

## Can Improved Hand-Wash Duration Lead to Zero Infections?

### **St. Mary's Reduces Nursery Infections to Near Zero by Paying Close Attention to Hand-Wash Duration**

Most children residing in the long-term care nursery at St. Mary's Healthcare System for Children in Queens, N.Y., are medically fragile. Having been born prematurely and transferred from intensive care units, many of these children at this post-acute residential care facility receive ventilation through permanent tracheostomies. A respiratory infection or any other kind of healthcare-acquired infection (HAI) at this stage of an early and vulnerable life can cause significant complications or even death.

St. Mary's implemented a variety of measures to reduce infections in this nursery unit, which had the highest infection rate in the facility. Installing ultraviolet lights and a new air filtration system reduced infections significantly but not low enough to reach the organization's goal of zero infections. St. Mary's re-trained its staff on hand hygiene and used direct observation to monitor compliance to hand antisepsis, but this, too, was not enough.

What finally did drive infections down to near zero was improved performance on hand-wash duration by the nursery's team members, in addition to interventions/restrictions put in place facility wide due to the COVID pandemic. The hand hygiene improvement was made possible by the ability of Vitalacy's electronic hand hygiene technology to monitor duration in a market-leading way. By gathering and tracking objective data about hand-wash duration and compliance, and then improving team results on these hand hygiene performance measures, the partnership between St. Mary's and Vitalacy reduced both respiratory infections and other HAIs:

- The unit had one respiratory infection in March and zero in April, May, June, July, and August 2020;
- There was only one total HAI identified in each of the months of March, April, and May and June, two in July, and zero in August 2020.

**Contact us to learn more about Vitalacy's Solutions**

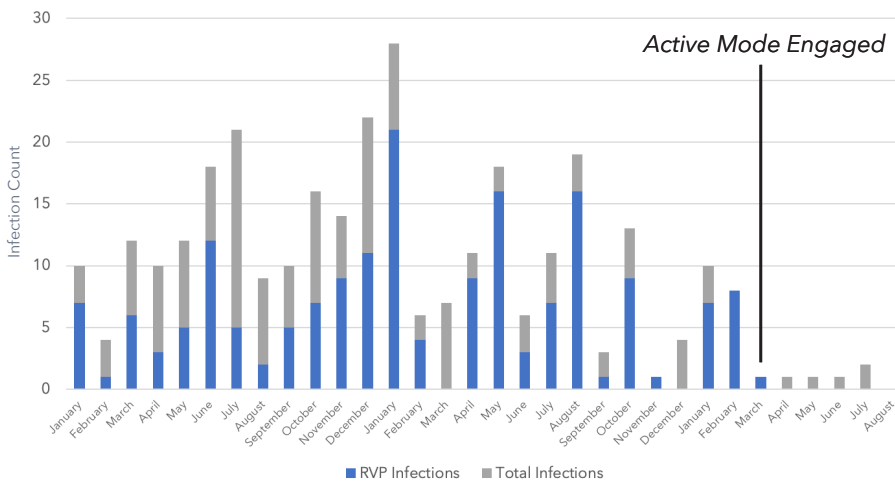


**The number of nursery unit staff who have been (+) for COVID are lower than other nursing units. This can definitely be attributed to Vitalacy's hand hygiene program."**

~ Judy Fine, St. Mary's  
Infection Control Dir.

These results were a dramatic improvement over 2019, when the St. Mary's 2019 total HAI rate of 7.3 ( total number of infections/ 1,000 patient days), with an average monthly infection rate of 24 ( facility wide- 17 respiratory infections ). The Nursery unit's 2019 total HAI rate - 13.2 ( total # infections = 128/ 12 months- average 10/ month). The sustainability of the improvement over several months was due to improved hand-wash duration made possible by Vitalacy's ability to monitor and measure duration.

### Nursery Unit Infection Rates 2018 - 2019 - 2020



### How St. Mary's reduced infections to near zero

When St. Mary's was considering a trial of Vitalacy's automated hand hygiene monitoring solution, the organization's infection control director Judith Fine, MSc, MPH, M (ASCP), CIC, volunteered the nursery unit as the trial location because she understood that infections could be controlled through better hand hygiene. "Babies cannot give babies infections," Fine stated. "If the babies are in their cribs 20 out of 24 hours each day, and the cribs are further than 10 feet away from each other, where is the source of the infection? It's in the hands of everybody and anybody."

The implementation process that started in November 2019 involved the nursery unit's entire multidisciplinary team - (medical staff, nursing teams, social worker, respiratory therapists, rehabilitation therapists, dietitian, environmental staff and more).



**"I am so excited about this project. Thank you all for your efforts in improving care for our special kids. I very much appreciate your hard work and dedication."**

~ Edwin Simpser, MD  
 St. Mary's President & CEO

**"The feedback the wrist-band gives me while I am washing is very helpful. I am more conscious of my hand hygiene now."**

~ St. Mary's Recreational Therapist

During the trial's first phase, which would last until March 10, 2020, Vitalacy's technology monitored team members' natural workflow behavior; this monitoring enabled Vitalacy to customize the technology according to the preferences of the unit's team members.

