QUALITY INDICATORS FOR INFECTION PREVENTION AND CONTROL IN ACUTE CARE HOSPITALS

Report 2023 – Data up to and including 2022

I. UWERA MPALIRWA • K. MATTHYS

levenslang gezond

WHO WE ARE

Sciensano can count on more than 850 staff members who commit themselves, day after day, to achieve our motto: Healthy all life long.
As our name suggests, science and health are central to our mission. Sciensano's strength and uniqueness lie within the holistic and multidisciplinary approach to health. More particularly we focus on the close and indissoluble interconnection between human and animal health and their environment (the "One health" concept). By combining different research perspectives within this framework, Sciensano contributes in a unique way to everybody's health.
For this, Sciensano builds on the more than 100 years of scientific expertise.

Sciensano

Epidemiology and public health - Healthcare-associated infections and antimicrobial resistance

Indicators for infection prevention and control

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ABBREVIATIONS

AMR	Antimicrobial resistance
BAPCOC	Belgian Antibiotic Policy Coordination Committee
CAUTI	Catheter-associated urinary tract infection(s)
CLABSI	Central line-associated bloodstream infection(s)
COVID-19	Coronavirus disease 2019
FPS	Federal Public Service
FTE	Fulltime equivalents
HAI	Healthcare-associated infection(s)
HACCP	Hazard analysis of critical control points
HH	Hand hygiene
HOST	Hospital Outbreak Support Team
ICU	Intensive care unit
IPC	Infection prevention and control
IPCAF	Infection Prevention and Control Assessment Framework
MDRO	Multidrug resistant organism
MRSA	Methicillin-resistant *Staphylococcus aureus*
n	Number of hospitals
PPS	Point Prevalence Study
SSI	Surgical site infection(s)
UTI	Urinary tract infection(s)
WHO	World Health Organisation

ABRÉVIATIONS

ETP	Equivalent temps plein
HH	Hygiène hospitalière
ISO	Infection(s) du site opératoire
PCI	Prévention et contrôle des infections

AFKORTINGEN

POWI	Postoperatieve wondinfectie(s)
VIKZ	Vlaams Instituut voor Kwaliteit van Zorg
VTE	Voltijd(s) equivalent(en)
ZHH	Ziekenhuishygiëne
ZI	Zorginfecties

SUMMARY

1. Background

The development and description of indicators to measure on a yearly basis the quality of infection prevention and control (IPC) provided in Belgian acute care hospitals is an initiative of the Federal Platform for IPC, part of the Belgian Antibiotic Policy Coordination Committee (BAPCOC). The **Royal Decree of 22 June 2017**[1] obliges Belgian acute care hospitals (university hospitals and general hospitals with or without university character) to monitor the quality of their program for the **prevention and control of healthcare-associated infections** (HAI) by means of these indicators. Due to the coronavirus disease 2019 (COVID-19) pandemic, BAPCOC communicated to Sciensano and the hospitals that registration of 2022 data was voluntary (same for 2020 and 2021).

The overall objective of this IPC indicator project is to support hospitals in defining, prioritizing and implementing strategies and interventions to prevent HAI, in order to improve the quality of care and patient safety. In order to achieve this overall objective, three specific objectives have been formulated: (1) an evaluation of the hospital IPC policies and activities at **national level** in order to provide policy makers an overall view of the IPC levels and trends; (2) an assessment of the IPC management at **hospital level** by evaluating the resources, commitment and efforts made in fighting HAI; and (3) the improvement of the quality of the IPC management at hospital level through encouraging hospitals to measure and improve their IPC activities and outcomes.

2. Methods

The Federal Platform for IPC developed and selected a set of indicators to measure and monitor the quality of the program for the prevention and control of HAI in Belgian acute hospitals.

For **each indicator, a weighted score** between 1 and 4 has been defined by the Federal Platform for IPC. For a limited number of indicators, no score was defined. The weighted scores evolve over time, in which initially (2017) special attention was paid to the development of procedures and protocols, to evolve over time towards conducting audits and providing feedback (2019). In 2020, 2021, and 2022 the same scores as in 2019 were used. In total, there are 72 individual indicators (6 not included in the scoring system) divided in **4 indicator groups**: 6 organisation, 8 resource (3 not scored), 57 activity (3 not scored) and 1 process indicator (Table 1). For each of these groups, a quality score (= indicator group quality score) was calculated which is the sum of the individual indicator scores belonging to this group (Table 1). Based on the quality score, **three quality classes** were defined for each indicator group: ‘weak’, ‘moderate’ or ‘good’. A quality score that achieved less than two-thirds (66.67%) of the maximum score (which is different for each indicator group; see Table 1) was assigned the quality class ‘weak’. A quality score that achieved 80% or more of the maximum score was assigned the quality class 'good'.

For all indicators together, an **overall quality score** (maximum score 100) and the corresponding quality class was calculated for each hospital which is the sum of all individual indicator scores.

[1] See: https://www.ejustice.just.fgov.be/cgi/article_body.pl?language=nl&caller=summary&pub_date=17-06-30&numac=2017012829

Between February and July 2023, **the 2022 data** were submitted by the hospitals via the online platform Healthdata.be. The analyses started in August 2023 and were concluded the following month. The list of the number of funded full-time equivalents (FTE) of physicians and nurses dedicated to IPC tasks in Belgian hospitals was obtained from the Federal Public Service (FPS) Public Health. The number of beds per hospital were retrieved from the denominator surveillance, available through the Healthdata platform.

3. Results

Sixty-nine hospitals (67%) reported 2022 data for the IPC quality indicators project. For Brussels 7 (50%) hospitals, for Flanders 37 (72%) hospitals and for Wallonia 25 (66%) hospitals participated. As a reminder, reporting was not mandatory for 2022.

When interpreting trends in the results from recent years, the potential effect of the COVID-19 crisis must always be considered.

3.1. ORGANISATION INDICATORS

Ninety percent of hospitals achieve a good quality score for the **organisation** indicator group (figure 1). Scores for the individual indicators in this group were high ; in 2022, 5 out of the 6 individual indicators were met by at least 95% of hospitals (The general strategic plan for IPC is integrated in the strategic plan of the hospital indicator is the weakest). Fifty-four hospitals achieved the maximum score, which is 10 for this indicator group.

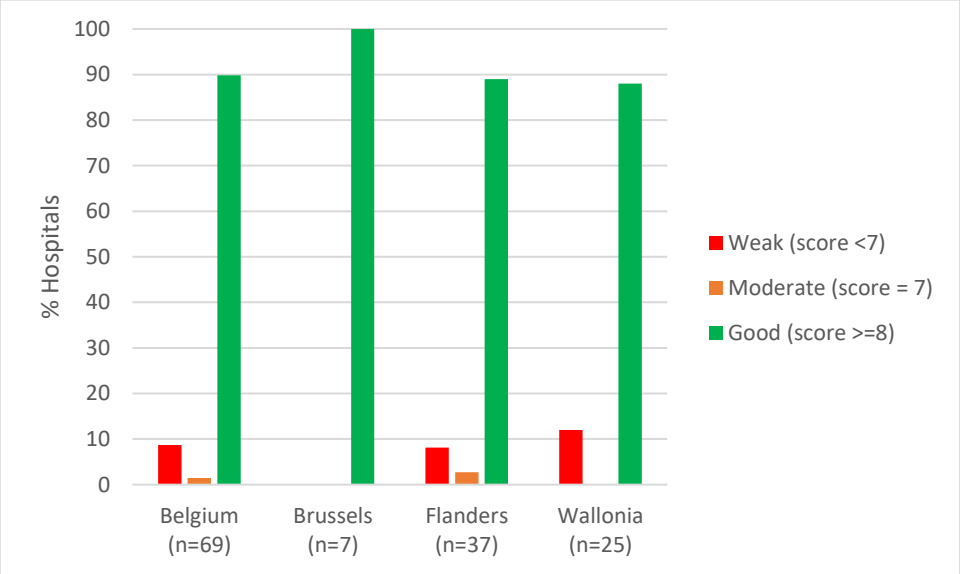


Figure 1 • Organisation indicators: proportion of Belgian hospitals per quality class at national and regional level, 2022. (Maximum score is 10 for this indicator group)

3.2. RESOURCE INDICATORS

Nearly nine out of ten hospitals achieve a good quality score for the **resource** indicator group (figure 2). For two out of five indicators in this group, hospitals achieve a score of at least 95%. Seventy-three percent of the hospitals have at least one FTE IPC professional per 250 beds. In 14% of the hospitals there is at least one FTE IPC professional per 100 beds.

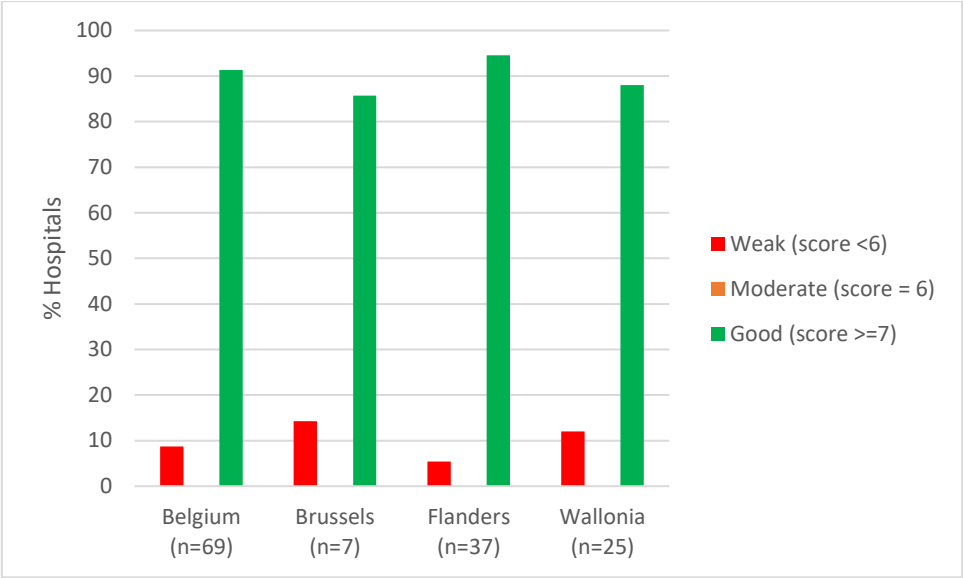


Figure 2 • Resource indicators: proportion of Belgian hospitals per quality class at national and regional level, 2022. (Maximum score is 9 for this indicator group)

3.3. ACTIVITY INDICATORS

A proportion of **81% of the hospitals achieve a good quality score** for the **activity** indicator group for the reference year 2022 (figure 3). There are striking differences in the quality score for the activity indicator group across the various regions, with Flanders performing best and Brussels least.

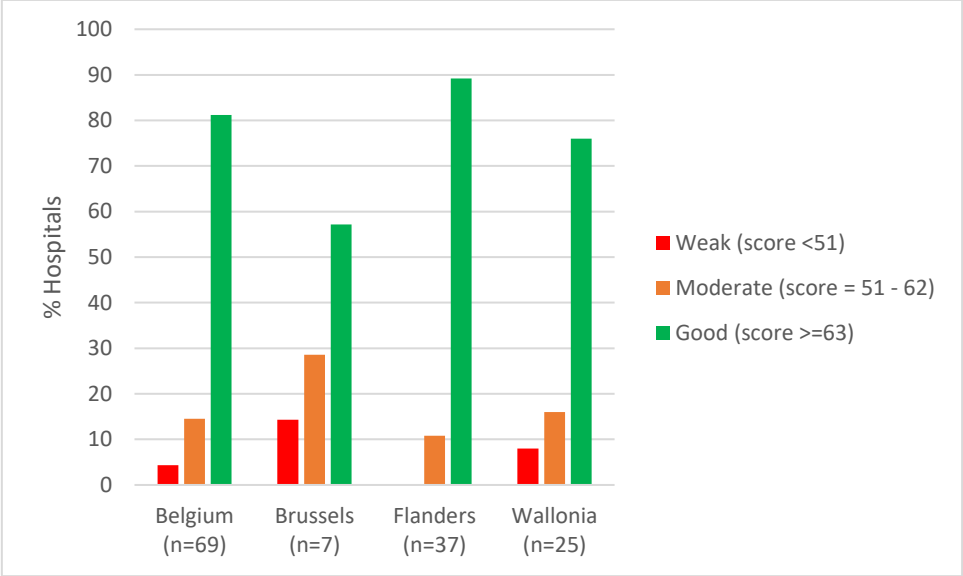


Figure 3 • Activity indicators: proportion of Belgian hospitals per quality class at national and regional level, 2022. (Maximum score is 79 for this indicator group)

Most of the indicators show similar results in 2022 compared to 2021. However, there is a slight increase in the proportion of hospitals meeting these criteria for more than 10 indicators. In contrast, between 2019 and 2020, there was a decrease of over 10% observed for 12 indicators, with ten of them being audit-related. The proportion of hospitals implementing these indicators increased for most of these 12 indicators in 2022 compared to 2020.

Some indicators, which were down during the COVID-19 crisis, have fallen back slightly or returned to 2019 levels. Most of these were indicators related to **auditing**:

- Audit of the procedure for the prevention of central line-associated bloodstream infections (CLABSI) (2019: 88%; 2022: 77%)
- Audit of the procedure for the prevention of catheter-associated urinary tract infections (CAUTI) (2019: 78%; 2022: 78%)
- Audit of the procedure for the prevention of infections related to invasive mechanical ventilation (2019: 69%; 2022: 68%)
- Audit of the procedure for the prevention of surgical site infections (SSI) (2019: 57%; 2022: 58%)
- Participation in the point prevalence study related to HAI and antimicrobial use (2019: 65%; 2022: 96%)
- Audit of the procedure for antibiotic prophylaxis in surgery (2019: 63%; 2022:55%)
- Audit of the procedure for the prevention of contact/droplet/airborne transmission (2019: 91%; 2022: 87%)
- Audit of the procedure for the disinfection of endocavity ultrasound probes (2019: 46%; 2022: 49%)
- Audit of the procedure to prevent the risk of infection in operating rooms and rooms for interventional techniques (2019: 61%; 2022: 58%)

3.4. PROCESS INDICATOR

In 2022, 56% of hospitals have an **alcohol-based hand rub consumption** that is higher than the 2016 average (2016 consumption is used as reference value). However, this percentage is lower than the percentage in 2020 (92%) and 2021 (78%), when the pandemic was ongoing. The median alcohol-based hand rub consumption for 2022 is 25.9 litres/1,000 hospitalisation days which is lower than in the last two years. After an initial steep increase during the first year of the COVID-19 pandemic (2020), consumption decreased. The median alcohol-based hand rub consumption is higher in Flanders (27 litres/1,000 hospitalisation days) than in Wallonia 23.4 litres/1,000 hospitalisation days and Brussels (24.8 litres/1,000 hospitalisation days). The average reference consumption is 24.7 litres/1,000 hospitalisation days (figure 4).

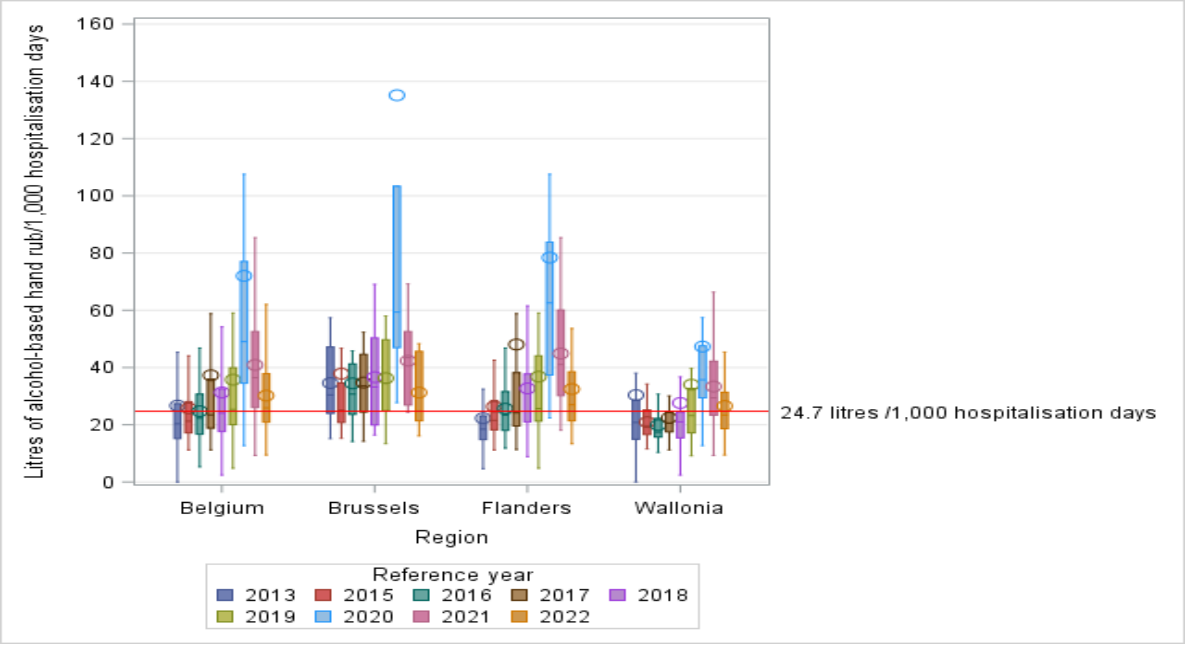
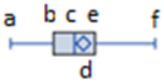


Figure 4 • Alcohol-based hand rub consumption in care units of Belgian hospitals, national and regional level, 2013 – 2022

Legend boxplot: a. maximum (without outliers, 1.5x interquartile range), b. 75th percentile (P75), c. median, d. mean, e. 25th percentile (P25), f. minimum (without outliers, 1.5x interquartile range)



3.5. OVERALL QUALITY SCORE

Eighty-three percent of hospitals achieve a good overall IPC quality score (figure 5). However, differences in this overall quality score between regions are observed. Compared with Wallonia and Brussels, Flanders has 20% and 21% more hospitals with a good overall quality score, respectively.

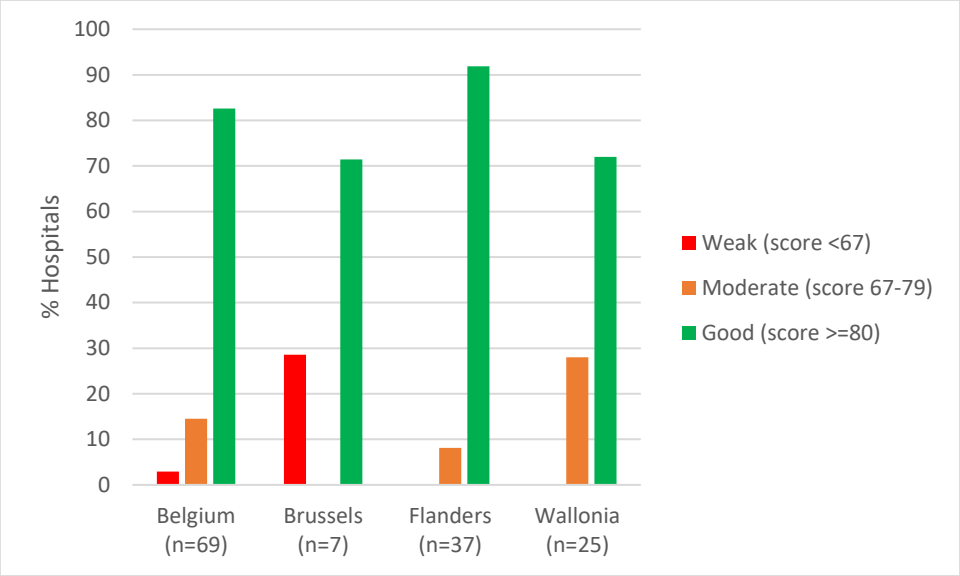


Figure 5 • Indicators: proportion of Belgian hospitals per overall quality scoring class at national and regional level, 2022

4. Recommendations

4.1. RECOMMENDATIONS FOR HOSPITALS

- Continue to register IPC activities and outcomes in order to monitor and improve the quality of the IPC program within the hospital.

