

1 **SARS-CoV-2 Transmission Associated with an Indoor Music Event That Required**
2 **Proof of Full Vaccination Against COVID-19 Prior to Entry — Seattle, July 2021**

3
4
5 Mellisa Roskosky^{1,2}, Gwen Moni², Vance Kawakami², Joanie Lambert², Claire Brostrom-Smith², Holly
6 Whitney², Amy Phu², Jennifer Look², Aley Pallickaparambil², Meagan Kay², Jeff Duchin²

7
8 ¹ Epidemic Intelligence Service, CDC, Atlanta, Georgia; ² Public Health – Seattle & King County, Seattle,
9 Washington

10
11
12 **Corresponding Author:** Mellisa Roskosky, Centers for Disease Control and Prevention, 1600 Clifton Rd
13 NE, Atlanta GA, 30322 (vqb0@cdc.gov)

14
15 Running Title: COVID-19 at Music Event—Seattle 2021
16
17

1 **Abstract:** In July 2021, Public Health – Seattle and King County--investigated a COVID-19 outbreak at an
2 indoor event intended for fully-vaccinated individuals, revealing unvaccinated staff, limited masking,
3 poor ventilation, and overcrowding. Supporting businesses to develop and implement comprehensive
4 COVID-19 prevention plans is essential for reducing spread in these settings. Word Count: 48/50

5

6

7 **Keywords:** COVID-19; SARS-CoV-2; vaccination; ventilation; Seattle; indoor transmission

8

ACCEPTED MANUSCRIPT

1 On June 30, 2021, as part of the third phase of the Washington COVID-19 Reopening Guidance for
2 Businesses and Workers, businesses in the state were allowed to return to usual capacity and operations
3 except for indoor events with more than 10,000 participants [1]. At that time, King County masking
4 mandates were removed for vaccinated persons in indoor public settings. Vaccine verification or
5 negative SARS-CoV-2 testing was recommended but not required for persons attending large indoor and
6 outdoor gatherings, such as concerts and sporting events. This report describes the investigation, public
7 health response, and lessons learned after an outbreak of COVID-19 among a group of 360 attendees
8 and 14 staff after an indoor music event requiring proof of vaccination prior to entry in July 2021.

9

10 **Outbreak Investigation and Findings**

11 On July 16, 2021, Public Health – Seattle and King County (PHSKC) was notified of two people with a
12 positive test for SARS-CoV-2, the virus that causes COVID-19, who had attended the same indoor music
13 event in Seattle on July 9, 2021. At the time of the event, King County, Washington was experiencing low
14 community levels of COVID-19 [2] with a 7-day incidence of 30.75 per 100,000 population. PHSKC
15 initiated an investigation on the day of notification and by July 29, 2021 had documented an additional
16 25 cases linked to the music event (**Figure 1**). Twenty-five primary and 2 secondary cases were identified
17 via contact tracing interviews and event organizer reporting. Among primary cases, 19 attendees and 1
18 staff were confirmed (positive SARS-CoV-2 nucleic acid amplification test result) and 4 attendees and 1
19 staff were probable cases (positive SARS-CoV-2 antigen test result or a compatible clinical syndrome and
20 an epidemiologic link to a confirmed case). The 2 secondary cases consisted of one confirmed and one
21 probable case. Two of the probable cases were reported directly to event organizers and were not
22 reported to the Washington Disease Reporting System or independently verified by PHSKC. The
23 estimated attack rate was 6.4% (23/360) among attendees and 14.3% (2/14) among staff. No

1 hospitalizations or deaths were reported. Eight of 20 specimens underwent molecular sequencing; all
2 were Delta variant (two B.1.617.2 and six AY.3).

