

Original article

# Preventing healthcare-associated infections: Residents and attending physicians need better training in advanced isolation precautions

*Prévention des infections associées aux soins : internes et médecins ont besoin de plus de formation pour les précautions complémentaires d'hygiène*

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Received 23 March 2015; received in revised form 20 August 2015; accepted 2 November 2015

Available online 2 December 2015

## Abstract

**Objective.** – Compliance with advanced isolation precautions (IPs) is crucial to reduce healthcare-associated infections. Our aim was to evaluate physician's knowledge and attitudes related to IPs.

**Methods.** – An online questionnaire was sent to our hospital's physicians (attending physicians and residents).

**Results.** – A total of 111 physicians completed the questionnaire: 60 (54%) attending physicians and 51 (46%) residents. Overall, respondents had a poor knowledge of the three types of IPs, especially droplet precautions (13 correct answers, 11.7%) and airborne IP (17 correct answers, 16.3%). We observed a statistically significant difference between attending physicians and residents for the type of IP to prescribe to a patient presenting with multidrug-resistant urinary infection: 44 residents (86%) gave the correct answer vs 42 attending physicians (70%),  $P=0.04$ . Physicians (both residents and attending physicians) who were already familiar with the dedicated webpage available on the hospital's intranet ( $n=40$ ) obtained a score of 4.75/10 ( $\pm 2.0$ ) compared with 4.03/10 ( $\pm 1.7$ ) for those who had never used that tool ( $n=71$ ). The difference was statistically significant ( $P=0.04$ ). The average score for both residents and attending physicians was 4.3/10 ( $\pm 1.9$ , range: 1–10). Attending physicians' and residents' scores were 4/10 ( $\pm 1.8$ ) and 4.5/10 ( $\pm 1.9$ ), respectively, but the difference was not statistically significant ( $P=0.14$ ).

**Conclusion.** – Physicians' knowledge of IPs was insufficient. Improvement in medical training is needed. The use of a dedicated webpage on hospitals' intranet could help physicians acquire better knowledge on that matter.

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**Keywords:** Isolation precautions; Healthcare-associated infections

## Résumé

**Objectif.** – Les précautions complémentaires d'hygiène (PCH) réduisent l'incidence des infections associées aux soins. Notre objectif était d'évaluer les connaissances des médecins en PCH et leur attitude face à certaines situations concrètes.

**Méthodes.** – Envoi par mail d'un questionnaire Internet à l'ensemble des praticiens de notre établissement.

**Résultats.** – Cent onze médecins ont complété le questionnaire : 60 (54 %) médecins diplômés et 51 (46 %) internes. Les connaissances théoriques concernant les trois types de PCH étaient faibles, particulièrement concernant les PCH de type gouttelette et air : respectivement 13 (11,7 %) et 17 (16,3 %) bonnes réponses. Une différence significative a été observée entre médecins diplômés et internes concernant les PCH à

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appliquer pour infections urinaires à germes multi-résistants : 44 bonnes réponses (86 %) chez les internes contre 42 (70 %) chez les médecins diplômés ( $p=0,04$ ). Les praticiens qui connaissaient l'outil mis en place par l'unité d'hygiène sur l'intranet de l'établissement ( $n=40$ ) ont obtenu une meilleure note que ceux qui ne le connaissaient pas ( $4,75 \pm 2/10$  vs  $4,03 \pm 1,9/10$ ,  $p=0,04$ ). La note moyenne de l'ensemble était de  $4,3 \pm 1,9/10$  (de 1 à 10). Les médecins diplômés ont obtenu une moyenne de  $4 \pm 1,8/10$  et les internes de  $4,5 \pm 1,9/10$ , sans différence significative entre les groupes ( $p=0,14$ ).

**Conclusion.** – La connaissance des praticiens en matière de PCH est insuffisante. Des améliorations en termes de formation sont nécessaires. Les outils dédiés aux PCH sur l'intranet des établissements pourraient permettre une amélioration de leur prescription.

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**Mots clés :** Précautions complémentaires d'hygiène ; Infections associées aux soins

## 1. Background

The prevalence of patients presenting with at least one healthcare-associated infection (HAI) in Europe is 6% (ranging from 2.3 to 10.8%). The overall number of patients presenting with an HAI in European hospitals every year is estimated at 3.2 million [95% CI 1.9–5.2] [1]. Healthcare workers (HCW) must comply with standard precautions such as hand hygiene [2] and apply appropriate isolation precautions (IPs) to limit the spread of multidrug-resistant bacteria (MDRB) [3]. The results of several studies revealed that HCW compliance with IPs and hand hygiene is often inadequate [4,5]. Poor compliance with IPs may be due to a lack of knowledge or mistakes when making IP prescriptions for specific clinical situations. Following WHO recommendations, the French national medical training program includes information on infection control and hygiene measures [6].

Our main objective was to evaluate physicians' knowledge and attitudes related to IPs in a French university hospital. Our secondary objective was to compare attending physicians' and residents' knowledge of and attitudes related to IPs.

## 2. Methods

In February 2013 we sent, via email, an anonymous questionnaire created on Google Drive® (Google® Inc. Mountain View, California, USA) to 320 physicians (attending physicians and residents) working in the clinical departments of the Saint-Étienne University Hospital (1900 beds), France. The head of the local Infection Control Unit approved the questionnaire. The present study was implemented under the aegis of the hospital's Infection Control Committee.

The first part of the questionnaire consisted of questions about "contact", "droplet", and "airborne" IPs. In the second part of the questionnaire, we asked physicians to choose which type of IPs should be implemented in the event of patients:

- colonized with urinary MDRB;
- with whooping cough;
- with diarrhea due to *Clostridium difficile*;
- with diarrhea and fever;
- with influenza;
- with pulmonary tuberculosis;

- with respiratory methicillin-resistant *Staphylococcus aureus* (MRSA);
- and when confronted with a patient transferred from a foreign hospital.

The third part of the questionnaire enquired about the quality of training in the field of hygiene and physicians' attitudes related to IPs. Characteristics such as years of experience and status (attending physicians or residents) were also collected. The right answers were the precautions mentioned in the guidelines of the French Society for Hospital Hygiene (SF2H) [7] and of the Center for Disease Control and Prevention (CDC) [3]. Two reminder emails were sent two weeks and a month after the initial contact. The study was approved by our local Ethic Committee.

Statistical analysis was performed using SPSS 20.0 (IBM, Chicago, Illinois). Chi<sup>2</sup> test or Fisher's exact test were used to compare the proportion of right answers between the groups of attending physicians and residents. Wilcoxon's test was used to compare the average scores of both groups. A  $P$ -value < 5% was considered statistically significant.

## 3. Results

A total of 111 physicians (35% of the headcount who received the invitation) completed the questionnaire: 60 (54%) attending physicians and 51 (46%) residents. The mean years of practice were 13.1 years for attending physicians ( $\pm 9.8$ ); 6 residents (12%) were in their first year of residency, 15 residents (29%) in their second year, 16 (31%) in their third year, and 14 (27%) in their fourth year. A total of 43 attending physicians were practitioners, 10 were assistants, and 7 were professors. Sixty-nine physicians worked in departments of medicine (62%), 15 in departments of surgery (10%), 12 in intensive care units (10%), 10 in departments of anesthesiology (9%) and 5 in the emergency room (5%).

We observed a peak of answers (52 answers, 47%) within 48 hours of sending the first email.

### 3.1. Poor knowledge of isolation precautions

The percentages of correct answers to each question given by all physicians and by type of respondents (attending physicians and residents) are detailed in Table 1. We observed a

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