

# Letters

## RESEARCH LETTER

### Hand Hygiene Compliance Rate During the COVID-19 Pandemic

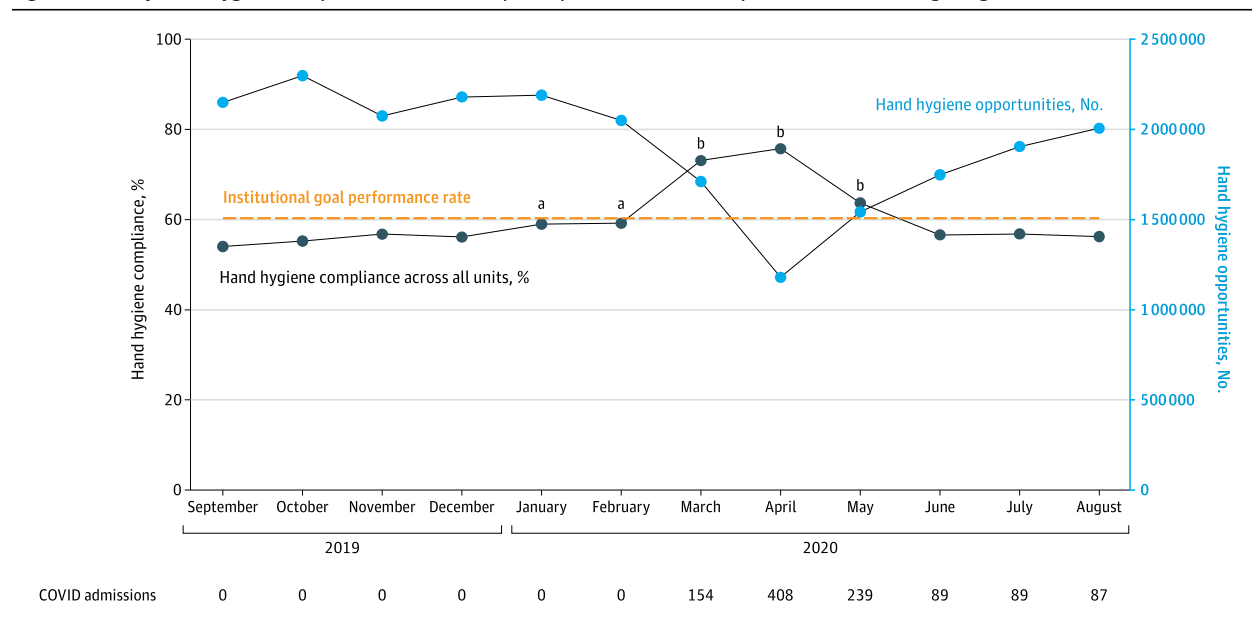
Hand hygiene is a cornerstone of infection control,<sup>1,2</sup> yet compliance remains low, averaging 50% across hospitals nationwide.<sup>1</sup> Audit and feedback can improve compliance,<sup>3</sup> but audits traditionally occur using direct observation, capturing few events and leading to inaccurate measurements.<sup>4</sup> To address this, some institutions have implemented automated monitoring.<sup>1,4</sup> To further validate hand hygiene compliance measurements from automated monitoring and estimate the upper bound of compliance achievable with such systems, we describe changes in compliance during the COVID-19 pandemic as measured by the automated system at our institution, one of the largest such deployments nationally.

**Methods** | The University of Chicago Medical Center (UCMC) implemented an automated hand hygiene monitoring system in 2015 (PURELL SMARTLINK Integrated Monitoring System, GOJO Industries). An infrared sensor anonymously records all dispenser uses (numerator) and entries into and exits from inpatient rooms (denominator) to estimate hand

hygiene compliance (numerator/denominator) for each inpatient unit. Graphical trends are displayed on centrally located unit monitors and weekly data are communicated through automated reports.

