COVID-19 Public Health Updates

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Topics of interest from recent MMWRs:

1) **Vaccine Effectiveness and rates of cases, hospitalizations and deaths by vaccination status, 13 U.S. Jurisdictions**
2) **Using Wastewater Surveillance Data to Support COVID-19 Response**
3) **Long-Term Symptoms Among Adults Tested for SARS-CoV-2**

Vaccine Effectiveness

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[Monitoring Incidence of COVID-19 Cases, Hospitalizations, and Deaths, by Vaccination Status — 13 U.S. Jurisdictions, April 4–July 17, 2021 | MMWR (cdc.gov)]

MMWR - Monitoring Incidence of COVID-19 Cases, Hospitalizations, and Deaths, by Vaccination Status — 13 U.S. Jurisdictions, April 4–July 17, 2021

- **Aim:** to understand the impact of the highly transmissible B.1.617.2 (Delta) variant of SARS-CoV-2 by analyzing reported COVID-19 cases, hospitalizations and deaths occurring in persons ≥ 18 y/o according to their vaccination status
- **Data Sources:** 13 US jurisdictions with linked case surveillance and immunization data registries from Apr-July 2021
- **Analysis:** Age-standardized incidence rate ratios comparing unvaccinated and partially-vaccinated to fully-vaccinated during two analysis periods Apr-Jun (less Delta predominance), Jun-July (more Delta predominance).

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MMWR - Monitoring Incidence of COVID-19 Cases, Hospitalizations, and Deaths, by Vaccination Status — 13 U.S. Jurisdictions, April 4–July 17, 2021

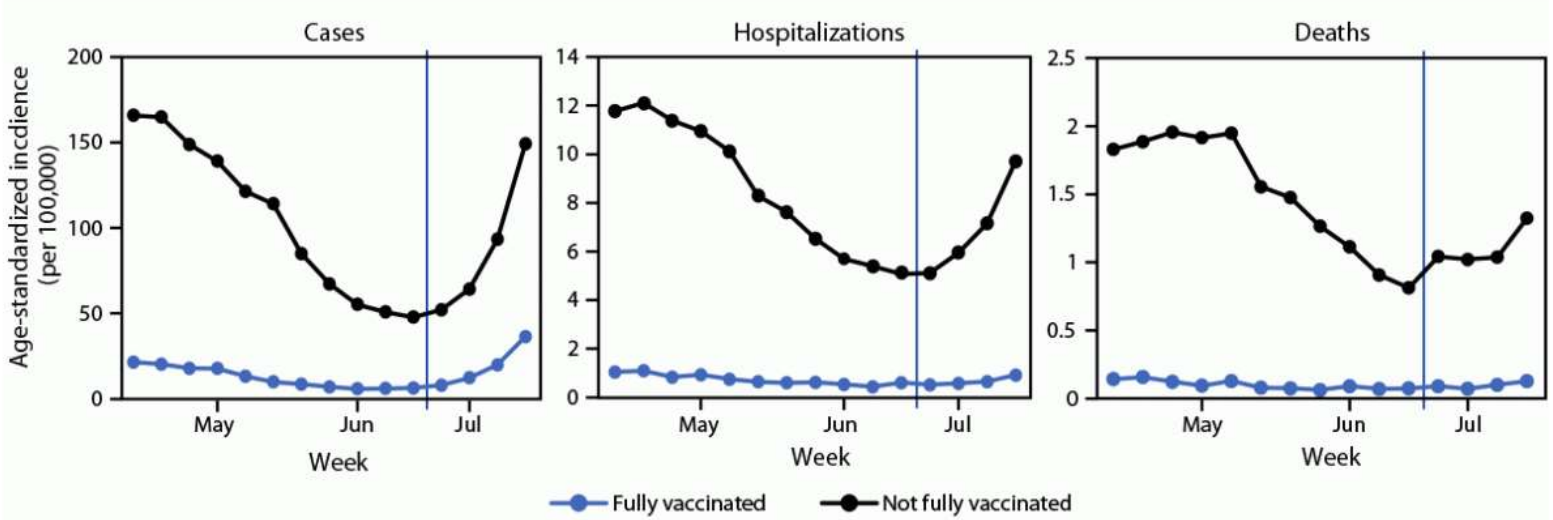
TABLE. Numbers, percentages, incidence rates, and incidence rate ratios * (in not fully vaccinated versus fully vaccinated persons) of COVID-19 cases, hospitalizations,† and deaths,§ by age group and vaccination status¶ — 13 U.S. jurisdictions,** April 4–June 19 and June 20–July 17, 2021††

