

## Hand Hygiene Sound Alert: is it a Good Tool to Improve Compliance?

*Alerta sonoro para higienização das mãos: é uma boa ferramenta para melhorar a conformidade?*

*Alerta sonoro para higienización de las manos: es una buena herramienta para mejorar la conformidad?*

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Although Hand Hygiene (HH) is the single most effective measure to prevent Healthcare-associated Infections (HAIs), making handwashing a habit among healthcare workers remains a huge challenge.<sup>1-3</sup> We investigated if a Sound Alert tool can improve HH compliance.

This pilot study was conducted in an Internal Medicine Unit with 16 beds of a private Hospital located in Belo Horizonte, Minas Gerais, Brazil. The Sound Alert was developed by researchers themselves with the support of building engineering. It was composed of a bell MP3 wireless with a micro SD 128MB memory card. In the beginning, the device was powered by two alkaline batteries (AA) in 3 modes ringer and one 12V battery (type A23) in its trigger (motion sensor). Nowadays, we adapted the system to use electrical energy from the hospital thereby eliminating all batteries. After that, the Sound Alert became a sustainable device.

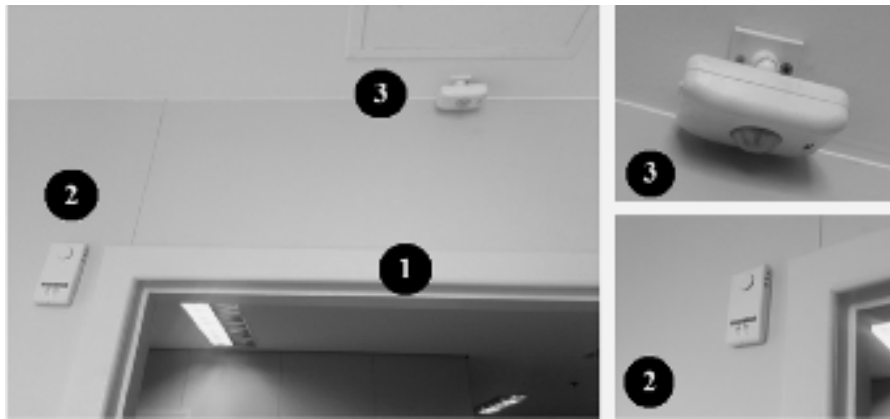
The reach between the trigger and the bell is up to 30 meters in free areas. The whole system costs about US\$ 30,00. When someone passes through the bedroom door, the sensor triggers an audible alert with the following voice message: "Do not forget to

wash your hands" (Fig. 1). However, the Sound Alert cannot be acquired by other hospitals yet, because researchers are still testing the tool.

The units included in this pilot study have ante-chamber, where only healthcare workers can hear the message, and this reduces annoyances to patients. The baseline period was from July to December 2017. Then, the pilot study period was between January and June 2018. Hand hygiene compliance was indirectly measured by two indicators: a) monthly volume of hand alcohol solution used (mL) for each patient-day; b) monthly volume of hand soap preparation used (mL) for each patient-day. These indicators are monitored by professionals of the Hospital Infection Control Service. In addition, data are discussed monthly in the Patient Safety Core.

For data analysis, was used descriptive statistical analysis by calculating absolute numbers. The impact of the Sound Alert was evaluated by Poisson regression method. This study was approved by the Research Ethics Committee of the study hospital (Protocol number: 1.887.633/2017; CAAE 62480416.1.0000.5126).

In the baseline period, the average consumption of



Notes: (1) Patients' bedroom door; (2) Sound Alert; (3) Motion sensor located above door.

**Figure 1.** Hand hygiene Sound Alert.

alcohol solution and hand soap was 16 mL per patient-day and 22 mL per patient-day, respectively. After the pilot study period started, the monthly volume of hand alcohol solution increased to 26 mL per patient-day ( $r^2 = 0.99$ ;  $p < 0.001$ ). The monthly volume of hand soap raised to 35 mL per patient-day ( $r^2 = 0.07$ ;  $p = 0.67$ ).

There is no doubt that HH saves lives and prevents HAIs. Improving handwashing is one of the core elements of the World Health Organization (WHO) patient safety solutions.<sup>1,3</sup> However, few health services can answer this question: how to improve HH and promote patient safety? Clearly, technological tools are needed to assist healthcare workers.

Some electronic systems are used to monitor HH practices. Alcohol vapor detectors and radiofrequency technologies are some examples that contribute to check conformities and compilation of results. These tools were created to improved HH, especially before touching a patient. However, new technologies are costly and may become unviable for health systems in developing countries.<sup>4-7</sup>

The Sound Alert was designed for implementation in the Internal Medicine Unit given the intense flow of visits and periodic evaluations of the multidisciplinary team. At the study hospital, the average patient turnover ranges from one to three days, and healthcare workers change on a weekly basis. In the pilot study period, our HH indicators remained favorable and above the WHO recommendations (20 mL per patient-day)<sup>1</sup>.

We conclude this new tool has proven a good option for hospitals with low financial resources. The Hand Hygiene Sound Alert was effective in relation to the pillar of care quality and significantly improved the monthly consumption of hand alcohol solution. Healthcare workers encouraged the development of this project in every hospital. The team's perception was positive, although physicians did not support the idea.

## CONFLICTS OF INTEREST

The author reports no conflicts of interest in this work.

## ACKNOWLEDGMENTS

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