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Infection prevention and control strategies in the era of limited resources and quality improvement: A perspective paper

Dominique Vandijck PhD [a,b,*],
Irina Cleemput PhD [b,c],
Johan Hellings PhD [d,e],
Dirk Vogelaers PhD [a,f]

[a] Ghent University, Faculty of Medicine and Health Sciences, Ghent, Belgium
[b] Hasselt University, Faculty of Business Economics, Diepenbeek, Belgium
[c] Belgian Health Care Knowledge Center, Brussels, Belgium
[d] Hasselt University, Faculty of Medicine and Life Sciences, Diepenbeek, Belgium
[e] ICURO, Brussels, Belgium
[f] Ghent University Hospital, Department of General Internal Medicine and Infectious Diseases, Ghent, Belgium

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ABSTRACT

This paper aims to describe, using an evidence-based approach, the importance of and the resources necessary for implementing effective infection prevention and control (IPC) programmes. The intrinsic and explicit values of such strategies are presented from a clinical, health-economic and patient safety perspective.

Policy makers and hospital managers are committed to providing comprehensive, accessible, and affordable healthcare of high quality. Changes in the healthcare system over time accompanied with variations in demographics and case-mix have considerably affected the availability, quality and ultimately the safety of healthcare. The main goal of an IPC programme is to prevent and control healthcare-associated infections (HAI). Many patient-, healthcare provider-, and organizational factors are associated with an increased risk for acquiring HAIs and may impact both the quality and outcome of patient care. Evidence has been published in support of having an effective IPC programme. It has been estimated that about one-third of HAIs could be prevented if key elements of the evidence-based recommendations for IPC are adequately introduced and followed. However, several healthcare agencies from over the world have reported deficits in the essential resources and components of current IPC programmes. To meet its main goal, staffing, training, and infrastructure requirements are needed. Nevertheless, and given the economic crisis, policy makers and hospital managers may be tempted to not increase or even to reduce the budget as it consumes resources and does not generate sufficient visible revenue.

IPC is a critical issue in patient safety, as HAIs are by far the most common complication affecting admitted patients. The significant clinical and health-economic burden HAIs place on the healthcare system speak to the importance of getting introduced effective IPC programmes.

Introduction

Healthcare-associated infections (HAIs) occur in relation to healthcare interventions including invasive, diagnostic, surgical, and medical procedures.[1,2] HAIs have a detrimental effect on the individuals' quality of life and are very costly.[3,4]

The current perspective paper focuses on the clinical, health-economic, and patient safety burden of HAIs as well as on the appropriate resources and activities required for implementing effective infection prevention and control (IPC) programmes to minimize the incidence and adverse outcomes of this complication. Previous studies have demonstrated the serious negative impact HAIs have on both patient outcomes and the broader health economy. The implications of these infections extend beyond the risk to the individual patient because they contribute to antimicrobial

* Corresponding author at: Ghent University, Faculty of Medicine and Health Sciences, Department of Public Health and Health Economics, De Pintelaan 185, 9000 Ghent, Belgium. Tel.: +32 9 332 50 47.
E-mail addresses: Dominique.Vandijck@UGent.be, dominique.vandijck@uhasselt.be (D. Vandijck).

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resistance thereby potentially reducing treatment options for specific infections.[5,6] The overall objective of IPC programmes is to minimize the risk of HAIs, cross-contamination of the environment and cross-colonization between patients, and to minimize the risk of other negative effects by contributing to patient safety through protecting patients from infections, and to accomplish this in the most efficient manner, thus by reducing the economic impact of HAIs on healthcare facilities, healthcare systems and the national healthcare industry.[7,8]

Healthcare associated infections

Clinical impact

HAIs contribute to significant morbidity and mortality, and the risk of HAIs is still increasing.[9,10] These infections are the most common complication affecting hospitalized patients, and are the fourth common cause of death.[7]

Personal and societal impact

Besides increased morbidity and mortality, the potential impact of HAIs on individuals is well documented. Their occurrence is also associated with decreased well-being and quality of life, increased suffering, psychosocial effects as a result of isolation, and safety issues including reduced attention to isolated patients from healthcare workers.[7,11,12] HAIs are also a major contributor to significant adverse events in healthcare affecting approximately 3–20% of hospital admissions of which at least one-third are considered preventable.[7]

