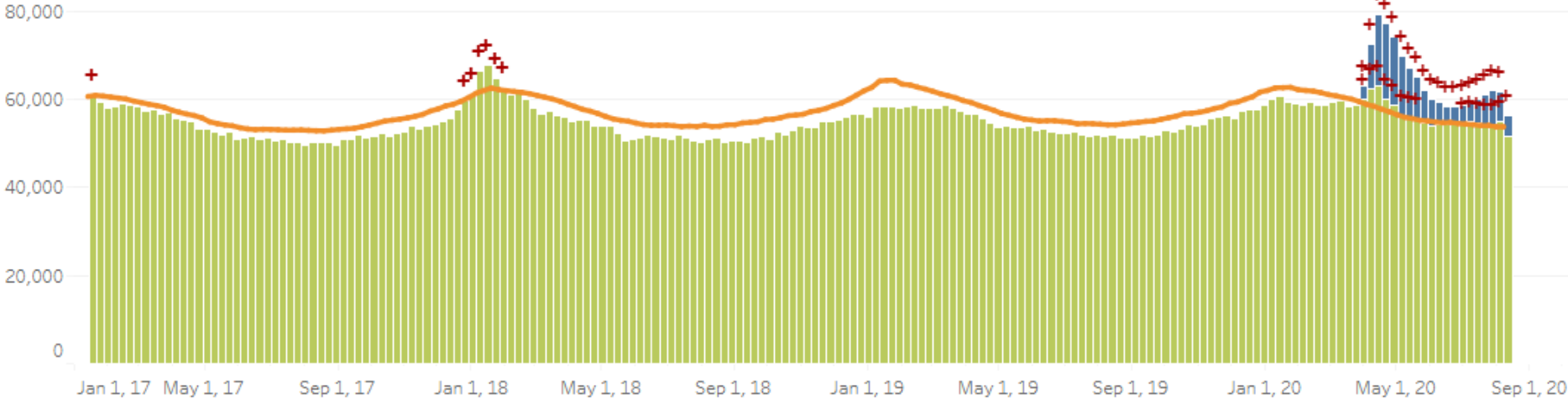
Weighting to account for incomplete data
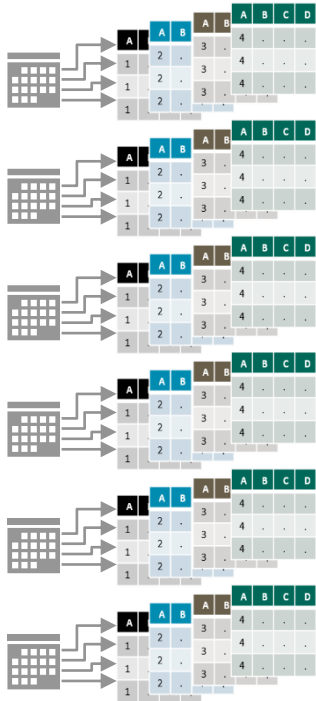
- Used weekly 'snapshots' of provisional data (from 2018-2019) to model underreporting relative to final data

- Predict completeness of provisional data within 1 week of death, 2 weeks, 3 weeks, etc.

- Weights calculated as 1/completeness for each jurisdiction
  - For example, if provisional data was historically 50% complete within 1 week of death, then the weight for that jurisdiction would be 2

