الإدارة العامة لمكافحة عدوى المنشآت الصحية

General Directorate of Infection Prevention and Control in Healthcare Facilities

Annual Report

2022

Kingdom of Saudi Arabia –Ministry of Health
Assistant Agency for Preventive Health
General Directorate of Infection Prevention and Control (GDIPC)
12234 King Abdulaziz Road, Alsulimania District, Riyadh, 3rd Building
www.gdipc.sa
gdipc@moh.gov.sa
Twitter: @SA_IPC

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1. GDIPC in Numbers

6 Comprehensive Infection Control Programs

76 graduates

12 online short-term courses

30 days > **5057** participants

40,000

BICSL certificates

3

Educational platforms

3 Published Articles

14 Published Guidelines

GDIPC in Numbers

2 New electronic systems

1. **HESN Plus**
2. **Outbreak Platform**

- **76** Adult Medical Surgical ICUs of MOH Hospitals involved in **CLABSI Rate Reduction Strategy**
- **26** hospitals: **20** MOH and 6 Private included in **Go Green Competition.**
- CLABSI rate is reduced to **28%** in medical-surgical ICU

28%

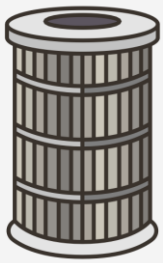
59%

- **11** assessment validation central visits → **25 unreported HAI outbreaks**
- HAIs reporting process improved by **59%** among all hospitals that have zero reporting during 2019-2022

GDIPC in Numbers

298 infection prevention & control supplies approval according to the technical specifications

157 requests followed up to change the Portable **HEPA filter** from MOH healthcare facilities



- **220** reviewed and approved infection prevention & control product requests submitted by medical companies, **as follow:**
- **140 Environmental Disinfectants**
- **50** of Personal Protective Equipment **(PPE)**
- **10** of Portable High-Efficiency Particulate Air **(HEPA) filter**
- **20** other **IPC-related machines**

2. Infection Control Program

2.1 Infection Control Audit (ICA)

The Infection Control Audit Program aims to follow up the evaluation of all program elements issued by the GDIPC and implemented in healthcare facilities by using approved evaluation forms based on scientific references at the national and international levels. Also, the program aims to verify the quality and progress of the evaluation process and to communicate with the directorates' responsible coordinators to achieve the highest rate of compliance with the proposed standards. In addition, the program is concerned with improving the level of program-related auditors/coordinators by providing a comprehensive training program for them. There are two types of evaluation:

1. Supervisory Auditing Programs: These are conducted by certified evaluators for the following programs (infection control auditing (ICA), dental infection control auditing (DICA), hemodialysis centers infection control auditing (HD ICA), comprehensive rehabilitation centers).
2. Self-Auditing Programs: These are conducted by the healthcare facilities' self-evaluation for the following programs (infection prevention & control core components, respiratory protection program (RPP), adherence to hand hygiene, and self-assessment of hand hygiene).

Supervisory Auditing Programs:

ICA	Infection Control Audit
DICA	Dental Infection Control Audit
HD	Hemodialysis Infection Control Audit

Self-Auditing Programs:

HH -SA	Hand Hygiene -Self Assessment
IPCCC	Infection Prevention and Control Core Component
PHC	Primary Health Care Infection Control Self-Assessment

The mechanism of supervisory programs follow-up

- Supervising the evaluation visits to the healthcare facilities and following up the process of reports receiving.
- Communication with the coordinators and provision of advisory support in regard to the quality of submitted reports.
- Following up on adherence to the evaluation visits protocol for all regions.
- Creating reports about all healthcare facilities' compliance regarding all auditing programs through data analysis and the results of visits.

The mechanism of the self-auditing programs follow-up

- Communicate with the program coordinators and provide technical support.
- Follow up on the data entered for evaluation results for all healthcare facilities.

- Compare the results of the self-assessment reports to the results of the supervisory evaluation visits for ensuring validity and quality.

The mechanism of the hand hygiene program follow-up

- Follow-up data entry and reports to verify the compliance rate of all healthcare facilities.
- Monitor the quality of reports for all regions.
- Follow up on the implementation of the verification visits.
- Analyze the results of the verification visits according to the approved standards.

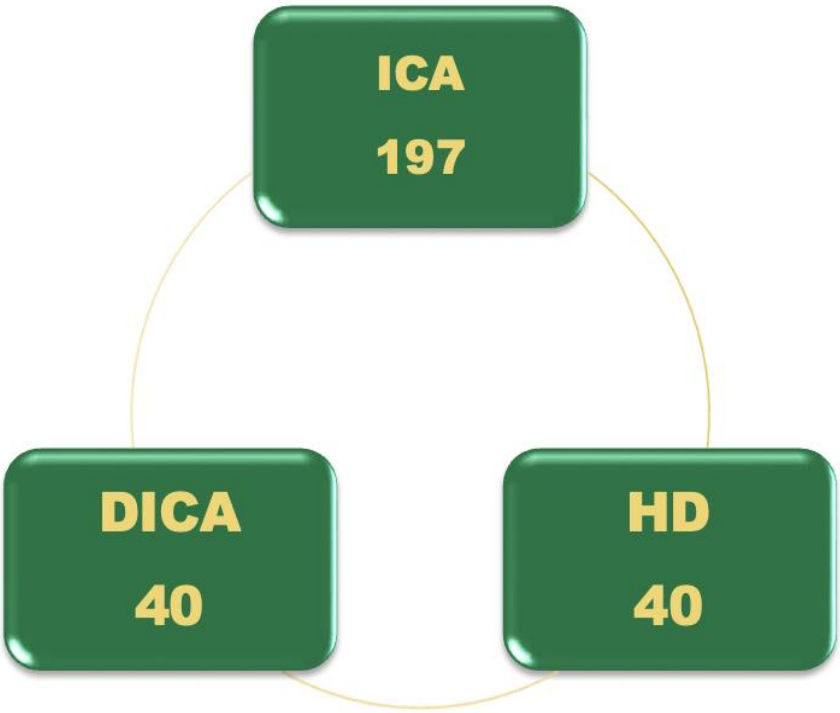


Figure 1: Number of Approved Coordinators, 2022

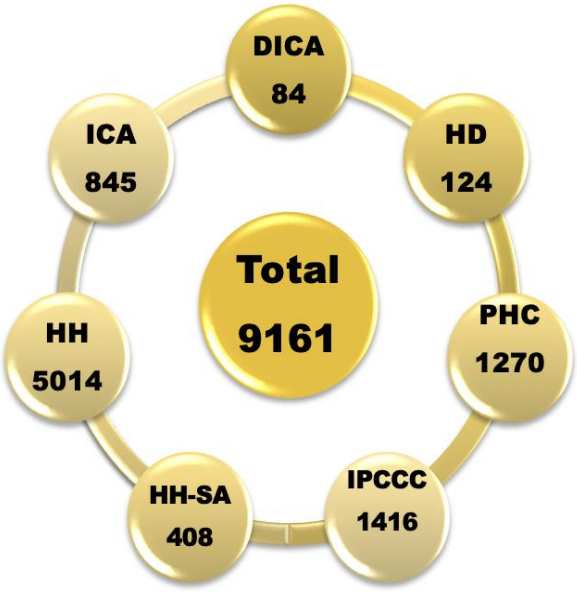
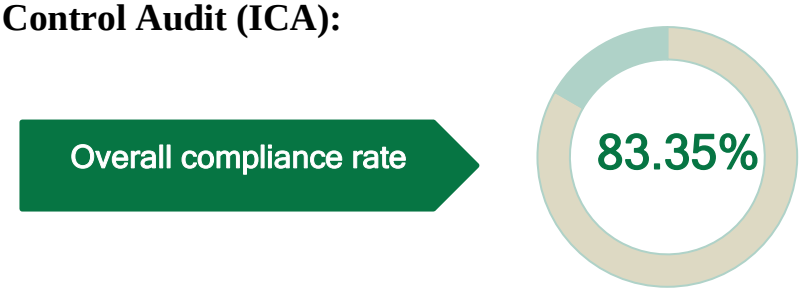


Figure 2: Number of Auditing Programs Reports, 2022

2.1.1 Infection Control Audit (ICA):



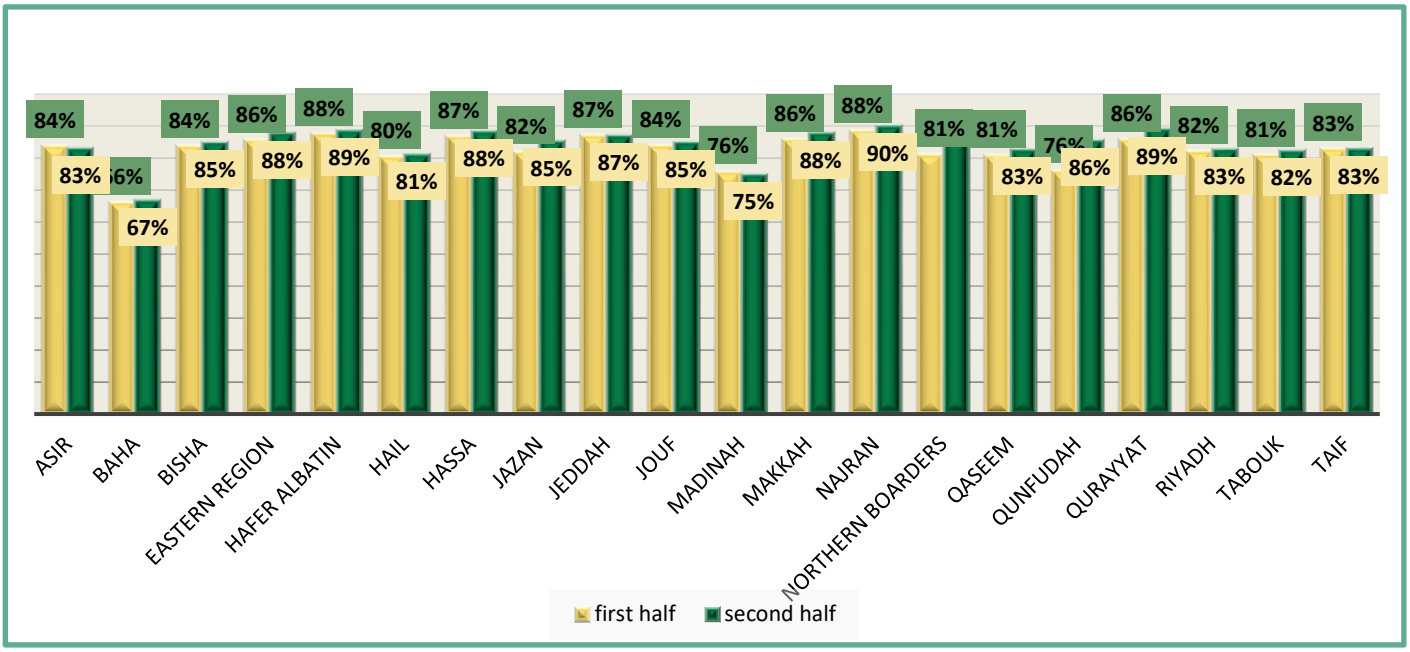


Figure 3: ICA Compliance Rate per Region, 2022

The graph shows each region's average compliance rate with infection control standards for the first and second half of 2022. The overall compliance rate for the first half of KSA was 82.77%. While the second half was 83.95%. The first half's highest compliance rate was in Hafar Al-Batin and Najran regions at 88%. While Najran region at 90% was the second half's highest. The lowest compliance rate in both the first and second half was Al-Baha region at 66% and 67%. The compliance rate in 2022 increased from the first to the second half by 1.18%.

