



## Review

## Impact of nosocomial infections surveillance on nosocomial infection rates: A systematic review

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## HIGHLIGHTS

- Nosocomial infection (NI) rates reduced during surveillance period.
- Continuous surveillance has a positive impact on reducing NIs.
- Hospitals need to consider participant in NIs surveillance.

## ARTICLE INFO

*Article history:*

Received 20 July 2016

Received in revised form

18 April 2017

Accepted 30 April 2017

Available online 3 May 2017

*Keywords:*

Nosocomial infections

Surveillance

Effect

## ABSTRACT

**Background:** According to previously studies, nosocomial infections (NIs) surveillance could effectively reduce infection rates. As NIs surveillance systems have been implemented in some hospitals for several years, their impact on NIs need to be explored. Therefore, the purpose of this review is to evaluate the tendency of NI rates during the surveillance period and the impact of surveillance on NI rates.

**Methods:** A systematic literature search of the PubMed database to identify papers that evaluated effect of surveillance on NIs, all kinds of NIs occurred during hospitalization or discharged were included. Exclude articles investigated the surveillance combined with other infection control measures.

**Results:** Twenty-five articles were included. NI rates had different levels of reduction during surveillance period, the reduction were not limited by state, department, surveillance system, and NI type. Continuous surveillance had a positive impact on NI, OR/RR were ranged from 0.43 to 0.95.

**Conclusion:** Participation in NI surveillance is associated with reducing infection rates, though RCTs need to further prove the effective role of surveillance. Hospitals may consider to perform NIs surveillance systems according to its own conditions.

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## 1. Introduction

Nosocomial infections (NIs) continue to be a significant problem in patients across the globe. NIs can prolonged hospitalization and significantly increased health care costs. According to previous study, the extra length of stay in ICUs was 9.5 days for Central line-associated bloodstream infection (CLABSI) and 9.1 days for Ventilator associated pneumonia (VAP), respectively [1], moreover, the additional cost per hospital-acquired bloodstream infection was

4900 Euro [2]. Since it was first proved that surgical wound surveillance could decrease surgical site infection (SSI) in 1983 [3], more and more publication have been focusing on the effect of surveillance systems. Zingg et al. summarized 10 key components for preventing NIs, one was surveillance and feedback [4]. The main purpose of surveillance was to find outbreak and to provide comparable benchmarking data.

Until now, many countries have established their national or regional surveillance systems, mostly on the basis of network and electronic records [5–7]. NIs surveillance systems have been implemented in some hospitals for several years, and their impact on NIs need to be explored. Therefore, the aim of this study was to evaluate the tendency of NIs rates during the surveillance period and to assess whether surveillance system had protective effects on NIs.

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**2. Methods**

**2.1. Search strategy**

A literature search was applied to MedLine database using PubMed by combining search terms for “surveillance” with “nosocomial infection”, “infection”, “hospital”. Reference lists of all the relevant articles were also screened to identify other relevant studies. Articles were published in English, from 2006 to 2016. The systematic review was conducted in accordance with the PRISMA guidelines (Fig. 1).

**2.2. Inclusion and exclusion criteria**

All kinds of NIs occurred during hospitalization or hospital discharge were included. Definitions of NIs, surveillance design and implementation, infection rate, and statistical analysis method must be described clearly.

Exclusion criteria: 1) Commentaries, abstracts, conference proceedings; 2) Articles about dedicated disease-specific surveillance such as hepatitis and HIV or pathogen surveillance such as MRSA and VRE; 3) Articles investigating the surveillance with infection control measures, which did not assess the effect of surveillance and control measures separately.

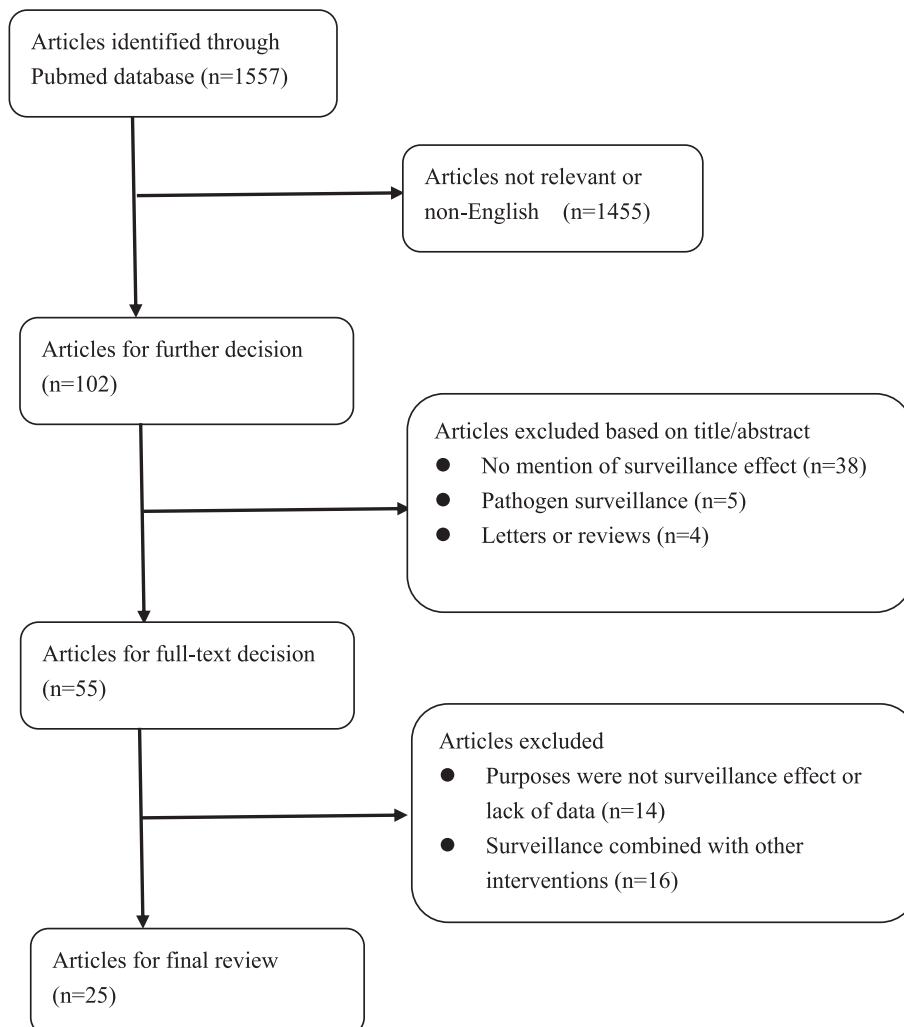
**2.3. Data extraction**

Data were extracted and tabulated by two researchers, conflicts were resolved by panel discussion. The baseline information included: author and state, the name of performed surveillance, surveillance period, departments and the number of patients, types and definitions of NIs, and statistical methods. The effect of surveillance was evaluated in continuous surveillance studies by logistic regression analysis. Outcome variables were the tendency of infection rates during surveillance and OR/RR.

**3. Results**

A total of 1557 studies were screened on PubMed. 1455 were not relevant or non-English articles, 47 were excluded based on title/abstract and other 30 were excluded based on full-text. Finally, 25 articles were included in this review (Fig. 1).

Five articles results came from hospital-based surveillance programs [8–12], the others came from national/regional surveillance systems. The main types of NIs were SSI, VAP, bloodstream infection, and urinary tract infection. Thirteen articles evaluated the effect of surveillance on NIs. The general information of the included studies were presented in Table 1.



**Fig. 1.** Flow diagram of the selection procedures.

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