QUALITY INDICATORS FOR INFECTION PREVENTION AND CONTROL IN ACUTE CARE HOSPITALS

Additional analysis on audit-related quality indicators

T. VAN ISEGHEM • S. DEQUEKER

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T. Van Iseghem[1,2]
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S. Dequeker[1]

1 Sciensano, Epidemiology and public health, Healthcare-associated infections and antimicrobial resistance, Brussels, Belgium
2. Master of Science in Global Health, Ghent University, Ghent, Belgium

Contact Person: Sara Dequeker • T+32 2 642 52 34 • Sara.Dequeker@sciensano.be

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ABREVIATIONS

BAPCOC	Belgian Antibiotic Policy Coordination Committee
ECDC	European Center for Disease and Control
HAI	Hospital-associated infections
IPC	Infection Prevention and Control
MDRO	Multidrug resistant organism
SEA	Severe Event Analysis

INTRODUCTION

The development and description of indicators for measuring the quality of infection prevention and control (IPC) in Belgian acute care hospitals is an initiative of the Federal Platform for IPC, part of the Belgian Antibiotic Policy Coordination Commission (BAPCOC). The Royal Decree of 22 June 2017[1] obliges Belgian acute care hospitals (university hospitals and general hospitals with or without a university character) to monitor and improve the quality of their IPC programmes to prevent hospital-associated infections (HAI), based on these indicators. The purpose of this quality indicator system is to generate actions to improve the quality of care and to reduce infection risks in hospitals. Once a year, data is collected and a national report[2] is produced. A first data collection took place in 2015 (with data from 2013). In 2016, the Federal Platform for IPC decided to adapt the protocol. The renewed set includes all historical indicators (used in 2013, 2015 and 2016) supplemented by a new group of indicators defined for three years (from 2017). In the new set of indicators, progressively more importance is given to indicators related to process audits. Among the 71 indicators included in the questionnaire, 13 indicators relate to audits (Figure 1).

To meet each audit-related indicator, the hospitals have to fulfil three conditions:

- There needs to exist an audit protocol and a registration form.
- They must have executed the audit.
- Identified problems must be communicated to whom it may concern.

Fulfilling these conditions each year for 13 audits is therefore very labour-intensive and the amount of work should not be underestimated. Meeting all the indicators - including 13 audits - with current staffing and resources has proven difficult [1]. Underneath, *Figure 1* shows the evolution over time of the proportion of hospitals meeting the audit-related indicators [2]. This figure shows substantial variability in the proportions over the years. A potential explanation of this pattern can be that hospitals switch their focus on certain audits every few years, implying hospitals (de)prioritize certain audits to make the amount of work feasible. The objective of this report was to check the proportion of hospitals that met the separate audit-related indicators over a three-year period, looking from 2017 up to 2019.

[1] See: https://www.ejustice.just.fgov.be/cgi/article_body.pl?language=nl&caller=summary&pub_date=17-06-30&numac=2017012829
[2] See: https://www.sciensano.be/en/projects/quality-indicators-infection-prevention-and-control-acute-hospitals