We examined hand hygiene compliance in UCMC's new adult hospital, by day, week, and month, from September 2019 through August 2020. We also examined compliance in units temporarily converted into COVID cohort units, which exclusively cared for patients with COVID-19, hypothesizing that such units would provide an estimate for maximum compliance. To provide context for the compliance data, we examined number of hand hygiene opportunities (ie, room entries and exits) and COVID-positive inpatient admissions by month. To assess for statistically significant differences in compliance by month and adjust for clustering within unit, we used bivariate linear mixed models with month as a categorical variable. Analyses included 13 validated inpatient units (9 non-cohort, 4 cohort) and 6 intensive care units (3 noncohort, 3 cohort),<sup>5</sup> comprising 276 noncohort and 160 cohort beds, performed with SAS, version 9.4 (SAS Institute). This project received a formal Quality Improvement determination, and as such was not reviewed by the Institutional Review Board, which is consistent with institutional policy.

Figure 1. Monthly Hand Hygiene Compliance Across All Hospital Inpatient Units From September 1, 2019, through August 31, 2020



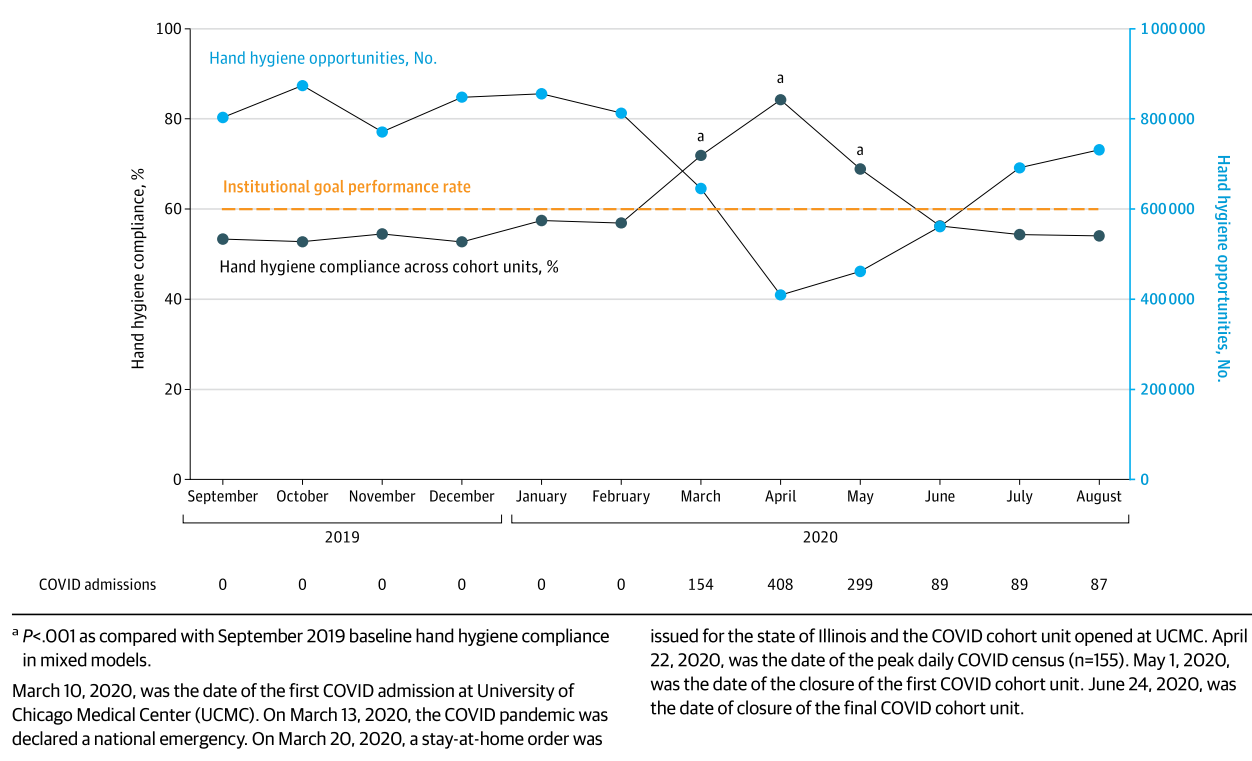
<sup>a</sup>  $P = .01$  as compared with September 2019 baseline hand hygiene compliance in mixed models.

