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Editorial

Getting it right: automated surveillance of healthcare-associated infections☆

Healthcare-associated infections (HAI) such as surgical site infections and central line–associated bloodstream infections are among the commonest adverse events of medical care and are estimated to affect 6.5% of patients in acute care hospitals on any given day [1–3]. Surveillance of HAI and feedback of their rates, in particular within surveillance networks, is a key component of successful infection prevention programmes that provides caregivers and policy makers with the necessary information to identify areas of improvement and guide interventions [4–6].

Conventional surveillance of HAI is done by manually reviewing patients' medical records and ascertaining the presence of HAI according to standardized surveillance definitions. This is a time-consuming and resource-intensive effort, and there are concerns regarding the uniformity of the surveillance results as a result of interrater reliability, differences in profiles of professionals conducting surveillance and the effort dependency of the surveillance process [7–12].

These shortcomings of conventional HAI surveillance have led to the development and use of automated surveillance (AS) systems for the identification surgical site infections, central line–associated bloodstream infections and other HAI [13–15]. AS uses routine-care data stored in electronic health records (EHR) to identify patients who (may) have developed a HAI. These systems reduce the workload of manual surveillance, thereby freeing up infection control practitioners' time; in addition, it can provide better standardization of surveillance results by facilitating data collection and standardizing case ascertainment [16–18]. These benefits of AS, combined with the increasing availability of data stored in EHR and the need for large-scale surveillance data, could motivate many hospitals, public health institutes and surveillance networks to transition to AS methods. The need for surveillance methods that are less reliant on tedious manual chart review, and possibly more timely, is illustrated by the current coronavirus disease 2019 (COVID-19) pandemic. Surveillance has been interrupted in many places to reallocate human resources to the pandemic response, thereby reducing case identification and resulting in potential lapses in infection control [19]. At the same time, COVID-19 has spurred the digitalization of healthcare; it may turn out to be the catalyst needed to realize the transition to large-scale AS.

However, this transition to AS is not without risk. Guidance is lacking on how to best automate the surveillance process and ensure the delivery of surveillance data that is uniform and useful for improving the quality of care. In addition, automation in itself is not a guarantee of high-quality surveillance output, as small differences in implementation, underlying clinical care practices or coding procedures can greatly affect results [20,21]. Importantly, the transition to AS entails more than converting a manual process to an automated process; it will affect surveillance targets, definitions, methods and interpretation of data, and it thereby runs the risk of losing clinical buy-in [22]. As AS is implemented on a larger scale, it is paramount to explicitly define the purpose of surveillance – for example, quality improvement or, in some settings, pay-for-performance – and involve the correct stakeholders. Ideally, all implementation efforts should be coupled to an assessment of whether the surveillance method delivers results that contribute to reducing HAI rates, for example by observing the effect of HAI prevention programmes on measured infection rates or by assessing whether surveillance results are used to trigger interventions.

AS has been applied in the research setting within hospitals [13] and sparsely in the setting of large-scale AS [19]. However, many of the currently available AS systems were developed in individual institutions with specific local preferences and conditions, and hence they are diverse in their aims, definitions, design and methods used. This solitary, stand-alone development of AS systems leads to heterogeneity and poor interoperability between systems. In addition, not all healthcare facilities can make a transition to AS on their own, leading to a segregation in healthcare facilities that collect surveillance data manually and automatically. These factors jeopardize the possibility of using surveillance data for comparison and subsequent quality improvement.

The PRAISE network (Providing a Roadmap for Automated Infection Surveillance in Europe) was initiated in 2019 to develop guidance support the transition to large-scale AS; the products of this collaboration are presented in this supplement. The roadmap offers high-level conceptual guidance for the development of surveillance systems and details two possible approaches to their implementation, so-called locally implemented and centrally implemented AS. It pays extensive attention to the selection of surveillance targets and definition and the design of AS systems (including selection of data sources and algorithms), and it discusses

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implementation considerations, validation, maintenance and areas of future research.

The accompanying article on the information technology (IT) aspects of large-scale AS focuses specifically on the IT requirements for implementation of AS, including the (re)use of healthcare data from EHR, standardization, interoperability, IT architecture and secure data transfer [23]. The article on governance discusses governance aspects that are of particular importance in large-scale AS systems, including engagement of stakeholders, transparency of algorithms and accountability and the legal and ethical principles regarding the reuse of personal data for the purpose of surveillance [24].

Surveillance networks and hospitals can use this roadmap and the guidance documents to develop a harmonized automated approach to surveillance that suits their local situation and ideally that results in data supporting comparison and quality improvement. A first step in going forwards will be to choose an approach to implementation and achieve consensus on the targets for automated HAI surveillance and their definitions, as this will form the basis of all further development efforts.

Transparency declaration

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