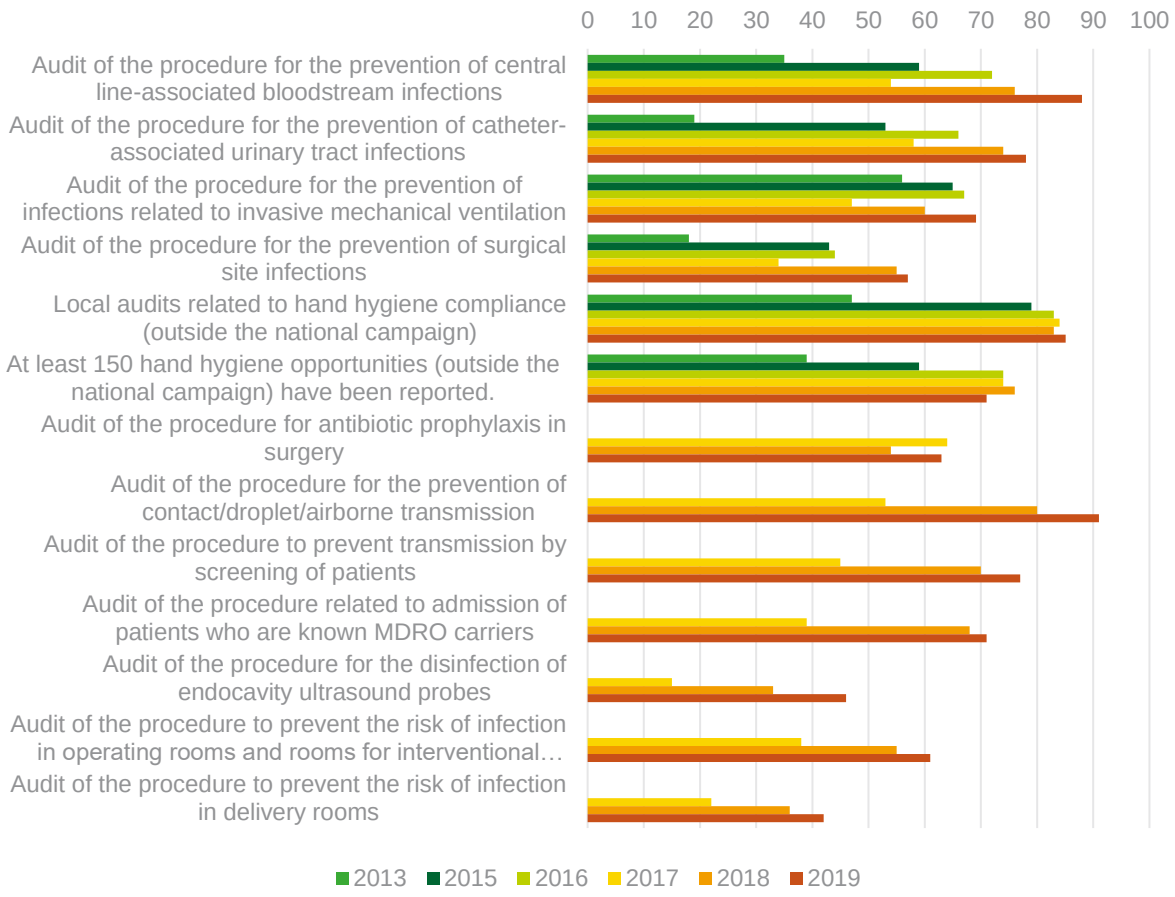

Figure 1: Proportion of hospitals meeting the individual audit-related indicators; 2013 - 2019

METHODS

This descriptive analysis looked at the proportion of hospitals that met the audit-related indicators at least once in the 3-year period from 2017 to 2019. The analysis specifically focussed on this period to avoid the impact of the COVID-19 pandemic. The specific research question was*: "What proportion of hospitals performed the separate audits at least once over the 3-year period from 2017 to 2019?".* We expected to see a higher proportion of hospitals that meet the individual audit-related indicators when looking over a 3-year period compared to the annual proportions. The analysis was done using R statistical computing software, version x64 4.1.2 [3]. In total 102 hospitals were included. Because of the impact of the COVID-19 pandemic the data of 2020 and 2021 were excluded from this analyses.

The proportion of hospitals per year (from 2017 to 2019) that complied with the individual audit-related indicators was presented for comparison. Hereby, the number of participating hospitals for this year was used as the denominator.

RESULTS

In the three-year period, the proportion of hospitals meeting the separate audit-related indicators varied from 49% to 95%. Seven out of the thirteen indicators have proportions bigger than 80%. Smaller proportions were observed for the following indicators:

- Audit of the procedure for the prevention of central line-associated bloodstream infections (CLABSI) (79%)
- Audit of the procedure for the prevention of infections related to invasive mechanical ventilation (75%)
- Audit of the procedure for the prevention of SSI (65%)
- Audit of the procedure for the disinfection of endocavity ultrasound probes (51%)
- Audit of the procedure to prevent the risk of infection in operating rooms and rooms for interventional techniques (71%)
- Audit of the procedure to prevent the risk of infection in delivery rooms (49%)

The exact proportions can be found in *Table 1* and *Figure 2* displays the proportions of the combined period next to the annual proportions for each indicator.

