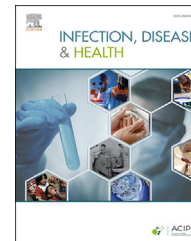




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Discussion paper

Infection control: Evidence-based common sense

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Abstract When compared against classical sciences, infection control is very much the ‘new kid-on-the-block’. This means that activities directed by infection prevention and control are more likely to reflect ‘common sense’ rather than robust evidence. Indeed, hand hygiene, isolation, screening, decontamination and cleaning remain hotly debated, especially the current vogue for bathing patients in antiseptics. So, which of these provide measurable benefit, and which do not? And why is it important? Do we actually need irrefutable evidence for the advice that we dispel on a daily basis? This opinion piece examines the main components of a modern day infection control service and assesses their worth from a mainly UK perspective. The findings suggest that the framework for preventing infection is structurally sound, despite the lack of evidence. Biological sciences, by their very nature, do not easily fit into neat equations; they remain subject to measurement variables, tempered by patient status and microscopic pathogens. Despite this, numerous reports from healthcare facilities all over the world stand testimony to basic hygiene, particularly when confronted by outbreaks. Managers and others who seek to undermine traditional infection control practices should be challenged, particularly when imposing knee-jerk policies for which there is no evidence at all. Given the insidious creep of antimicrobial resistance, infection prevention and control will inevitably assume the status it has hitherto been denied. Common sense, however defined, eventually turns into scientific evidence at some stage but this progression relies upon continued accumulation, evaluation and integration of evidence by professionals and policy makers.

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Highlights

- Infection control is a relatively ‘young’ science and does not yet have a robust evidence base.
- Increasing antimicrobial resistance provides a new focus on infection prevention.
- Hand hygiene and cleaning hand-touch sites are better together.

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- Screening identifies an unknown reservoir of colonised patients. You can't control what you don't know about!
- Accurate surveillance permits analyses of infection prevention strategies.
- Making senior managers responsible for infection control creates an infection control ethos throughout the institution.

Introduction

Controlling infection has long been recognised as key to good health. Over the past century, doctors have discovered how to isolate and identify microbes of human interest, along with their reservoirs and major modes of transmission. Tracing the origin of these pathogens and interrupting spread between environmental, non-human and human reservoirs underpins the basis of infection prevention and control practiced in today's hospitals.

The first UK Infection Control nurses were appointed in the late 1950's; just as the first national infection control guidelines were published in 1959 [1]. The trigger for these was a decade or more of problems with the 'hospital staphylococcus', an organism wreaking havoc in surgical wards and furthermore becoming increasingly resistant to penicillin [2]. The staphylococcal pioneers of the day quickly established the epidemiology of ubiquitous *Staphylococcus aureus*, including human carriage, role of the air and environmental longevity [3]. The infection control response in hospitals reflected burgeoning knowledge of *S. aureus* and its reservoirs, and endorsed a staple diet of patient isolation, screening, hand washing, natural ventilation and cleaning [3]. These activities relied heavily on common sense, since there was little in the way of evidence at the time. It wasn't until 1985, with the publication of the SENIC study, that definitive surveillance data demonstrated tangible benefits of infection control in hospitals [4]. Since then, the speciality of infection prevention and control is recognized as a fundamental necessity for all healthcare institutions, with increasing numbers of staff, policies, protocols and guidelines providing a framework for delivery.

How much progress have we made, then, toward securing a robust evidence base for infection prevention activities in hospitals over the last 50 years? The answer to that is very little, if one considers the comments from recent reviews [5]. Studies examining much of what we do in the name of infection control concludes that evidence supporting individual components of an infection prevention programme is piecemeal and poor quality, and even the evidence for 'bundles' of interventions fares little better. The whole is still questionable, subject to confounding, bias, quality and scale.

Following outbreaks of specific organisms, the public made hospital-acquired infection an electoral issue in the UK [6]. This led to the introduction of targets for key pathogens, with responsibility devolved to healthcare managers [7,8]. The target culture has flourished to incorporate hand hygiene compliance and environmental inspections, along with directives on doctor's dress, watches, vases of flowers, magazines and toys in the waiting room

[9,10]. On the wards, clinical staff live in fear of 'zero tolerance' of their hand washing skills, with doctors themselves accused of scruffiness and suspect personal hygiene [11]. While these interventions have been implemented in the name of infection control, they lack rigorous studies and merely showcase the predictable knee-jerk response from policy makers charged with public health responsibilities. They also intimate what might happen when the antibiotics finally run out.

Hand hygiene

Hand hygiene itself, the most obvious, the oldest (and simplest) of all infection control activities has a shaky lead over most other interventions from the evidence base viewpoint [12]. Perhaps because it is so simple, it has attracted funding, research and political support. It cannot be argued that new build hospitals with plenty of spare rooms and state of the art ventilation, are a lot more expensive than providing bottles of alcohol gel. Furthermore, hygiene misdemeanours are firmly in the hands of clinical staff and far removed from government offices. The hand hygiene proponents claim that their efforts saved the UK from MRSA, but one only has to examine the data to see that there were many other interventions introduced over the same time period that could all have contributed towards falling rates of MRSA bacteraemias [13,14]. These include surveillance programmes, rapid molecular tests, antibiotic prescribing policies, the 'deep clean' initiative, and screening all patient admissions for MRSA. While some, or all, may have contributed towards decreased MRSA rates, no effect has been seen on rates of multiply-resistant coliforms, vancomycin-resistant enterococci or *S. aureus* bacteraemias [14]. The latter is perhaps the real thorn in the UK hand hygiene story, since all the emphasis on hand hygiene and extra gel failed to impact on rates of a close epidemiological relation of MRSA [13,14].

Screening

Universal screening for MRSA carriage with subsequent decolonisation has almost certainly had a beneficial effect on MRSA carriage and infection rates [14,15]. The MSSA bacteraemia rate might also have decreased, as it has in Australia, if patients had been screened for MSSA as well as for MRSA [14,16]. In the UK, screening swabs arriving in the microbiology laboratory are plated onto MRSA chromogenic agar, which cannot support the growth of methicillin-susceptible *S. aureus* (MSSA). Thus, infection control staff readily identify patients with MRSA and treat accordingly, while those with MSSA remain unidentified. Patients are

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