4.2. RECOMMENDATIONS FOR THE BAPCOC SUPPORT TEAM AND THE FEDERAL PLATFORM FOR IPC AND FOR SCIENSANO

- **Evaluate IPC programs in hospitals**. Recommendations arising from this evaluation should enable hospitals to improve their standards, supported by appropriate funding.
- **Investigate the content of a new set of indicators** and develop a new protocol for 2025, based on the planned comprehensive evaluation of the IPC programs in hospitals. Many hospitals comply with a high number of the current indicators for consecutive years already. It is necessary to adapt these indicators to the new realities. Most quality indicators have now been implemented in many hospitals. Certain aspects (by theme) could probably be explored in greater depth in order to pursue more specific improvements in IPC management.
- **Examine the extent to which data collected in other quality projects can be coordinated and integrated** within this IPC quality indicator project, in order to reduce the (administrative) workload of staff and to improve the efficiency of healthcare quality measurement. Additional research is needed for this.

- **Regarding surveillance projects of Sciensano**: Make the protocol for the surveillance of surgical site infections (SSI) more user-friendly and feasible to implement, to enhance participation in this surveillance (local and/or national). Assess how the lack of resources/time to participate in the surveillance projects of Sciensano, e.g. of intensive care unit (ICU) infections and SSI, can be addressed, for example by striving for more automation. Assess if a surveillance for urinary tract infections (UTI) on all wards is useful and wanted. Assess the streamlining and integration of all Sciensano coordinated surveillances.
- Continue to **improve and optimise the data collection tool (Healthdata) and the online reporting platform (Healthstat).**

4.3. RECOMMENDATIONS FOR POLICY MAKERS

- Assess whether the current legislation and funding regarding the **number of FTE physicians and nurses assigned to IPC** should be revised and adapted to current IPC needs in Belgium.
- **Support** the development and implementation of an **external quality control** (validation) of the data collected for the IPC indicator project.
- **Connect** to avoid duplication of effort at institutions level and at hospitals level and to promote efficiency in care quality measurement.
- Continuing to **support this IPC quality indicator project** so that the quality of the IPC program within hospitals can be further monitored and improved. The past COVID-19 crisis emphasizes the importance of strengthening and supporting a well-functioning IPC policy and management at national and hospital level.

NEDERLANDSTALIGE SAMENVATTING

1. Achtergrondinformatie

De ontwikkeling en het definiëren van deze kwaliteitsindicatoren om de kwaliteit van ziekenhuishygiëne (ZHH) te meten in Belgische acute ziekenhuizen jaarbasis, is een initiatief van het federaal platform voor ZHH, onderdeel van de *Belgian Antibiotic Policy Coordination Committee* (BAPCOC). Het **Koninklijk Besluit van 22 juni 2017**[2] verplicht Belgische acute ziekenhuizen (universitaire ziekenhuizen en algemene ziekenhuizen met of zonder universitair karakter) om aan de hand van deze kwaliteitsindicatoren de kwaliteit van hun programma ter **preventie en controle van zorginfecties** (ZI) op te volgen. Wegens de *coronavirus disease 2019* (COVID-19) pandemie heeft BAPCOC aan Sciensano en de ziekenhuizen meegedeeld dat voor het jaar 2022 de registratie van gegevens vrijwillig was (hetzelfde voor 2020 en 2021).

Het algemene doel van dit kwaliteitsindicatoren voor infectiepreventie en -controle project is om ziekenhuizen te ondersteunen bij het definiëren, prioriteren en implementeren van strategieën en interventies om HAI te voorkomen en zo de kwaliteit van de zorg en de patiëntveiligheid te verbeteren. Om dit algemeen doel te bereiken, zijn er drie specifieke doelstellingen opgesteld: (1) een evaluatie van het beleid en de activiteiten inzake ZHH in ziekenhuizen op **nationaal niveau**, om de beleidsmakers een algemeen beeld te geven van het **ZHH-niveau** en -trends; (2) het beoordelen van het programma ter preventie en controle van zorginfecties op **ziekenhuisniveau** door het evalueren van de middelen, het engagement en de inspanningen geleverd in de strijd tegen zorginfecties en (3) het verbeteren van de kwaliteit van het programma ter preventie en controle van zorginfecties op ziekenhuisniveau door ziekenhuizen aan te sporen hun activiteiten en resultaten te meten en te verbeteren.

2. Methoden

Het federaal platform voor ZHH ontwikkelde en selecteerde een set kwaliteitsindicatoren om de kwaliteit van het programma ter preventie en controle van zorginfecties in Belgische acute ziekenhuizen te meten en op te volgen.

Voor **elke individuele indicator** werd door het federaal platform voor ZHH een gewogen **score** tussen 1 en 4 gedefinieerd. Voor een beperkt aantal indicatoren werd geen score gedefinieerd. De gewogen scoren evolueren in de tijd, waarin in het begin (2017) bijzondere aandacht gaat naar het uitwerken van procedures en protocollen om dan te evolueren naar audits en het geven van feedback (2019). In 2020, 2021 en 2022 werden dezelfde scores als in 2019 gebruikt. In totaal zijn er 72 individuele indicatoren (6 niet opgenomen in het scoresysteem), verdeeld over 4 **groepen indicatoren**: 6 organisatie, 8 middelen (3 niet gescoord), 57 activiteiten (3 niet gescoord) en 1 procesindicator (Tabel 1). Bovendien werden indicatorgroepen gedefinieerd. Voor elk van deze groepen werd een **kwaliteitsscore** (= indicatorgroep-kwaliteitsscore) berekend die de som is van de individuele indicatorenscores die deel uitmaken van deze groep (Tabel 1). De indicatoren waaraan geen score werd toegekend, werden niet meegenomen in de berekening voor de kwaliteitsscores.

Voor **alle indicatoren samen** werd voor elk ziekenhuis een algemene kwaliteitsscore (maximumscore 100) en de bijbehorende kwaliteitsklasse berekend, die de som is van alle individuele indicatorscores.

[2] Zie: https://www.ejustice.just.fgov.be/cgi/article_body.pl?language=nl&caller=summary&pub_date=17-06-30&numac=2017012829

Op basis van de indicatorgroep-kwaliteitsscore werden voor elke indicatorgroep drie kwaliteitsklassen gedefinieerd: ‘zwak’, ‘matig’ of ‘goed’. Een indicatorgroep-kwaliteitsscore die minder dan twee-derde (66,67%) van de maximale score behaalde, kreeg de kwaliteitsklasse ‘zwak’ toegekend. Een indicatorgroep-kwaliteitsscore die 80% of meer van de maximale score behaalde, kreeg de kwaliteitsklasse ‘goed’.

De **gegevens van 2022** werden door de ziekenhuizen van februari tot en met juli 2023 via het online platform Healthdata.be ingebracht. De analyses begonnen in augustus 2023 en werden de volgende maand afgerond. De lijst met het theoretisch aantal gefinancierde voltijds equivalenten (VTE) arts- en verpleegkundige-ZHH in Belgische werd verkregen via de Federale Overheidsdienst Volksgezondheid. Het aantal bedden per ziekenhuis werd verkregen via de noemer module, beschikbaar op het Healthdata platform.

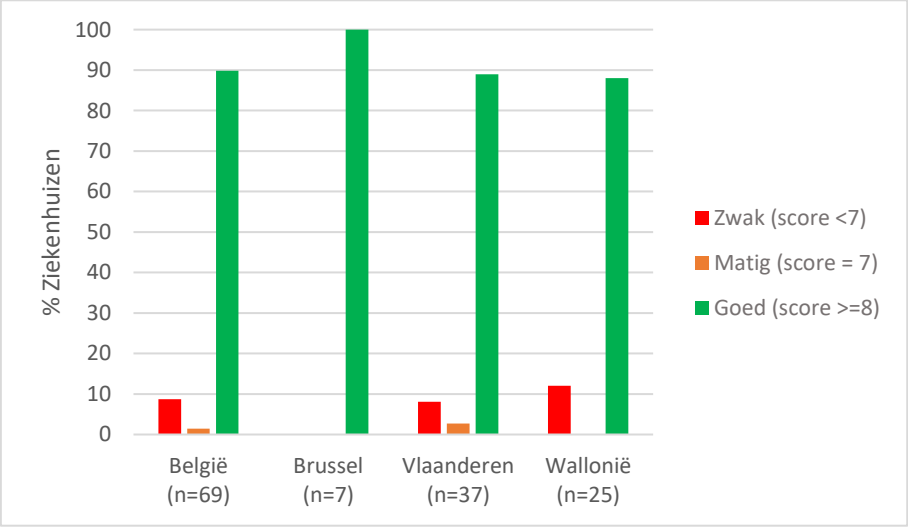
3. Resultaten

Negenenzestig ziekenhuizen registreerden (67%) de ZHH kwaliteitsindicatoren voor 2022. Voor Brussel waren dit 7 (50%) ziekenhuizen, voor Vlaanderen 37 (72%) ziekenhuizen en voor Wallonië 25 (66%) ziekenhuizen. Ter herinnering: rapporteren was niet verplicht voor 2022.

Bij het interpreteren van trends in de resultaten van de afgelopen jaren moet altijd rekening worden gehouden met het mogelijke effect van de COVID-19 crisis.

3.1. ORGANISATIE INDICATOREN

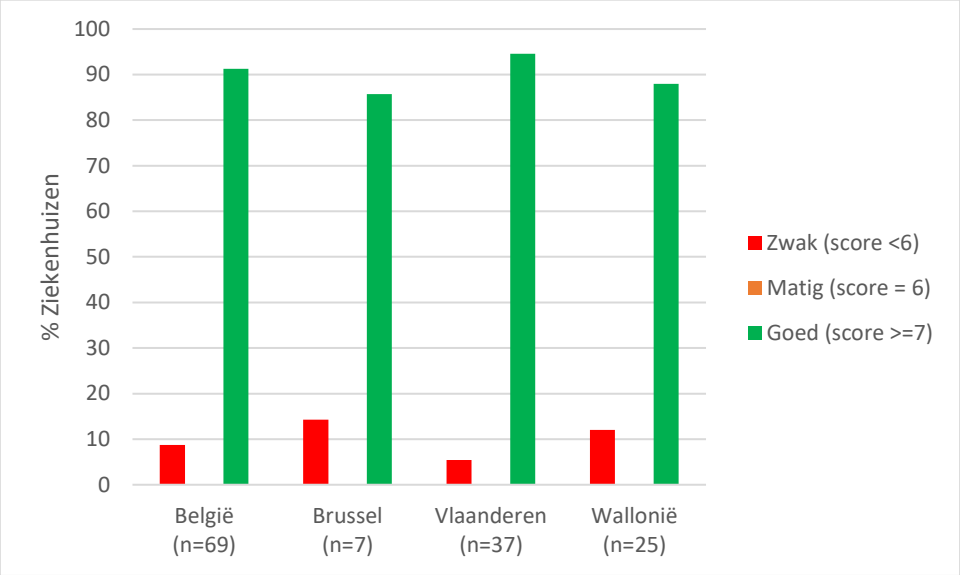
Achtentachtig percent van de ziekenhuizen haalt een goede kwaliteitsscore voor de **organisatie** indicatorgroep (figuur 1).
De scores van de individuele indicatoren in deze groep zijn hoog. Vierenvijftig ziekenhuizen hebben de hoogste score die 10 is voor deze indicatorgroep. In 2022 voldeed ten minste 95% van de ziekenhuizen aan 5 van de 6 individuele indicatoren (Het algemeen strategisch plan voor ZHH is geïntegreerd in het strategisch plan van het ziekenhuis indicator is de laagste).



Figuur 1 • Organisatie indicatoren: percentage Belgische ziekenhuizen per kwaliteitsklasse op nationaal en regionaal niveau, 2022

3.2. MIDDELEN INDICATOREN

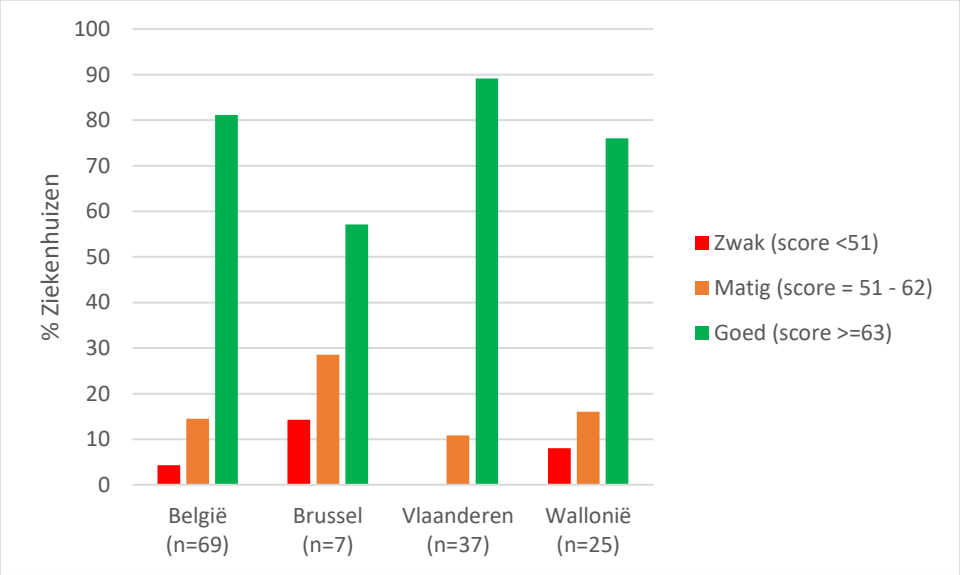
Bijna negen van de tien ziekenhuizen haalt een goede kwaliteitsscore voor de **middelen** indicatorgroep (figuur 2). Voor twee van de vijf indicatoren in deze groep behalen de ziekenhuizen een score van ten minste 95%. Negenenvijftig procent van de ziekenhuizen heeft ten minste één VTE IPC-professional per 250 bedden. Slechts 8% van de ziekenhuizen heeft ten minste één VTE IPC-professional per 100 bedden.



Figuur 2 • Middelen indicatoren: proportie Belgische ziekenhuizen per kwaliteitsklasse op nationaal en regionaal niveau, 2022

3.3. ACTIVITEITEN INDICATOREN

Een proportie van **81% van de ziekenhuizen** haalt een goede kwaliteitsscore voor de **activiteiten** indicatorgroep voor het referentiejaar 2021 (figuur 3). Er zijn opvallende verschillen in de kwaliteitsscore voor de activiteiten indicatorgroep tussen de verschillende regio's, waarbij Vlaanderen het best presteert en Brussel het minst.



Figuur 3 • Activiteiten indicatoren: proportie Belgische ziekenhuizen per kwaliteitsklasse op nationaal en regionaal niveau, 2022

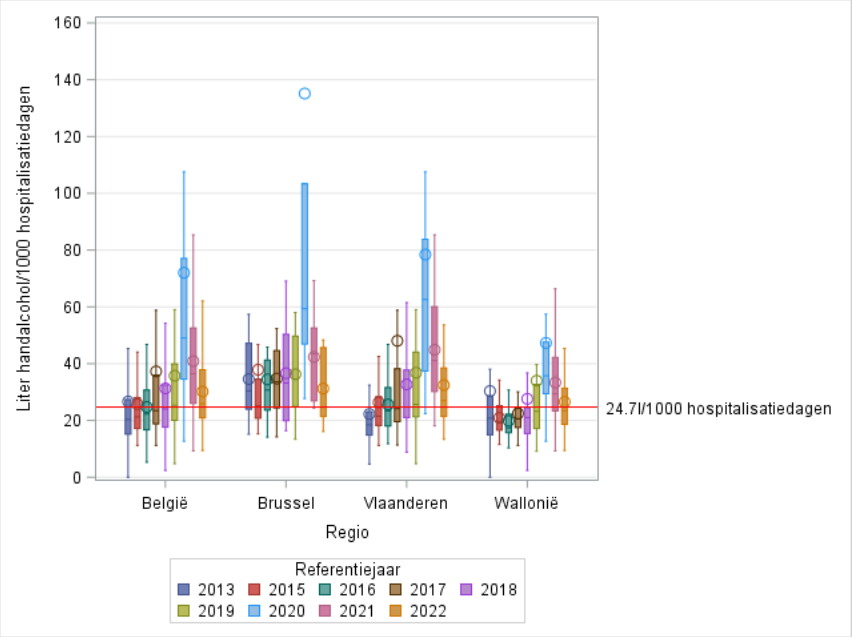
Voor de meeste van deze indicatoren zijn de resultaten voor 2022 vergelijkbaar met die voor 2021. Voor meer dan 10 indicatoren zien we een lichte stijging van het aandeel ziekenhuizen dat aan deze criteria voldoet.
Tussen 2019 en 2020 werd voor 12 indicatoren een daling van ruim 10% waargenomen in het aandeel ziekenhuizen dat aan de indicator voldeed. Tien daarvan hadden betrekking op audits. Het aandeel ziekenhuizen dat deze indicatoren heeft geïmplementeerd, stijgt voor de meeste van deze twaalf indicatoren in 2022 vergeleken met 2020.

Sommige indicatoren die tijdens de COVID-19-crisis daalden, zijn licht gedaald of teruggekeerd naar het niveau van 2019. De meeste hiervan waren indicatoren die verband hielden met **auditing**:

- Audit van procedure ter preventie van bloedstroominfecties gerelateerd aan centraal veneuze katheters (2019: 88%; 2022: 77%)
- Audit van procedure ter preventie van katheter-gerelateerde urineweginfecties (2019: 78%; 2022: 78%)
- Audit van procedure ter preventie van infecties gerelateerd aan kunstmatige (2019: 69%; 2022: 68%)
- Audit van procedure ter preventie van postoperatieve wondinfecties (2019: 57%; 2022: 58%)
- Deelname aan prevalentiestudie over zorginfecties en antibioticagebruik (2019: 65%; 2022: 96%)
- Audit van de procedure voor antibioticaprofylaxe in chirurgie (2019: 63%; 2022: 55%)
- Audit van de procedure ter preventie van de overdracht via contact/druppels/lucht (2019: 91%; 2022: 75%)
- Audit van de procedure voor de desinfectie van endocavitaire echografiesondes (2019: 46%; 2022: 49%)
- Audit van de procedure ter preventie van het infectierisico in operatiekwartieren en zalen voor interventionele technieken (2019: 61%; 2022: 58%)

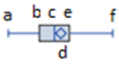
3.4. PROCES INDICATOR

In 2022 heeft 56% van de **ziekenhuizen een handalcohol-verbruik** dat hoger is dan het gemiddelde van 2016 (het verbruik van 2016 wordt als referentiewaarde gebruikt). Dit percentage is echter lager dan het percentage in 2020 (92%) en 2021 (78%), toen de pandemie aan de gang was. De mediaan voor het handalcohol-verbruik voor 2022 is 25,9 liter/1.000 hospitalisatiedagen, wat lager is dan in de afgelopen twee jaar. Na een aanvankelijke sterke stijging tijdens het eerste jaar van de COVID-19 pandemie (2020) daalde het verbruik. De mediaan voor het handalcohol-verbruik is hoger in Vlaanderen (27 liter/1.000 hospitalisatiedagen) dan in Wallonië (23,4 liter/1.000 hospitalisatiedagen) en Brussel (24,8 liter/1.000 hospitalisatiedagen). Het gemiddelde referentieverbruik is 24,7 liter/1.000 hospitalisatiedagen (figuur 4).



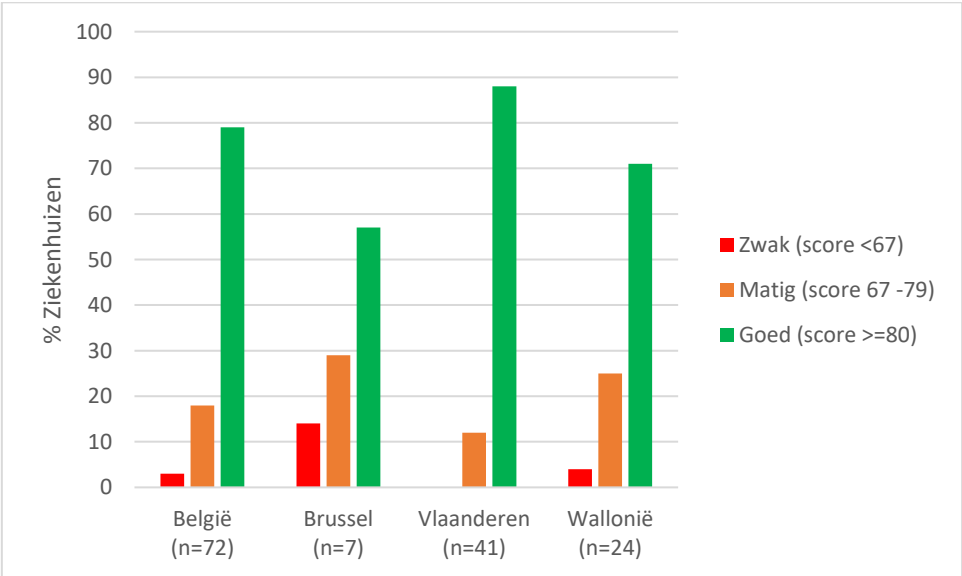
Figuur 4 • Handalcohol-verbruik in de zorgeenheden van Belgische ziekenhuizen, nationaal en regionaal, 2013-2022

Legende boxplot: a. maximum (zonder outliers, 1.5x interkwartielafstand), b. 75e percentiel (P75), c. mediaan, d. gemiddelde, e. 25e percentiel (P25), f. minimum (zonder outliers, 1.5x interkwartielafstand)



3.5. TOTALE KWALITEITSSCORE

Drieëntachtig procent van de ziekenhuizen behaalt een goede totale ZHH kwaliteitsscore (figuur 5). Er zijn echter verschillen in totale ZHH kwaliteitsscore tussen de gewesten. In vergelijking met Wallonië en Brussel heeft Vlaanderen respectievelijk 20% en 21% meer ziekenhuizen met een goede algemene kwaliteitsscore.