<sup>b</sup>  $P < .001$  as compared with September 2019 baseline hand hygiene compliance in mixed models.

March 10, 2020, was the date of the first COVID admission at University of Chicago Medical Center (UCMC). On March 13, 2020, the COVID pandemic was

declared a national emergency. On March 20, 2020, a stay-at-home order was issued for the state of Illinois and the COVID cohort unit opened at UCMC. April 22, 2020, was the date of the peak daily COVID census ( $n = 155$ ). May 1, 2020, was the date of the closure of the first COVID cohort unit. June 24, 2020, was the date of closure of the final COVID cohort unit.

Figure 2. Monthly Hand Hygiene Compliance Across Inpatient COVID Cohort Units From September 1, 2019, through August 31, 2020



**Results** | The hospital at which this study took place admitted 1159 inpatients with COVID-19 during the study period, with a monthly peak in April (Figure 1, Figure 2). Before the pandemic, monthly hand hygiene compliance across all units was similar to the September baseline of 54.5% (Figure 1). During the pandemic, compliance reached a daily peak of 92.8% on March 29, 2020, across all units, and 100% on March 28, 2020, across cohort units; a weekly peak of 88.4% across all units and 98.4% on cohort units during the week of March 29, 2020; and a monthly peak of 75.5% across all units and 84.4% on cohort units in April. Compliance declined across all units to a daily nadir of 51.5% on August 15, 2020, a weekly nadir of 55.1% that same week, and a monthly nadir of 56% in August. Statistical analyses demonstrated a significant association between month and hand hygiene compliance, for all units and cohort units specifically (supporting data reported in Figure 1 and Figure 2). Hand hygiene opportunities had an inverse relationship to compliance during the study.

**Discussion** | The hospital examined for this study achieved daily hand hygiene compliance rates higher than 90%, peaking at 100% across cohort units, significantly above national levels and the institutional goal of 60%. Study limitations include our inability to assess the quality of hand hygiene. The timeline illustrated in Figures 1 and 2 and the concomitant changes in hand hygiene opportunities suggest the compliance surge was driven by fear and increased awareness of the importance of hand hygiene associated with the start of the pandemic, as well as fewer room entries and exits resulting from fewer patient visitors, remote rounding by clinicians, and nurse batching of

tasks while in patient rooms. High compliance was not sustained and returned to baseline. As hospitals set hand hygiene goals, this study suggests high compliance is possible, even with automated monitoring, yet difficult to sustain.<sup>6</sup> The recent decline in compliance should be a clarion call to hospitals currently experiencing COVID-19 surges.

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**Accepted for Publication:** February 22, 2021.

**Published Online:** April 26, 2021. doi:10.1001/jamainternmed.2021.1429

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**Conflict of Interest Disclosures:** Dr Landon has received travel support from GOJO Industries to speak about hand hygiene but has not received honoraria or any other form of financial support. No other disclosures were reported.

**Author Contributions:** Dr Marrs had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

*Concept and design:* Makhni, Umscheid, Bartlett, Landon, Marrs.

*Acquisition, analysis, or interpretation of data:* All authors.

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*Critical revision of the manuscript for important intellectual content:* Makhni, Umscheid, Soo, Chu, Bartlett, Landon.

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*Supervision:* Umscheid, Bartlett.

**Funding/Support:** The evaluation was supported in part by the Center for Healthcare Delivery Science and Innovation (HDSI) at the University of Chicago Medicine.

**Role of the Funder/Sponsor:** The Center for Healthcare Delivery Science and Innovation at the University of Chicago Medicine had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

**Additional Contributions:** We would like to acknowledge Stephen Weber, MD, MS (Chief Medical Officer, University of Chicago Medical Center) for his review of our study, and Mark Connolly, MEng (Business Intelligence Lead, Data and

Analytics, University of Chicago Medical Center) for providing COVID data. Neither received compensation for their role.

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