Comparing weighted and unweighted estimates

+ indicates observed count above threshold
▨ Predicted number of deaths, accounting for underreporting (weighted)
▨ Reported number of deaths (unweighted; does not account for underreporting)
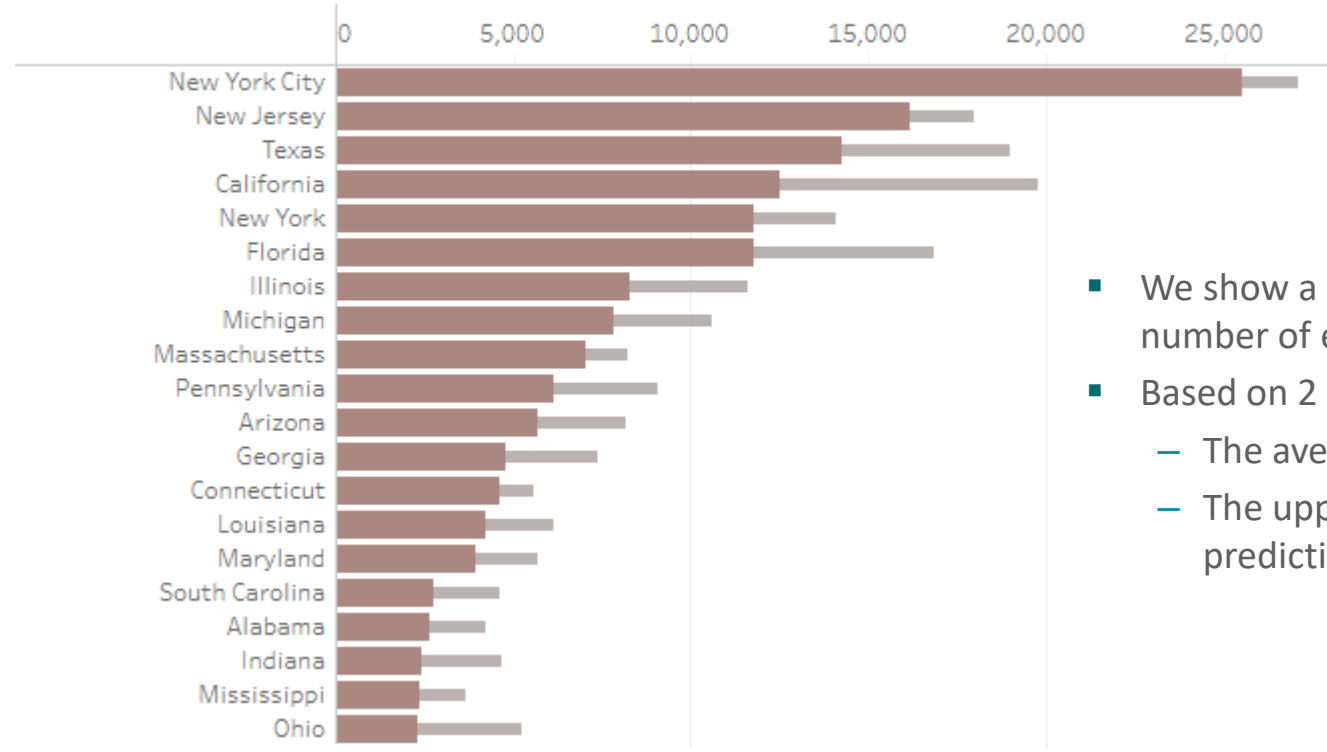— threshold for excess deaths

Weekly number of deaths (from all causes)
Comparing predicted (weighted) and reported (unweighted) estimates
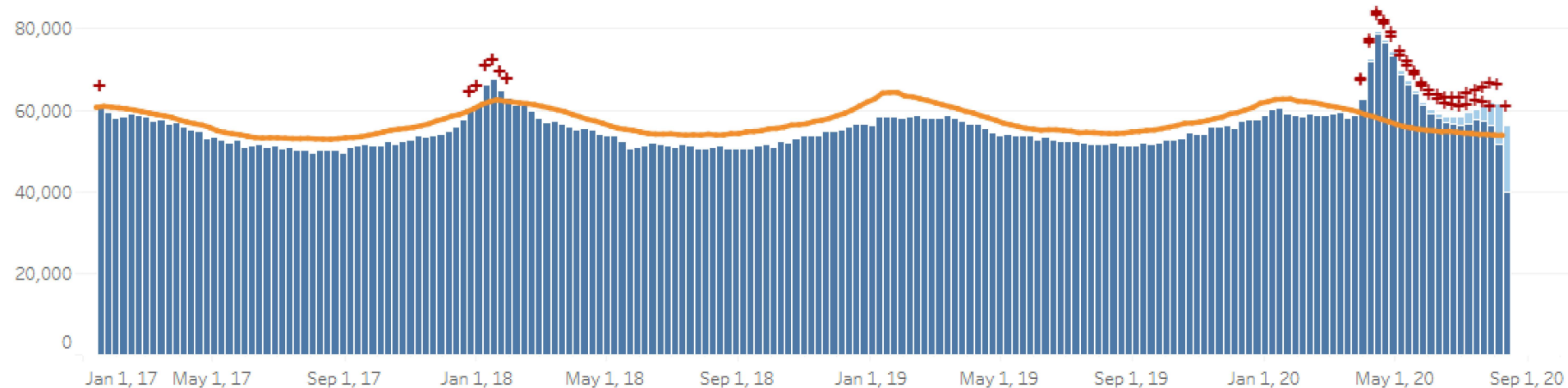
Total predicted number of excess deaths since 2/1/2020 across the United States: 192,767 — 252,307