Figuur 5 • Kwaliteitsindicatoren: percentage Belgische ziekenhuizen per kwaliteitsklasse op nationaal niveau, 2022

4. Aanbevelingen

4.1. AANBEVELINGEN VOOR DE ZIEKENHUIZEN

- Verder hun activiteiten en resultaten blijven registreren zodat ze de kwaliteit van het programma ter preventie en controle van zorginfecties binnen hun ziekenhuis blijven opvolgen en verbeteren.

4.2. AANBEVELINGEN VOOR DE BAPCOC-WERKGROEP 'KWALITEITSINDICATOREN VOOR ZIEKENHUISHYGIËNE' EN VOOR SCIENSANO

- **Programma's voor infectiepreventie en -bestrijding** in ziekenhuizen evalueren. Aanbevelingen uit deze evaluatie moeten ziekenhuizen in staat stellen hun normen te verbeteren, ondersteund door passende financiering.
- **Onderzoek de inhoud van een nieuwe set indicatoren en ontwikkel een nieuw protocol** voor 2025, gebaseerd op de geplande uitgebreide evaluatie van de IPC-programma's in ziekenhuizen. Veel ziekenhuizen voldoen al jaren achtereen aan een groot aantal van de huidige indicatoren. Het is noodzakelijk om deze indicatoren aan te passen aan de nieuwe realiteit. De meeste kwaliteitsindicatoren zijn nu in veel ziekenhuizen geïmplementeerd. Bepaalde aspecten (per thema) kunnen wellicht verder worden uitgediept om meer specifiek verbeteringen in het beheer van infectiepreventie en -bestrijding na te streven.
- **Nagaan in welke mate gegevens verzameld** in andere kwaliteitsprojecten afgestemd en geïntegreerd kunnen worden binnen dit kwaliteitsindicatoren project, dit om de (administratieve) werklast van het personeel te verlagen en efficiëntie van de zorgkwaliteitsmeting te bevorderen. Aanvullend onderzoek is hiervoor nodig.
- **Met betrekking tot surveillanceprojecten van Sciensano**: Maak het protocol voor de surveillance van surgical site infections (SSI) gebruiksvriendelijker en haalbaarder om te implementeren, om deelname aan deze surveillance (lokaal en/of nationaal) te vergroten. Beoordelen hoe het gebrek aan middelen/tijd om deel te nemen aan de surveillanceprojecten van Sciensano, bijv. van infecties op de intensive care afdeling (ICU) en SSI, kan worden aangepakt, bijvoorbeeld door te streven naar meer automatisering. Beoordeel of een surveillance voor urineweginfecties (UTI) op alle afdelingen nuttig en gewenst is. Beoordeel de stroomlijning en integratie van alle door Sciensano gecoördineerde surveillances.
- **Nagaan wat de verschillen in de vaccinatiegraad** voor verpleegkundigen, vroedvrouwen en verpleeghulpen voor influenza tussen de verschillende regio's en ziekenhuizen onderling kan verklaren.
  Verder de gegevensverzamelingstool (Healthdata) en het online rapportageplatform (Healthstat) blijven verbeteren en optimaliseren.

4.3. AANBEVELINGEN VOOR BELEIDSMAKERS

- Nagaan of de huidige wetgeving en financiering in verband met het aantal **voltijds equivalent artsen en verpleegkundigen** bestemd voor ziekenhuishygiëne herzien en aangepast dient te worden aan de huidige infectiepreventienoden in België.
- Het opzetten en uitvoeren van een **externe kwaliteitscontrole (validatie) van de gegevens** verzameld voor het ZHH kwaliteitsindicatoren project ondersteunen.
- **Verbinden** om dubbel werk op het niveau van instellingen en ziekenhuizen te voorkomen en om efficiëntie in het meten van zorgkwaliteit te bevorderen.
- Doorgaan met de **ondersteuning van dit ZHH kwaliteitsindicatoren project** zodat de kwaliteit van het programma ter preventie en controle van zorginfecties binnen de ziekenhuizen verder opgevolgd en verbeterd kan worden. De afgelopen COVID-19-crisis benadrukt het belang van het versterken en ondersteunen van een goed werkend infectiepreventie en -controlebeleid en management op nationaal en ziekenhuisniveau.

RESUME EN FRANÇAIS

1. Informations générales

Le développement et la définition de cette série d'indicateurs de qualité, destinés à mesurer la qualité de l'hygiène hospitalière (HH) dans les hôpitaux belges aigus sur une base annuelle, est une initiative de la Plateforme fédérale d'HH, qui fait partie de la *Commission belge de coordination de la politique antibiotique* (BAPCOC). L'**Arrêté royal (AR) du 22 juin 2017**[3] mentionne l'obligation pour les hôpitaux belges aigus (hôpitaux universitaires et hôpitaux généraux ayant ou non un caractère universitaire) de suivre la qualité de leur politique de **prévention et de contrôle des infections associées aux soins** à l'aide de ces indicateurs de qualité. En raison de la pandémie du COVID-19, la BAPCOC a communiqué à Sciensano et aux hôpitaux que l'enregistrement des données pour 2022 se faisait sur une base volontaire (idem pour 2020 et 2021).

L'objectif global de ce projet d'indicateurs IPC est d'aider les hôpitaux à définir, hiérarchiser et mettre en œuvre des stratégies et des interventions visant à prévenir les infections nosocomiales, afin d'améliorer la qualité des soins et la sécurité des patients. Pour atteindre cet objectif général, trois objectifs spécifiques ont été établis: (1) L'évaluation de la politique, de la planification et des activités hospitalières en matière d'HH et de prévention des infections au **niveau national** afin de donner aux responsables politiques une vision d'ensemble du niveau d'HH et de prévention des infections et des tendances; (2) L'évaluation du programme de prévention et de contrôle des infections liées aux soins **à l'hôpital** par une évaluation des moyens, de l'engagement et des efforts fournis dans sa lutte contre les infections liées aux soins; et (3) l'amélioration de la qualité du programme de prévention et de contrôle des infections liées aux soins à l'hôpital en encourageant les hôpitaux à enregistrer et améliorer leurs activités et leurs résultats.

2. Méthodes

La plateforme fédérale pour l'HH a sélectionné et défini un ensemble d'indicateurs de qualité afin de mesurer et de suivre la qualité du programme de prévention et de contrôle des infections liées aux soins dans les hôpitaux aigus belges.

Pour **chaque indicateur individuel**, la plateforme fédérale d'HH a défini un **score pondéré** situé entre 1 et 4. Pour un petit nombre d'indicateurs, aucun score n'a été défini. Les scores pondérés évoluent dans le temps, avec au début (2017) une attention particulière pour le développement de procédures et de protocoles pour évoluer ensuite vers les audits et le feedback (2019). En 2020, 2021 et en 2022, les mêmes scores ont été utilisés qu'en 2019. Au total, il y a 72 indicateurs individuels (6 non inclus dans le système de notation) répartis en 4 groupes d'indicateurs : 6 indicateurs d'organisation, 8 indicateurs de ressources (3 non notés), 57 indicateurs d'activité (3 non notés) et 1 indicateur de processus. De plus, des groupes d'indicateurs sont également définis. Pour chacun de ces groupes était calculé un score de qualité (= score de qualité du groupe d'indicateurs) égal à la somme des scores d'indicateurs individuels faisant partie de ce groupe. Les indicateurs n'ayant pas reçu de score n'ont pas été repris dans le calcul destiné aux scores de qualité.

[3] Voir: https://www.ejustice.just.fgov.be/cgi/article_body.pl?language=nl&caller=summary&pub_date=17-06-30&numac=2017012829

Pour **l'ensemble des indicateurs**, un score de qualité global (score maximum de 100) et la classe de qualité correspondante ont été calculés pour chaque hôpital, ce qui correspond à la somme de tous les scores des indicateurs individuels.
Sur la base du score de qualité du groupe d'indicateurs, trois classes de qualité ont été définies pour chaque groupe d'indicateurs: « faible », « moyen » ou « bon ». Un score de qualité du groupe d'indicateurs ayant obtenu moins de deux-tiers (66,67%) du score maximal a reçu la classe de qualité « faible ». Un score de qualité du groupe d'indicateurs ayant obtenu 80% ou plus du score maximal a reçu la classe de qualité « bon ».

Les **données de 2022** ont été saisies par les hôpitaux de février à juillet 2023 inclus via la plateforme en ligne Healthdata.be. Les analyses ont débuté en août 2023 et se sont achevées le mois suivant. La liste du nombre théorique d'équivalents temps plein (ETP) financés dans les hôpitaux belges, médecins et/ou infirmiers/infirmières en HH a été fournie par le service public fédéral Santé publique. Le nombre de lits par hôpital a été obtenu via le module dénominateur, disponible sur la plateforme Healthdata.

3. Résultats

En 2023, 69 hôpitaux (66%) ont enregistré des données relatives aux indicateurs de qualité en HH pour 2022: 7 (50%) hôpitaux à Bruxelles, 37 (72%) hôpitaux en Flandre et 25 (66%) hôpitaux en Wallonie. Pour rappel, la déclaration n'était pas obligatoire en 2022.

Lors de l'interprétation de l'évolution des résultats des dernières années, il faut toujours tenir compte de l'effet potentiel de la crise de COVID-19.

3.1. INDICATEURS D'ORGANISATION

Nonante pourcent des hôpitaux obtiennent un bon score de qualité pour le groupe des indicateurs d'**organisation** (figure 1). Les scores des indicateurs individuels de ce groupe sont élevés. Cinquante-quatre hôpitaux ont atteint la note maximale qui est de 10 pour cet indicateur. En 2022, au moins 95% des hôpitaux répondent à 5 des 6 indicateurs individuels.

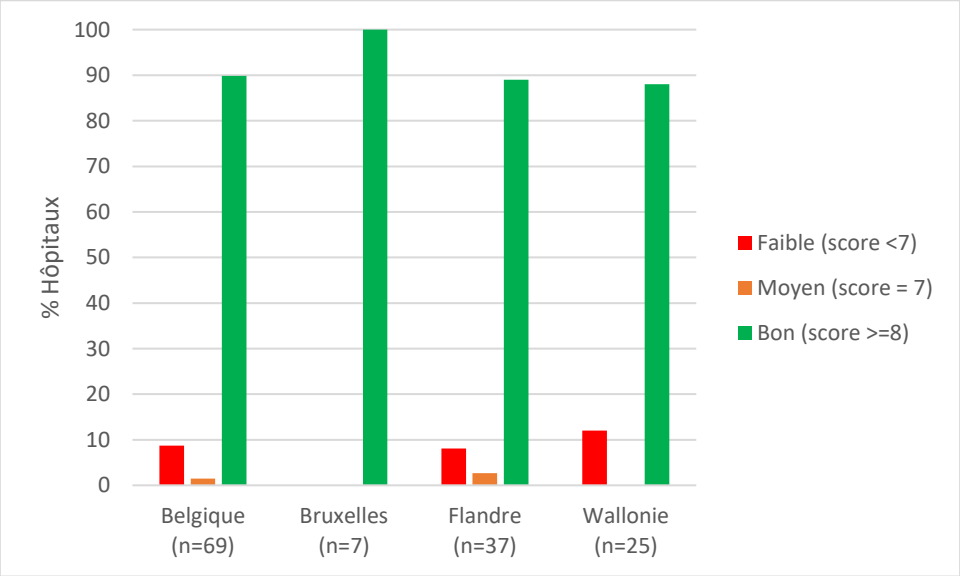


Figure 1 • Indicateurs d'organisation; proportion d'hôpitaux belges par classe de qualité au niveau national et régional, 2022

3.2. INDICATEURS DE MOYENS

Près de neuf hôpitaux sur dix obtiennent un score de bonne qualité pour le groupe des indicateurs de **moyens** (figure 2). Pour deux des cinq indicateurs de ce groupe, les hôpitaux obtiennent un score d'au moins 95 %. Septante-trois pour cent des hôpitaux disposent d'au moins un professionnel IPC ETP pour 250 lits. Seuls 14 % des hôpitaux disposent d'au moins un professionnel IPC ETP pour 100 lits.

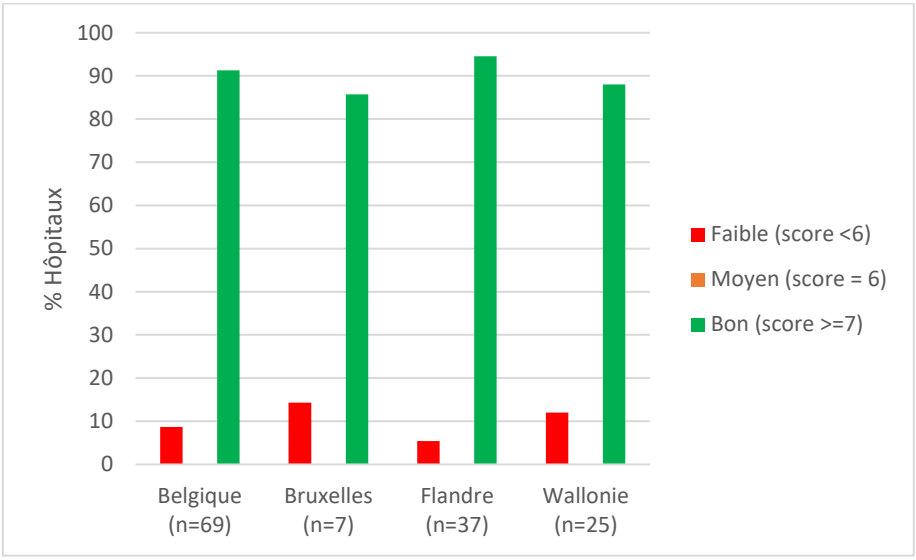


Figure 2 • Indicateurs de moyens; proportion d'hôpitaux par classe de qualité au niveau national et régional, 2022

3.3. INDICATEURS D'ACTIONS

Une proportion de **81% des hôpitaux** obtiennent un bon score de qualité pour le groupe d'indicateurs d'**actions** pour l'année de référence 2022 (figure 3). Le score de qualité pour le groupe d'indicateurs d'activité varie considérablement d'une région à l'autre, la Flandre étant la plus performante et Bruxelles la moins performante.

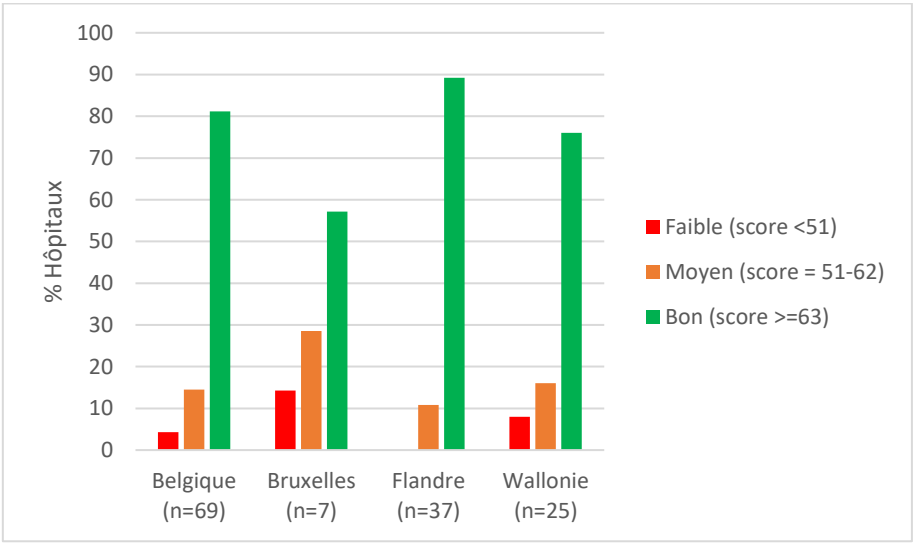


Figure 3 • Indicateurs d'actions; proportion d'hôpitaux par classe de qualité au niveau national et régional, 2022

Pour la plupart de ces indicateurs, les résultats de 2022 sont similaires à ceux de 2021. Pour plus de 10 indicateurs, nous observons une légère augmentation de la proportion d'hôpitaux répondant à ces critères.

Entre 2019 et 2020, une diminution de plus de 10 % de la proportion d'hôpitaux satisfaisant à l'indicateur a été observée pour 12 indicateurs. Dix d'entre eux étaient liés à l'audit. La proportion d'hôpitaux ayant mis en œuvre ces indicateurs augmente pour la plupart de ces 12 indicateurs en 2022 par rapport à 2020.

Certains indicateurs, en baisse pendant la crise du COVID-19, ont légèrement décru ou sont revenus aux niveaux de 2019. Il s'agit principalement d'indicateurs liés à l'**audit** :

- Audit de la procédure de prévention des septicémies associées au cathéter veineux central (2019: 88%; 2022: 77%)
- Audit de la procédure de prévention des infections urinaires sur sonde (2019: 78%; 2022: 78%)
- Audit de la procédure de prévention des infections liées à la ventilation invasive (2019: 69%; 2022: 68%)
- Audit de la procédure de prévention des infections de site opératoire (2019: 57%; 2022: 58%)
- Participation à une étude de prévalence des infections liées aux soins et de l'utilisation des antibiotiques (2019: 65%; 2022: 96%)
- Audit de la procédure antibioprophylaxie en chirurgie (2019: 63%; 2022: 55%)
- Audit de la procédure de prévention de la transmission par contact/gouttelettes/voie aérienne (2019: 91%; 2022: 75%)
- Audit de la procédure de désinfection des sondes d'échographiques endocavitaires (2019: 46%; 2022: 49%)
- Audit de la procédure de prévention du risque infectieux au quartier opératoire et dans les salles de techniques d'interventionnelles (2019: 61%; 2022: 58%)

3.4. INDICATEUR DE PROCESSUS

En 2022, 56% des hôpitaux ont une **consommation de gel hydroalcoolique** supérieure à la moyenne de 2016 (la consommation de 2016 est utilisée comme valeur de référence). Ce pourcentage est toutefois inférieur à celui de 2020 (92 %) et de 2021 (78 %), lorsque la pandémie était en cours. La consommation médiane de gel hydroalcoolique pour 2022 est de 25,9 litres/1.000 jours d'hospitalisation, ce qui est inférieur aux deux dernières années. Après une forte augmentation initiale au cours de la première année de la pandémie de COVID-19 (2020), la consommation a diminué. La consommation médiane de désinfectant pour les mains à base d'alcool est plus élevée en Flandre (27 litres/1.000 jours d'hospitalisation) qu'en Wallonie (23,4 litres/1.000 jours d'hospitalisation) et qu'à Bruxelles (24,8 litres/1.000 jours d'hospitalisation). La moyenne de référence s'élève à une consommation de 24,7 litres/1.000 journées d'hospitalisation (figure 4).