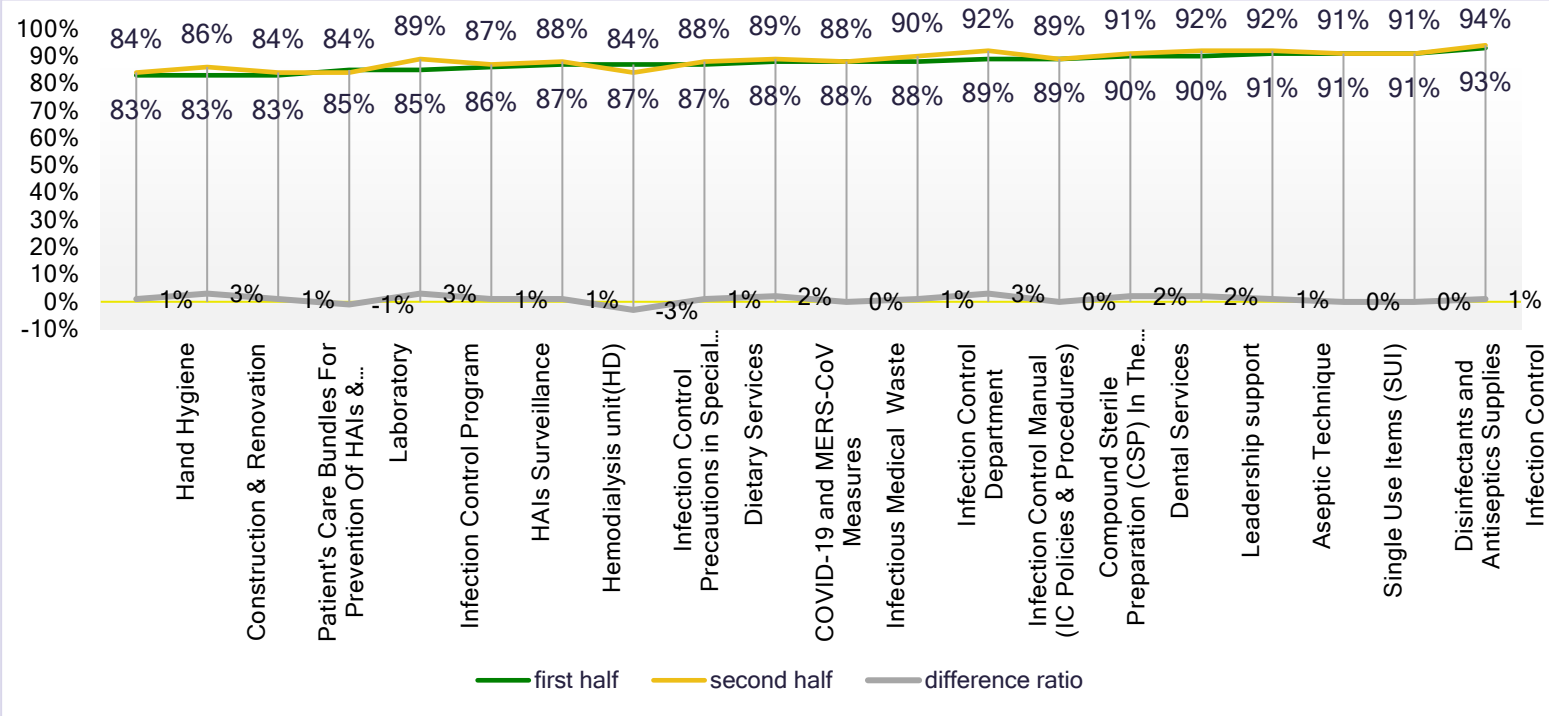


Figure 4: ICA Compliance Rate per standards, 2022

The line chart shows the difference between the first and second half of 2022 regard to the Compliance Rate of infection prevention and control standards at the national level. There was an increase from the first half to the second except for two standards, laboratory and infection control percussion in special situations where the first half was higher. The highest compliance rate for both the first and second half was the standard of infection control committee with 94% and 93%.

2.1.2 Dental Infection Control Audit Program (DICA):

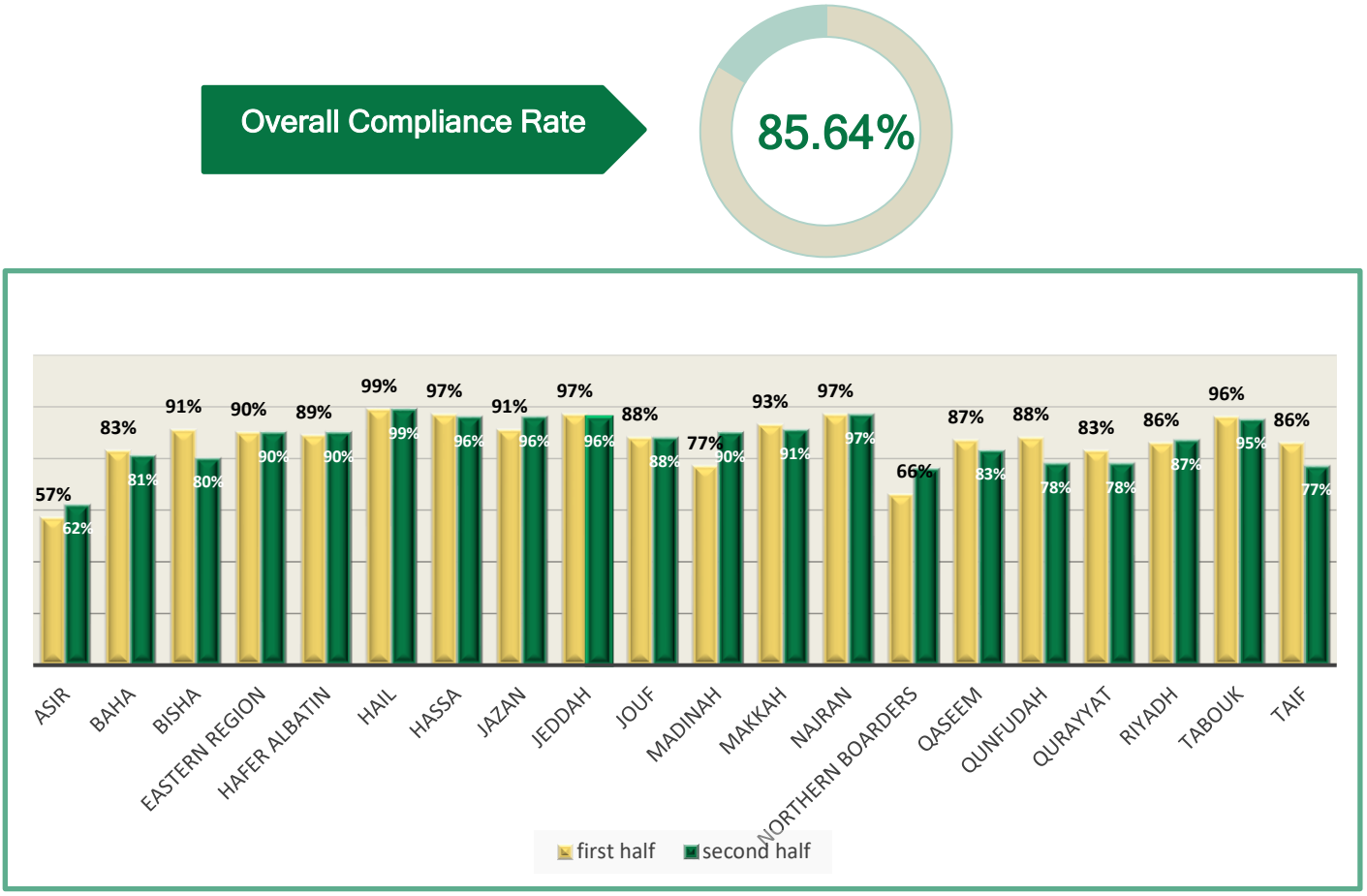


Figure 5: DICA Compliance Rate per Region, 2022

The graph indicates the average rate of adherence to the infection control standards in dental centers during the first and second half of 2022. The total percentage was **84.61%** in the first half of 2022, while it increased by 1.59% in the second half to **86.20%.** The lowest reported rate was in Asir region (57% for the first half and 62% for the second half).