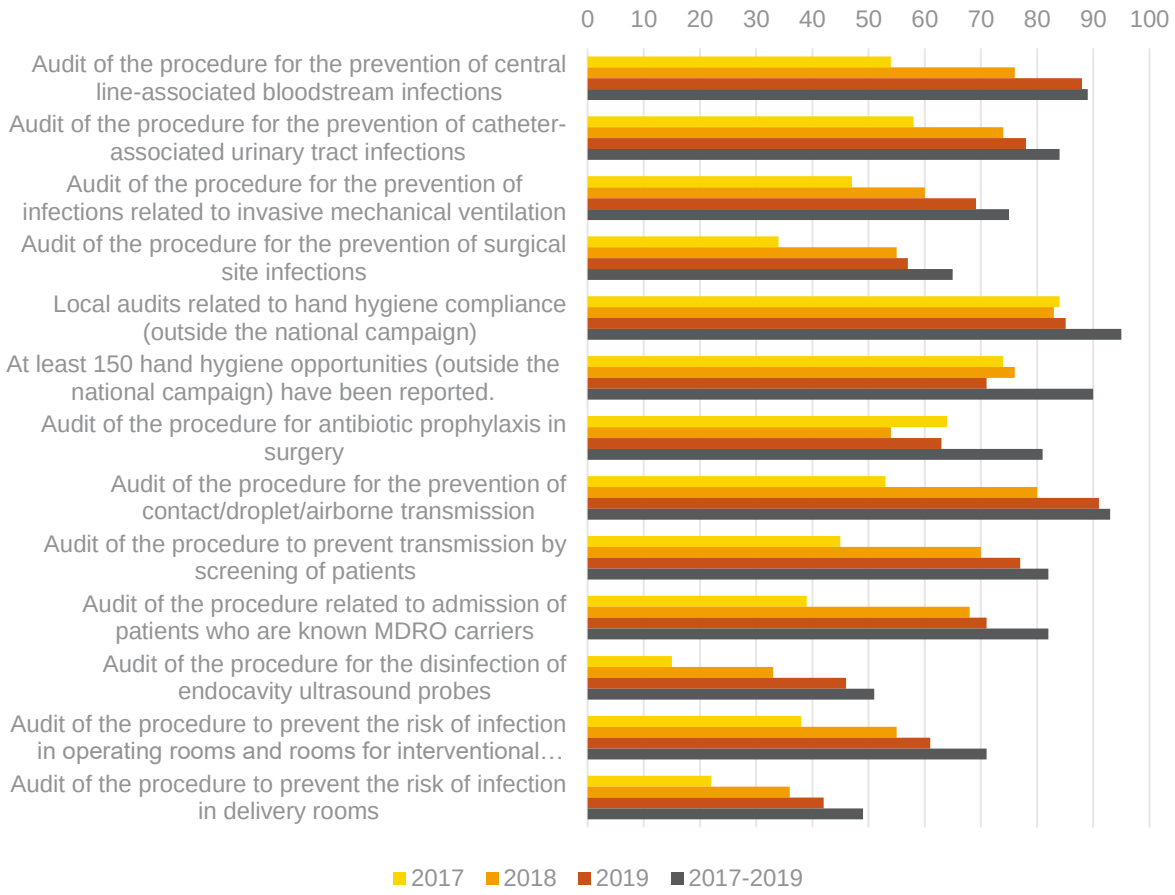

Figure 2: Percentage of hospitals meeting the individual audit-related 2017-2019 + combined period

Table 1: percentages of hospitals performing a specific audit at least once in the period from 2017 to 2019 (included), per indicator

Audit-related indicator	Proportion of hospitals performing the indicator in 2017 (*)	Proportion of hospitals performing the indicator in 2018 (*)	Proportion of hospitals performing the indicator in 2019 (*)	Proportion of hospitals performing the indicator at least once from 2017 to 2019 (*)
Audit of the procedure for the prevention of central line-associated bloodstream infections	54% (56/103)	76% (78/102)	88% (86/98)	89% (91/102)
Audit of the procedure for the prevention of catheter-associated urinary tract infections	58% (60/103)	74% (75/102)	78% (76/98)	84% (86/102)
Audit of the procedure for the prevention of infections related to invasive mechanical ventilation	47% (48/103)	60% (61/102)	69% (68/98)	75% (77/102)
Audit of the procedure for the prevention of surgical site infections	34% (35/103)	55% (56/102)	57% (56/98)	65% (66/102)
Local audits related to hand hygiene compliance (outside the national campaign)	84% (87/103)	83% (85/102)	85% (83/98)	95% (97/102)
At least 150 hand hygiene opportunities (outside the national campaign) have been reported.	74% (76/103)	76% (78/102)	71% (70/98)	90% (92/102)
Audit of the procedure for antibiotic prophylaxis in surgery	64% (66/103)	54% (55/102)	63% (62/98)	81% (83/102)
Audit of the procedure for the prevention of contact/droplet/airborne transmission	53% (55/103)	80% (82/102)	91% (89/98)	93% (95/102)
Audit of the procedure to prevent transmission by screening of patients	45% (46/103)	70% (71/102)	77% (75/98)	82% (84/102)
Audit of the procedure related to admission of patients who are known MDRO carriers	39% (40/103)	68% (69/102)	71% (70/98)	82% (84/102)
Audit of the procedure for the disinfection of endocavity ultrasound probes	15% (15/103)	33% (34/102)	45% (44/98)	51% (52/102)
Audit of the procedure to prevent the risk of infection in operating rooms and rooms for interventional techniques	38% (39/103)	55% (56/102)	61% (60/98)	71% (72/102)
Audit of the procedure to prevent the risk of infection in delivery rooms	22% (23/103)	36% (37/102)	42% (41/98)	49% (50/102)

* number of hospitals performing the audit / number of hospitals included in analysis

DISCUSSION

As expected, the analysis resulted in large proportions of hospitals performing the indicators related to audits at least once over the three year period. *Figure 2* shows distinct higher proportions for the combined period compared to the annual proportions. This confirms our hypothesis that, even after implementation, most of the hospitals execute these audits, albeit not every single year. All but six indicators have a proportion higher than 80% (Table 2). Half of them are part of the audits added in 2017 which all show smaller proportions because hospitals needed time to develop missing protocols and implement the audits in a second phase.