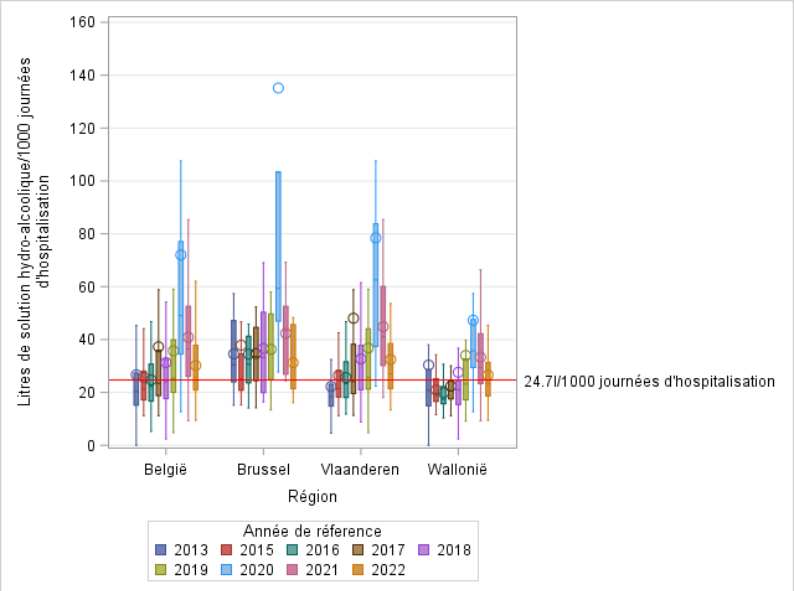
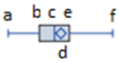


Figure 4 • Consommation de solution hydro-alcoolique dans les unités de soins des hôpitaux belges au niveau national et régional, 2013-2022

Légende diagramme en boîte : a. valeur maximale (sans valeurs aberrantes, 1,5 fois l'écart interquartile), b. 3ième quartile (Q3), c. médiane, d. moyenne, e. 1er quartile (Q1), f. valeur minimale (sans valeurs extrêmes, 1,5 fois l'écart interquartile).



3.5. SCORE DE QUALITÉ TOTAL

Quatre-vingt-trois pourcent des hôpitaux obtiennent un bon score de qualité en HH (figure 5). Toutefois, on observe des différences entre les régions en ce qui concerne ce score de qualité global. Par rapport à la Wallonie et à Bruxelles, la Flandre compte respectivement 20 % et 21 % d'hôpitaux en plus ayant obtenu un bon score de qualité globale.

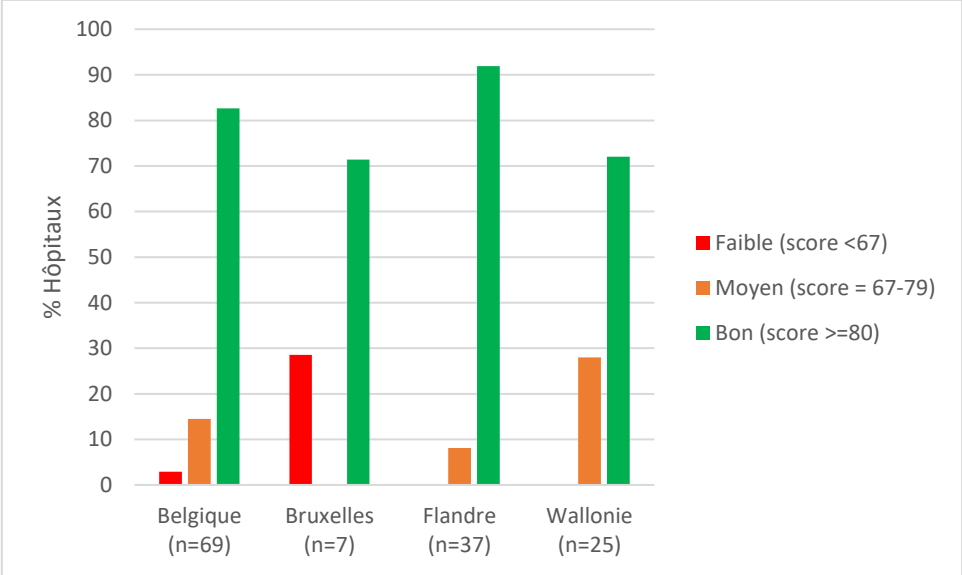


Figure 5 • Indicateurs de qualité; proportion d'hôpitaux belges par classe de qualité au niveau national et régional, 2022

4. Recommandations

4.1. RECOMMANDATIONS POUR LES HÔPITAUX

- Continuer à enregistrer leurs activités et résultats afin de continuer à suivre et à améliorer le programme de prévention et de contrôle des infections liées aux soins au sein de leur hôpital.

4.2. RECOMMANDATIONS POUR LE GROUPE DE TRAVAIL BAPCOC « INDICATEURS DE QUALITÉ EN HYGIÈNE HOSPITALIÈRE » ET POUR SCIENSANO

- **Evaluer les programmes de prévention et de contrôle des infections** (PCI) dans les hôpitaux. Les recommandations découlant de cette évaluation devraient permettre aux hôpitaux d'améliorer leurs normes, avec le soutien d'un financement approprié.
- **Etudier le contenu d'une nouvelle série d'indicateurs et développer un nouveau protocole** pour 2025, sur la base de l'évaluation complète prévue des programmes de PCI dans les hôpitaux. De nombreux hôpitaux se conforment déjà à un grand nombre d'indicateurs actuels pendant plusieurs années consécutives. Il est nécessaire d'adapter ces indicateurs aux nouvelles réalités. En effet, la plupart des indicateurs de qualité ont, à présent, été implémentés dans de nombreux hôpitaux. Certains aspects (par thème) pourront probablement être approfondis afin de poursuivre l'amélioration plus détaillée de la prévention et du contrôle des infections.

- **Investiguer** dans quelle mesure **les données collectées** dans le cadre d'autres projets de qualité peuvent être harmonisées et intégrées dans ce projet d'indicateurs de qualité, ceci afin de diminuer la charge de travail (administrative) du personnel et d'améliorer l'efficacité de la mesure de la qualité des soins. Des recherches supplémentaires sont nécessaires à cette fin.
- En ce qui concerne les **projets de surveillance de Sciensano** : rendre le protocole de surveillance des infections du site opératoire (ISO) plus convivial et plus facile à mettre en œuvre, afin d'améliorer la participation à cette surveillance (locale et/ou nationale). Évaluer comment le manque de ressources/de temps pour participer aux projets de surveillance de Sciensano, par exemple des infections dans les unités de soins intensifs et des ISO, peut être résolu, par exemple en s'efforçant d'améliorer l'automatisation. Évaluer si une surveillance des infections urinaires dans tous les services est utile et souhaitée. Évaluer la rationalisation et l'intégration de toutes les surveillances coordonnées par Sciensano.
- Poursuivre l'amélioration et l'optimisation de l'outil de collecte de données (Healthdata) et de la plateforme de rapport en ligne (Healthstat).

4.3. RECOMMANDATIONS POUR LES RESPONSABLES POLITIQUES

- Investiguer si la législation et le financement actuels relatifs au **nombre de médecins et infirmiers PCI en ETP** doit être revue et adaptée en fonction des besoins actuels en prévention des infections en Belgique.
- Initier et soutenir l'installation et l'exécution d'un **contrôle de qualité externe (validation) des données** collectées pour le projet « indicateurs de qualité » pour la prévention et le contrôle des infections (PCI).
- **Connecter** pour éviter la duplication des efforts au niveau des institutions et des hôpitaux et pour promouvoir l'efficacité dans la mesure de la qualité des soins.
- Poursuivre le **soutien de ce projet « Indicateurs de qualité pour la prévention et le contrôle des infections »** afin que la qualité du programme de prévention et de contrôle des infections liées aux soins dans les hôpitaux puisse continuer à être suivie et améliorée. La crise du COVID-19 passée souligne l'importance de renforcer et de soutenir une politique et une gestion de prévention et de contrôle des infections fonctionnant bien au niveau national et au niveau des hôpitaux.

INTRODUCTION

The development and description of indicators to measure the quality of infection prevention and control (IPC) provided in Belgian acute care hospitals is an initiative of the Federal Platform for IPC, part of the Belgian Antibiotic Policy Coordination Committee (BAPCOC). All Belgian acute care hospitals (university hospitals and general hospitals with or without university character) [3] are legally obliged to monitor the quality of the program for the prevention and control of healthcare-associated infections (HAI) using these indicators (see Royal Decree 30/06/2017) [4].
This report presents the 2022 results of the IPC quality indicator project. Reports with the results of the previous years (starting from 2013 onwards) can be found at the Sciensano website: https://www.sciensano.be/en/projects/quality-indicators-infection-prevention-and-control-acute-hospitals

1. Objectives

The overall objective of the IPC quality indicators project is to define, prioritise and implement strategies and interventions to prevent HAI in Belgian hospitals in order to improve the quality of care provided in these hospitals.

The project has three specific objectives:

1. To **evaluate** the hospital IPC policies, planning and activities at **national level** in order to provide policy makers an overall view of the IPC levels and trends.
2. To **assess the quality** of the IPC management at **hospital level** by evaluating the resources, commitment and efforts made by the hospital in fighting HAI.
3. **Improve the quality** of the IPC management at **hospital level** through encouraging hospitals to measure and improve their IPC activities and outcomes.

In order to meet the three specific objectives mentioned before, the IPC indicator data are used; for,

1. Objective 1: through a publication of aggregated quality scores at national and regional level.
2. Objective 2: through a publication of quality scores per hospital. These scores are available via Healthstat.be.
3. Objective 3: by making an detailed IPC quality report available for each individual hospital (see Healthstat.be).

This report contains the quality scores at national and regional level for the 2022 data. The results of previous years (2013-2021) are reported for comparison.

METHODS

1. Quality assessment of the program for infection prevention and control of healthcare associated infections

The Federal Platform for IPC developed and selected a set of indicators to measure and monitor the quality of the program for the prevention and control of healthcare-associated infections in Belgian acute hospitals. This set of IPC indicators was adapted for the reference year 2017. This updated indicators set includes all indicators used in 2013, 2015 and 2016 (historical indicators) supplemented by additional indicators and has been set for three years. In this updated set of indicators, progressively more importance is given to indicators related to the implementation of IPC related process audits. During the coronavirus disease 2019 (COVID-19) pandemic, it was decided to keep the same indicators for 2020, 2021 and 2022 data, rather than developing and implementing a new protocol.

The set of indicators included four indicator groups:

1. organisation indicators,
2. resource indicators,
3. activity indicators, and
4. process indicator.

Each of these four groups contained one or more individual indicators (Table 1). A detailed description of the indicators can be found in the protocol [3].

Based on these indicators, an extensive quality assessment was performed using both individual indicator results and compiled quality scores.

1.1. INDIVIDUAL AND GROUP INDICATORS

For each indicator, the proportion (percentage) of hospitals that met the indicator was calculated. For each indicator group, the average of the proportions of hospitals that met the individual indicators was calculated as well.

1.2. QUALITY SCORE

For each individual indicator, a weighted score between 1 and 4 has been defined by the Federal Platform for IPC. For a limited number of indicators, no score was defined. The weighted scores evolve over time. Initially (2017) special attention was paid to the development of procedures and protocols. This evolved over time towards conducting IPC related audits and providing feedback (2019). In 2020, 2021 and 2022, the same scores as in 2019 were used. The scores used in 2022 can be found in Table 1.

When the individual indicator was met, the weighted score was assigned. If the indicator was not met, a '0' score was assigned. When answering with 'not applicable', the corresponding weighted score was assigned if the motivation for answering ‘not applicable’ was valid (Table 1).

For each indicator group, a quality score (= indicator group quality score) was calculated which is the sum of the individual indicator scores belonging to this group. Indicators that were not scored were not included in the calculation of the quality scores. For all indicators together, an overall quality score was calculated which is the sum of all individual indicator scores.

1.3. QUALITY CLASSES

Based on the quality score, three quality classes were defined for each indicator group: "weak", "moderate" or "good". A quality score that achieved less than two-thirds (66.67%) of the maximum score was assigned the quality class "weak". A quality score that achieved 80% or more of the maximum score was assigned the quality class 'good'. This definition of quality classes is based on the definition used in the old set of indicators (until 2016). The quality classes are shown in Table 1. Similarly, three quality classes (weak, moderate or good) were defined for the overall quality score for IPC.

1.4. IPC PROFESSIONAL PER BEDS RATIO

The World Health Organisation (WHO) recommended a minimum ratio of one full-time equivalent IPC professional (nurse or doctor) per hospital 250 beds. In the IPC full requirements conditions, they even recommended a ratio of one IPC professional per 100 beds. This due to increased patient acuity and complexity, as well as the multiple roles and increasing responsibilities of the IPC professional [2, 5]. To assess the current ratio is for Belgian hospitals, the median and interquartile range of IPC professionals per hospital bed were calculated. The proportion of hospitals declaring a ratio of one full-time equivalent (FTE) IPC professional per ≤250 beds and the proportion of hospitals reporting a ratio of one FTE per ≤100 beds was calculated.

2. Data collection

The protocol contains a detailed description of the indicators and instructions for data collection and the supporting documents to be kept [5]. A paper registration form has been developed for hospitals who want to prepare their registration.

Between February and July 2023, the 2022 data were submitted by the hospitals via the online platform Healthdata.be. Hospitals who did not register their data upon publication of the current report still can submit these. For hospitals consisting of several campuses, the data are collected per fusion (RIZIV/INAMI number) and not per campus. The list of the number of FTE of physicians and nurses dedicated to IPC tasks in Belgian hospitals as well as a list of the members of each regional platform were obtained from the FPS Public Health. The number of hospital beds were retrieved from the denominator surveillance, available through the Healthdata platform.

3. Data analyses

The statistical software SAS Enterprise Guide 7.13 (SAS Institute Inc., Cary, North Carolina, USA) was used to analyse the data. The analyses were conducted from August to September 2023.

4. Reporting

The reporting of the quality of the IPC program in Belgian hospitals at the national and regional level differs from the reporting at the hospital level.

At national and regional levels, (1) for each individual indicator the proportion of hospitals complying with the indicator was calculated, (2) for each indicator group as well as for the total set of indicators the median and range quality score of all hospitals was calculated, (3) for each indicator group the average of the proportions of hospitals complying with the individual indicators belonging to the indicator group concerned was calculated and (4) for each quality class the proportion of hospitals belonging to class 'weak, moderate and good' was calculated. For comparison, the proportion of hospitals that met the indicator in previous years (2013, 2015-2021) also is reported.

At hospital level, (1) the quality scores per indicator group were calculated and (2) based on this indicator group quality scores, it was determined whether the quality class was 'weak', 'moderate' or 'good'. These results and individual indicator results per hospital are available on Healthstat.be.

Table 1 • Indicators for IPC used to calculate a quality score and to measure the quality of the program for the prevention and control of Healthcare-associated infections (HAI) in Belgian hospitals (data 2022 - collected in 2023).

Indicator group and indicators (corresponding indicator code as mentioned in the protocol and registration form)	Score per indicator	Quality score - scale	Calculation of quality scores
1. Organisation indicators		*Number of indicators:* 6 *Quality score indicator group:* maximum 10 – minimum 0 *Classification by quality class:* • Weak: score <7 • Moderate: score = 7 • Good: score ≥8	• Each individual indicator was assigned the corresponding score if the answer was "yes" and the score "0" if the answer was "no". • The quality score is the sum of the results of the individual indicators belonging to this group
1. (O.1.a) Presence of a general long-term strategic plan (3-5 years) for IPC, approved by the IPC committee.	1		
2. (O.1.b) The strategic plan is integrated in the hospital's strategic plan.	2		
3. (O.2) Number of meetings of the IPC committee ≥4 per year	1		
4. (O.3) A detailed action plan for IPC is present and approved by the IPC committee.	1		
5. (O.4) An annual report on IPC is present and approved by the IPC committee.	1		
6. (O.5) The IPC nurse(s) is/are part of the nursing middle management.	4		
2. Resource indicators		*Number of indicators:* 8 (5 dichotomous and 3 numeric indicators) *Quality score indicator group:* maximum 9 – minimum 0 *Classification by quality class:* • Weak: score <6 • Moderate: score = 6 • Good: score ≥7	• Each individual indicator was assigned the corresponding score if the answer was "yes" and the score "0" if the answer was "no". • If no intensive care unit was present, the maximum number of points was assigned for indicator M.4. • Numeric indicators (last 3 indicators in the 1st column): No score was assigned to these indicators. Consequently, these indicators were not included in the calculation of the indicator group quality score. • The indicator group quality score is the sum of the results of the individual indicators belonging to this group
1. (M.1) The effective number of IPC physicians ≥ 90% of the funded number	2		
2. (M.2) The effective number of IPC nurses ≥ 90% of the funded number	2		
3. (M.3) Presence of referents for infection control	1		
4. (M.4) Number of referents in ICU / number of ICU ≥ 1	2		
5. (M.5) Number of referents in units (including ICU) / number of units (including ICU) ≥ 1	2		
6. (M.6.a) Number of hours for training on IPC provided by the IPC team to the hospital staff, per funded number of FTE for IPC (physicians and nurses)	No score		
7. (M.6.b) Number of participants in these trainings, per funded number of FTE for IPC (physicians and nurses)	No score		
8. (M.6.c) Number of hours of e-learning training on IPC followed by the hospital staff, per funded number of FTE for IPC (physicians and nurses).	No score		

3. Activity indicators		*Number of indicators: 57*
3.1. Meetings		
1. (A.1) Participation of the management to the meetings of the IPC committee	2	*Quality score indicator group:* maximum 79 – minimum 0
2. (A.2) Participation of the infection control team to the meetings of the regional platform for IPC	1	*Classification by quality class:* • Weak: score <51 • Moderate: score 51-62 • Good: score ≥63
3.2. Surveillances		
3. (A.3.a) MRSA (local)	1	*Quality score per subgroup* *3.1 Meetings* maximum 3 – minimum 0
4. (A.3.b) MRSA (national)	1	
5. (A.4.a) Bloodstream infections (local)	1	*1.2 Surveillances* maximum 11 – minimum 0
6. (A.4.b) Bloodstream infections (national)	1	
7. (A.5.a) Multi-resistant Gram-negative bacteria (local)	1	*1.3 Process audits* maximum 13 – minimum 0
8. (A.5.b) Multi-resistant Gram-negative bacteria (national)	1	
9. (A.6) Toxigenic *Clostridioides difficile* infections (local)	1	*1.4 National campaign/ prevalence study* maximum 5 – minimum 0
10. (A.7) Infections in Intensive Care Units (local)	1	
11. (A.8) Surgical site infections (local)	1	*1.5 Other* maximum 47 – minimum 0
12. (A.9) Vancomycin-resistant enterococci (local)	1	
13. (A.10) Other surveillances (local)	No score	
14. (A.11) Presence of a systematic interaction between the laboratory and the IPC team (warning system)	1	
3.3. Process audits		
15. (A.13.a) Approach for optimizing the choice of venous vascular access	1	
16. (A.13.b) Procedure for the prevention of central line-associated bloodstream infections	1	
17. (A.13.c) The application of this procedure was audited	2	
18. (A.14.a.) Procedure for the prevention of catheter-associated urinary tract infections	1	
19. (A.14.b.) The application of this procedure was audited	2	
20. (A.15.a) Procedure for the prevention of infections related to invasive mechanical ventilation	1	
21. (A.15.b.) The application of this procedure was audited	2	
22. (A.16.a) Procedure for the prevention of surgical site infections	1	
23. (A.16.b) The application of this procedure was audited	2	
24. (A.17) Other audits related to IPC	No score	

- Each individual indicator was assigned the corresponding score if the answer was "yes" and the score "0" if the answer was "no".
- If no intensive care unit was present, the maximum number of points was assigned for the indicators A.7 and A.15.
- When for indicator A.24 was indicated that there are 0 nurses/midwives/nursing assistants working in the hospital, this indicator was considered as missing.
- The corresponding score was assigned to the individual indicators where the answer was 'not applicable' and the motivation for this answer was justified.
- Since 2018 the antibiotic prophylaxis in surgery audit from BAPCOC has not been organised. Therefore the corresponding score of the indicator (A.28) was assigned to all hospitals in 2018,2019, 2020 and 2021.
- The indicator group quality score is the sum of the results of the individual indicators belonging to this group. Indicators were no score was assigned to, were not included in the calculation of the indicator group quality score.