2.1.3 Hemodialysis Centers Infection Control Audit Program (HD ICA):

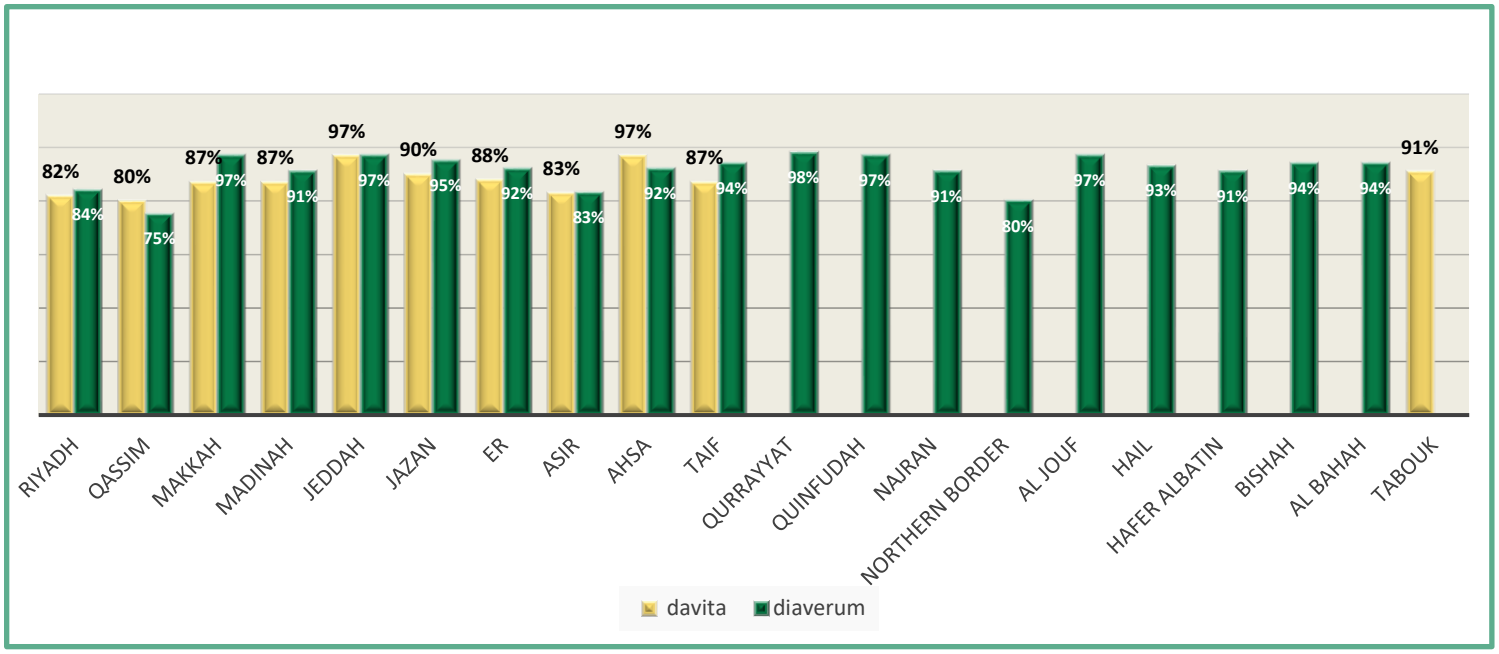


Figure 6: Dvita and Diaverum Compliance Rate per Region, 2022

The graph shows the overall compliance rate of the infection control standards for the DaVita and Diaverum hemodialysis centers in 2022 for each region. The overall compliance rate was 88.93%. The highest compliance rate for DaVita centers was in Jeddah and Al Hassa at 97%. The lowest compliance rate for DaVita centers was in Al Qassim at 80%. The highest compliance rate for Diaverum centers was in Qurrayat at 98%. The lowest compliance rate for Diaverums center was in Al Qassim at 75%.

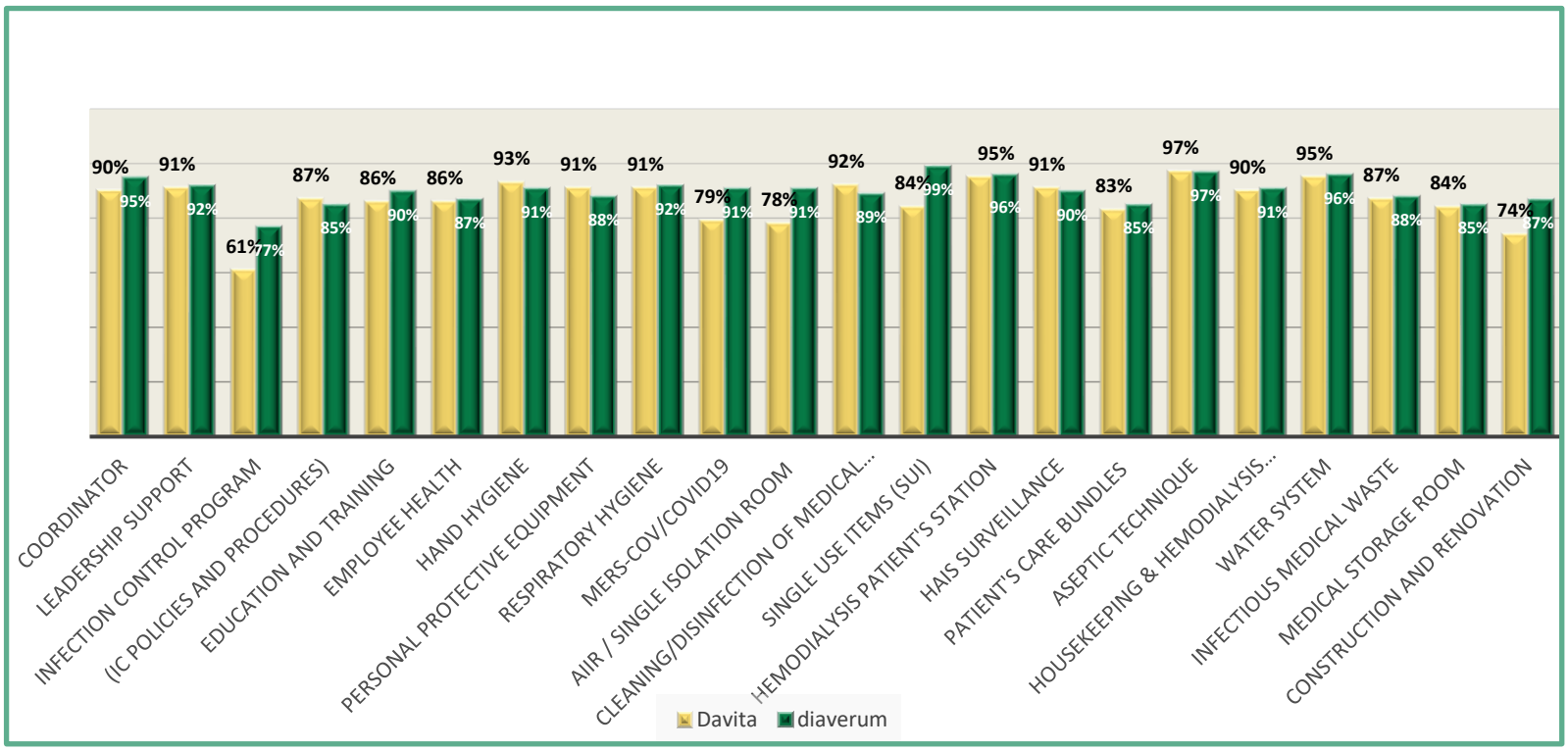


Figure7: Dvita and Diaverum Compliance Rate per standards, 2022

The graph shows each region's average compliance rate for each infection control standard for DaVita and Diaverum hemodialysis center in 2022. The highest compliance rate for DaVita centers was 97% for aseptic technique, while the lowest compliance rate was 61% for infection control program. The highest compliance rate for Diaverum centers was 99% for the standard of single-use items, while the lowest compliance rate was 77% for infection control program.

2.1.4 Hand Hygiene Program:

Total number of hospitals	Total number of received monthly reports	Total number of verified monthly reports
440	5280	5014

Opportunities: 864268

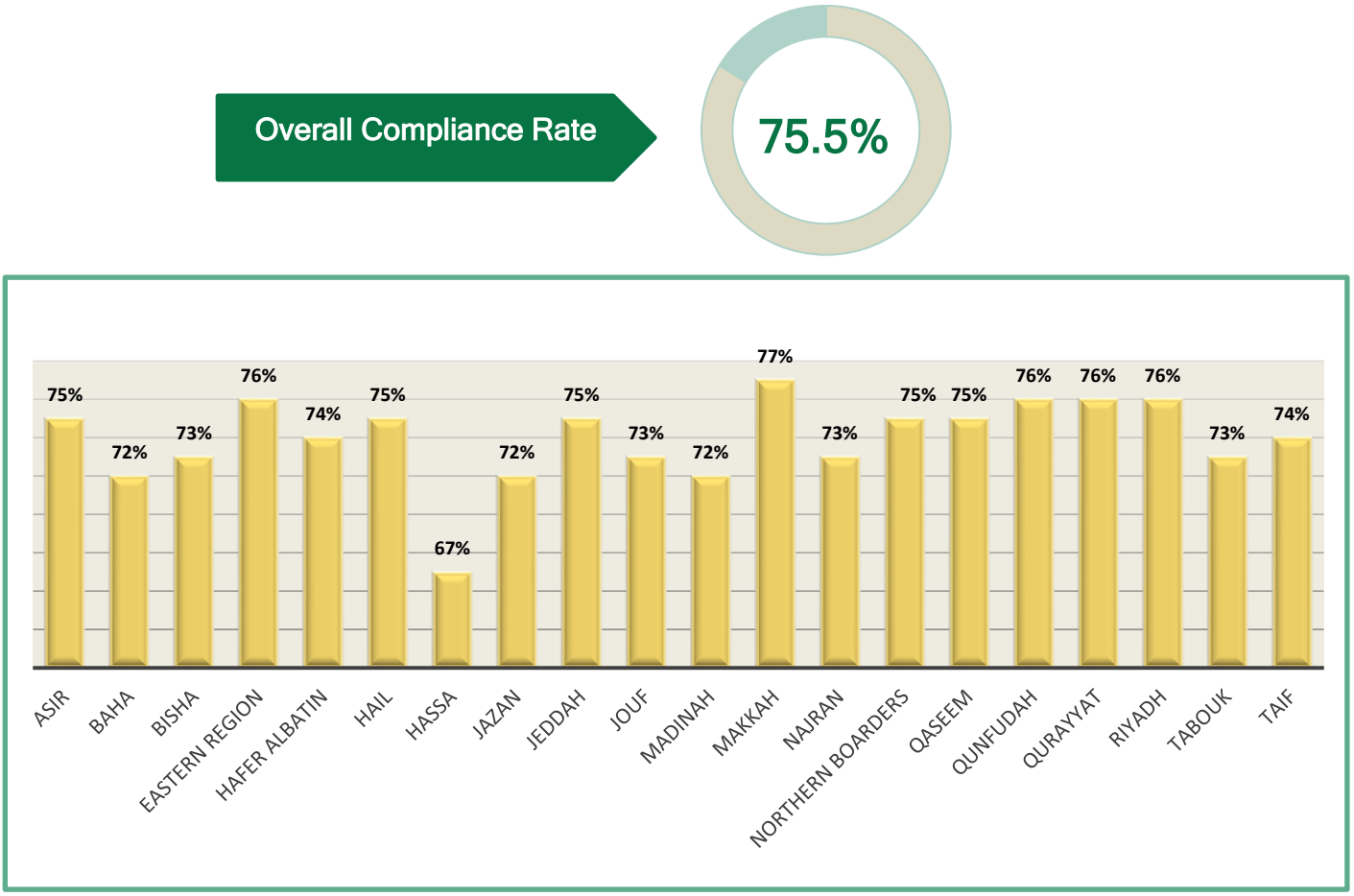


Figure 8: Hand Hygiene Compliance Rates per Region, 2022

The graph shows the average compliance rate of Hand hygiene in 2022 per region. The highest rate of compliance was in Makkah at 77%. The lowest compliance rate was in Al Hassa at 67%.