	Cases		Hospitalizations		Deaths	
Age group, yrs	Not fully vaccinated	Fully vaccinated	Not fully vaccinated	Fully vaccinated	Not fully vaccinated	Fully vaccinated
Totals	569,142 (92)	46,312 (8)	34,972 (92)	2,976 (8)	6,132 (91)	616 (9)
April 4–June 19						
Total no. (% of total)						
18–49	331,151 (97)	10,346 (3)	10,526 (97)	295 (3)	609 (99)	7 (1)
50–64	93,474 (94)	5,850 (6)	9,158 (95)	444 (5)	1,380 (96)	58 (4)
≥65	42,884 (85)	7,307 (15)	9,199 (88)	1,286 (12)	3,137 (90)	363 (10)
All ages	467,509 (95)	23,503 (5)	28,883 (93)	2,025 (7)	5,126 (92)	428 (8)
June 20–July 17						
Total no. (% of total)						
18–49	76,237 (85)	13,030 (15)	2,666 (95)	146 (5)	155 (96)	7 (4)
50–64	17,303 (77)	5,027 (23)	1,755 (88)	234 (12)	290 (93)	23 (7)
≥65	8,093 (63)	4,752 (37)	1,668 (74)	571 (26)	561 (78)	158 (22)
All ages	101,633 (82)	22,809 (18)	6,089 (86)	951 (14)	1,006 (84)	188 (16)

Original question from August ECHO:
Are there any studies showing how many vaccinated individuals have died from COVID-19?

FIGURE 2. Weekly trends in age-standardized incidence* of COVID-19 cases, hospitalizations,† and deaths,§ by vaccination status¶ — 13 U.S. jurisdictions, April 4–July 17, 2021**

Return



* Rates are standardized by age, according to the enumerated 2000 U.S. Census age distribution. Blue vertical lines indicate when the B.1.617.2 (Delta) variant reached a threshold of >50%, using weighted estimates for 13 jurisdictions combined.

† To ascertain COVID-19–associated hospitalizations, two jurisdictions relied upon case investigations; seven jurisdictions relied upon hospital records; two jurisdictions relied upon both case investigations and hospital records; and two did not submit hospitalization data. Four jurisdictions reported hospitalizations only where COVID-19 was the cause, and seven reported COVID-19 cases in persons hospitalized for any cause.

§ To ascertain COVID-19–associated deaths, eight jurisdictions relied upon vital records, and five jurisdictions relied upon a combination of vital records and provider reporting (two), case investigations and vital records (two), and provider reporting, case investigations, and vital records (one). Eleven jurisdictions provided deaths with COVID-19 as a cause; one provided all deaths that occurred within 30 days of becoming a case (without confirming cause); and one provided deaths confirmed with COVID-19 as a cause or within 60 days of positive specimen collection.

¶ Fully vaccinated persons are those who are ≥14 days postcompletion of the primary series of a COVID-19 vaccine with Food and Drug Administration emergency use authorization. Not fully vaccinated persons are those who did not receive a COVID-19 vaccine with Food and Drug Administration emergency use authorization or who received a COVID-19 vaccine but are not yet considered fully vaccinated.

** Alabama, Arizona, Colorado, Indiana, Los Angeles County (California), Louisiana, Maryland, Minnesota, New Mexico, New York City (New York), North Carolina, Seattle/King County (Washington), and Utah.

Discussion

- Highlights that rates of cases, hospitalizations and deaths are much higher in unvaccinated persons
  - Cases among vaccinated did increase when delta became predominant variant
- This may suggest decreased vaccine efficacy against confirmed infections but certainly not for hospitalizations or deaths during Delta predominance
- Limitations:
  - Partially vaccinated and unvaccinated were a combined group which lowered incidence ratio and vaccine efficacy estimates
  - Variable linkage between cases, vaccination, hospitalization, mortality – namely lag-time in death reporting
  - Temporal variability in these jurisdictions when Delta was predominant variant
  - 13 jurisdictions with an estimated 25% US population – large, but might not be generalizable

MMWR: Using Wastewater Surveillance Data to Support COVID-19 Response

- **Aim:** To detect the presence of SARS-CoV-2 within a population or to monitor infection trends using changes in the concentration of SARS-CoV-2 RNA in wastewater. Sewersheds can be selected to achieve coverage for a specific proportion of the population, to provide data on communities at higher risk for COVID-19, or to provide data where patient testing is limited
- **Methods:** National Wastewater Surveillance System (NWSS) has been coordinating with 43 public health departments; currently, 9 states are reporting to CDC with sample collection, laboratory testing, use of a CDC platform for analysis and guiding public health actions accordingly. This publication highlighted the experiences of Ohio and Utah.