3.4. National campaign/ prevalence study			
25. (A.18) Participation in the national campaign “You’re in good hands”.	1		
26. (A.12.a.) Local audits related to hand hygiene compliance (outside the national campaign)	2		
27. (A.12.b) At least 150 hand hygiene opportunities (outside the national campaign) have been reported.	1		
28. (A.19) Participation in the point prevalence study related to HAI and antimicrobial use	1		
3.5. Other			
29. (A.20) Information for the patient regarding the risk of infections	4		
30. (A.21) Approach for the prevention of accidental blood exposure	2		
31. (A.22) Procedure for the management of accidental blood exposure	2		
32. (A.23) An influenza vaccination campaign for staff	2		
33. (A.24) Staff vaccination coverage for influenza	No score		
34. (A.25) Participation of the IPC team in the medical devices committee meetings	1		
35. (A.26) Participation of the IPC physician in the antimicrobial stewardship group meetings	1		
36. (A.27.a) Procedure for antibiotic prophylaxis in surgery	1		
37. (A.27.b) The application of this procedure was audited	2		
38. (A.28) Participation in the antibiotic prophylaxis in surgery audit from BAPCOC	1		
39. (A.29.a) Procedure for the prevention of contact/droplet/airborne transmission	1		
40. (A.29.b) The application of these preventive measures was audited	2		
41. (A.30.a) Procedure to prevent transmission by screening of patients	1		
42. (A.30.b) The application of these preventive measures was audited	2		
43. (A.31.a) Procedure related to admission of patients who are known MDRO carriers	1		
44. (A.31.b) The application of these preventive measures was audited	2		
45. (A.34) A preventive approach regarding the transmission of tuberculosis	4		
46. (A.35) A preventive approach regarding the risk of Creutzfeldt Jakob disease	2		
47. (A.32) Procedure for the disinfection of endoscopes	2		
48. (A.33.a) Procedure for the disinfection of endocavity ultrasound probes	1		
49. (A.33.b) The application of these preventive measures was audited	2		

50. (A.36) An approach to prevent the risk of infection related to the management of construction works	2		
51. (A.37) An approach to prevent the risk of infection related to the cleaning and disinfection of surfaces and non-medical equipment	1		
52. (A.38) An approach to prevent the risk of infection related to the cleaning and disinfection of non-critical medical materials	1		
53. (A.39) Risk management plan with regard to the distribution of warm water for sanitary purposes	1		
54. (A.40.a) Procedure to prevent the risk of infection in operating rooms and rooms for interventional techniques	1		
55. (A.40.b) The application of this procedure was audited	2		
56. (A.41.a) Procedure to prevent the risk of infection in delivery rooms	1		
57. (A.41.b) The application of this procedure was audited	2		
4. Process indicator 1. (R.1) Alcohol-based handrub consumption (litres /1000 hospitalisation days) > mean of 2016	2	*Number of indicators: 1* *Quality score indicator group: maximum 2 – minimum 0* *Classification by quality class: /*	• The mean alcohol-based handrub consumption in 2016 was 24.7l/1000 hospitalisation days. • Each individual indicator was assigned the corresponding score if the answer was "yes" and the score "0" if the answer was "no".
All indicators for IPC		*Overall quality score: Maximum 100 – minimum 0* *Classification by quality class:* • Weak: score <67 • Moderate: score 67-79 • Good: score ≥80	• The overall quality score is the sum of the results of the individual indicators. Indicators were no score was assigned to, were not included in the calculation of the overall quality score.

BAPCOC, Belgian Antibiotic Policy Coordination Committee; FTE, full time equivalent; ICU, intensive care unit; IPC, infection prevention and control; MRSA, Methicillin-resistant *Staphylococcus aureus*

RESULTS

In this chapter you find aggregated quality scores at national level. The results at regional level can be found in the supplement of this report via www.sciensano.be. Individual indicator results per hospital are available via healthstat.be.

1. Results at national level

In 2023, 69 out of 103 eligible hospitals[4] (67%) (identified by RIZIV/INAMI number) reported 2022 data for the IPC quality indicators project. For Brussels 7 out of 14 (50%) hospitals, for Flanders 37 out of 51 (72%) hospitals and for Wallonia 25 out of 38 (66%) hospitals participated.

1.1. ORGANISATION INDICATORS

The organisation indicator group contains 6 individual indicators (Table 1).

Ninety percent of hospitals achieve a good quality score for the organisational indicator group. The median quality score stand at 10 on a national level and for the Walloon and Flemish region, which is also to the maximum score. The variation in the quality score of the organisational indicator group between hospitals remains low.

Scores in this group are high (Table 2, 3 and Figure 6). In 2022, 5 out of the 6 individual indicators were met by at least 95% of hospitals. The indicator 'The general strategic plan for IPC is integrated in the strategic plan of the hospital' (84% in 2022) had a lower score compared with the other organisational indicators (Table 3).

Table 2 • Median and range of the quality score for the organisation indicator group in Belgian hospitals and proportion of hospitals per quality class, national and regional level, 2022

	Belgium 2022 (n=69)	Brussels 2022 (n=7)	Flanders 2022 (n=37)	Wallonia 2022 (n=25)
Median quality score (range) (min.=0 – max.=10)	10 (2 – 10)	9 (8 – 10)	10 (6 - 10)	10 (2 – 10)
Proportion (%) of hospitals per quality class				
Weak (score <7)	9	0	8	12
Moderate (score = 7)	1	0	3	0
Good (score ≥8)	90	100	89	88

n, number of hospitals

[4] Based on the address list of general & psychiatric hospitals in Belgium on 01/01/2022, obtained from the FPS Health, Safety of the Food Chain and Environment, DG GS, Data and Policy Information Service

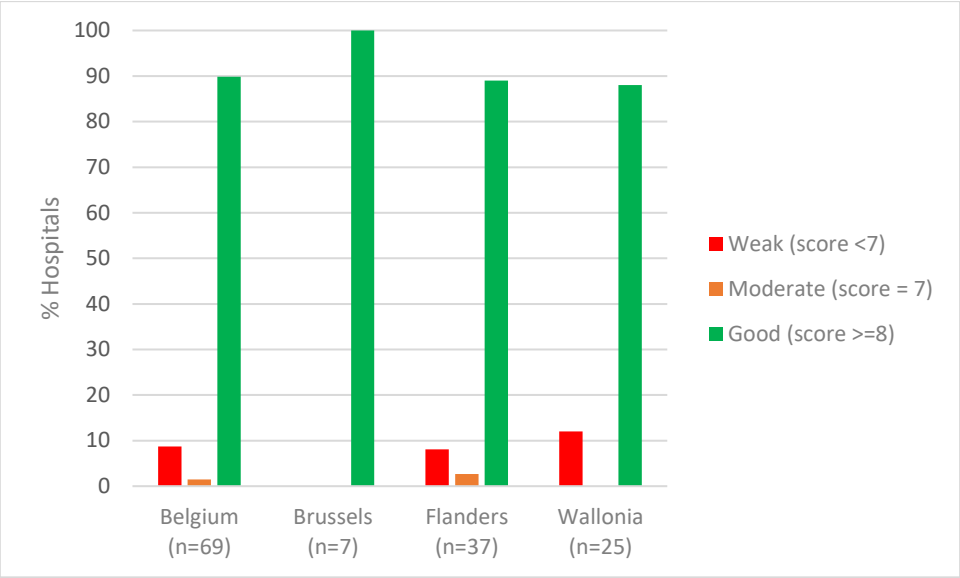


Figure 6 • Organisation indicators: proportion of Belgian hospitals per quality class at national and regional level, 2022

Table 3 • Proportion (%) of Belgian hospitals meeting each individual organisation indicator, national level, 2015 – 2022

Indicator Description	Belgium							
	2015 n=104	2016 n=103	2017 n=103	2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
Presence of a general long-term strategic plan (3-5 years) for IPC, approved by the infection control committee	97	100	99	98	100	97	97	97
The general strategic plan for IPC is integrated in the strategic plan of the hospital	70	79	86	82	90	88	88	84
The number of meetings for the infection control committee ≥4 per year	100	98	100	98	100	78	93	97
Presence of a detailed action plan for IPC, approved by the infection control committee	97	99	100	98	99	97	99	99
Presence of an annual report, approved by the infection control committee	100	99	100	100	99	96	99	97
The infection control nurse(s) is/are part of the nursing middle management	94[1]	95[1]	92	94	95	95	92	93
Mean proportion	**93**	**95**	**96**	**95**	**97**	**92**	**95**	**94**

n, number of hospitals; IPC, infection prevention and control

[1]in 2015 and 2016 only one IPC nurse had to be a member of the nursing middle management

1.2. RESOURCE INDICATORS

The resource indicator group contains 8 individual indicators (Table 1).

Ninety-one percent of hospitals achieve a good quality score for the resource indicator group (Table 4 and Figure 7). The median quality score at national, Flemish and Walloon regions levels is 9, which is equal to the maximum score (Table 4). The variation in the quality score of the resource indicator group between hospitals remains low.

For two out of five indicators in this group, hospitals achieve a score of at least 95% (Table 4, 5 and Figure 7). All hospitals work with IPC referents and in 80% of hospitals there are at least as many referents as units present. In approximately 9 out of 10 hospitals, the effective number of IPC physicians and the effective number of IPC nurses are close to the funded number (expressed in FTE; calculated using the number of beds accounted for by the government to finance this activity, as described in the Royal Decree) (Table 5). The median of the number of beds per FTE IPC professional is 166 (IQR: 120-221) in 2022. Seventy-three percent of the hospitals have at least one FTE IPC professional per 250 beds. In 14% of the hospitals, there is at least one FTE IPC professional per 100 beds. It is important to

note that the data regarding the number of beds is not mandatory to provide. The number of hospitals that have provided this data decreases over time (Table 7).

A large variation between hospitals regarding the number of IPC training courses and participants has been observed. E-learning tools is still used to a limited extent as a training tool (Table 6).

Table 4 • Median and range of the quality score for the resource indicator group in Belgian hospitals and proportion of hospitals per quality class, national and regional level, 2022

	Belgium 2022 (n=69)	Brussels 2022 (n=7)	Flanders 2022 (n=37)	Wallonia 2022 (n=25)
Median quality score (range) (min.=0 – max.=9)	9 (2 – 9)	7 (2– 9)	9 (5 - 9)	9 (4 – 9)
Proportion (%) of hospitals per quality class				
Weak (score <6)	9	14	5	12
Moderate (score = 6)	0	0	0	0
Good (score ≥7)	91	86	95	88

n, number of hospitals

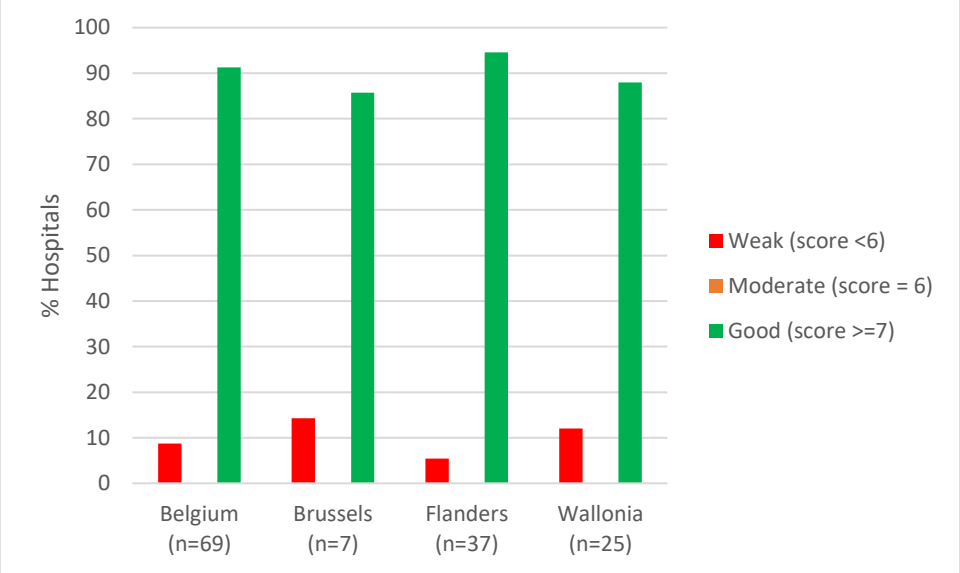


Figure 7 • Resource indicators: proportion of Belgian hospitals per quality class at national and regional level, 2022

Table 5 • Proportion (%) of Belgian hospitals meeting each individual resource indicator, national level, 2013 - 2022

Indicator Description	Belgium								
	2013 n=104	2015 n=103	2016 n=103	2017 n=103	2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
The effective number of IPC physicians ≥ 90% of the funded number (expressed in number of FTE)	81	87	90	91	93	90[3]	93	92	87
The effective number of IPC nurses ≥ 90% of the funded number (expressed in number of FTE)	92	91	90	93	92	94[3]	97	94	99
Presence of referents for infection control	90	96	99	99	100	100	100	100	97
Number of referents in ICU / number of ICU ≥ 1	80[1]	91[1]	96[2]	96[1]	99[1]	99[1]	99[1]	96[1]	88[2]
Number of referents in units (including ICU) / number of units (including ICU) ≥ 1	65	82	91	93	92	93	92	88	80[2]
Mean proportion	**82**	**89**	**93**	**95**	**95**	**95**	**96**	**94**	**90**

FTE, fulltime equivalent; ICU, intensive care unit; IPC, infection prevention and control; n, number of hospitals

[1]This indicator was not applicable in 1 hospital, [2]This indicator was not applicable in 2 hospitals, [3] The financed number of FTEs indicator was missing for 1 hospital

Table 6 • Median and percentile 25 and 75 for the three numeric indicators belonging to the resource indicator group, national level, Belgian quality indicators for infection prevention and control project, 2013-2022

Indicator Description	Belgium								
	2013 n=104	2015 n=103	2016 n=103	2017 n=103	2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
Number of hours for training on IPC provided by the IPC team to the hospital staff, per funded number of FTE for IPC (physicians and nurses)	15 (9-32)	22 (13-36)	21 (12-34)	20 (12-32)	18 (10-35)	19 (12-33)	37 (13-71)	17 (10-46)	18 (9-37)
Number of participants in these trainings, per funded number of FTE for IPC (physicians and nurses)	191 (96-289)	237 (140-365)	238 (132-407)	277 (148-454)	204 (130-404)	247 (119-448)	276 (150-530)	190 (87-338)	177 (87-329)
Number of hours of e-learning training on IPC followed by the hospital staff, per funded number of FTE for IPC (physicians and nurses).				0 (0-38)	0 (0-27)	0 (0-41)	3 (0-61)	25 (0-93)	45 (0-125)

FTE, full time equivalents; IPC, infection prevention and control; n, number of hospitals

Table 7 • Median and percentile 25 and 75 for the number of beds per IPC professional and the proportion of Belgian hospitals for the minimal and higher ratio's defined by the World Health Organization, national level, 2013-2022

Indicator Description	Belgium								
	2013 n=101	2015 n=101	2016 n=103	2017 n=99	2018 n=94	2019 n=87	2020 n=66	2021 n=60	2022 n=56
Number of beds per full-time equivalent IPC professional (nurse or doctor) (median + IQR)	211 (145-300)	201 (141-289)	201 (141-298)	207 (149 -292)	216 (156-304)	211 (153-299)	211 (157-299)	221 (160-316)	166 (120-221)
Number of beds per full-time equivalent IPC professional (nurse or doctor) ≤250 (proportion of hospitals)	61%	65%	62%	61%	60%	60%	64%	59%	73%
Number of beds per full-time equivalent IPC professional (nurse or doctor) ≤100 (proportion of hospitals)	9%	12%	10%	8%	7%	9%	8%	8%	14%

FTE, full time equivalents; IPC, infection prevention and control; n, number of hospitals. No obligation to collect 'number of beds' data

1.3. ACTIVITY INDICATORS

The activity indicator group contains 57 individual indicators (Table 1). This indicator group contains the largest number of indicators. The majority of activity indicators achieve high scores (Table 9 and 11).

Eighty-one percent of the hospitals achieve a good quality score for the activity indicator group for the reference year 2022 (Figure 8, Table 8). Significant disparities exist in the quality scores for the activity indicator group across the different regions. In Flanders, there is a notable difference in the percentage of participating hospitals achieving a good quality score for this indicator group, with up to a 30% higher rate compared to Brussels, as shown in Table 8. Similarly, in Wallonia, there is nearly a 20% higher rate of participating hospitals achieving a good quality score for this indicator compared to Brussels. The median quality score at the national level is 71 (Table 8), the maximum score is 79. The variation in the quality score of the activity indicator group is shown in a boxplot (Figure 9).

Table 8 • Median and range of the quality score for the activity indicator group in Belgian hospitals and proportion of hospitals per quality class, national and regional level, 2022

	Belgium 2022 (n=69)	Brussels 2022 (n=7)	Flanders 2022 (n=37)	Wallonia 2022 (n=25)
Median quality score (range) (min.=0 – max.=79)	71 (49 – 79)	70 (49 – 76)	74 (57 - 79)	69 (49 – 79)
Proportion (%) of hospitals per quality class				
Weak (score <51)	4	14	0	8
Moderate (score 51-62)	14	29	11	16
Good (score ≥63)	81	57	89	76

n, number of hospitals

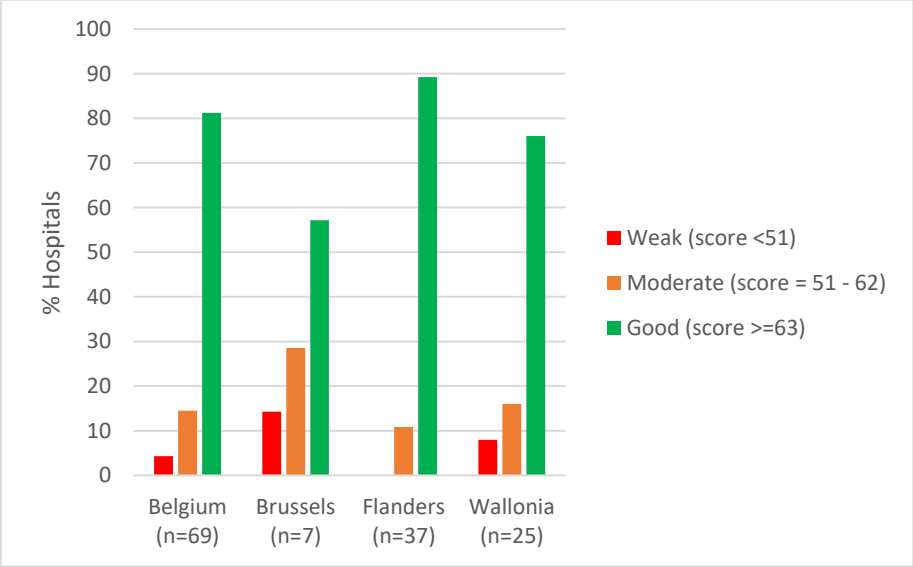


Figure 8 • Activity indicators: proportion of Belgian hospitals per quality class at national and regional level, 2022

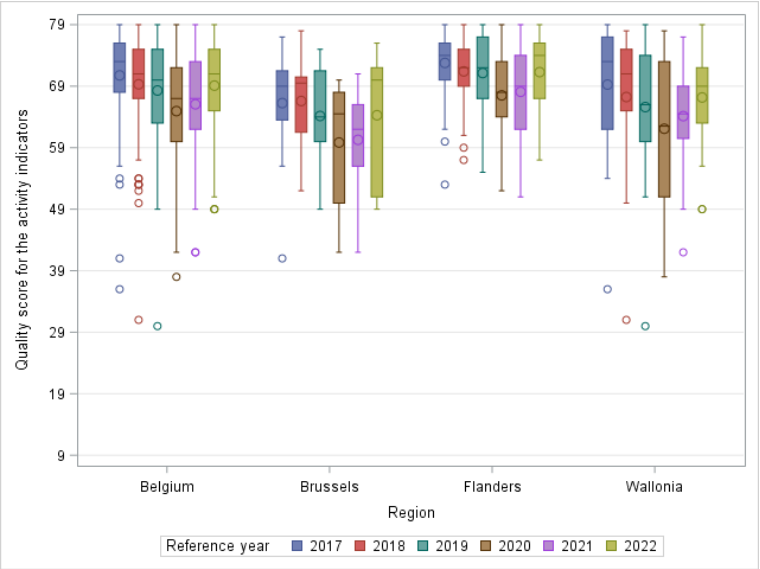
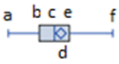


Figure 9 • Activity indicators in Belgian hospitals: boxplot for quality scores at national and regional level, 2017-2022

Legend boxplot: a. maximum (without outliers, 1.5x interquartile range), b. 75th percentile (P75), c. median, d. mean, e. 25th percentile (P25), f. minimum (without outliers, 1.5x interquartile range)



1.3.1. Activity indicators collected in all previous data collections (2015-2022)

In 99% of participating hospitals, the management participates to meetings of the IPC committee and the IPC team (100% of participating hospitals) participates to meetings of the regional platform for IPC (Table 9).

Participation in surveillances organised at hospital (local) and/or national level reach high scores (94% - 100%), except for the 'infections in intensive care units' and 'surgical site infections' surveillances. Only 74% and 61% of hospitals organise these surveillances at local level, respectively. However, since 2015, the number of hospitals organising these two surveillances locally increased. A systematic interaction between the laboratory and the IPC team (alarm system) is present in almost all participating hospitals (Table 9).