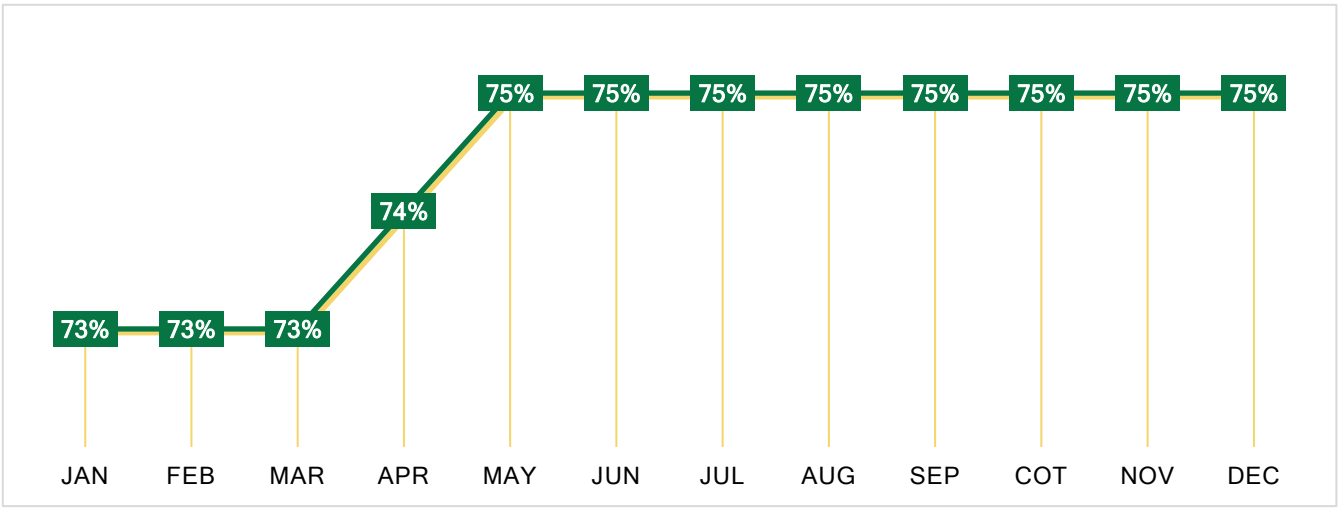


Figure 9: Hand Hygiene Compliance Rates per Month, 2022

The graph demonstrates that the hand hygiene compliance rate was increasing from 73% for the first three months to 75% for the last eight months of the year.

Table 1: Hand Hygiene Compliance Rates per Department, 2022

Hemodialysis	Intensive care	Emergency	Other
79%	77%	75%	76%

Table 2: Hand Hygiene Compliance Rates per staff category, 2022

Nurse/midwife	Doctors	Other health care worker
78%	77%	70%

Table 3: Hand Hygiene Compliance Rates per Shift, 2022

Morning	Afternoon	Night
77%	76%	74%

Table 4: Hand Hygiene Compliance Rates per Indication (5 moments), 2022

Before touching a patient	Before clean/aseptic procedure	After touching patient surroundings	After touching a patient	After body fluid exposure risk
70%	84%	69%	81%	91%

The above-posted tables (1-4) explain the hand hygiene compliance rate among healthcare workers according to various aspects: per department, per staff category, per shift, and per indication (5 moments). It is obvious that the overall compliance rate was the highest among the Hemodialysis department at the national level and the nurses were the most compliant in comparison to other healthcare workers categories. From the above-recorded data, the

compliance rate among healthcare workers in the morning shift was the highest and particularly if there is after-body fluid exposure risk.

2.2 Central Sterilization Services Department (CSSD)

The central sterilization services program in GDIPC promotes the concept of applying infection control standards within central sterilization service departments (CSSD) in hospitals and within sterilization service units (SSU) in primary health care centers and dental centers. The program is responsible for issuing guidelines and documents for infection control standards in CSSD to develop the work environment, the correct practices within the sterilization departments, and the workflow to obtain safe instruments. One of the important pillars of the unit is the training that aims to standardize the correct practices to reduce the transmission of infection.

The 2022 plan's aim was to promote the level of competence in sterilization-related practices in all healthcare facilities and to enhance the application of the best infection control standards in CSSDs.

2.2.1 Training & Education:

Educational Platform of CSSD for Primary Health Care:

The electronic educational platform for sterilization service units in primary health care centers was launched on 8/4/2022 at the website of the GDIPC. There were lectures and quizzes, uploaded to the GDIPC website, which highlight the essential measures that should be implemented correctly inside the SSU. HCWs who answer the quizzes and pass the exam are provided with certificates.

Educational Platform of CSSD for Hospitals

The educational platform was established on 21/6/2021 on the GDIPC website. The platform plays an effective role in raising the knowledge of practitioners.

Further Specific Training:

The training of 6 regional coordinators, who are newly enrolled in the regional directorates, was conducted in the following regions: Madinah, Jeddah, Makkah, Jouf, Riyadh, and Asir. The purpose of this training was to introduce the basics of infection control and supervisory

skills in central sterilization. The evaluation list of the CSSD in the healthcare facilities was fully detailed and explained in the training.

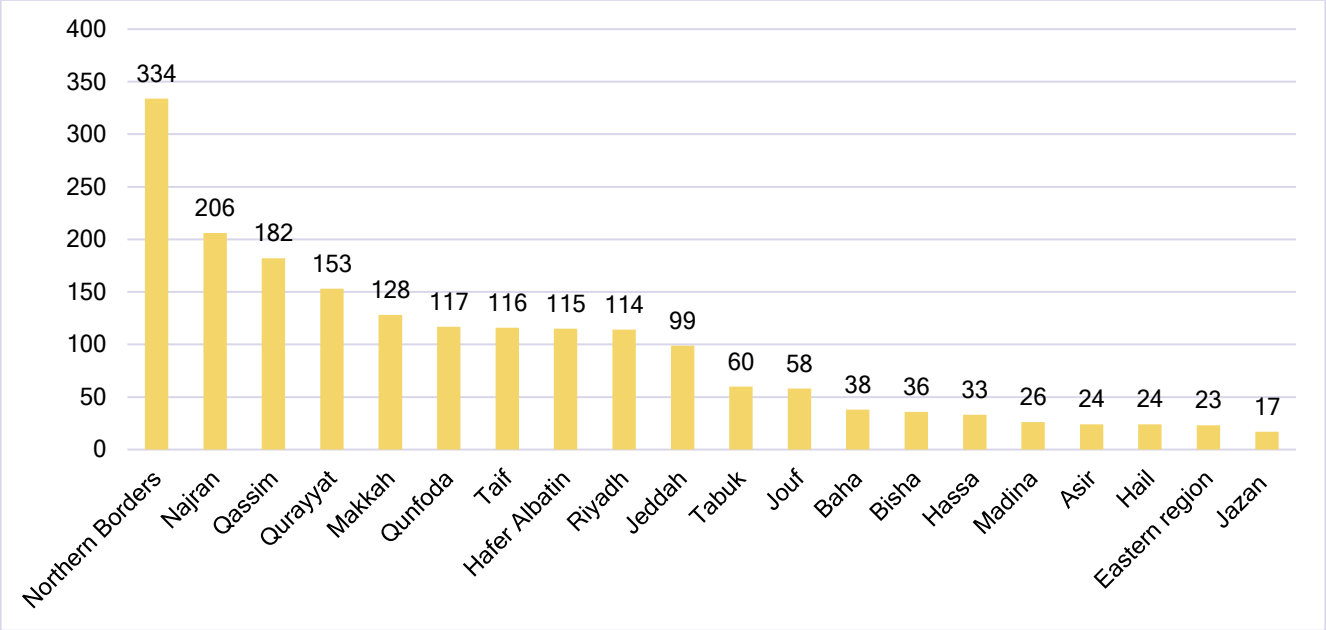


Figure 10: Number of HCWs Utilized the PHC Platform per region, 2022

The total number of HCWs who used and benefitted from the platform was 922 practitioners. Most of them were from Northern Borders region (334), lowest participation was from Jazan (17).

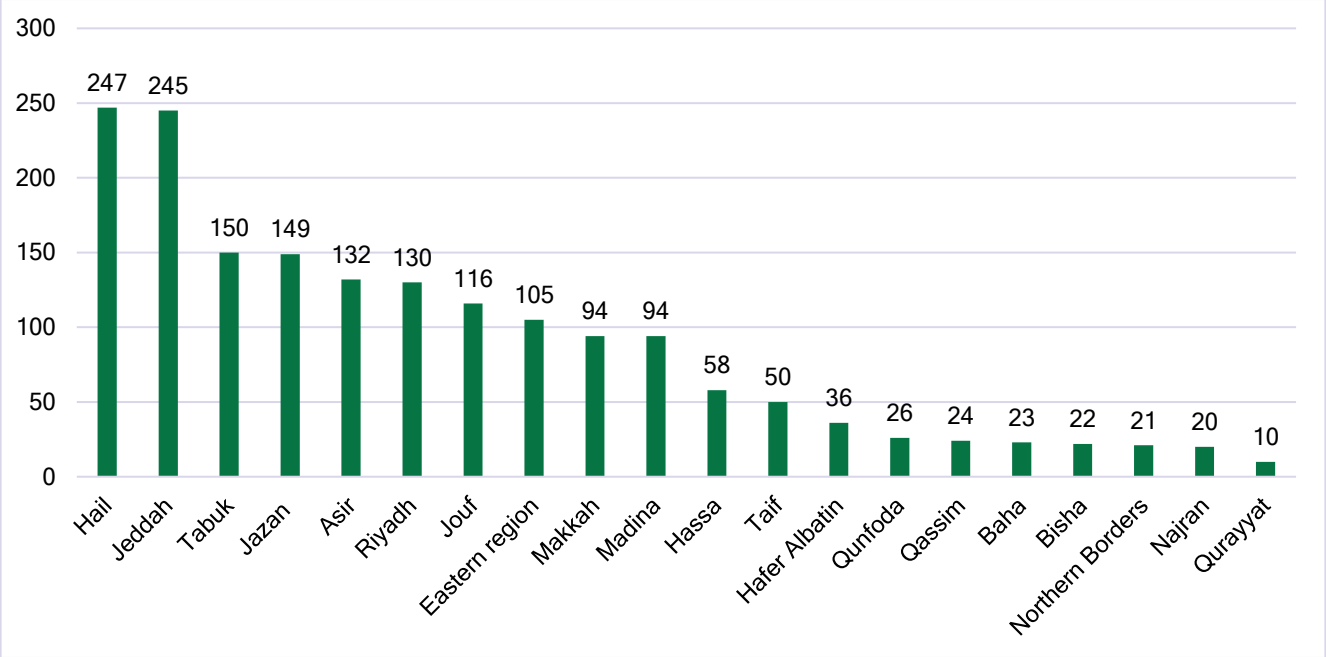


Figure 11: Number of HCWs Who used Hospital Platforms Per Region, 2022

The total number of HCWs who used and benefitted from the platform is around 1752 practitioners. Most of them were from Hail northern borders region (247), lowest participation was from Qurayyat **(10).**