Total predicted number of excess deaths since 2/1/2020, by state

- We show a range for the predicted number of excess deaths
- Based on 2 thresholds:
  - The average expected #
  - The upper bound of the 95% prediction interval

Number of deaths over the average expected number
Number of deaths over the upper bound of the 95% CI

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Thresholds for excess deaths

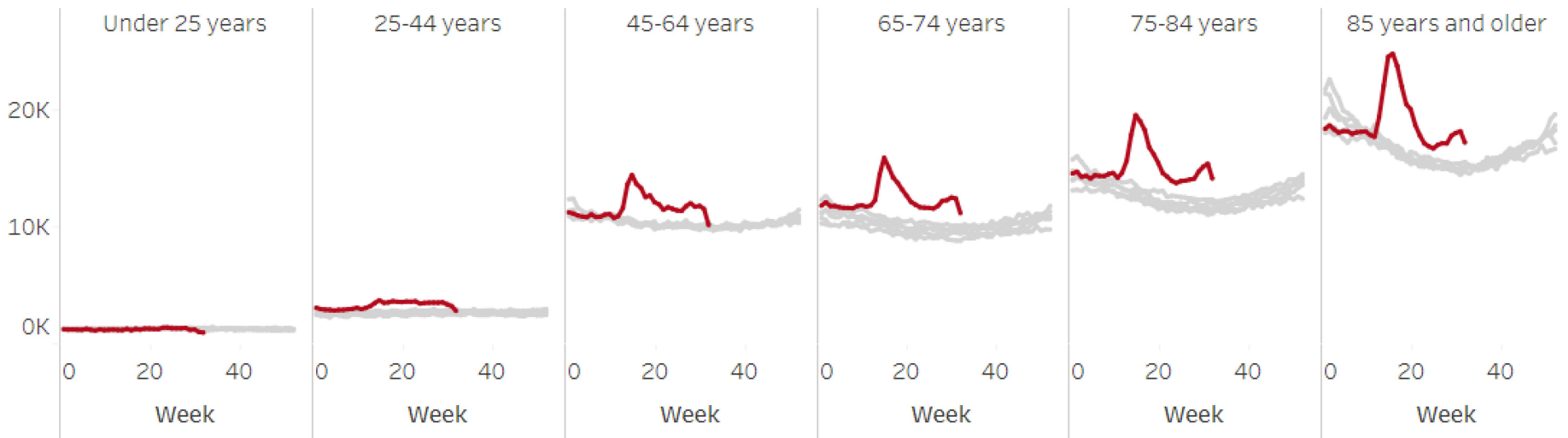Upper bound

Average expected number