At least half of the hospitals conduct the process audits surveyed since 2015 (Table 9 and Figure 10). Figure 10 visually shows the proportion of hospitals that comply with these process audits and shows an increase in conducting these process audits until 2019. Between 2019 and 2020, a decrease in hospitals conducting these audits was observed. Between 2020 and 2022 an increase for most of these indicators has been observed again.

The pre-campaign observation period of the national hand hygiene (HH) campaign has been cancelled in 2022 due to the migration of the previous collection tool (NSIHweb2) to Healthdata. Local audits regarding HH compliance were conducted by 90% of hospitals outside the national campaign (which did not include monitoring of the compliance in 2022). In the process, 70% of hospitals observed more than 150 HH opportunities (Table 9).

The organisation of and participation in other surveillances and audits than those mentioned in the questionnaire are also asked. The answers to these open questions are not used in the composition of the quality score. An overview of the most common answers to these questions can be found in chapter 2 (Tables 15 and 16).

Table 9 • Proportion (%) of Belgian hospitals meeting each individual activity indicator for the indicators collected in all previous data sets, national, 2015 - 2022

Indicator Description	Belgium							
	2015 n=103	2016 n=103	2017 n=103	2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
1. Meetings								
Participation of the management in the meetings of the IPC committee	94	97	96	97	98	97	100	99
Participation of the infection control team in the meetings of the regional platform for IPC	93	92	96	97	96	99	100	100
2. Surveillances								
MRSA (local)	100	100	100	100	100	100	100	100
MRSA (national)	100	100	99	100	98	95	99	100[1]
Bloodstream infections (local)	100	100	98	100	100	99	99	100
Bloodstream infections (national)	99	99	97	100	98	97	99	99
Multi-resistant Gram-negative bacteria (local)	100	100	99	100	100	99	100	100
Multi-resistant Gram-negative bacteria (national)	99	100	98	100	98	92	100	99
Toxigenic *Clostridioides difficile* infections (local)	97	98	98	100	98	99	99	99
Infections in Intensive Care Units (local)	68	72	72[1]	75[1]	71[1]	75[1]	76[1]	74[1]
Surgical site infections (local)	40	50	58[1]	59[1]	60[2]	58[1]	56[1]	61[1]
Vancomycin-resistant enterococci (local)	94	96	95	98	99	100	97	94
Other surveillances (local)		66	68	71	65	66	72	83
Presence of a systematic interaction between the laboratory and the IPC team (warning system)	98	99	99	100	100	100	100	99
3. Process audits								
Audit of the procedure for the prevention of central line-associated bloodstream infections (CLABSI)	59	72	54	76	88	73	69	77
Audit of the procedure for the prevention of catheter-associated urinary tract infections (CAUTI)	53	66	58	74	78	66	74	78
Audit of the procedure for the prevention of infections related to invasive mechanical ventilation	65	67	47[1]	60[1]	69[1]	52[1]	53[1]	68
Audit of the procedure for the prevention of SSI	43	45	34[1]	55[1]	57[1]	41[1]	50[1]	58
Other audits related to IPC		62	68	66	67	64	78	81
4. National campaign/prevalence study								
Participation in the national campaign “You’re in good hands”.	95	96	99	99	97	/	79	/
Local audits related to hand hygiene compliance (outside the national campaign)	79	83	84	83	85	71	76	90
At least 150 hand hygiene opportunities (outside the national campaign) have been reported.	59	74	74	76	71	59	71	70[3]
Mean proportion	**78**	**83**	**86**	**86**	**86**	**82**	**84**	**87**

CLABSI, central line-associated bloodstream infections; MRSA, Methicillin-resistant *Staphylococcus aureus*; n, number of hospitals; SSI, surgical site infections; CAUTI, catheter-associated urinary tract infections; IPC, infection prevention and control

[1]This indicator was not applicable in 1 hospital, [2]This indicator was not applicable in 2 hospitals, [3]This indicator was not applicable in 3 hospitals

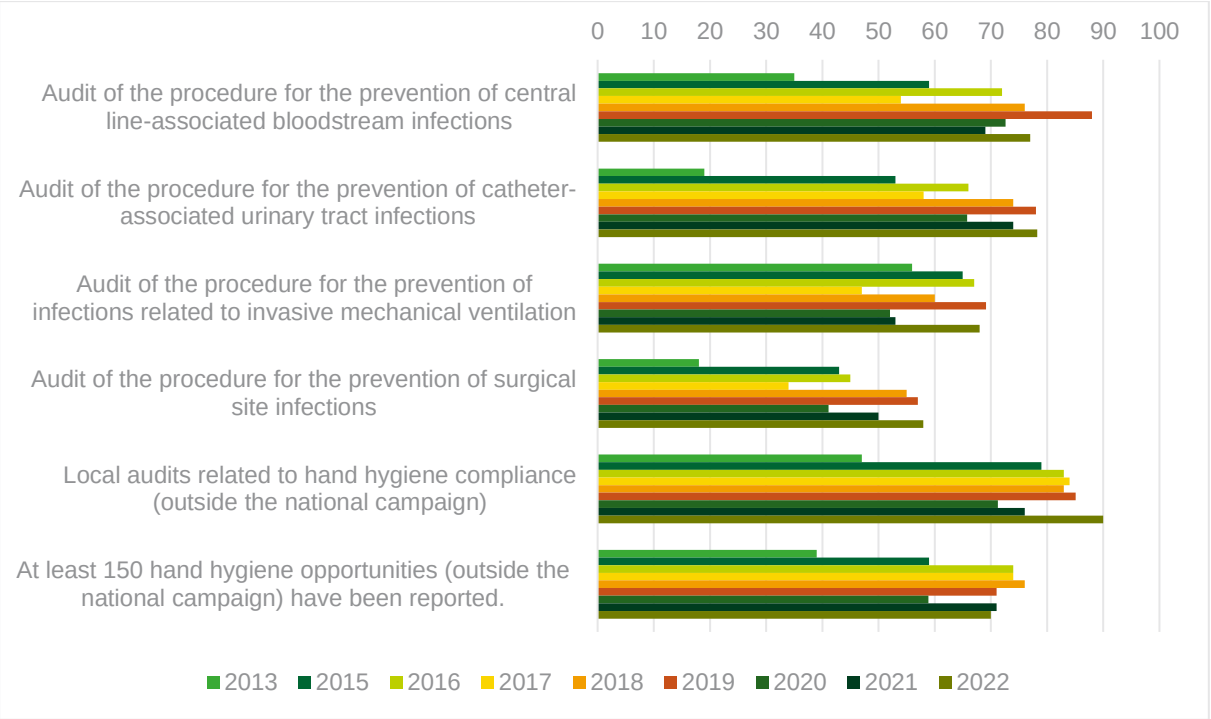


Figure 10 • Proportion of Belgian hospitals meeting the individual activity; process audits, national level, 2013 - 2022

1.3.2. Activity indicators collected since 2018 (2018-2022)

The indicators on the presence of procedures score high (>90%), with the exception of the indicators 'Procedure for antibiotic prophylaxis in surgery' (88%), and 'Procedure to prevent infection risk in delivery rooms' (80%). While the previous year, four indicators assessing the existence of a procedure achieved a score below 90% (Table 11).

In contrast to previous year, three audits of procedures: (1) 'audit of the procedure for the prevention of contact/droplet/airborne transmission', (2) 'audit of the procedure to prevent transmission by screening patients' and (3) 'audit of the procedure related to admission of patients who are known multidrug resistant organism (MDRO) carriers', were audited by at least 70% of hospitals. The following procedures were audited by half or less of the hospitals:

- Audit of the procedure for disinfection of endocavitary ultrasound probes (50%); and
- Audit of the procedure to prevent the risk of infection in delivery rooms (36%).

In 2022, the surgical antibiotic prophylaxis audit of BAPCOC did not take place. In 2022, 96% of hospitals participated in a point prevalence study related to HAI and antimicrobial use which is almost 50% more than previous year (Table 11).

Figure 11 documents the activity indicators on the implementation of an audit, collected since 2018. Until 2019, an increase in the number of hospitals meeting these activity indicators for all seven audits was observed whereas in 2020 a decrease in conducting these audits was observed. Between 2020 and 2021 an although small but further decrease has been observed for the indicators: 'Audit of the procedure to prevent transmission by screening of patients', 'Audit of the procedure related to admission of patients who are known MDRO carriers' and 'Audit of the procedure to prevent the risk of infection in delivery rooms'. However, in 2022, a greater proportion of hospitals reported having met these indicators (with the exception of 'Audit of the procedure to prevent the risk of infection in delivery rooms').

A minor decline has been noted for participation in the medical device committee meetings by the IPC team and participation in the antibiotic therapy policy group meetings by the IPC physician with a score

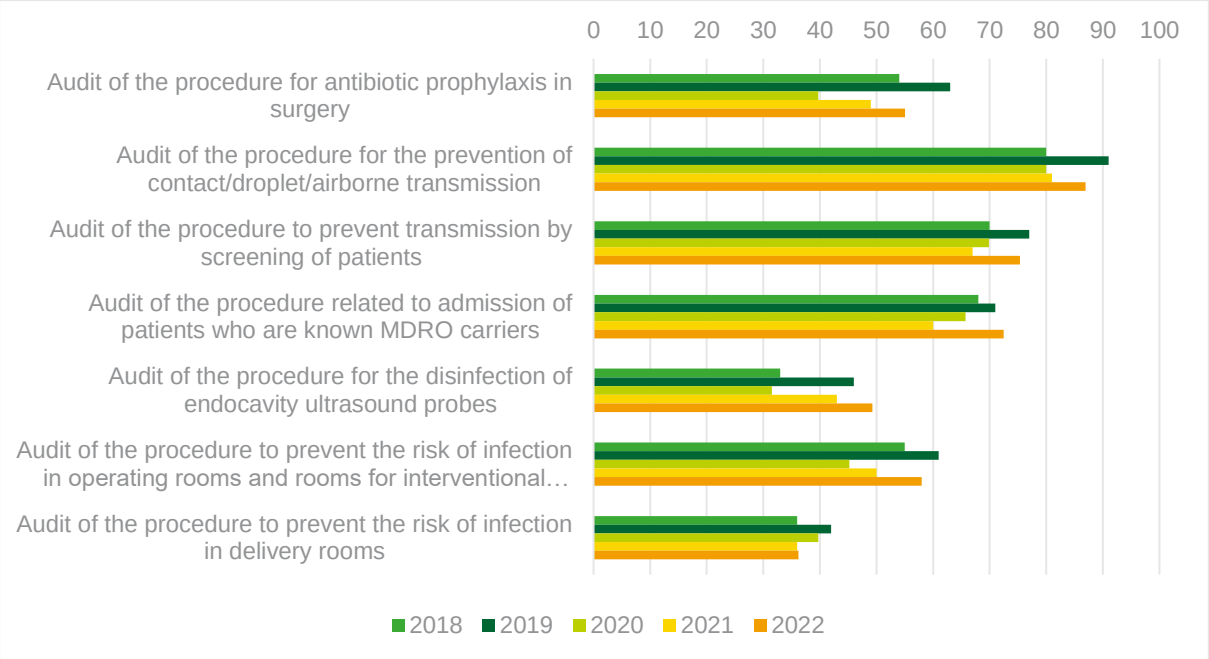
of 97% and 96% (2021: 99% for both indicators). Information on infection risk for the patient is present in 99% of hospitals (Table 10).

All hospitals (100%) performed an influenza vaccination campaign. The median vaccination coverage among nurses, midwives and nursing assistants is 40% and is decreasing since 2021 following an increase between 2018 and 2020 previous years (Table 9).

Table 10 • Median and percentile 25 and 75 for the two numeric indicators across Belgian hospitals in %, belonging to the activity indicator group, national level, 2018-2022

Description	Belgium				
	2018 n=102	2019 n=94	2020 n=73	2021 n=72	2022 n=69
Staff vaccination coverage for influenza (expressed in percentage)	45%[2] (28%-65%)	52%[1] (31%-67%)	64% (33%-79%)	58%[2] (31%-74%)	40%[2] (19%-52%)
Number of observed hand hygiene opportunities (outside the national campaign)	570 (187 – 1105)	641 (169 – 1766)	204 (151 – 743)	345[4] (190-937)	343[4] (150-1317)

n, number of hospitals;
[1]This indicator was missing for 1 hospital, [2]This indicator was missing for 2 hospitals, [3]This indicator was missing for 3 hospitals, [4]This indicator was missing for 7 hospitals. In 2022 the migration from NSIHweb2.0 to Healthdata/Healhtstat as reporting tool for the hand hygiene campaign was initiated. Due to difficulties during this migration, not all hospitals had already access to the exact number of hand hygiene opportunities they observed and therefore only reported an estimate.



MDRO: multidrug resistant organisms

Figure 11 • Proportion of Belgian hospitals meeting the individual activity indicators collected since 2018; process audits, national level, 2018 – 2022

Table 11 • Proportion (%) of Belgian hospitals meeting each individual activity indicator for the indicators collected since 2017, national, 2018 - 2022

Indicator Description	Belgium 2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
3. Process audits					
Approach for optimizing the choice of venous vascular access	76	82	85	83	90
Procedure for the prevention of central line-associated bloodstream infections	95	97	96	94	99
Procedure for the prevention of catheter-associated urinary tract infections	90	94	96	97	97
Procedure for the prevention of infections related to invasive mechanical ventilation	88[1]	92[1]	89[1]	89[1]	90
Procedure for the prevention of surgical site infections	84[1]	85[1]	84[1]	86[1]	90
4. National campaign/ prevalence study					
Participation in the point prevalence study related to HAI and antimicrobial use	44	65	30	50	96
5. Other					
Information for the patient regarding the risk of infections	95	95	96	94	99
Approach for the prevention of accidental blood exposure	99	99	97	97	100
Procedure for the management of accidental blood exposure	99	97	99	100	99
An influenza vaccination campaign for staff	99	100	100	100	100
Participation of the IPC team in the medical devices committee meetings	98	98	96	99	97
Participation of the IPC physician in the antimicrobial stewardship group meetings	99	97	96	99	96
Procedure for antibiotic prophylaxis in surgery	90[1]	96[1]	96[1]	94[1]	88[1]
Audit of the procedure for antibiotic prophylaxis in surgery	54[1]	63[1]	40[1]	49[1]	55
Participation in the antibiotic prophylaxis in surgery audit from BAPCOC	/	/	/	/	/
Procedure for the prevention of contact/droplet/airborne transmission	98	100	100	100	99
Audit of the procedure for the prevention of contact/droplet/airborne transmission	80	91	80	81	87
Procedure to prevent transmission by screening of patients	96	99	100	99	100
Audit of the procedure to prevent transmission by screening of patients	70	77	70	67	75
Procedure related to admission of patients who are known MDRO carriers	96	97	99	97	100
Audit of the procedure related to admission of patients who are known MDRO carriers	68	71	66	60	72
Procedure for the disinfection of endoscopes	92	99	99	99	100
Procedure for the disinfection of endocavity ultrasound probes	81[2]	87[1]	89	92	97
Audit of the procedure for the disinfection of endocavity ultrasound probes	33[2]	46[1]	32	43	50
A preventive approach regarding the transmission of tuberculosis	97	97	97	97	96
A preventive approach regarding the risk of Creutzfeldt Jakob disease	79	85	89	88	93
An approach to prevent the risk of infection related to the management of construction works	94	93	97	97	99
An approach to prevent the risk of infection related to the cleaning and disinfection of surfaces and non-medical equipment	99	97	99	99	99
An approach to prevent the risk of infection related to the cleaning and disinfection of non-critical medical materials	94	96	99	97	100
Risk management plan with regard to the distribution of warm water for sanitary purposes	90	96	89	97	100
Procedure to prevent the risk of infection in operating rooms and rooms for interventional techniques	89[1]	91[1]	88[1]	90[1]	93
Audit of the procedure to prevent the risk of infection in operating rooms and rooms for interventional techniques	55[1]	61[1]	45[1]	50[1]	58[6]
Procedure to prevent the risk of infection in delivery rooms	76[4]	75[5]	75[3]	78[3]	80[4]
Audit of the procedure to prevent the risk of infection in delivery rooms	36[4]	42[5]	40[3]	36[3]	36[4]
Mean proportion	**83**	**87**	**83**	**85**	**89**

BAPCOC, *Belgian Antibiotic Policy Coordination Committee*; MDRO, multidrug resistant organisms; n, number of hospitals; IPC, infection prevention and control; HAI, healthcare-associated infections

[1]**This indicator was not applicable in 1 hospital,** [2]**This indicator was not applicable in 2 hospitals,** [3]**This indicator was not applicable in 6 hospitals,** [4]**This indicator was not applicable in 7 hospitals,** [5]**This indicator was not applicable in 8 hospitals**

1.4. PROCESS INDICATOR

Only one process indicator was included within the IPC indicators, being the 'total alcohol-based hand rub consumption'.

In 2022, 56% of hospitals reported an alcohol-based hand rub consumption that was higher than the 2016 average (the 2016 average is used as reference number) (Table 12). The median alcohol-based hand rub consumption for 2022 was 26 litres/1,000 hospitalisation days (IQR: 21 – 38 /1,000 hospitalisation days) (Table 13). The variability in alcohol-based hand rub consumption between hospitals is shown in a boxplot (Figure 12).

Table 12 • Proportion (%) of Belgian hospitals meeting the process indicator, national, 2018-2022

Indicator Description	Belgium 2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
Hand rub consumption (litres/1,000 hospitalisation days) ≥ mean in 2016 (24.7 litres/1,000 hospitalisation days)	42	54	92	79	56

n, number of hospitals

Table 13 • Median and percentile 25 and 75 for the alcohol-based hand consumption (in litres/1,000 hospitalisation days) in care wards in Belgian hospitals, national level, 2015-2022

	Belgium 2015 n=103	2016 n=98	2017 n=103	2018 n=102	2019 n=98	2020 n=73	2021 n=72	2022 n=69
Alcohol-based hand rub consumption, median	21.3 (17.2 – 28.1)	22.3 (16.7 – 30.7)	23.4 (18.8- 35.9)	24.1 (17.6 – 32.5)	25.4 (20.0 – 39.9)	49.0 (34.5 – 77.0)	36.4 (26.4 – 51.8)	25.8 (20.9- 37.9)

n, number of hospitals

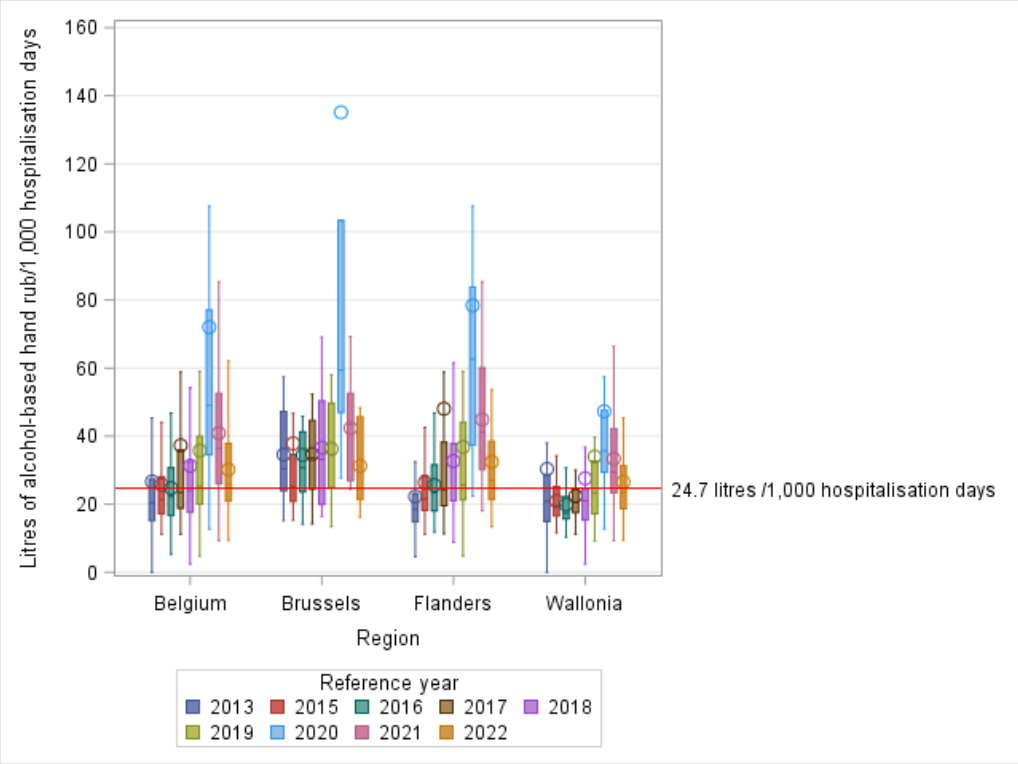
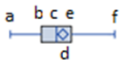


Figure 12 • Alcohol-based hand rub consumption in care units of Belgian hospitals, national and regional level, 2013 – 2022

Legend boxplot: a. maximum (without outliers, 1.5x interquartile range), b. 75th percentile (P75), c. median, d. mean, e. 25th percentile (P25), f. minimum (without outliers, 1.5x interquartile range)



1.5. OVERALL QUALITY SCORE FOR INFECTION PREVENTION & CONTROL (IPC)

Eighty-three percent of hospitals achieve a good overall IPC quality score (Table 14 and Figure 13. However, differences in this overall quality score between regions are observed. Compared with Brussels and Wallonia we found in Flanders around 10% more hospitals with a good overall quality score.