Bency Mathew, RN, MSN, DNS-CT, St. Mary's Assistant Vice President of Nursing Services and AVP for System quality, education and informatics, said this customization enables the Vitalacy monitoring system to "become a part of workflow, not a burden to workflow" and to become an essential part of establishing a culture in which hand hygiene is the "single most successful part of infection prevention." To get team members to do hand-washing diligently "is what this whole mission was about," she emphasized.

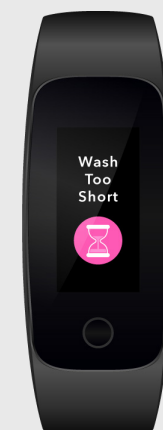
Hand-wash reminder notices were turned off during the first phase, which lasted four months, to determine the unit's baseline hand-washing compliance and to provide the opportunity to set the timing of reminders - appearing on Vitalacy Smartbands worn on the wrist of each worker on the unit - at a frequency appropriate for each team member's workflow. Physicians and nurses working very closely with the children required more frequent reminders than other team members. "For example, our rehab staff sits in a communal area for a prolonged period of time," Fine explained. "They're not going in and out of the rooms as often as our other clinicians. We could set up a reminder for them to get up every 15 or 20 minutes to hand wash, with the time determined by the exact reality of what's happening 24 hours day."

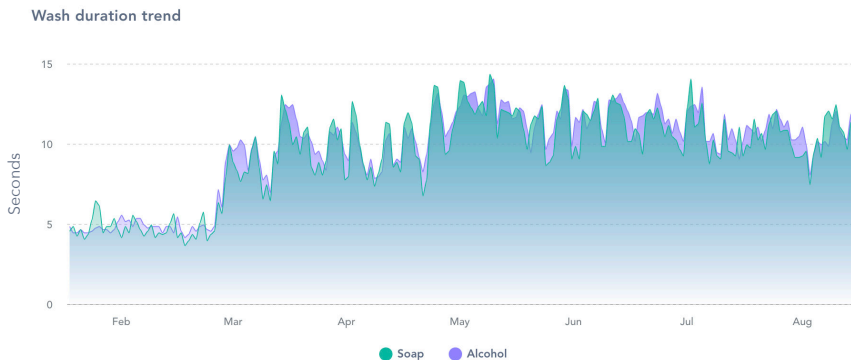
Wash duration during the first November-through-February silent phase, after an initial uptick due to increased hand hygiene awareness, averaged about five seconds. During this period, the unit averaged 4 respiratory infections and 5.75 HAIs per month.

### **Customized reminders drive improvements in hand-wash duration and infection control**

The Vitalacy Smartbands remained in "silent mode" until March 10, 2020, when of the unit's team members began receiving hand-wash duration reminders customized to their workflow. Each notice consisted of a brief text message, which was accompanied by a gentle vibration to the Vitalacy Smartband if the hand-wash was too short.

### **Vitalacy SmartBand**





Here's how the reminders work: when a team member activates a soap or sanitizer dispenser, the Smartband measures how long the hands are articulating by using a built-in accelerometer. If the hand motion ends too early, a vibration will activate on the SmartBand with the visual notification "Wash Too Short." This vibration and message reminds the team member to keep handwashing. Once the wash duration is sufficient and the hand-washing motions stop, the visual notification says, "Well Done." The vibration only occurs if the team member needs coaching on duration. If a team member washes correctly, there is no vibration and no disruption to workflow.

These notifications spurred the nursery's team to improve average hand-wash duration from 5.1 seconds on March 1, 2020, to 13.3 seconds on March 31, with the days in between marked by gradual improvement. The month ended with an average hand-wash duration of about 8 seconds. In April, the unit average improved to 11 seconds and in May to 12.6 seconds. Average duration was 12.3 seconds in June and 11.2 seconds in July. These improvements in hand-wash duration correlated to the lower infection rates mentioned earlier in this article. And, in the midst of a city bearing the brunt of the COVID-19 pandemic, the nursery unit workers had fewer COVID-19 infections than workers in the facility's other units.

"This can definitely be attributed to Vitalacy's hand hygiene program," Fine said.

St. Mary's goal is to continually increase the average hand-wash duration while noting that infections began to reduce in number after wash durations began to be monitored and hand hygiene compliance improved. "When you see staff doing two seconds or three seconds, that is not appropriate or acceptable," Fine said. Mathew explained further, "Establishing a benchmark internally of between 20 to 30 seconds holds people to a higher

**"When you see staff doing two seconds or three seconds, that is not appropriate or acceptable."**

~ Judy Fine, St. Mary's  
Infection Control Dir.

standard of handwashing. So while 15 seconds may be acceptable, we're not going to settle for that. We want 20 to 30 seconds because then we can assure that more than 50 percent achieve 15 to 20 seconds. That's the reality of all of this."