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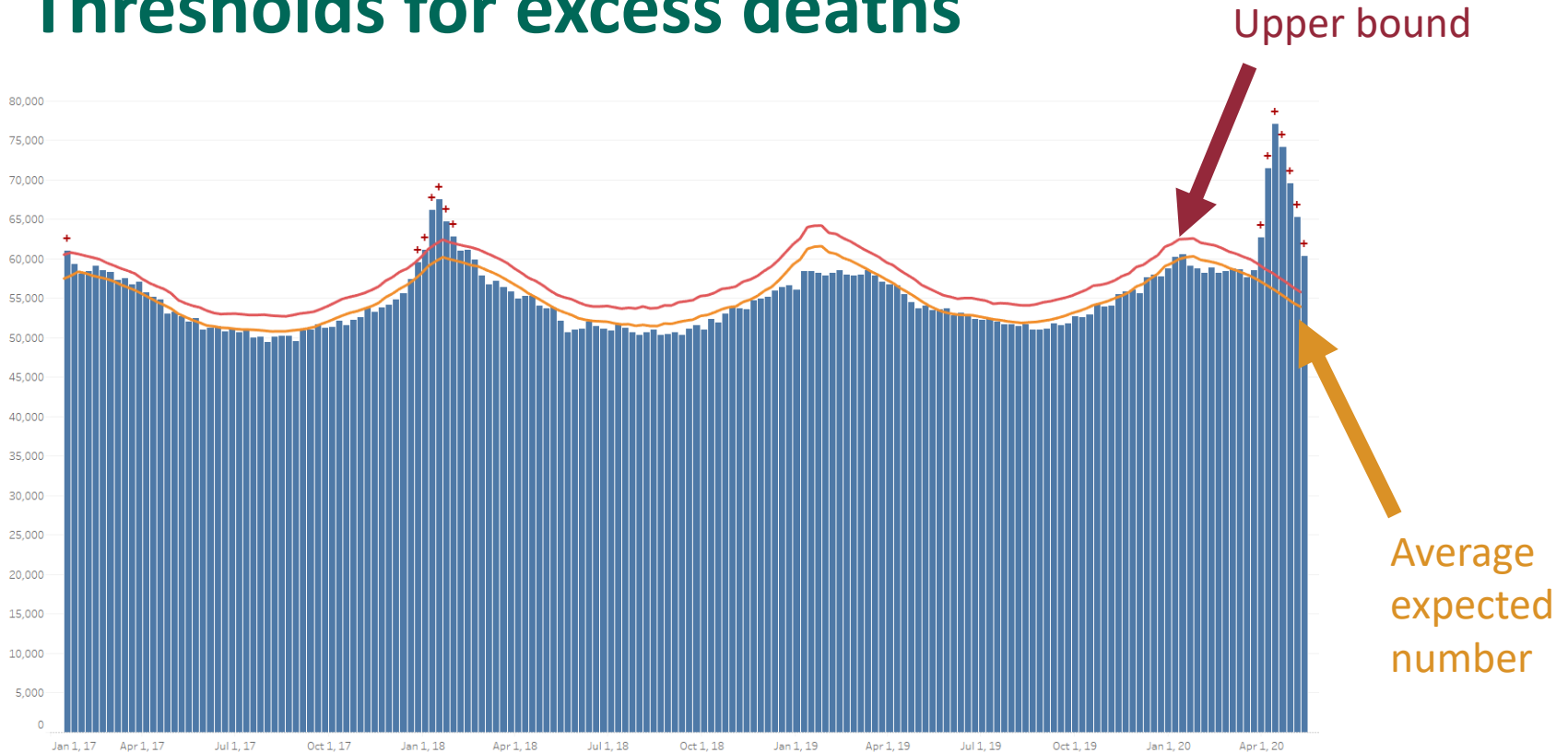
New(er) dashboards and data

- Weekly counts of death by age group
- Weekly counts of death by race and ethnicity
- Weekly counts of death by underlying cause of death
  - Determined based on comorbidities on COVID-19 death records
    - Respiratory diseases*
    - Circulatory diseases*
    - Malignant neoplasms
    - Alzheimer disease and dementia
    - Residual (other select natural causes)*
  - * indicates specific causes within those categories also shown