The median overall quality score at the national level is 90, the maximum score is 100 (Table 14). The variation in the overall quality score is shown in a boxplot (Figure 14).

Table 14 • Median and range of the overall quality score in Belgian hospitals and proportion of hospitals per quality class, national and regional level, 2022

	Belgium 2022 (n=69)	Brussels 2022 (n=7)	Flanders 2022 (n=37)	Wallonia 2025 (n=25)
Median quality score (range)	90	87	93	87
(min.=0 – max.=100)	(82 – 95)	(66 – 92)	(87 - 96)	(79 – 91)
Proportion (%) of hospitals per quality class				
Weak (score <67)	3	29	0	0
Moderate (score 67 - 79)	14	0	8	28
Good (score ≥80)	83	71	92	72

n, number of hospitals

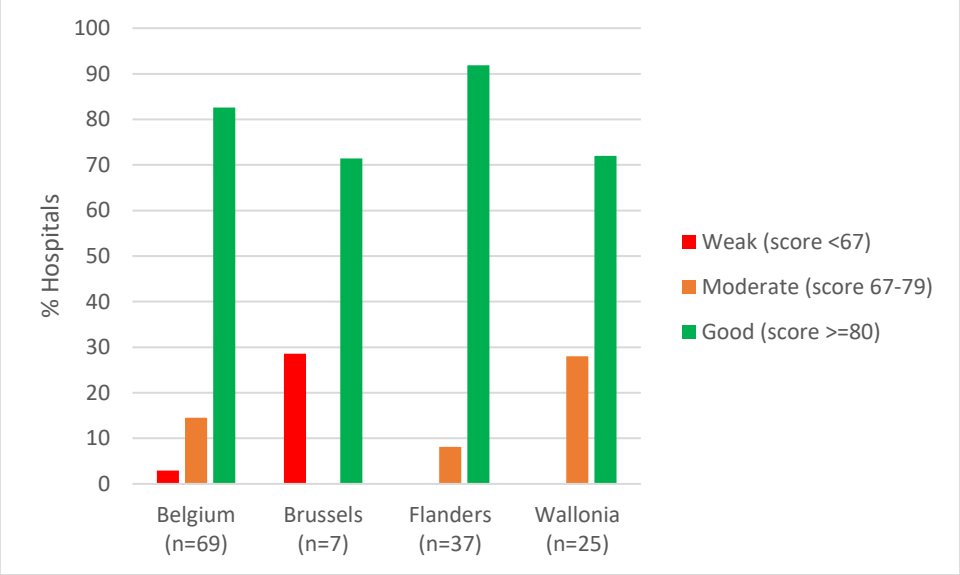


Figure 13 • Indicators: proportion of Belgian hospitals per quality class for the overall score in infection prevention and control (IPC) at national and regional level, 2022

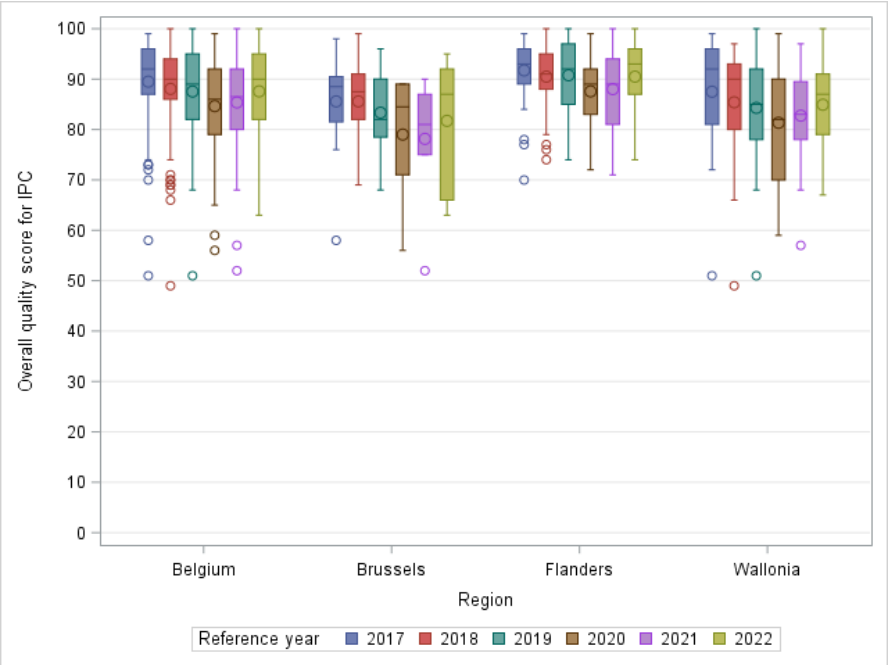
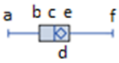


Figure 14 • Indicators for infection prevention and control (IPC) in Belgian hospitals: boxplot for overall quality scores at national and regional level, 2017-2022

Legend boxplot: a. maximum (without outliers, 1.5x interquartile range), b. 75th percentile (P75), c. median, d. mean, e. 25th percentile (P25), f. minimum (without outliers, 1.5x interquartile range)



2. Participation in surveillances and audits other than those mentioned in the questionnaire

2.1. PARTICIPATION IN A LOCAL SURVEILLANCE SYSTEM FOR HEALTHCARE-ASSOCIATED INFECTIONS/MULTIRESISTANT BACTERIA

Answers to this question included surveillances that were already included in the general list, such as participation in a surveillance of carbapenemase-producing *Enterobacterales* (CPE) or *Pseudomonas aeruginosa*. Both are part of the surveillance of multi-resistant Gram-negative bacteria.

Table 15 gives an overview of the most common surveillances that were given as an answer to this open question and that do not appear in the general questionnaire.

Table 15 • Overview of the most common answers given by the hospitals on the question to which surveillances beside these included in the questionnaire, they participated, Belgium, 2022

Surveillance related to	Surveillance
1. Other infections	• COVID-19 (n=24) • Influenza (n=12) • Norovirus (n=11) • Tuberculosis (n=8) • *Legionella* (n=7)
2. Infections associated with the use of an invasive device	• Catheter-associated urinary tract infections (and urinary tract infections) (n=8)

COVID-19: coronavirus disease 2019

4.2. PARTICIPATION IN LOCAL AUDITS OF HEALTHCARE PROCESSES AND/OR HEALTHCARE-ASSOCIATED INFECTIONS

Again, answers included audits that were already included in the general questionnaire, such as conducting a local HH audit.

Table 16 gives an overview of the most common audits given as an answer to this open question and that do not appear in the general questionnaire.

Table 16 • Overview of the most common answers given by the hospitals on the question to which audits beside these included in the questionnaire, they participated, Belgium, 2022

Audits of	Audit
1. Infrastructure	• Kitchen, kitchen on the service and milk kitchen (HACCP) (n=14) • Linens and laundry (n=4) • Cleaning and disinfection (n=4) • Construction, renovation and technical work (n=5)
2. Medical Equipment	• Endoscopes (n=7)
3. IPC guidelines	• Isolation measures (n=10) • Basic requirements for hand hygiene and staff clothing[1] (n=10) • Standard and additional precautions (n=7)

HACCP: Hazard analysis of Critical Control Points; IPC: infection prevention and control

[1] An audit of the compliance with the basic requirements is an (optional) part of the hand hygiene campaign and therefore does not belong in this list. Within the VIKZ (Vlaams Instituut voor Kwaliteit van Zorg – www.zorgkwaliteit.be) project, both internal and external audits are set up to check to what extent the basic requirements for good hand hygiene are being observed. As it is not clear whether the hospitals mean an external or internal audit, the non-mandatory nature of the hand hygiene campaign and the large number of hospitals that gave this answer, this audit has been included in the overview.

RESULTS PER HOSPITAL

The quality scores per hospital for each of the three indicator groups are very good (Table 17). The table is based on data received before 31 July 2023. Over 80% of hospitals score high (green) for all three groups of indicators: organization, resources and actions. Further information regarding the established limits for classifying the results are available Table 1 in the "Methods" section.

Table 17 • Quality score for Infection Prevention and Control per participant hospital (n=69, 66% of eligible hospitals), Belgium, 2022

Post-code	Places	Hospitals	Score organisation (max. 10)	Score mean (max.9)	Score activities (max. 79)	Score process (max.2)	Total score (max. 100)
1000	BRUSSELS	CHU SAINT-PIERRE / UMC SINT-PIETER	10	7	70	2	89
1020	BRUSSELS	HOPITAL UNIVERSITAIRE DES ENFANTS REINE FABIOLA (HUDERF)	10	9	71	2	92
1020	BRUSSELS	CHU/UVC - BRUGMANN	8	7	72	0	87
1070	BRUSSELS	CHIREC - HOPITAL SARE	8	2	51	2	63
1090	BRUSSELS	UNIVERSITAIR ZIEKENHUIS BRUSSEL	10	7	76	2	95
1160	BRUXELLES	CHIREC - HOPITAL DELTA	8	9	49	0	66
1180	BRUSSELS	EUROPAZIEKENHUIZEN - CLINIQUES DE L'EUROPE	10	9	61	0	80
1340	OTTIGNIES	CLINIQUE SAINT PIERRE	10	9	72	0	91
1800	VILVOORDE	AZ JAN PORTAELS	10	7	70	0	87
2100	DEURNE	AZ MONICA	10	9	67	0	86
2200	HERENTALS	AZ HERENTALS	8	7	74	2	91
2300	TURNHOUT	AZ TURNHOUT	10	9	73	2	94
2400	MOL	HEILIG HARTZIEKENHUIS	10	7	57	0	74
2440	GEEL	ZIEKENHUIS GEEL	10	7	78	2	97
2500	LIER	HEILIG HART ZIEKENHUIS	10	9	76	0	95
2610	WILRIJK	GZA- ZIEKENHUIZEN	10	9	67	2	88
2650	EDEGEM	UNIVERSITAIR ZIEKENHUIS ANTWERPEN (UZA)	10	7	79	2	98
2800	MECHELEN	AZ ST.- MAARTEN	7	5	68	0	80
2820	BONHEIDEN	IMELDA ZIEKENHUIS	10	9	79	2	100
3000	LEUVEN	UZ LEUVEN	10	7	75	2	94
3000	LEUVEN	REGIONAAL ZIEKENHUIS HEILIG HART	10	9	72	2	93
3300	TIENEN	RZ HEILIG HART TIENEN	10	9	71	2	92
3600	GENK	ZIEKENHUIS OOST - LIMBURG	10	9	75	2	96
3680	MAASEIK	ZIEKENHUIS OOST - LIMBURG	10	9	74	2	95
3800	SINT-TRUIDEN	SINT - TRUDO ZIEKENHUIS	10	9	77	2	98
3900	OVERPELT	NOORDERHART	6	9	59	2	76
4000	ROCOURT	GROUPE SANTE CHC	10	9	76	0	95
4000	LIEGE	CHU DE LIEGE	6	9	70	2	87
4000	LIEGE	GROUPE SANTE CHC	10	7	72	0	89
4020	LIEGE	ISOSL, CLINIQUES DE SOINS SPECIALISES VALDOR - PERI	10	5	68	0	83
4040	HERSTAL	CLINIQUE ANDRE RENARD	8	7	69	0	84
4100	SERAING	CENTRE HOSPITALIER DU BOIS DE L'ABBAYE	10	9	69	0	88
4700	EUPEN	ST.-NIKOLAUS HOSPITAL	10	7	72	2	91
4780	SANKT-VITH	KLINIK ST.JOSEF	10	5	64	0	79
5000	NAMUR	CHU UCL NAMUR	10	9	63	0	82
5000	NAMUR	CHR SAMBRE ET MEUSE	8	7	56	0	71
5004	BOUGE	CLINIQUE ST.-LUC	10	9	76	2	97
5060	AUVELAIS	CHR SAMBRE ET MEUSE	8	7	65	0	80

5500	DINANT	CHU UCL NAMUR - HOPITAL DINANT	10	9	56	2	77
5530	MONT-GODINNE	CHU UCL NAMUR	8	9	67	2	86
6000	CHARLEROI	GRAND HOPITAL DE CHARLEROI	10	9	77	0	96
6042	LODELINSART	CHU CHARLEROI	10	9	69	2	90
6110	MONTIGNY-LE-TILLEUL	C.H.U. DE CHALEROI	10	9	71	2	92
6460	CHIMAY	CENTRE DE SANTE DES FAGNES	4	7	61	0	72
7000	MONS	CHU AMBROISE PARE	10	9	76	2	97
7060	SOIGNIES	CENTRE HOSPITALIER REGIONAL HAUTE SENNE	10	9	72	0	91
7301	HORNU	CENTRE HOSPITALIER EPICURA	10	9	49	2	70
7500	TOURNAI	CENTRE HOSPITALIER DE WALLONIE PICARDE - Chwapi	2	4	61	0	67
7700	MOUSCRON	CENTRE HOSPITALIER DE MOUSCRON	10	9	79	2	100
7800	ATH	CENTRE HOSPITALIER EPICURA	10	7	49	2	68
8000	BRUGGE	AZ SINT - JAN	10	7	77	2	96
8300	KNOKKE-HEIST	AZ ZENO	10	9	67	2	88
8310	BRUGGE	AZ SINT - LUCAS	10	9	63	0	82
8400	OOSTENDE	ALGEMEEN ZIEKENHUIS DAMIAAN	10	5	59	0	74
8500	KORTRIJK	AZ GROENINGE	10	9	77	0	96
8630	VEURNE	AZ WEST	10	9	66	2	87
8700	TIELT	SINT-ANDRIESZIEKENHUIS	10	9	71	0	90
8800	ROESELARE	AZ DELTA	6	7	66	2	81
8900	IEPER	JAN YPERMAN ZIEKENHUIS	*	9	75	0	90
9000	GENT	ALGEMEEN ZIEKENHUIS ST. LUCAS	10	9	63	2	84
9000	GENT	AZ JAN PALFIJN	10	9	76	2	97
9000	GENT	AZ MARIA MIDDELARES	10	9	77	0	96
9100	SINT-NIKLAAS	VITAZ	10	9	74	2	95
9200	DENDERMONDE	AZ SINT - BLASIUS	10	9	78	2	99
9300	AALST	ONZE-LIEVE-VROUW ZIEKENHUIS	10	9	75	2	96
9600	RONSE	AZ GLORIEUX	10	9	77	0	96
9620	ZOTTEGEM	AZ SINT-ELISABETH	10	9	72	2	93
9700	OUDENAARDE	AZ OUDENAARDE	10	9	75	0	94
9800	DEINZE	AZ SINT - VINCENTIUS	10	9	59	2	80

*Hospital reported an error in its organisation score after 31 July 2023. The national benchmark has not been adapted but the impact is considered low.

Good Moderate Weak

DISCUSSION

1. Main results

The current set of indicators was originally developed to be used three years (up to and including 2019) [5]. However Federal Platform for IPC has decided that in order to assess the effect of COVID-19 on the existing IPC indicators, the 2019 version of the protocol would continue to be used on a voluntary basis in 2020, 2021 and 2022. This is due to the COVID-19 pandemic the importance of infection prevention measures give priority to comparability with previous data collection. No changes have therefore been made to the indicators neither to the calculation of scores, in order to allow accurate measurement of the progress made in 2022. Of notice, many of the discussion points from the previous reports (2017, 2018, 2019, 2020 and 2021 data) still apply. These points are addressed to a limited extent in this report.

Significant progress have been observed in the participating hospitals (n=69, 66% of eligible hospitals) such as :

- A growing percentage of hospitals are complying with the condition of not exceeding 250 beds (and 100 beds) per full-time IPC professional and the number of beds per FTE IPC is decreasing. However, a limited participation of hospitals (n=56) in collecting data on the number of beds may be attributed to several factors, notably the lack of obligation to report bed numbers (denominator data) and the potential complexities associated with collecting this data.
- Participation in the Healthcare-Associated Infection (HAI) prevalence study and antimicrobial use have increased over the years. In 2017, all acute hospitals were invited to take part in the PPS [6]. The same year, 79% (n=103) of hospitals reported their participation to the PPS. However, the actual participation to the 2017 ECDC PPS amounted to 32.4% among Belgian acute hospitals [7]. The proportion of hospitals declaring their participation reached 96% (n=69) in 2022. The results for the 2022 ECDC PPS will encompass various indicators related to healthcare associated COVID-19 [8], along with other changes compared to the previous PPS.
- In 2022, the alcohol-based hand rub consumption fell compared to 2020, but remained higher than the average for 2019 and 2016. This collected data for 2022 suggests that the Belgian participating hospitals have maintained more rigorous disinfection practices than before the pandemic, as the importance of hand hygiene has become a norm in healthcare facilities. Despite the observed decrease in alcohol-based hand rub consumption compared to 2020 and 2021 (with median consumption rates of 49.0 l/1,000 hospitalization days in 2020 and 36.4 l/1,000 hospitalization days in 2021, and dropping to 25.9 l/1,000 hospitalization days in 2022), it's worth noting that this decrease could be influenced by the relaxation of COVID-19-related measures in the general population. These relaxations include the end of mask requirements (except for hospitals, doctor's offices, and pharmacies) and the end of mandatory isolation after a positive test [9]. All these measures, taken in 2022, have certainly contributed to a revival of certain standard measures. However, it's essential to highlight that the median alcohol-based hand rub consumption was reported at 20.3 liters per 1,000 patient-days in the 2017 PPS of HAI and antimicrobial use in European acute care hospitals [6].

This trend shows hospitals' growing commitment to HAI surveillance and prevention, which is encouraging for patient safety and quality of care.

2. Final months of the COVID-19 pandemic effect on the IPC quality indicator results

The global impact of COVID-19 pandemic has had repercussions on IPC programs worldwide. This pandemic and other majors outbreaks have shown how infectious agents can cause epidemics and can quickly propagate within healthcare environments. As a matter of fact it has revealed gaps and deficiencies in IPC programs, which persist regardless of the available resources or a country's economic status [10].
Belgian IPC teams claim that compliance with recommendations (hand hygiene and wearing personal protective equipment) declined sharply once the acute phase of the pandemic was over [11]. As stated above, this report also shows that the quantity of alcohol-based hand rub consumption has decreased in 2022 compared with 2020 and 2021.

It is clear that the COVID-19 pandemic has had an impact on teams of carers and IPC teams, with a considerably increased workload and a number of challenges that have had to be faced as a result of the decline in certain infection prevention and control recommendations [12]. Hospitals are still trying to recover from this crisis. In this context, we note that in recent years, the indicators with lower scores have made only very limited progress. Compared to the pre-COVID-19 period, a small decrease in the median of the overall quality score from 90/100 in 2019 to 83/100 in 2022 has been observed. In 2020, 2021 and 2022 the same protocol and scoring as in 2019 were used, therefore a change in the methodology could not explain this decrease. It has become evident that deficiencies continue to exist in the activity indicators that assess the existence of audits by the end of the pandemic. Less than half of the audit indicators achieved a percentage of 75%, in 2022. Even though, the proportion of hospitals that implemented the indicator is increasing again for most of these 12 indicators, the level of 2019 was not reached again. Recommendations on how hospitals can evaluate and improve their scores (Significant Event Analysis) are formulated in the report of 2020 [13].

However, for several years, the proportion of hospitals that meet certain indicators has been very high (≥95%). This indicate that the efforts made by the hospitals continue to have an effect during and after the COVID-19 pandemic. In an other hand, an increase is observed for some indicators. This may be the result of post-pandemic. For example, WHO recommends a minimum ratio of one full-time equivalent IPC professional (nurse or physician) per 250 hospital beds. In the IPC full requirements conditions, they even recommend a ratio of one IPC professional per 100 beds [10]. In 2022, 73% of the Belgian hospitals (for who data was available) met this minimal requirement and 14% had the higher ratio. Whereas a year earlier, the minimal requirement was met by 59% of the hospitals who entered their data and 8% for the higher ratio. Efforts are still needed at this level. The COVID-19 pandemic caused a considerable burden on the hospitals and IPC resources were diverted to the COVID-19 pandemic. In addition to the already increased patient acuity and complexity, the multiple roles and increased responsibilities of the IPC professional [10].