2.2.2 Auditing Visits:

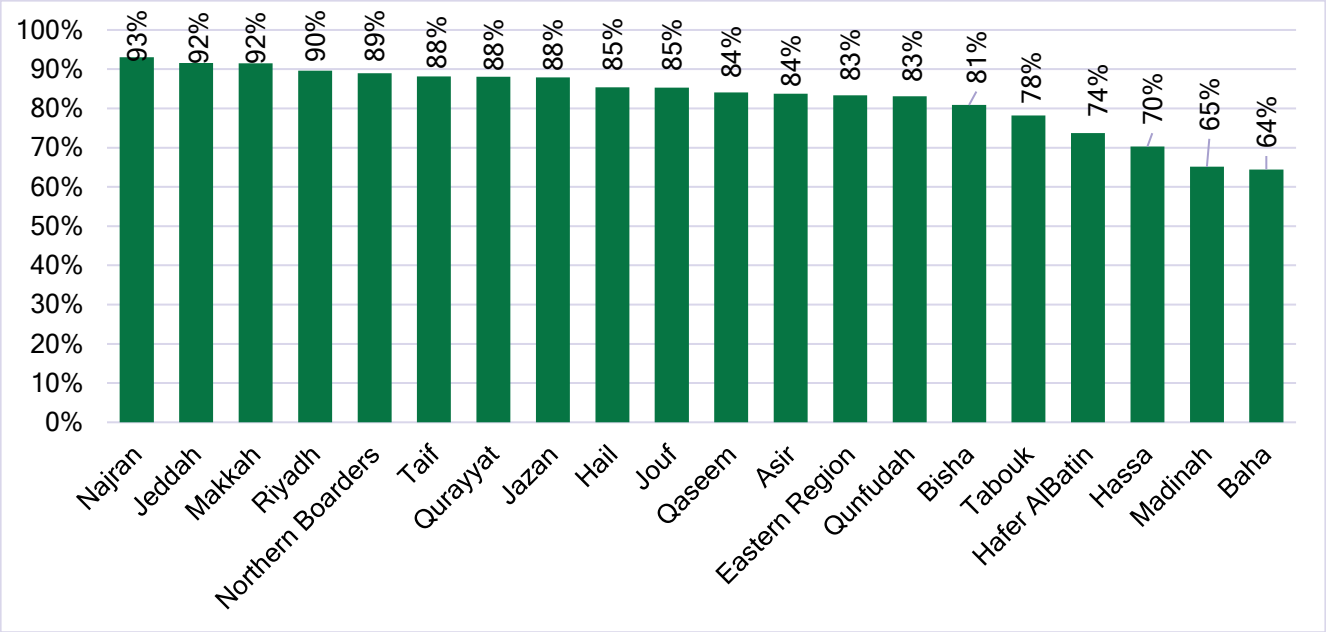


Figure 12: The Overall Compliance Rate of CSSD Per Region, 2022

The 2022 annual CSSD auditing visits indicate a total of 752 reports received with an overall general compliance rate of 83.72% among 414 healthcare facilities in all regions. The compliance rate increased from 83.04% for the first half to 84.30% for the second half of 2022. This improvement was linked to the continuous training on best practices in the central sterile services department. The specialized tailored educational platforms aim to increase knowledge and disseminate the best measures to raise the performance rate.

2.2.3 CSSD Week Celebration:

The CSSD Week was celebrated starting from the 9th of October 2022, targeting infection control managers and sterilization coordinators of all regions in the central sterilization departments of different hospitals, under the slogan ***"Let's Be Pioneers In Sterilization"***.

2.3 Technical Services Programs

2.3.1 Clinical Services Program

A program specialized in preparing scientific guidelines and training lectures regarding IPC practices for clinical services and providing IPC departments with technical support for all other related IPC programs. The program team also works on updating the guidelines periodically in line with the scientific references approved at the national and international levels. Additionally, this program provides technical and educational support through scientific lectures and educational publications, which raise the level of awareness and promote the application of IPC measures among healthcare facilities.

2.3.2 Respiratory Protection Program (RPP)

Respiratory Protection Program was established on 1/7/2022 by the GDIPC for the effective protection of HCWs, patients, and visitors against respiratory hazards. The purpose of this program is to ensure that all employees, patients, and visitors are protected from respiratory hazards through a systematic approach that incorporates 4 main elements as follows:

- Prevention of respiratory hazards through administrative control.
- Early identification of respiratory hazards.
- Prevention of respiratory hazards through engineering control.
- Prevention of respiratory hazards through Respiratory Protection Equipment (RPE).

2.3.3 Supportive Services Program

The program was structured to improve the infection prevention & control standards of supportive services in the healthcare facility and to prepare and issue related guidelines, policies, educational materials, and checklists for implementing the IPC measures. Additionally, it offers technical specifications related to environmental products, infection prevention & control consumables, and equipment. Supportive services program includes the following:

- Disinfection and cleaning within healthcare facilities.
- Laundry services.
- Food services.

- Mortuary.
- Construction & renovation procedures within healthcare facilities.
- Medical waste.
- Isolation room projects

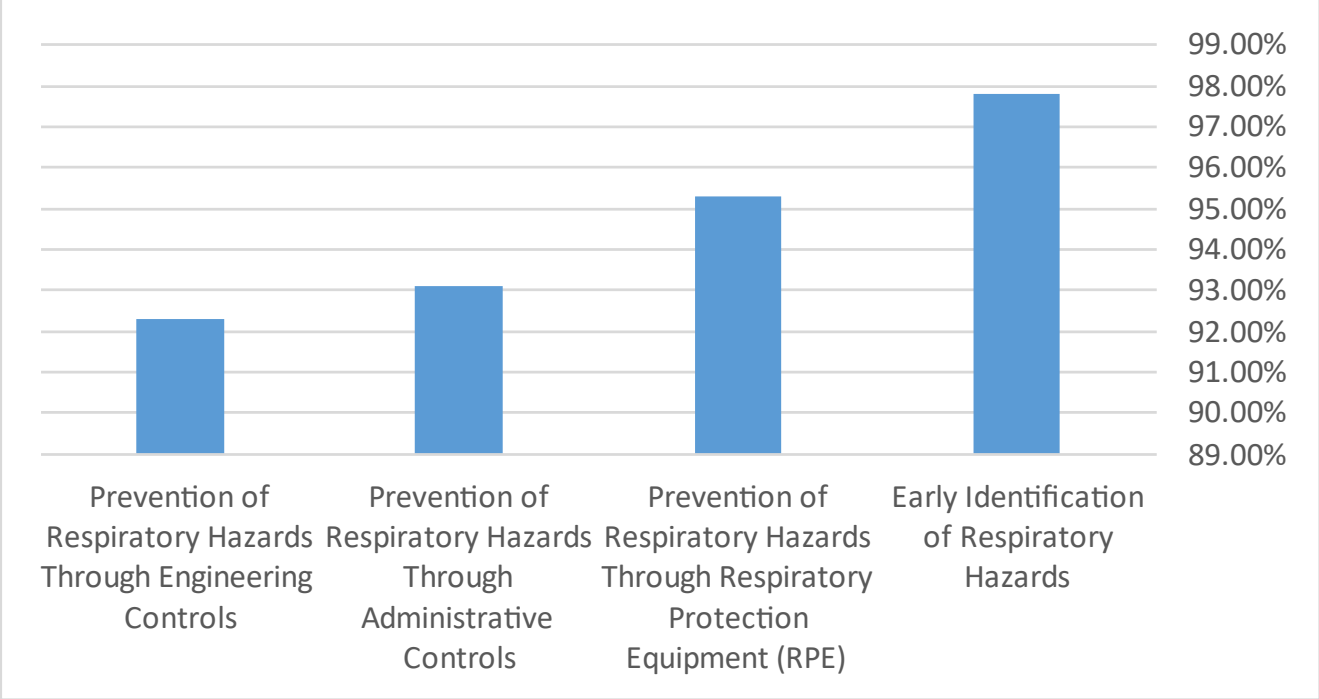


Figure 13: RPP overall Compliance Rate Per elements, 2022

The overall compliance rate of the respiratory protection program is 94.56% at the national level. The graph demonstrates the overall compliance rate per each component of the program; prevention of respiratory hazards through administrative control at around 93.12%, early identification of respiratory hazards at 97.78%, and prevention of respiratory hazards through engineering control at 92. %, and prevention of respiratory hazards through respiratory protection equipment at 95.30%.

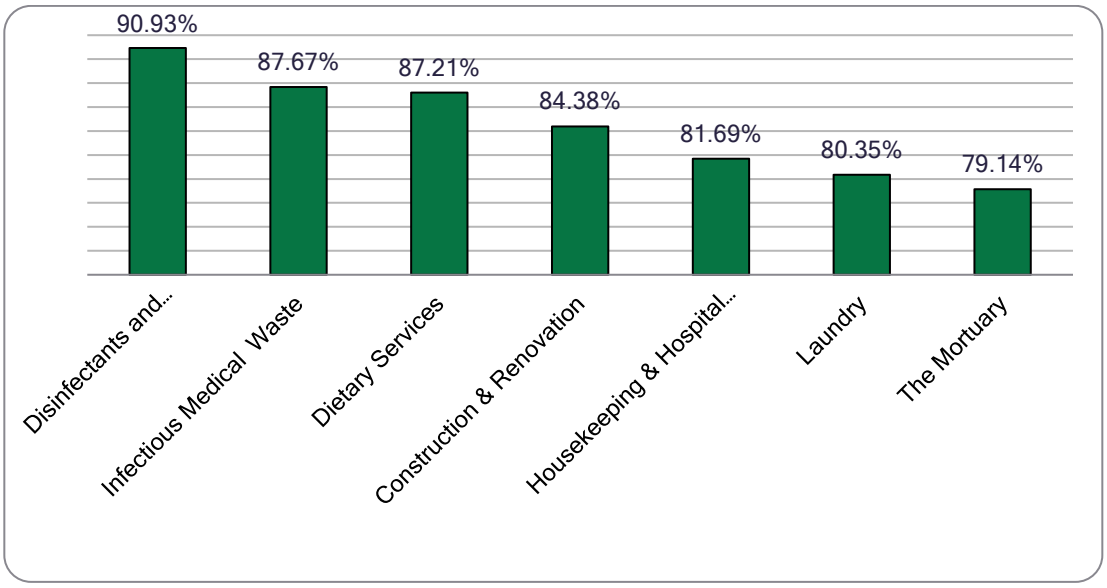


Figure 14: ICA Supportive Services Compliance Rate by Departments, 2022

In general, the overall compliance rate of the infection prevention & control standards for all programs and departments of supportive services in the healthcare facilities was **84.48%.** In specific, the highest rate of compliance regarding IPC standards for supportive services & related measures is among disinfectants & antiseptic supplies standards. Following the previously noted rate, the rate of compliance with the IPC standards among infectious medical waste and dietary services is at around 87.67% & 87.21% consequently. The lowest compliance rate was noted among the mortuary department at approximately 79.14%, which is considered low and required urgent interventions to improve the practices in that area.