MMWR: Using Wastewater Surveillance Data to Support COVID-19 Response

- Ohio Department of Health Experience:
  - Established criteria for notifying local health districts of substantial increases of SARS-CoV-2 levels in wastewater
    - Notification if a tenfold increase in levels were detected in past two samples
  - Local groups use this early warning information and dashboard data to limit disease spread
    - Increase testing capacity
    - Direct contact tracing teams
    - Provided toolkit (social media and press resources for FAQs)
  - Since June 2020, 500 notifications have been generated

Using Wastewater Surveillance Data to Support COVID-19 Response

MMWR: Using Wastewater Surveillance Data to Support COVID-19 Response

- Utah Department of Health Experience
  - Samples currently collected twice weekly from 42 facilities that serve ~80% of state's population
  - Dashboard implemented with dissemination of reports to local health departments and updated response teams twice/week
  - Directed clinical testing resources to areas with increased wastewater levels
    - A main component of an existing ranking system to determine where to send mobile testing teams
  - Example of how this was helpful:
    - In July 2020, declining case rates were thought to be related to declining clinical testing volume. Consistent decreases SARS-CoV-2 RNA levels in wastewater indicated the declining case rates were accurate

Discussion

- **Benefits of Wastewater Surveillance:**
  - Show presence of infection in community
  - Track trends
  - Provide information regardless of symptoms and access to patient testing
  - Identify new variants
- **Limitations of Wastewater Surveillance:**
  - Excludes communities not served by municipal sewer systems
  - Difficult interpretation in communities with highly transient populations (tourist or industrial regions)
  - Lower limit of detection is unknown – cannot tell us when a community is free from infections
  - Operations and treatment of wastewater can affect results

MMWR: Long-Term Symptoms Among Adults Tested for SARS-CoV-2 — United States, January 2020–April 2021

- **Aim:** Compare long-term symptoms in those who tested positive for SARS-CoV-2 with those who tested negative to better assess background symptoms prevalence.
- **Study Design:** Survey to nationwide adults to compare prevalence of long-term symptoms (≥4 weeks since onset) among persons who self-reported ever having a positive SARS-CoV-2 test with the prevalence of similar symptoms among persons who reported always receiving a negative test result.
  - The weighted prevalence of ever testing positive for SARS-CoV-2 was 22.2%.
  - 65.9% of those who tested positive reported long-term symptoms

MMWR: Long-Term Symptoms Among Adults Tested for SARS-CoV-2 — United States, January 2020–April 2021

Differences in Symptoms between groups:

- Any long-term symptom: higher proportion of respondents who received a positive test result than those who received a negative test result reported any long-term symptoms (65.9% versus 42.9%; $p<0.05$)
- Specifically highlighted symptoms:
  - Fatigue (22.5% versus 12.0%)
  - Change in smell or taste (17.3% versus 1.7%)
  - Shortness of breath (15.5% versus 5.2%)
  - Cough (14.5% versus 4.9%)
  - Headache (13.8% versus 9.9%)
- all $p<0.05$ except for headache

Discussion

- The prevalence of long-term symptoms often associated with SARS-CoV-2 infection was higher among respondents who ever received a positive test result than among those who always received a negative test result, and symptoms in these persons tended to persist for >4 weeks.
- Describes experiences of non-hospitalized patients and recognition of common long-term symptoms
- Allows for more assessment of background symptom frequencies
- Limitations:
  - Recall bias due to self-reporting survey
  - No follow-up of symptoms beyond the first 4 weeks of testing positive
  - Did not assess differences in duration or severity of long-term symptoms
  - Those who tested negative, had a longer period to report symptoms, possibly inflating their healthcare use and reports of long-term symptoms
  - Could not assess validity of SARS-CoV-2 testing with potential for false-positive and false negative test results leading to possible misclassification

Conclusions

- Vaccine Effectiveness
  - When Delta was widely circulating, individuals that were not fully vaccinated were at least 5x more likely to get infected and 10x more likely to be hospitalized or die from COVID-19. The vaccine continues to offer strong protection from severe illness among vaccinated adults.
- Wastewater SARS-CoV-2 Surveillance
  - Increasing implementation on state and local levels across the US through coordination with NWSS
  - Has several limitations but may be effective for mobilizing resources
- Long-term COVID-19 Symptoms
  - Persons with confirmed COVID-19 reported more long-term symptoms of >4 weeks of at least one symptom compared to those who tested negative
  - Could this be useful in communicating recommendations for vaccination?

Questions?

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