3
4 Event organizers reported that prior to entry, all 360 attendees (including guest ticket holders,
5 performers, and volunteers) were required to provide official documentation (i.e., COVID-19 vaccination
6 card) as proof of being fully vaccinated against COVID-19. People were considered fully vaccinated 2
7 weeks after their second dose of a 2-dose series COVID-19 mRNA vaccine (Pfizer-BioNTech or Moderna
8 vaccines) or 2 weeks after one dose vaccine of Johnson & Johnson's Janssen vaccine. The 14 venue-staff,
9 which included bartenders, security, event management, and facilities management, were not screened
10 for proof of vaccination. The investigation revealed at least five unvaccinated staff members worked the
11 event, including one person who later reported having COVID-19 symptoms on the day of the event.
12 That person was in a roaming security position throughout the event, and subsequently tested positive
13 for SARS-CoV-2. A second unvaccinated staff member who worked the event developed symptoms and
14 tested positive for SARS-CoV-2 within eight days of the event. One fully vaccinated attendee reported
15 having symptoms three days prior to the event, attested to having no symptoms of COVID-19 on the day
16 of the event, and tested positive for SARS-CoV-2 three days after the event.

17
18 Several COVID-19 prevention strategies had been implemented by the event organizers, including
19 limiting ticket sales to 50% capacity (based on a presumed maximum occupancy of 700), checking proof
20 of vaccination at the door with matching government-issued photo identification, and requiring
21 attendees to sign an attestation that they were not currently experiencing symptoms of COVID-19.
22 No symptom screening was implemented upon entry for venue staff. Facial coverings were optional for
23 attendees, with event organizers estimating that approximately 15% wore masks during the event. A
24 mask requirement was in place for venue staff, but not enforced, and mask compliance among staff

1 during the event was reported to be low. Event activities included singing and dancing. The event
2 organizers did not maintain a formal attendee registration list (i.e., email addresses were only available
3 for 214 (59%) attendees), and some tickets were purchased in groups.

4 **Public Health Response**

5 On July 14, 2021, the event organizers sent an electronic notification via a social media post on the
6 event announcement and sent an email the following day to event attendees and staff informing them
7 about the outbreak and encouraging SARS-CoV-2 testing. Messaging to attendees also encouraged the
8 use of Washington Exposure Notifications [3], a Washington State Department of Health tool that
9 uses smartphones to allow users to report a positive test for SARS-CoV-2 and alerts other close contact
10 users that they may have been exposed. On July 17, 2021, at PHSKC's request, the event organizer re-
11 notified staff and event attendees of the outbreak . PHSKC provided public health guidance to event
12 organizers to support identification of additional SARS-CoV-2 infections and prevent further
13 transmission, including recommending SARS-CoV-2 testing for anyone who attended the event on July 9,
14 2021, and might have been exposed to SARS-CoV-2, regardless of symptoms or vaccination status.

15
16 An onsite assessment of the venue was completed on July 30, 2021, by PHSKC. Venue management had
17 not developed a formal COVID-19 plan and no system for tracking vaccination status of employees was
18 in place despite both being required by the Washington Department of Labor and Industries [4]. PHSKC
19 provided a tailored COVID-19 plan to the venue after the assessment. The assessment included
20 evaluation of indoor ventilation and air filtration practices. Multiple recommendations were made to
21 improve ventilation at the venue, including altering location of fans for maximal airflow and
22 installation of HEPA filters in areas with inadequate ventilation. Further evaluation by a heating,
23 ventilation, and air conditioning specialist was recommended. For future events, the venue was
24 encouraged to further reduce occupant capacity to limit overcrowding, require staff to wear masks

1 within the venue, and implement widespread symptom screening and testing of symptomatic or
2 exposed staff, regardless of vaccination status.

3

4

5 **Discussion**

6 Event organizers planned this event for a fully vaccinated group of attendees, and therefore masking
7 was not required after local masking requirements were lifted following local declines in SARS-CoV-2
8 cases. While organizers chose to limit event capacity to 50%, it was determined during PHSKC's facility
9 assessment that social distancing as defined by CDC guidance at the time of the event (6 feet distance
10 between people who do not live in the same household) was not possible, even at this reduced capacity,
11 and that the space was poorly ventilated [5]. This PHSKC investigation revealed that at least five
12 unvaccinated staff members—including one who was likely SARS-CoV-2 positive—worked at the event.
13 Businesses should encourage employees to get vaccinated and establish supportive policies that
14 decrease barriers to access (such as paid leave for employees to get vaccinated). State and local health
15 jurisdictions should consider supporting businesses in the development and implementation of COVID-
16 19 prevention plans and in the creation of mechanisms to track the vaccination status of their staff. In
17 settings where resources are not available to provide tailored service to every business, venues could be
18 prioritized based on level of risk.