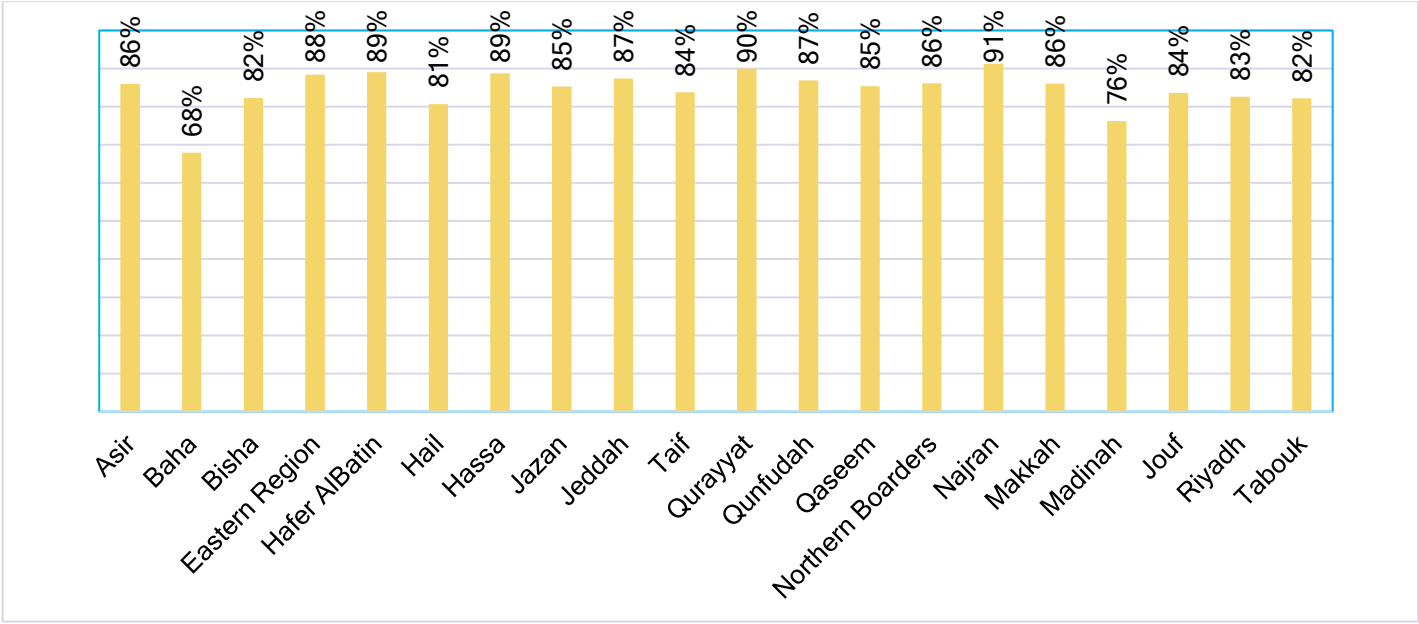


Figure 15: ICA Supportive Services Compliance Rate by Region, 2022

As shown in the graph above, in relation to compliance with infection control standards in support services in all regions, the highest rates were in Najran and Qurayyat regions, with 91.27% & 90.02%, consequently. In contrast, the lowest rate was noted in Al-Baha region, with a rate of 67.95%. The following graphs show the compliance rate of supportive services per standards in these three regions:

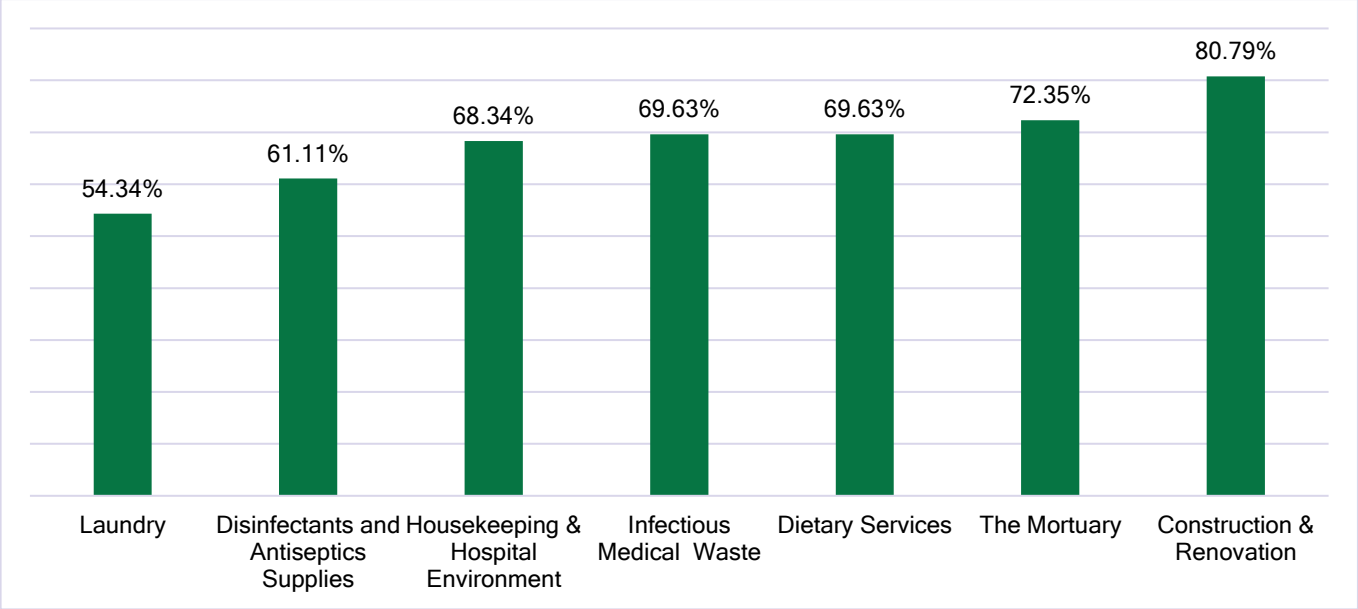


Figure 16: Compliance Rate of Supportive Services per Standards, Al Baha 2022

The graph shows, compliance with infection control standards in support services in Al-Baha which was the lowest rate among all the regions. The laundry, disinfection, and antiseptic supplies were the lowest compliance rate among all the 7 standards.

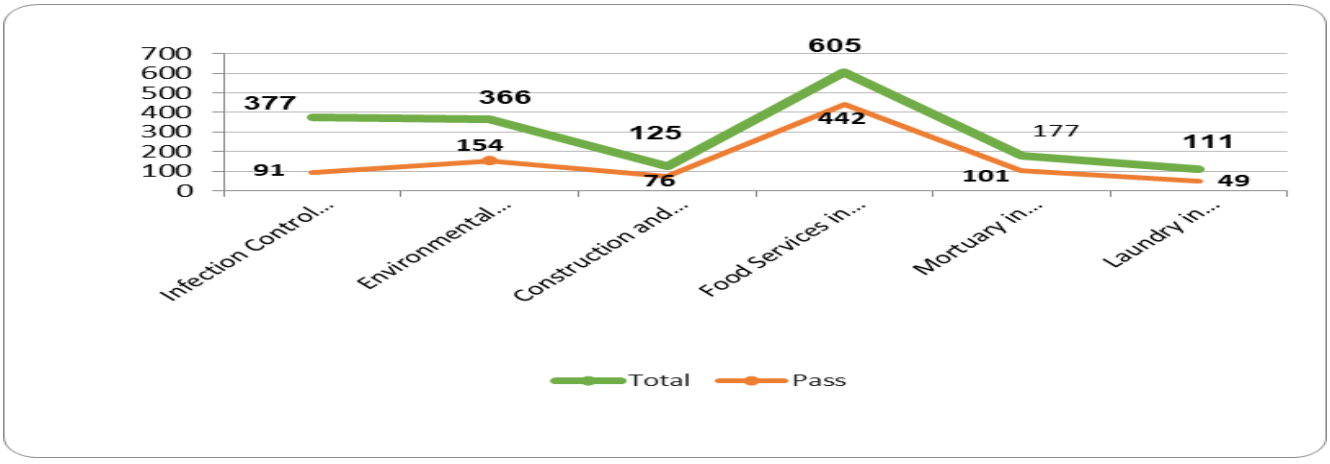


Figure 17: Attendance Rate of Supportive Services Program Educational platform. 2022

The electronic educational platform for Supportive Services was launched on the website of the GDIPC. The scientific content of lectures and the forms of the test section was updated. The certificates were directly linked to the required passing score of the test. The educational posters were designed in relation to the updated guidelines. The total number of participants of the Supportive Services Program Educational platform was 1761 only 913 of them passed.

2.4 Water, Sanitation, Hygiene (WASH).

Introduction

GDIPC responds to the WASH program in the hospitals of the kingdom of the Saudi Arabia and submits its findings to the WASH – concerned body in WHO. This paramount WASH report will be arranged and facilitated by the General Directorate of the Environmental Health as a focal point for the WASH.

The total number of the recent functioning - hospitals of the kingdom under the WASH program is (431), (288) is governmental and (143) is private. The rate of the urban to the rural hospitals is 358 to 73, subsequently. Fortunately, all these hospitals are under the direct supervision of GDIPC for the various and comprehensive components of the infection prevention and control (IPC).

Objectives of the WASH report

1. To fill the form of the core questions of the WASH by answering all the questions for each one of the five WASH components.
2. To analyze the results of the core questions in the specified WASH excel sheet.
3. To release a descriptive and clearly explainable report to the concerned WASH bodies and parties.

Findings

Results are shown in details in the excel sheet (attached below) that was designed by Joint Monitoring Program (JMP). To summarize, the hospitals of the kingdom of the Saudi Arabia acquire and attain (100%) proportion for the basic level of the five WASH components (water, hygiene, sanitation, waste management & environmental cleaning). This fact is not drawing

attention, instead it goes beyond doubts, since the kingdom's hospitals are well – established and modernly – equipped. Moreover, all the WASH requirements are responded to, completely; and even further developments in IPC are achieved and visualized in the standard medical services and practices.