### **Studies show that duration matters - up to a point**

Since the beginning of the COVID-19 pandemic, the Centers for Disease Control and Prevention (CDC, 2020) recommendation of a hand-wash duration of 20 seconds has become well-known. The World Health Organization (WHO, 2009) recommends at least a 20- to 30-second handwash during each of the five moments of hand hygiene: 1) before touching a patient, 2) before an aseptic procedures, 3) after body fluid exposure risk, 4) after touching a patient, and 5) after touching patient surroundings. These durations enable an individual to scrub both the front and back of hands and fingers effectively; the scrubbing lifts bacterial and viral substances off of the skin so that they can be rinsed down the drain with water. If a sink is not immediately available, alcohol-based hand sanitizers kill most kinds of bacteria and viruses when the hands are scrubbed for a sufficient amount of time.

Four recent studies show that hand-wash durations of 15 seconds are as effective as longer durations in reducing infections, and two of these studies showed that the shorter 15-second duration time resulted in better hand hygiene compliance. St. Mary's experience was consistent with these four published studies, as its nursery unit saw infections decrease even with wash durations of less than 10 seconds.

Bin Abdulrahman, et al., 2019, concluded that hand-wash durations of at least 15 seconds could decrease the frequency of influenza-like illnesses. "The duration of handwashing with soap and rubbing, which were statistically significant in terms of the time spent on handwashing as it showed that the participant who spent 5-10seconds of handwashing with soap and hand rubbing got influenza-like illness more frequently in comparison to those who washed their hands for long periods," the authors wrote.

In a study of hand antisepsis using alcohol-based hand rubs, Harnoss et al. (2020) revealed no difference between a 15-second and a 30-second rub-in time in reducing in the bacterial load on fingertips. In addition, study participants rubbing for 15

### **Latest WHO Findings**

Hand rubbing for 10, 15, 20, 30, 45 and 60 seconds led to significant reductions in bacterial counts, the reductions achieved after 10, 15 and 20 seconds were not significantly different than those obtained after 30 seconds.

seconds were more likely to perform hand antisepsis compared with those rubbing for 30 seconds, with compliance increasing from 54.7% to 69.5% in the 15-second trial.

Pires et al. (2017) measured hand rubbing for 10, 15, 20, 30, 45 and 60 seconds, according to the WHO technique using 3 mL alcohol-based hand rub. While all durations led to significant reductions in bacterial counts, the reductions achieved after 10, 15 and 20 seconds were not significantly different than those obtained after 30 seconds. The researchers' conclusion was that hand rubbing for 15 seconds was not inferior to 30 seconds in reducing bacterial counts on hands, and there was no gain in reducing bacterial counts from hand rubbing longer than 30 seconds.

Kramer et al. (2017) found that all hand rubs tested in their study achieved equal or significantly higher efficacy within 15 seconds when compared to a referenced 60% alcohol-based hand rub used for 30 seconds. The study also found that reducing the hand-rub time increased the frequency of hand antisepsis from 5.8+2.9 per hour to 7.9+4.3 per hour.

### **Wash duration becomes top of mind for many**

Once top of mind only among healthcare professionals, hand-washing duration is now something familiar to all. The COVID-19 pandemic has obviously enhanced awareness of the importance of hand hygiene, both among healthcare professionals and the general public. An increasing number of consumer wellness products and apps, such as the Apple and Samsung watches, have hand-wash reminders and timers.

Fine credited the unit's team members for their commitment to the project, noting their willingness to spend time with Vitalacy to understand the technology and use it most effectively. "St. Mary's is moving forward, and we'll be starting the same process, measuring the silent mode for a month or so, and towards the end of September, we'll activate the reminder mode," Fine said. St. Mary's plans to implement the technology into the entire 124-bed facility by the end of 2020.

Satisfaction with the infection control improvements runs all the way to the top of St. Mary's organization.

"I am so excited about this project," said Edwin Simpser, M.D., St. Mary's president and CEO. "Thank you all for your efforts in improving care for our special kids. I very much appreciate your hard work and dedication."

### **References**

Bin Abdulrahman AK, et al. Do various personal hygiene habits protect us against influenza-like illness? *BMC Public Health* (2019) 19:1324.

Centers for Disease Control and Prevention (CDC) website. When and how to wash your hands, Aug. 17, 2020.

Harnoss JC, et al. Hand antisepsis without decreasing efficacy by shortening the rub-in time of alcohol-based handrubs to 15 seconds. *Journal of Hospital Infection*, April 1, 2020;104(4):419-424.

Kramer A, et al. Shortening the application time of alcohol-based hand rubs to 15 seconds may improve the frequency of hand antisepsis actions in a neonatal intensive care unit. *Infection Control & Hospital Epidemiology*, December 2017;38(12):1430-1434.

Pires D, et al. Hand hygiene with alcohol-based hand rub: how long is long enough? *Infection Control & Hospital Epidemiology*, May 2017;38(5):547-552.

World Health Organization (WHO). Hand hygiene: why, how & when? August 2009.