Weekly counts of deaths by age group

Weekly counts of deaths by race and Hispanic origin
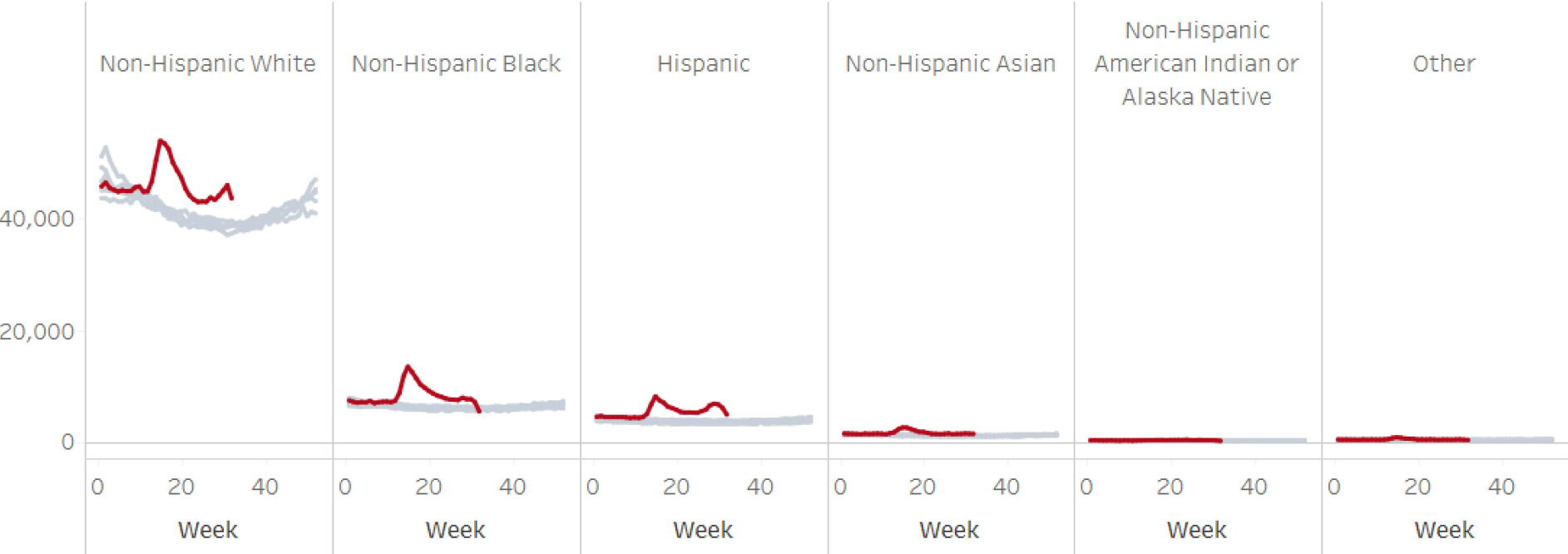
Time Period
- 2020
- 2015-2019

Non-Hispanic White | Non-Hispanic Black | Hispanic | Non-Hispanic Asian | Non-Hispanic American Indian or Alaska Native | Other

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Change and percent change in the weekly number of deaths in 2020 compared with the average number from 2015-2019
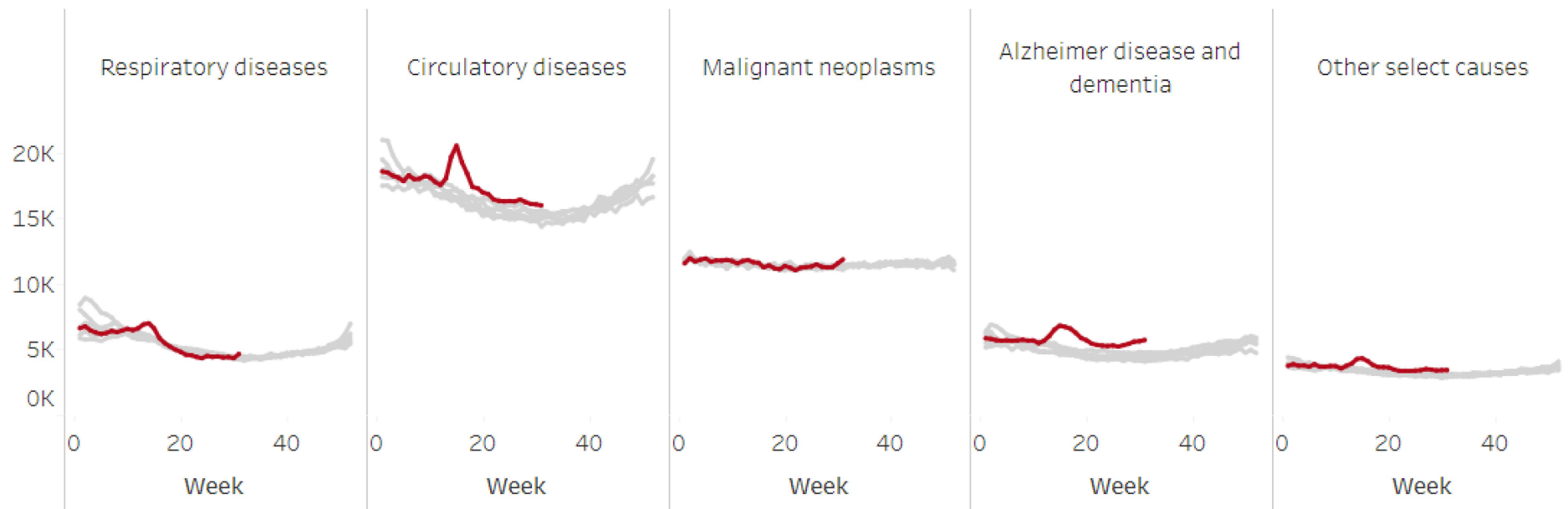
By race and Hispanic origin