19

20 Event organizers did not have a formal registration or sign-in process for the event, and PHSKC
21 investigators had to rely on incomplete information when conducting case-finding. A list of names and
22 emails from online ticket sales was available to PHSKC investigators, but information was only available
23 for 59% of attendees due to group ticket purchases. This led to PHSKC's inability to verify two of the
24 reported cases and likely resulted in an overall underreporting of cases associated with the event. It is

1 important to note that pre- and post-event social activities among attendees could also have
2 contributed to transmission and total cases associated with this event. Some attendees reported
3 participating in multiple social activities during the 14-day exposure period prior to the event, and
4 immediately following, such as interstate travel, visiting bars and restaurants, and other indoor and
5 outdoor gatherings. Sequencing results showed two distinct strains of the Delta variant among cases,
6 which could indicate multiple introductions at this event or exposure at another gathering.

7

8 The results of this outbreak investigation are further evidence in support of layered COVID-19
9 prevention strategies including symptom screening, masking, and vaccination for both patrons and staff
10 before spending time in public indoor spaces. Prevention efforts can be scaled up or down based on
11 community levels of COVID-19 [2]. It is likely that the implementation of the existing public health
12 guidance regarding COVID-19 prevention measures at the time of this event [1] could have minimized
13 the extent of the outbreak. With the emergence of the Omicron variant, and its increased
14 transmissibility [6-8], the importance of prevention strategies has only increased. Local health
15 jurisdictions can support businesses with COVID-19 prevention plan development (including masking
16 requirements, encouraging employees to get vaccinated, and creation of vaccination tracking systems
17 for employees) and support the use of ventilation assessments as standard practice, which might lead to
18 the reduction of SARS-CoV-2 transmission in these settings [9].

19

1 **NOTES:**

2 **Acknowledgements** This supplement is supported by the Infectious Diseases Society of America through
3 Cooperative Agreement NU50CK000574 with the U.S. Centers for Disease Control and Prevention.

4
5 **Disclaimer:** The findings and conclusions in this report are those of the authors and do not necessarily
6 represent the official position of the Centers for Disease Control and Prevention. All data were collected
7 as part of routine public health surveillance, contact tracing, and environmental health assessments for
8 COVID-19.

