COMMENTARY

Quicker, Easier, and Cheaper? The Promise of Automated Hand Hygiene Monitoring

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(See the article by Boyce, on pages 1016–1028.)

There are several reasons why surveillance of hand hygiene performance is a crucial part of successful promotion strategies.^{1,2} These can be conceptualized according to the end-user of the data: infection control professionals; healthcare workers (HCWs); researchers; and external stakeholders, such as governmental and nongovernmental accreditation and benchmarking bodies and the general public. Each of these groups comes to hand hygiene performance data with different expectations and preconceptions and will use it for different purposes. Thus, one of the challenges of collecting such data is to do it in such a way that it satisfies the specifications of all interested parties as much as possible.

Boyce³ provides a thorough and balanced overview of the current state of hand hygiene monitoring. At a time when the field of hand hygiene promotion is maturing rapidly and infection control professionals are facing a vast range of options for monitoring performance in their hospital, this review comes as a timely and welcome summary and answers many common questions in addition to demystifying some newer technologies.

The first questions might be, Why do we need new options? and Don't we already have the gold standard? Certainly direct observation and, more specifically, the World Health Organization (WHO) method based on "My 5 Moments for Hand Hygiene,"⁴ are frequently regarded as such, and for good reasons (Figure 1). The WHO method has a solid conceptual foundation, identifies opportunities that should equate to transmission of pathogens, and has been validated, translated, and used in different countries across continents and cultures.^{2,4–6} However, several commonly cited limitations provide impetus to find alternative techniques, such as indirect monitoring using surrogates and automated monitoring, which is a particular focus of Boyce's review. The potential advantages of automated systems include minimal consump-

My 5 moments for HAND HYGIENE

FIGURE 1. "My 5 Moments for Hand Hygiene" specifies the 5 key moments when healthcare workers should perform hand hygiene. This evidence-based, field-tested, user-centered approach is designed to be easy to learn, logical, and applicable in a wide range of settings. So far, only direct observation allows assessment of all 5 moments. This figure is reprinted from the *Journal of Hospital Infection*⁴ with permission from Elsevier and the authors.

tion of resources once installed, provision of large data sets, and, potentially, less observation bias or Hawthorne effect. Conversely, major risks include the counterproductive temptation to monitor the wrong things because more convenient from a technical perspective, such as hand hygiene on entry/exit to wards or rooms, and a significant initial cost, which

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is particularly difficult in resource-limited settings. There is also the loss of an important opportunity for connection between the infection control team and HCWs, which provides an occasion for "bottom-up" promotion.

The infection control professional (ICP) has a direct mandate to optimize patient safety and is aware that hand hygiene observation and performance feedback to HCWs is a key component of successful multimodal hand hygiene promotion strategies.² Part of the ICP role is to follow closely the progress of hand hygiene performance in their facility and to identify specific wards, professions, or indications that are associated with poor compliance with practices in order to direct future interventions. Thus, information must be rapidly available for performance feedback and must contain detailed data to facilitate improvement. Direct observation fulfills the need for detailed information and requires time spent "on the ground," thus giving the observer an insight into factors that facilitate and impede optimal hand hygiene performance at their healthcare facility. The trade-off is that it is an undeniably resource-intensive process.

Most HCWs know the risks posed by inadequate hand hygiene and want to improve. Yet we are notoriously poor at estimating our own performance, thus mandating the use of an alternate method.⁷ In our experience, HCWs want access to their own hand hygiene performance results. Although this may vary between countries and institutions, they dislike being observed without feedback. Moreover, to be effective, feedback should probably be immediate and individual, rather than only systematically reported compliance rates for an entire ward or department. For this purpose, automated monitoring systems able to identify specific categories of HCWs offer great benefits. And it is even better if the device is able to remind the healthcare worker to perform hand hygiene at the correct moment in a manner that does not become either excessively irritating or easily disregarded.

Benchmarking and public reporting is currently a challenging issue with increasing pressure for hospital reimbursement to be tied to the achievement of defined standards.⁸ Our long-term vision is that monitoring will become a mandatory process measure for each institution to report and benchmark in parallel to infection and resistance cross-transmission rates. In this context, hand hygiene data must be robust and as resistant as possible to "gaming." Additionally, in order for external comparison of hospitals to be of value, the same validated methodology for observing and reporting should be utilized in each institution. Currently, we argue that the WHO "My 5 Moments for Hand Hygiene" methodology is the most robust technique available as based on an underlying schema for transmission of pathogens and clearly defined methods.^{4,9} Automated techniques offer an enormous potential advantage of collecting large—and therefore, more statistically significant—amounts of data in an objective manner. But caution should be exercised, and it must be ensured that the system monitors an action that corresponds conceptually with patient safety. We believe that actions that are easily monitored automatically, such as open-

ing a door, are not useful and could be counterproductive from this perspective.

Finally, some facilities and ICPs may want to consider specifications appropriate to conducting research in the field of hand hygiene. Hand hygiene performance can be used either as a process measure or an outcome, depending on the study objectives and design. Direct observation poses several challenges in this context: it measures a relatively small proportion of all hand hygiene behavior, it is difficult to blind observers to the intervention¹⁰, and the Hawthorne effect may bias the results. Measuring product volume consumption overcomes some of these problems as it has the potential to reflect all hand hygiene actions, but it is unable to provide the level of detail often required by research, for example, variation between professions and hand hygiene indications, and it does not provide a denominator. A well-developed automated monitoring system has the ability to overcome these challenges by providing a complete and unbiased picture of hand hygiene activity.

There are several questions that must be asked when considering what type of hand hygiene performance monitoring should be undertaken in any given institution. What is the purpose of the monitoring? Who will use the information? What will be done with it? What is the definition of a hand hygiene opportunity and an action? What additional information is provided for each opportunity, for example, date and time, profession, indication? How accurate are the data and how can they be validated? What resources are required? What additional benefits or features does this method bring, such as simultaneous reminders or education of HCWs or monitoring of other patient safety indicators? As Boyce's review demonstrates, automated monitoring is likely to play an increasingly significant role, although there are still a number of challenges to overcome and most of our colleagues in developing countries are many years from using such technologies. But whether directly observed, automated, or indirect, monitoring and feedback of HCW performance remains an essential part of successful hand hygiene promotion.

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