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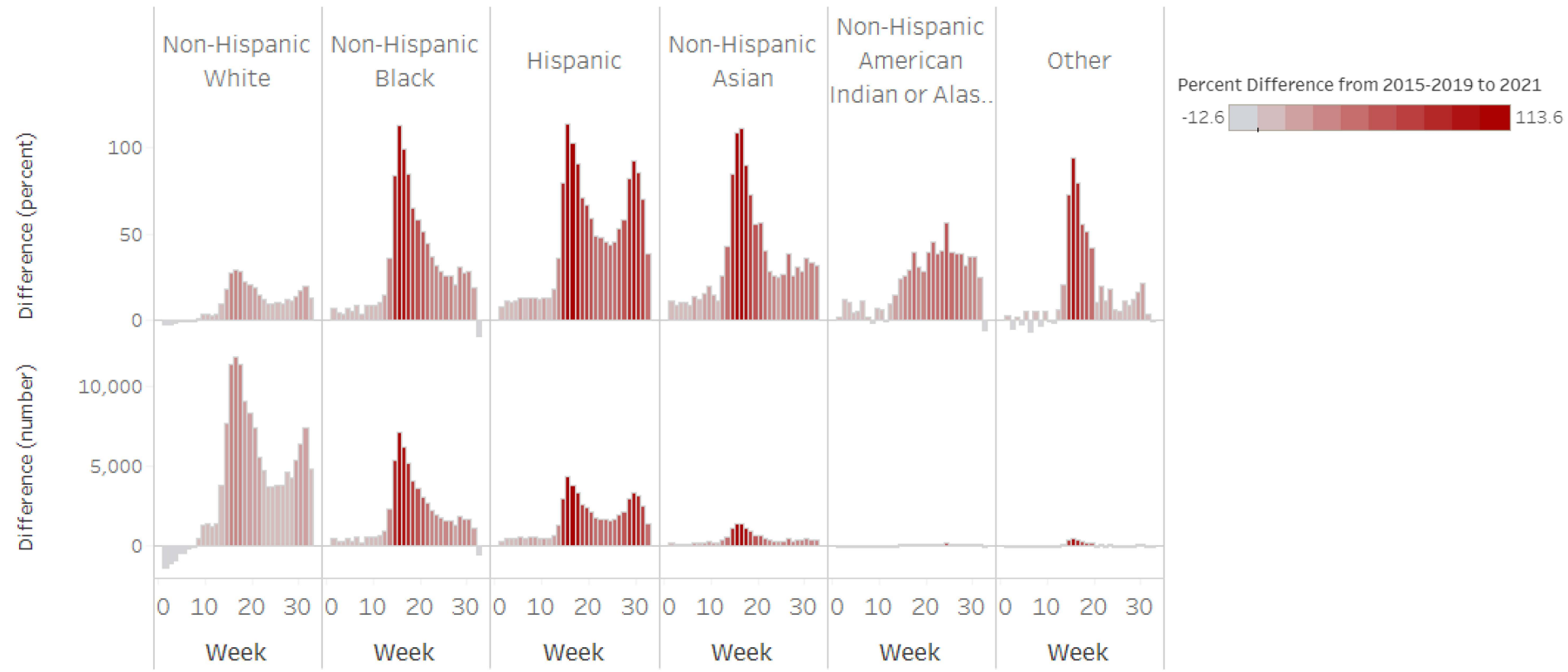
Weekly counts of deaths due to select causes of death

Time Period
■ 2020
■ 2015-2019

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Challenges and Opportunities for Provisional Data Release

Challenges and Opportunities

- Provisional data is the new normal… how will we continue to improve access to provisional COVID-19 death data, and what will post pandemic release of provisional data look like?

- Current approaches for adjusting incomplete provisional data based on reporting patterns in previous years are inadequate… can data science offer solutions to provide a more dynamic approach based on what is happening now that would allow for more timely and more accurate provisional estimates?

Comments
&
Questions

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.