Although evidence of the efficacy of audit and feedback in improving infection control outcomes is present [4], further research is needed to explore the main reasons why hospitals do or do not perform certain audits on a yearly basis. Existing literature states lack of experience/formal training in performing audits; lack of infection control/audit resources; time pressures; lack of audit tools; and methods can all be reasons for arbitrarily conducted audits [4]. Johnston et al. [5] identified five main barriers to clinical audits: lack of resources, lack of expertise or advice in project design and analysis, problems between groups and group members, lack of an overall plan for audit, and organisational impediments. Regarding the lack of resources (personnel and/or money), the European Centre for Disease Prevention and Control (ECDC) already recommended in to review the Belgian legislation on the number of full time equivalents for IPC staffing per hospital and to adapt it to the current infection prevention needs [6]. Next to these barriers, a Dutch study reported hospital boards and executives can optimise the patient safety auditing system by increasing active leadership engagement, by promoting audits as an opportunity for staff to learn from safety problems and by providing vital resources, such as a medical specialist in the audit team [7].

Although this report did not include the data of the reference year 2020, the impact of COVID-19 supports the hypothesis that hospitals set certain priorities which makes it difficult to execute all of the audits [2]:

> *"Compared to 2019, a decrease of at least 10% in the proportion of hospitals meeting the indicator, was observed for several indicators. Most of these were indicators related to auditing. Possible hypotheses for this decrease are 1) time constraints due to additional tasks by the COVID-19 pandemic for the IPC team and the absence of IPC staff due to a COVID-19 infection or quarantine; and 2) COVID-19 mitigation measures have hindered the implementation of these components hospital wide."*

Other explanations could be hospitals deprioritized certain audits because they already knew the procedures are well implemented and executed. This can make it unnecessary and even undesirable to conduct all audits each year.

The findings of this study need to be kept in mind with regards to future reforms of the quality indicators. A second reform of the indicators was planned in 2020, but was postponed because of the COVID-19 pandemic. Introducing additional process audits seems inappropriate within the current format as this will put an extra burden on the IPC teams. One solution could be to evaluate the audits over a longer period of time instead of annually by adding the following specification to each audit-related indicator: *".. at least once in the past 2/3 years"*. Another option could be to work with (bi)annual themes that put a focus on specific audits that need to be performed in-dept. These themes could be chosen in dialogue with the regional and federal platforms for infection prevention and control, accompanied by sensibilisation campaigns.

This approach can also provide hospitals with the opportunity to process the audit results and developed adequate solutions. The most successful audits identify barriers to change throughout the audit's planning stages and design improvement strategies to address it [8]. In other health care disciplines, the effect of Significant Event Analysis (SEA) has been proven as a powerful tool for assessing and improving the quality of care [9]. SEA is a process in which individual episodes (either favourable or unfavourable significant event) are analysed qualitatively, systematically and in detail to determine what can be learned about the overall quality of care, and to identify any changes that could lead to future improvements [9,10]. This involves inviting all persons involved in the significant event (including patients) to discuss, examine and analyse the significant event [10] and takes into account all elements of the health system [9]. This approach allows the specific reason(s) for poor quality of care to be identified (if poor quality is identified as a problem), taking into account all elements of the health system, and context specific measures to be designed and implemented to improve the identified quality gaps [9,10].

More than ever, finding the right balance in the number of indicators is important to measure all quality aspects and to avoid confusion or apathy about the usefulness of indicators. Clusters of indicators around specific themes, each with a limited set of robust indicators that have credibility, will encourage their use and increase their effectiveness [11]. Finally, it must be acknowledged that the data provided by the hospitals through the years has not been validated externally, which limits the strength of our findings. We therefore support the development and implementation of an external quality control (validation) of the data collected for the IPC indicator project [2].

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CONTACT
Sara Dequeker • T+32 2 642 52 34 • Sara.Dequeker@sciensano.be

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Sciensano • Rue Juliette Wytsmanstraat 14 • Brussels • Belgium • T + 32 2 642 51 11 • T press + 32 2 642 54 20 • info@sciensano.be • www.sciensano.be

Responsible editor: Christian Léonard, Managing director • Rue Juliette Wytsmanstraat 14 • Brussels • Belgium