On the other hand some hospitals indicate that the absence of an appropriate IPC program limits evaluation of its effectiveness. This is a crucial point that the WHO promote through the Infection Prevention and Control Assessment Framework (IPCAF) at the facility level tool [14]. Moreover, following some participants, turn-over among IPC team could influence the results of quality indicators. They also notified that exercise of recording indicators is useful for follow-up and that communicate the results is essential for mobilizing staff. Indeed making the annual report available internally encourages transparency and learning.

3. Next steps

In 2024, the federal IPC platform will carry out an evaluation of IPC programs in hospitals. This evaluation will lead to recommendations, in line with international recommendations, to improve the standards, funding and internal and external reporting of IPC teams.
This initiative is an integral component of Belgium's "One Health" national action plan to combat antimicrobial resistance.
A data collection for quality indicators remains unchanged for 2023 data. As a matter of fact they are one of the main sources of information to assess IPC programs [15].
Focusing more on inter-hospital collaboration in networks such as the regional platforms or the Hospital Outbreak Support Teams (HOST) project may be the way forward to enhance implementation of the few remaining lower scoring indicators in all hospitals. All the more so as one of the aims of the project is to strengthen these field teams [18] .

The impact of the COVID-19 crisis on the results of the IPC quality indicator project, although minimal, remains to be seen in 2022. This is mainly the case for the process indicators related to auditing. This stresses the need for a robust and feasible crisis preparedness plan for the Belgian healthcare sector, in order to continue to guarantee high-quality of care during crises. Reflecting on these advises, it is questionable if the current staffing ratio is sufficient to achieve implementation, networking, new IPC educational and training approaches, etc. In conclusion, joint efforts are needed to strengthen programs (call for action), communication, and maintain a culture of continuous improvement in IPC.

4. Strengths and limitations

4.1. STRENGTHS

- For 2022, 69 Belgian acute hospitals participated in the quality indicator project, which corresponds to a response rate of 67%. Despite the COVID-19 pandemic, the voluntary participation and the not to the changing situation adapted set of indicators, most hospitals participated.
- This indicator set was developed in response to the need to develop IPC programs in hospitals in a coordinated and project-based way. The protocol and the IPC quality indicators project can be seen as an instrument to enhance the IPC strategy of the federal IPC platform during and outside a COVID pandemic.
- The quality indicator project contains indicators selected and developed at federal level whose results are publicly available. However, the use of these indicators to assess the quality of IPC programs is widely supported and we feel that this project is initiating improvement of IPC processes within hospitals. This project does not only mobilise the IPC teams within the hospitals, but also the hospital management, the regional IPC platforms and the HOST.

4.2. LIMITATIONS

- As expected, the participation of eligible hospitals dropped during the years when the projects was set ‘voluntarily’. The representativeness of our findings for the entire country is therefore lower compared to pre-pandemic reports. Moreover, selection bias may have occurred.
- The data provided by the hospitals to compile the indicators have not been and are not being validated. The need for external data validation was already mentioned in the feasibility study for this project [16] and in the previous reports [7,10,23].
- The quality of the IPC program in hospitals is in this project mainly evaluating whether certain tasks part of the IPC program are performed in the hospital or not. The quality of how these tasks are performed and their impact on the IPC and the overall quality of care is not evaluated by this project [20].
- Achieving a good score on predefined IPC indicators does not automatically mean that the IPC related care provided to individual patients and at hospital level is of good quality. Most indicators require further research and validation before it can be stated with certainty that the IPC is 'good' or 'weak' [21,22]. It can be questioned whether the use of indicators and quality scores is the best way to measure and improve the quality of care in Belgian hospitals [13,17–19].
- This report shows the impact on the indicators that were available by the end of the COVID-19 pandemic. Through these indicators it was not possible to identify the effect of the COVID-19 pandemic on the emotional burden of the IPC teams. Other surveys (e.g. survey done by Belgian Infection Control Society [26], the COVID-19 Health Interview Survey [27], the COVID-19 HEROES study) may provide additional information.
- Regional disparities in IPC performance highlight persistent problems, but the report may not explore the underlying reasons for these inequalities in depth.

5. Recommendations

5.1. RECOMMENDATIONS FOR HOSPITALS

- Continue to register IPC activities and outcomes in order to be able to monitor and improve the quality of the IPC program within the hospital.

5.2. RECOMMENDATIONS FOR THE BAPCOC SUPPORT TEAM, THE FEDERAL PLATFORM FOR IPC AND THE RESEARCHERS RESPONSIBLE FOR THE DATA COLLECTION, ANALYSIS AND REPORTING OF THE QUALITY INDICATOR PROJECT (SCIENSANO)

- Define a limited set of indicators that provide the best possible assessment of the IPC quality in the hospital. Important in the choice of these indicators is that they are sensitive enough to detect improvement and differences in IPC quality and to identify weaker performances. A first step in this process, a systematic literature review, was conducted by the Sciensano research team in June 2022.
- Investigate the contents of a new set of indicators and develop a new protocol. Suggestions regarding this were formulated in the previous reports. Many hospitals comply with a high number of the current indicators for consecutive years already and therefore additional indicators are needed for further improvements. Now that the most quality indicators have been implemented in many hospitals, it may be possible to look more in depth to certain aspects (per theme) in order to further improve IPC management and implement more detailed indicators.
- Examine the extent to which data collected in other quality projects can be coordinated and integrated within this IPC quality indicator project, in order to reduce the (administrative) workload of staff and to improve the efficiency of healthcare quality measurement. Additional research is needed for this.
- Investigate the extent to which the selected indicators can be harmonised with the minimal requirements for IPC programs proposed by the WHO [4].
- Asses how the protocol for the surveillance of surgical site infections can be made more user friendly and feasible to implement, to enhance participation in this surveillance (local and/or national). Assess how the lack of resources/time to participate in the surveillance of intensive care unit infections and surgical site infections can be addressed. Assess if a surveillance for UTI on all wards is useful and wanted. Assess the streamlining and integration of these surveillances in other by Sciensano coordinated surveillances.
- Examine what could explain the differences in influenza vaccination coverage among nurses, midwives and nursing assistants between different regions and hospitals.
- Continue to improve and optimise the data collection tool (Healthdata) and the online reporting platform (Healthstat).

5.3. RECOMMENDATIONS FOR POLICY MAKERS

- Assess whether the current legislation regarding the number of fulltime equivalents (FTE) physicians and nurses assigned to IPC should be revised and adapted to current IPC needs in Belgium.
- Support the development and implementation of an external quality control (validation) of the data collected for the IPC indicator project. This external quality control could be conducted by Sciensano in collaboration with the BAPCOC working group 'Quality indicators for IPC'.
- Connect to avoid duplication of effort at institutions level and at hospitals level and to promote efficiency in care quality measurement.
- Continuing to support this IPC quality indicator project so that the quality of the IPC program within hospitals can be further monitored and improved. The current COVID-19 crisis emphasizes the importance of strengthening and supporting a well-functioning IPC policy and management at national and hospital level.
- Consider making data collection on IPC quality indicators mandatory in future, even in times of crisis such as the COVID-19 pandemic. This will ensure more complete and representative data.

CONCLUSION

The COVID-19 pandemic has had a significant impact on infection prevention and control (IPC) programs in healthcare settings globally. Participation in the quality indicator project was set from mandatory to voluntarily and resulted in a decrease of approximately 30% in eligible hospitals reporting the indicators.

To a significant degree, the pandemic increased the workload and challenges for healthcare and IPC teams. While some indicators show progress, the overall quality score for IPC programs decreased slightly compared to the situation pre COVID-19. Deficiencies persist, particularly in audit completion at the end of the pandemic.

Efforts by hospitals in meeting certain indicators demonstrate the lasting effects of their commitment to IPC. However, there is still room for improvement, especially in meeting WHO recommendations.

The lessons learned from the COVID-19 pandemic emphasize the need to strengthen IPC programs for the ongoing protection of public health.

VISION OF THE FEDERAL PLATFORM FOR IPC (BAPCOC) AND THE FPS OF HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT

1. Version en français

Deux tendances intéressantes se dessinent. L'une est l'augmentation du nombre de FTE IPC par rapport au nombre de lits hospitaliers, avec désormais 73% d'hôpitaux ayant un nombre de lit par FTE IPC < à 250 et même 14% atteignant désormais la proportion de moins de 100 lits par FTE IPC, norme proposée par WHO. Ceci témoigne d'un élargissement des équipes au sein des hôpitaux. La seconde est une récupération progressive des scores évaluant les indicateurs d'activité. Le niveau atteint en 2019 a été récupéré en 2022, soit au cours de la deuxième année suivant la première vague de COVID-19. A noter encore et toujours une faible proportion d'hôpitaux ayant développé un programme de surveillance des infections en IC et des SSI. On note également que quelques indicateurs d'activité restent peu suivis (avec de taux < à 60%). Il serait intéressant d'en identifier les raisons. Enfin on observe un retour aux valeurs antérieures de la consommation de solution hydroalcoolique. Ceci doit être mis en perspective avec les importantes consommations encouragées également auprès des visiteurs, familles etc. et ne témoigne probablement pas d'une réduction de compliance du personnel soignant.
Les renseignements principaux que l'on peut retirer de l'enquête portant sur les indicateurs qualité de l'année 2022 dans les hôpitaux aigus doivent être nuancés par une stabilisation de la participation par rapport aux années 2020 et 2021 (caractère facultatif de la collecte depuis 2020). Les variations observées, souvent de faible intensité, doivent donc être interprétées avec prudence.

L'ensemble des données témoigne donc d'un retour progressif des programmes IPC, déchargés du poids de la gestion de la crise COVID, à une situation normalisée, mais avec une augmentation des ressources.

A noter que ce set d'indicateur n'explore pas l'éventuel apport des équipes HOST à la réalisation de ces objectifs et que, comme les collectes antérieures, il souffre de l'absence de validation extérieure.

Le set actuel a permis d'accompagner le développement des programmes d'IPC et d'en mesurer l'évolution et de mesurer partiellement l'impact de la crise du COVID. Il est cependant temps de déployer un nouveau set d'indicateurs qui permettrait de poursuivre la démarche qualité en cours en intégrant les nouvelles perspectives ouvertes par le déploiement des HOST et la collaboration entre les différentes parties prenantes (hôpitaux, réseaux, collectivités, entités fédérées, …). Les résultats de l'évaluation du programme IPC mis en œuvre par le SPF Santé Publique en 2024 contribueront à établir un nouvel ensemble d'indicateurs de qualité pour la prévention des infections dans les hôpitaux de soins aigus dans le cadre plus large d'une optimalisation des programmes IPC.

2. Nederlandstalige versie

Twee interessante trends tekenen zich af. De eerste trend is een toename van het aantal VTE IPC in verhouding tot het aantal ziekenhuisbedden: 73% van de ziekenhuizen heeft nu minder dan 250 bedden per VTE IPC en 14% bereikt nu zelfs het percentage van minder dan 100 bedden per VTE IPC, de norm die de WHO vooropstelt. Dit toont aan dat de ziekenhuisteams uitbreiden. De tweede trend is een geleidelijk herstel van de scores die de activiteiten-indicatoren beoordelen. In 2022, het tweede jaar na de eerste COVID-19 golf, werd het niveau dat in 2019 werd behaald opnieuw bereikt.
Verder dient opgemerkt te worden dat het percentage ziekenhuizen dat een programma heeft ontwikkeld voor het monitoren van ICU-infecties en SSI nog steeds laag is. Ook valt op dat sommige activiteiten-indicatoren nog steeds laag scoren (met percentages < 60%). Het zou interessant zijn om de redenen hiervoor te achterhalen. Tot slot is de consumptie van hydroalcoholische oplossing terug gekeerd naar het oude niveau (pre-COVID-19). Dit moet worden gezien in de context van de hoge consumptie tijdens de pandemie, die ook werd aangemoedigd voor bezoekers, families, enz., en is waarschijnlijk geen weerspiegeling van een verminderde naleving door het verplegend personeel.
De belangrijke informatie die kan worden afgeleid uit de bevraging over de kwaliteitsindicatoren voor het jaar 2022 in acute ziekenhuizen stoelt op een deelname die gestabiliseerd is in vergelijking met de jaren 2020 en 2021 (de inzameling is vrijwillig sinds 2020). De waargenomen variaties, die vaak klein zijn, moeten daarom met de nodige voorzichtigheid worden geïnterpreteerd.
Over het geheel genomen laten de gegevens dus een geleidelijke terugkeer zien van de IPC-programma's, die bevrijd zijn van de last van het beheer van de COVID-19 crisis, naar een genormaliseerde situatie, maar met een toename van de middelen.
Opgemerkt moet worden dat deze set indicatoren niet de mogelijke bijdrage van de HOST-teams aan de verwezenlijkingen onderzoekt en dat, net als bij de eerdere gegevensverzamelingen, externe validatie ontbreekt.
De huidige reeks indicatoren heeft het mogelijk gemaakt om de ontwikkeling van IPC-programma's te ondersteunen, hun vooruitgang te meten en de impact van de COVID-19 crisis gedeeltelijk te meten. Het is nu echter tijd om een nieuwe reeks indicatoren uit te rollen die het mogelijk maakt om de huidige kwaliteitsbenadering voort te zetten en tegelijk de nieuwe perspectieven te integreren die worden gecreëerd worden door de ontwikkeling van HOST en de samenwerking tussen de verschillende actoren (ziekenhuizen, netwerken, residentiële collectiviteiten, gefedereerde entiteiten,...). De resultaten van de evaluatie van de IPC-programmas in acute ziekenhuizen door de FOD Volksgezondheid in 2024 zullen bijdragen tot het vastleggen van een nieuwe reeks kwaliteitsindicatoren voor infectiepreventie in het ruimere kader van de optimalisatie van IPC-programma's.

REFERENCES

1. FOD Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu. Gezondheidszorginstellingen [Internet]. 2020. Available from: https://www.health.belgium.be/nl/gezondheid/organisatie-van-de-gezondheidszorg/delen-van-gezondheidsgegevens/gezondheidszorginstellingen

2. Belgische staat. C-2015/24034, Moniteur Belge - Belgisch Staatsblad 27.01.2015 Article 5, §2. [Internet]. 2015. Available from: http://www.nsih.be/download/CDIF/Arrete%20Royal%202015.xps

3. Indicateurs de qualite en hygiene hospitaliere Cahier des charges : définitions, consignes de remplissage, preuves à conserver [Internet]. [cited 2023 Dec 8]. Available from: https://www.sciensano.be/sites/default/files/2019_cahier_des_charges_iq.pdf

4. Minimal requirements for infection prevention and control [Internet]. Geneva: World Health Organization; 2019. Available from: https://www.who.int/publications/i/item/9789241516945

5. Kwaliteitsindicatoren voor ziekenhuishygiëne. Lastenboek: definities, instructies voor het invullen en bewijselementen. Verzameling 2020 (gegevens 2019) [Internet]. Sciensano; 2019. Available from: https://www.sciensano.be/nl/biblio/kwaliteitsindicatoren-voor-ziekenhuishygiene-lastenboek-definities-instructies-voor-het-invullen-en

6. European Centre for Disease Prevention and Control. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals: 2016 2017. [Internet]. LU: Publications Office; 2023. Available from: https://data.europa.eu/doi/10.2900/474205

7. Point prevalence study of healthcare-associated infections and antimicrobrial use in Belgian acutre care hospitals [Internet]. [cited 2023 Dec 21]. Available from: https://www.sciensano.be/sites/default/files/nationalreport_ecdcpps2017_belgium_20181119.pdf

8. European Centre for Disease Prevention and Control. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals: protocol version 6.1, ECDC PPS 2022 2023. [Internet]. LU: Publications Office; 2022. Available from: https://data.europa.eu/doi/10.2900/017250

9. Dernières nouvelles | Coronavirus COVID-19 [Internet]. [cited 2023 Oct 13]. Available from: https://www.info-coronavirus.be/fr/news/

10. World Health Organization. Global report on infection prevention and control Executive summary [Internet]. [cited 2023 Oct 6]. Available from: https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/ipc/ipc-global-report/who_ipc_global-report_executive-summary.pdf

11. Jansens H, Antwerpen U. Enquête sur l'impact de la covid-19 sur l'organisation et le travail des équipes de prévention des infections en Belgique. 2022;

12. Rebmann T, Alvino RT, Mazzara RL, Sandcork J. Infection preventionists' experiences during the first nine months of the COVID-19 pandemic: Findings from focus groups conducted with Association of Professionals in Infection Control & Epidemiology (APIC) members. Am J Infect Control. 2021 Sep;49(9):1093–8.

13. Dequeker S, Duysburgh E. Kwaliteitsindicatoren voor ziekenhuishygiëne in acute ziekenhuizen: jaarrapport 2020 - data tot en met 2019 [Internet]. Brussels, Belgium: Sciensano; 2021 Jul p. 62. Report No.: D/2021/14.440/10. Available from: https://www.sciensano.be/nl/biblio/kwaliteitsindicatoren-voor-ziekenhuishygiene-acute-ziekenhuizen-jaarrapport-2020-data-tot-en-met

14. INFECTION PREVENTION AND CONTROL ASSESSMENT FRAMEWORK AT THE FACILITY LEVEL [Internet]. [cited 2023 Oct 27]. Available from: https://iris.who.int/bitstream/handle/10665/330072/WHO-HIS-SDS-2018.9-eng.pdf?sequence=1

15. Plan d'action national belge « One Health » de lutte contre la résistance aux antimicrobiens [Internet]. [cited 2023 Oct 6]. Available from: https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/annexe_2_-_fr_plan_operationnel_ikw.pdf

16. Viseur N, Lambert ML. Kwaliteitsindicatoren voor ziekenhuishygiëne in acute ziekenhuizen [Internet]. Brussels, Belgium: Scientific Insitutie for Public Health; 2011. Available from: http://www.nsih.be/download/IQ/IQ_eindrapport_NL_aanpassing%20na%20opmerkingen%20RPs%20_vs3.pdf

17. Dequeker S, Duysburgh E. Kwaliteitsindicatoren voor ziekenhuishygiëne in acute ziekenhuizen: Jaarraport 2019 - Data 2018 [Internet]. Brussels, Belgium: Sciensano; 2019. Available from: https://www.sciensano.be/nl/biblio/kwaliteitsindicatoren-voor-ziekenhuishygiene-acute-ziekenhuizen-jaarrapport-2019-data-2018

18. Dequeker S, Duysburgh E. Kwaliteitsindicatoren voor ziekenhuishygiëne in acute ziekenhuizen: Jaarraport 2019 - Data 2017 [Internet]. Brussels, Belgium: Sciensano; 2019. Available from: https://www.sciensano.be/nl/biblio/kwaliteitsindicatoren-voor-ziekenhuishygiene-acute-ziekenhuizen-jaarrapport-data-2017

19. Dequeker S, Duysburgh E. Quality indicators for infection prevention and control in acute care hospitals - Report 2021 - Data up to and including 2020 [Internet]. Brussels, Belgium: Sciensano; 2022 May. Report No.: D/2022/14.440/1. Available from: https://www.sciensano.be/nl/biblio/quality-indicators-infection-prevention-and-control-acute-care-hospitals-report-2021-data-and

20. Duysburgh E, Dequeker S, Mortgat L. Kwaliteitsindicatoren voor ziekenhuishygiëne in acute ziekenhuizen: Jaarrapport 2017 - Data 2016 [Internet]. Brussels, Belgium: Scientific Institute for Public Health; 2018. Available from: http://www.nsih.be/download/IQ/Rapport_QI_2017_NL.pdf

21. Raleigh V, Foot C. Getting the measure of quality: opportunities and challenges [Internet]. London, England: The King's fund; 2010. Available from: https://www.kingsfund.org.uk/sites/default/files/Getting-the-measure-of-quality-Veena-Raleigh-Catherine-Foot-The-Kings-Fund-January-2010.pdf

22. Werner R, Asch D. Clinical Concerns About Clinical Performance Measurement. Ann Fam Med. 2007;5(2):159–63.

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We look forward with enthusiasm to the positive impact this report can have on healthcare quality in Belgium and are eager to continue working together to promote patient safety and excellence in healthcare.

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