9
10 **Conflicts of Interest**

11 No reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure or Potential
12 Conflicts of Interest.

13

14

ACCEPTED MANUSCRIPT

1 **References**

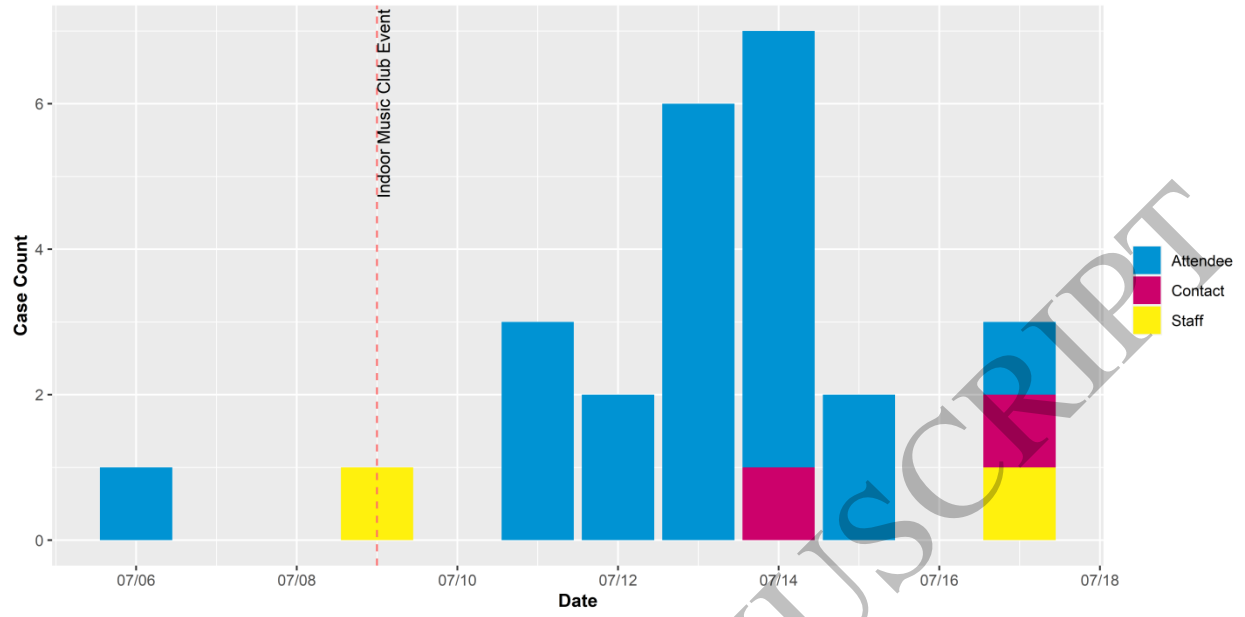
- 2 1. Washington Ready, Proclamation 20-25.16 (2021).
- 3 2. Centers for Disease Control and Prevention. COVID-19 Community Levels. Available at:
- 4 <https://www.cdc.gov/coronavirus/2019-ncov/science/community-levels.html>. Accessed 4
- 5 March 2022.
- 6 3. Washington State Department of Health. Washington Exposure Notifications – WA Notify.
- 7 Available at: <https://doh.wa.gov/emergencies/covid-19/wa-notify>. Accessed 4 March 2022.
- 8 4. Occupational Health and Safety Administration. Protecting Workers: Guidance on Mitigating and
- 9 Preventing the Spread of COVID-19 in the Workplace. Available at:
- 10 <https://www.osha.gov/coronavirus/safework>. Accessed 2 February 2022.
- 11
- 12 5. Wong SC, Au AK, Chen H, Yuen LL, Li X, Lung DC, Chu AW, Ip JD, Chan WM, Tsoi HW, To KK, Yuen
- 13 KY, Cheng VC. Transmission of Omicron (B.1.1.529) – SARS-CoV-2 Variant of Concern in a
- 14 designated quarantine hotel for travelers: a challenge of elimination strategy of COVID-19.
- 15 Lancet Reg Health West Pac. **2021** Dec 23:100360.
- 16
- 17 6. Washington Department of Labor and Industries. Sample COVID-19 Plan for Small Employers.
- 18 Available at: <https://www.lni.wa.gov/safety-health/safety-topics/topics/coronavirus>. Accessed 4
- 19 March 2022.
- 20 7. Gu H, Krishnan P, Ng DYM, Chang LDJ, Liu GYZ, Cheng SSM, Hui MMY, Fan MCY, Wan JHL, Lau
- 21 LHK, Cowling BJ, Peiris M, Poon LLM. Probable Transmission of SARS-CoV-2 Omicron Variant in
- 22 Quarantine Hotel, Hong Kong, China, November 2021. Emerg Infect Dis. **2021** Dec 3;28(2).
- 23 8. CDC COVID-19 Response Team. SARS-CoV-2 B.1.1.529 (Omicron) Variant - United States,
- 24 December 1-8, 2021. MMWR Morb Mortal Wkly Rep. **2021** Dec 17;70(50):1731-1734.
- 25 9. Centers for Disease Control and Prevention. COVID-19: Workplace Prevention Strategies.
- 26 Available at: [https://www.cdc.gov/coronavirus/2019-ncov/community/workplaces-](https://www.cdc.gov/coronavirus/2019-ncov/community/workplaces-businesses/index.html)
- 27 [businesses/index.html](https://www.cdc.gov/coronavirus/2019-ncov/community/workplaces-businesses/index.html). Accessed 2 February 2022.
- 28
- 29

1 **Figure Legends**

2 **Figure 1. Indoor Music Event COVID-19 Epidemic Curve.** Verified SARS-CoV-2 cases (n=25; excludes two
3 probable cases that were not reported to the Washington Disease Reporting System) among event
4 attendees, staff, and known contacts by symptom onset date. If symptom onset date was unavailable,
5 date of sample collection was used.

6

ACCEPTED MANUSCRIPT



1
2
3

Figure 1
254x127 mm (.63 x DPI)

ACCEPTED MANUSCRIPT