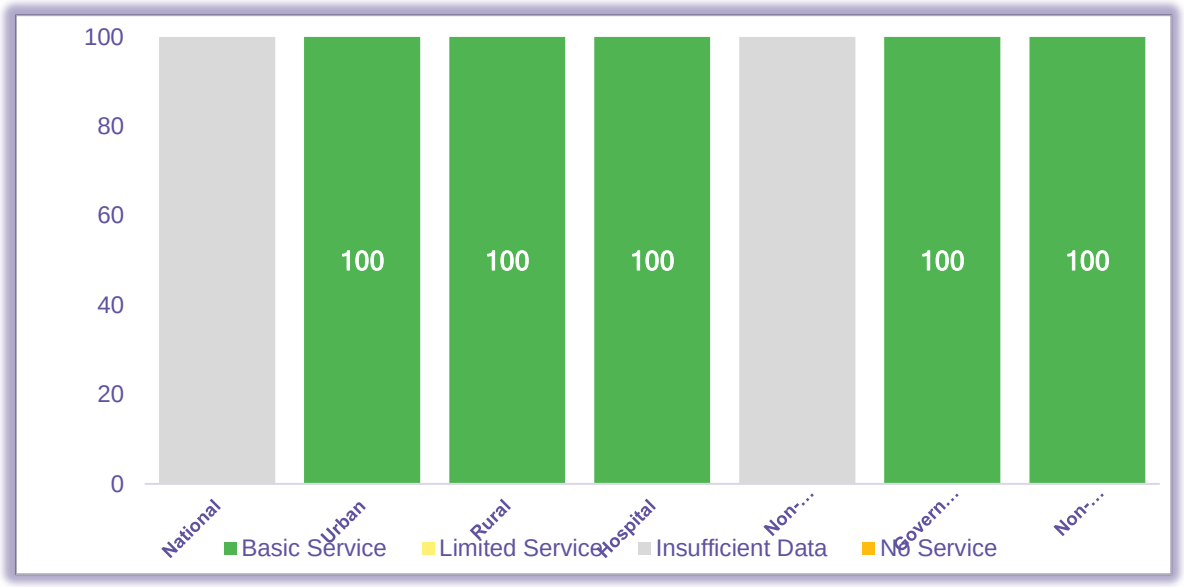


Figure 18: Proportion of Health care facilities (Hospitals) (%) for WASH, 2022.

Figure 18 shows that the hospitals of the Kingdom (431) achieved 100% of the basic services of WASH (Water, Sanitation, Hygiene, Waste management, and Environmental cleaning) in 2022. By reaching 100% of basic services, the kingdom fulfills all the WASH requirements set by WHO.

Recommendations

GDIPC shall look forwards to cooperate with the WHO in such a program like WASH.

3. Training & Continuous Education

3.1 Short-term courses

In 2022, the following online training courses were implemented:

No	Course	Days	No of participants
1	Infection control in Intensive Care Units (ICUs)	3	253
2	Basic Infection Control Skills License program (BICSL)-1	2	20
3	Outbreak management & Rapid Response Team	2	46
4	Clinical services standards training course	2	121
5	Basic Infection Control Skills License program (BICSL)-2	2	10
6	Quality concepts and tools in infection control programs for health facilities	4	460
7	Basic Principles of Infection Control in the Emergency Services Departments	3	228
8	Overview of Single Use Items Reprocessing and National Regulations	1	1168
9	Basic Concepts of Infection Control in Primary Health Care Centers (PHC)	3	1795
10	Outbreaks in Dialysis Unit	2	56
11	Central Line Associated Blood Stream infections (CLABSIs) Prevention Program	3	455
12	Basic Concepts of Infection Control in Special Care Services of Healthcare Facilities	3	445
Total		30	5057

Table 5: Summary of the online courses during 2022

A total of 5057 participants were enrolled in the 12 online courses during a period of only 30 days. The time, resources, and logistics were all saved by these courses. Without these online courses, it would have been difficult to attract such a large number of participants from various locations and demographic groups, with a wide range of specialties and backgrounds.

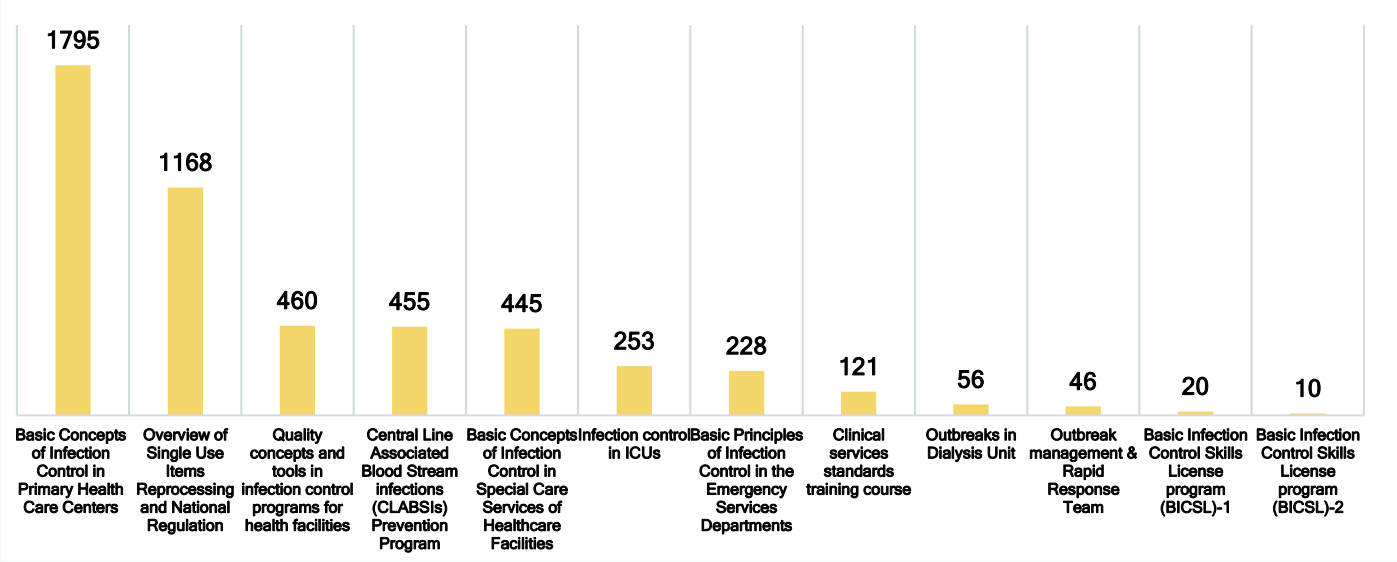


Figure 18: Distribution of the participants per online course in 2022

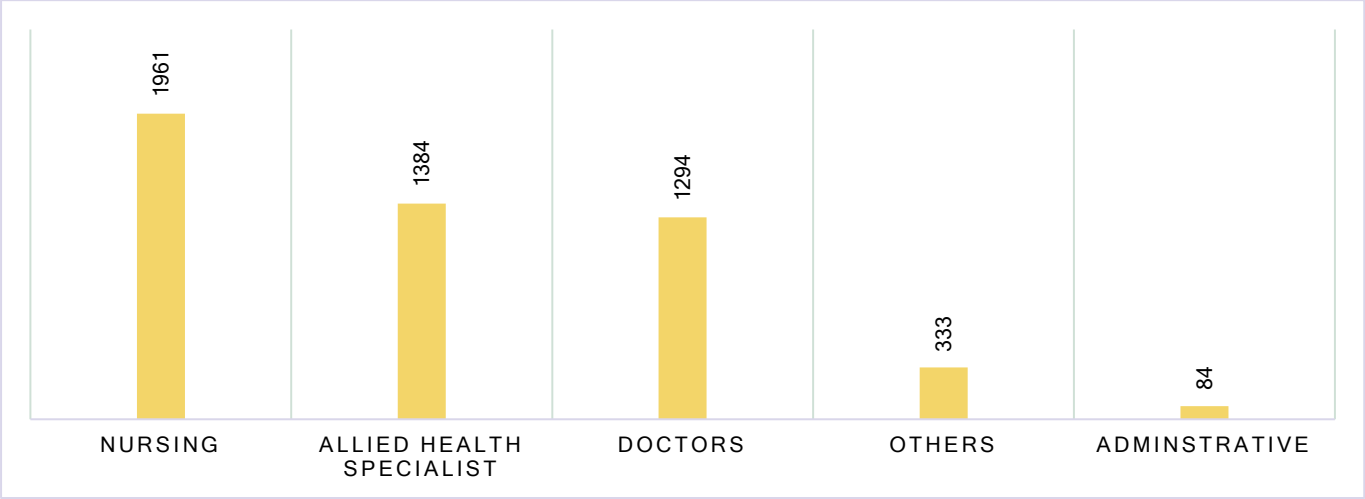


Figure 19: Distribution of the participants of the online course by specialties in 2022

3.2 Comprehensive Infection Control Programs

3.2.1 Comprehensive Sterilization Program (CSP)

The first and the second course of CSPs implemented in 2022. It is a comprehensive training program specialized in the Central Sterile Services Department (CSSD) that was approved by the Saudi Commission for Health Specialties (SCHS). The target groups of the training program are Central Sterile Services Practitioners to provide them with all principles of sterilization processes and sterilization best practices subjects for a seek of enhancing and improving the level of the sterilization staff knowledge. This aim is achieved through an intensive training plan for the period of (2) months that includes lectures and clinical training under the supervision of expert CSSD coordinators in accredited training centers. Evaluation of the trainees according to:

- 6 Assignments (for each one, 10 points; total: 60 points).
- 6 quizzes (for each one, 10 points; total: 60 points).
- Attendance (10 points).
- Extra- activities (20 points).
- Final Exam (50 points).
- Total marks: 200 points.
- Passing score for the course (75%).

The approval of the first program from the Saudi Council for Health Specialties with an accreditation number (SPP-20200000012) was obtained on January 4, 2022. Followed by the announcement and registration for the first CSP, which was done through internal communication. The selection of the participants was done based on eligibility criteria and the specifications of the participants. Fifteen participants were selected from different regions

(see Table 6). Finalization of the administrative process occurs through communication with the general directorate of training and scholarship. The program runs for two months, from January 23 to March 17, 2022, in three training centers in 3 regions: Dammam, Riyadh, and Jeddah. The results of the first batch of trainees are shown in Table 7. The submission for SCFHS's second program re-certification was completed prior to the announcement of the start of registration for the second batch. The second program started on 25 December 2022 till 22 February 2023. The distribution of the participants in the second batch is shown in Table 8.

Region	Riyadh	HB	Tabouk	Baha	ER	Hassa	Quarayat	Jazan	NB	Asser	Total
Number	2	1	1	1	2	2	1	2	1	2	15

HB= Hafr Al Batin, ER= Eastern Region, NB= North Border

Table 6: Distribution of the 1st batch participants in the CSP per region, 2022

Min. Aver. Max.	Attendance [Total = 10 Score]	Quizzes (Total =60 Score)	Assignments [Total =60 Score]	Extra- activities [Total = 20 Score]	Final Exam (Total Pts: 50)	%	Result (Pass, Fail)
Minimum	9	37	38	19	33	76	All Pass
Average	10	49	45	20	37	85	
Maximum	10	60	48	20	48	92	

Table 7: Descriptive statistics of the 1st batch of participants results in the CSP, 2022

Region	Riyadh	Asser	Tabouk	Bisha	NB	ER	Jeddah	Al Quarayat	AlQunfadh	Total
Number	2	2	1	3	1	3	1	1	1	15

ER= Eastern Region, NB= North Border

Table 8: Distribution of the 2nd batch participants in the CSP per region, 2022

3.2.2 Hospital-Acquired Infections Outbreak Investigations and Surveillance (HAIOS) -1st batch

The first HAIOS program was implemented in 2022, It is a comprehensive training program that is approved by the Saudi Commission for Health Specialties (SCHS) to provide trainees with the basic principles and applied skills required for hospital outbreak investigation and response, including early detection, investigations, management, and implementation of control measures to reduce the incidence of outbreaks of for healthcare-associated infections (HAIs) and conducting and interpreting HAI surveillance. This aim is achieved through an intensive training plan for the period of (3) months that includes lectures and clinical training under the supervision of expert infection control coordinators in accredited training centers. The approval of the first program from the Saudi Council of Health Specialties with accreditation number SPP-2022000014 was obtained on May 25, 2022. Followed by the

announcement and registration for the first HAIOS through internal communication. The selection of the participants was done based on eligibility criteria and the specifications of the participants. Twenty-seven participants were selected from different regions (see Table 9). Five different centers in 3 different regions were included in this course:

1. King Fahad Specialized Hospitals in Dammam.
2. King Fahad Hospital in Jeddah.
3. King Abdullah medical complex in Jeddah.
4. Dallah Hospital in Riyadh.
5. Prince Mohamed Bin Abdelaziz Hospital in Riyadh.