Health economic impact

HAIs induce high costs.[13] Annual estimates of the total costs of preventable HAIs in the United States are approximately $5 billion, for the United Kingdom they exceed £900 million, and there is no reason to believe that for other developed countries these costs are any lower.[9] These estimates are related to direct healthcare-related costs. Time away from home for the individual suffering the HAI, and if employed, absenteeism, sick leave, potentially loss of work, and earnings, are indirect costs of HAIs contributing to the total societal cost of HAIs.[14] Also family members' time lost from work in caring for his relative must be taken into account as indirect societal costs of HAIs. These indirect costs have, however, not been well quantified.[9,15]

The direct financial impact of HAIs on the healthcare budget is predominantly determined through an increased number of readmissions, length of hospitalization (e.g. about 1–4 extra days for a urinary tract infection, 7–8 days for a surgical site infection, 7–21 days for a bloodstream infection, and 7–30 days for pneumonia), use of antimicrobials, surveillance and isolation measures, laboratory and imaging services attributable to diagnosing and managing HAIs, and costs attributable to outbreaks.[15–23]

Besides the economic impact, there is a non-negligible broader societal impact of HAIs.[9] Although there are only very limited data dealing on the societal impact of HAIs, some emerging examples illustrate their seriousness. Examples include the urgent need to develop new antimicrobial agents with its long-term worldwide effects on health, the environmental pollution and consumption of scarce natural resources induced by medical care, and the significant toll epidemics can have on the healthcare system as a whole.[24–26]

Infection prevention and control programmes

Brief historical overview of the introduction of IPC programmes

The problem of HAIs appeared as soon as people started being cared for in hospitals. The introduction of IPC strategies to monitor HAIs did not occur until the mid 1950s.[27] Initial IPC programmes were usually executed by registered nurses whose main function was to gather data through hospital-wide environmental surveillance and outbreak monitoring.[28] During the 1960s, with the rise of infectious diseases as a clinical specialty and support from the fields of epidemiology and microbiology, IPC programmes became increasingly outcome oriented.[27,28] The latter is generally considered the early beginning for evidence-based best practices and the scientific basis for infection prevention formally developed. IPC in the 1970s addressed new issues about disinfection and sterilization as well as new risks for HAIs associated with the increasing use of invasive medical devices.[27] At about the same time, the risk of transmission of infections between healthcare providers and patients on the one hand, and occupational health issues on the other hand, also became infection control considerations.

The introduction of certification requirements for a comprehensive IPC programme and designation of measures to manage this strategy were important milestones in the development of infection control during the 1970s.[29] The most significant development for infection control during that decade was the landmark US Centers for Disease Control and Prevention SENIC (study on the efficacy of nosocomial infection control) project.[27,29] Healthcare delivery had been consuming a steadily increasing percentage of the gross domestic product and there was a concern that the resulting pressure on hospitals to reduce costs would prompt the elimination of preventive programmes of unproven value. The SENIC report provided evidence that organized evidence-based IPC programmes are not only effective, but also cost-effective.[30] Thus, the value of a formal IPC programme was established more than three decades ago. In the 1980s, infection control resources were continually extended by the emergence of HIV and the fact that microorganisms became resistant to administered antibiotics.[27] By the 1990s, patient care beyond the traditional healthcare settings and the focus on knowledge management, together with complex moral and legal considerations, made decision making regarding IPC issues increasingly challenging while resources remained stable or even decreased.[31] A plethora of guidelines to promote the rational use of antibiotics has not been able to control the problem of antibiotic resistance. In addition, while appropriate hand hygiene has been shown to significantly reduce the risk for HAIs, ensuring optimal hand washing practice remains problematic in hospitals. The new millennium has seen IPC teams contributing to controlling pandemics and outbreaks.[5,27] Critical issues challenging contemporary IPC programmes include the need to demonstrate value and cost-effectiveness to the administrators of the dynamic and economically competitive health system.[6,31]

Impact of healthcare changes and limited resources on infection prevention and control programmes

Healthcare reform over the past decades has resulted in a healthcare system that looks and operates differently from the system that evolved during the previous century.[32] Administrators and policy makers have been required to make healthcare reform decisions with little empirical evidence to guide the decision-making process. Other factors that have influenced changes include an ageing and varying population, increasing complexity of patient conditions and treatment interventions, realignment of healthcare delivery including restructuring, and changes in healthcare