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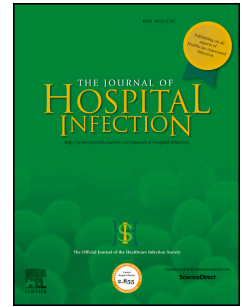
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Summary

Hand washing is a key barrier to cross infection performed at a Hand Wash Station (HWS) an interface between water and drainage systems. Widespread and often uncritical placement / design and use of HWSs is not without attendant risks. Recognition of the associated hazards went unheeded for over 45 years despite warnings in the literature until the neonatal outbreak of *Pseudomonas* in Belfast in 2012 forced change. Minimising risk requires a holistic approach beyond the mere testing of water from the outlet of a HWS for the presence of *Pseudomonas aeruginosa* or other pathogens. Literature reports of outbreaks linked to HWS outside of neonatal units are overrepresented by multi-resistant organisms, and increasingly so by carbapenemase producing organisms. Evidence suggests a large proportion of waterborne transmissions go undetected. Much could be done to improve current design use and placement of HWSs and is critically assessed in this article.

Introduction

Handwashing is viewed as one of the most important barriers to cross infection, performed using either alcohol gel or with soap (detergent) and water at a hand wash station (HWS). The latter is required when hands are visibly soiled or following contact with organisms not susceptible to the antibacterial properties of alcohol.

Semmelweis introduced the concept of hand washing in 1847. The early HWS consisted of a jug containing a solution of lime (calcium hypochlorite) and a bowl. This evolved into the plumbed in HWS, whose basic design has changed little over the centuries.

In 2012 the Belfast neonatal ITU outbreak of *Pseudomonas aeruginosa* (PA) changed overnight the way water would be managed in UK hospitals, particularly regarding HWSs. The periphery of the water system became recognised as a risk and is unique being an interface between water and drainage systems.

Water is bacteria's kingdom and biofilm (honed for three billion years) their adaptation to an aqueous environment. It is biofilm which thwarts our ability to provide microbiologically safe water in buildings.

The purpose of this article is to critically examine HWS design and attendant risks.

HAND WASH STATIONS

The primary and sole purpose of a HWS (unless designated otherwise) is hand decontamination. Nothing else. No standard design exists.

A HWS is made up of three main components;

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