The program started on July 31, 2022, and continued for 3 consecutive months. The trainees were successfully evaluated according to the following criteria:

- Attendance 10%
- Assignments 25%
- Quizzes 20%
- Final Exam: 40%
- Extra-activities 5%

Region	Number
Riyadh	4
Makkah	2
Al Baha	2
Bisha	2
NB	1
ER	3
Najran	1
Jazan	2
Al Taif	1
Al Hassa	2
HB	2
Al Medina	3
Hail	1
Al Jouf	1
AlQunfadh	2
Total	27

Table 9: Distribution of the 1st batch of participants in the HAIOS per region, 2022

Min. Aver. Max.	Attendance 10%	Quizzes 40%	Assignments 25%	Extra- activities 5%	Final Exam 40%	Total Marks (100)	Result (Pass, Fail)
Minimum	9	13	16	5	26	79	All Pass
Average	10	17	21	5	32	87	
Maximum	10	20	25	5	39	96	

Table 10: Descriptive statistics of the 1st batch of participants results in the HAIOS, 2022

3.2.3 Comprehensive Infection Control Program (CICP) - 2nd batch

It is a comprehensive training program specialized in the infection control field that was approved by the Saudi Commission for Health Specialties (SCHS). The target groups of the training program are infection control practitioners to provide them with basic principles, applied practices, and standards for infection control in healthcare facilities based on the latest local and international standards for managing and operating all infection control program activities. This aim is achieved through an intensive training plan for the period of (3) months that includes lectures and clinical training under the supervision of expert infection control coordinators in accredited training centers. The submission for the second program re-accreditation from SCFHS was done and obtained in 2022. Followed by the nomination of 15 participants for the 2nd batch from different regions, as seen in Table 11. The program started on October 30th, 2022 and continued for 3 consecutive months. The participants were distributed among 4 training centers in 3 regions. The centers include (see Table 12):

1. Dammam Medical City.
2. King Abdullah Medical Complex in Jeddah
3. Dallah Hospital in Riyadh
4. Prince Sultan Medical City in Riyadh

Riyadh	Tabouk	Baha	Jouf	ER	Qassim	Quarayat	Taif	Medina	TOTAL
5	2	2	1	1	1	1	1	1	15

ER= Eastern Region

Table 11: Distribution of participants in the Second CICP per region

Training centers	DMC	King Abdullah Medical Complex	Dallah Hospital	Prince Sultan Medical City	TOTAL
No. of participants	3	4	5	3	15

Table 12: Distribution of the participants of the Second CICP per training center

3.2.4 Infection Control Orientation Program (ICOP)

It is a comprehensive IPC program implemented for the regions intended to orient and empower the RHD/cluster HCWs in the field of infection control. It is considered one of the supportive programs provided by GDIPC. The duration of this orientation program is one month.

- **First Program (Northern Borders):**

The program started on the 5th of June 2022 and continued for one month. Seven trainers from the infection control department and hospitals were targeted. The program was implemented in the Northern Borders region's North Medical Tower hospitals.

- **Second Program (Tabouk):**

The program started on the 20th of November 2022 and continued for one month. The program targeted 12 infection control staff working in the infection control department and hospitals in the Tabouk region.

3.3 Basic Infection Control License (BICSL) Program

- The BICSL workshop for the BICSL coordinators was executed in seven regions, including the Eastern region, Al Hassa, Al Riyadh, Hail, Al Qassim, Al Medina, and Makkah.
- Development and publication of BICSL training guidelines in the Arabic language for Hajj 1443.
- Updating BICSL on the HESN+ database with the HESN responsible team.
- Releas of the 40,000 BICSL certificates through the HESN system.
- Launching the operational indicator as a part of the dashboard of the infection control operational indicators to measure the BICSL training quality (it weighs 10%):
    - It is well-applied in the eastern region, including Al Hassa, Al Riyadh, Hail, Al Qassim, Al Medina, and Makkah.
    - The value of the indicator was measured through an evaluation process that targeted BICSL trainers in certain hospitals. The indicator had been calculated according to the following considerations:
        - Clusters with more than 20 hospitals (the quality of BICSL training is evaluated twice a year in each hospital).
        - Clusters with 20 or fewer hospitals (the quality of BICSL training is evaluated in each hospital four times per year)
        - Jeddah and Hafer al-Batin regions later joined the BICSL operational indicator. Therefore, nine regions instead of seven will be included in the process. This will increase the power of the indicator in the imminent future due to the wide coverage expected by the evaluation of the BICSL quality of training.

Region		Q1	Q2	Q3	Q4	Average per region
Al Riyadh	First health cluster	-	35	77	91	67.7
	Second health cluster	70		90	76	78.7
	Third health cluster	57		78	84	73
Eastern Region		92	94	89	94	92.25
Al Qassim		78	87	83	90	84.5
Makkah		92	-	93	96	93.7
Al Medina		82	86	88	90	86.5
Hail		91	95	97	86.9	92.5
Al Hassa		64	-	85	94	81
Al Taif		-	89	83	89	87
Average per quarter		78.25	81	86.3	89.09	83.7

Table 13: Average Indicator of the Quality of BICSL Training in the Regions of the Health Transformation

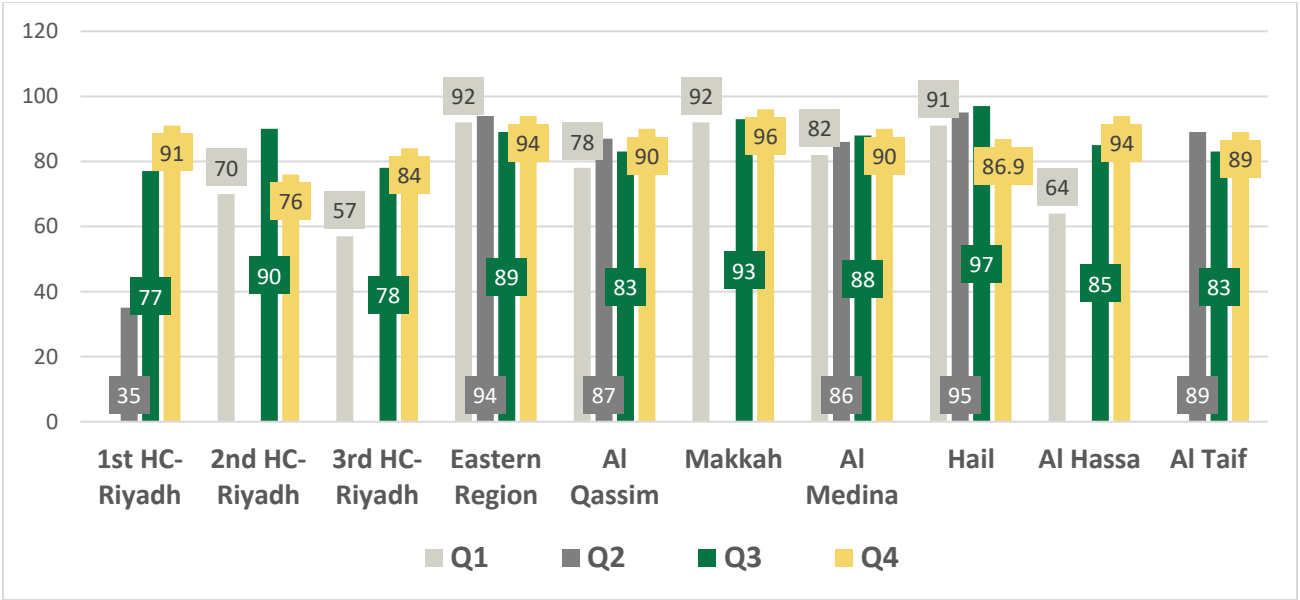


Figure 20: Average indicator of the quality of BICSL training in the regions of the health transformation

4. HAIs Surveillance Program

4.1 Introduction

A patient infection that occurred while receiving care in a healthcare facility and was not incubated at the time of admission is referred to as a healthcare-associated infection (HAI). It can affect patients in any healthcare setting, causing high morbidity and mortality, prolonged hospital stays, and extra costs.

Surveillance serves as a method to measure and understand the need to prevent and control HAI through the ongoing collection, consolidation, and analysis of data concerning the distribution and determinates of a given disease or event, then the dissemination of this information to regional directorates to improve the outcome.

The National Health Electronic Surveillance Network (HESN Plus) team and the General Directorate of Infection Prevention and Control (GDIPC) Surveillance team have collaborated to set up a surveillance system. According to national and international protocols, the system was created with specific criteria to operate in an acute care facility and be implemented for healthcare-associated infections (device-associated infections, surgical-associated infections, and infections related to hemodialysis treatment in outpatient settings). The general oversight of the HESN Plus implementation of the healthcare-associated infection surveillance system in the hospitals fell within the purview of the GDIPC surveillance team. To comply with prevention bundles and reduce them, healthcare facilities have been connecting via the national health electronic surveillance network. In order to help the regions and hospitals increase the quality of their work and lower infection rates, updated guidelines and protocols for the surveillance process and regular release of the reports have been made. The program oversees the development of essential research and studies based on the available surveillance data as well as the training and education of the participating hospitals through the General Directorate and the regions.

This report aims to provide an overview of HAIs surveillance data during 2022, measure trends of infections for the last 5 years, and allow internal and external benchmarks.

4.2 MOH Hospital Capacity

Type of Hospital	Bed size			N	%
	≤ 200	201-500	501-1000		
General/ Central Hospitals	44	38	3	85	80%
Maternal and Children Hospitals	6	9	0	15	14%
Cardiac Centers	5	0	0	5	5%
Pediatric Hospital	1	0	0	1	1%
Total	**56**	**47**	**3**	**106**	**100%**

Table 14: MOH hospitals monitored for surveillance data per type and bed capacity

Figure 21 A: MOH hospitals by type

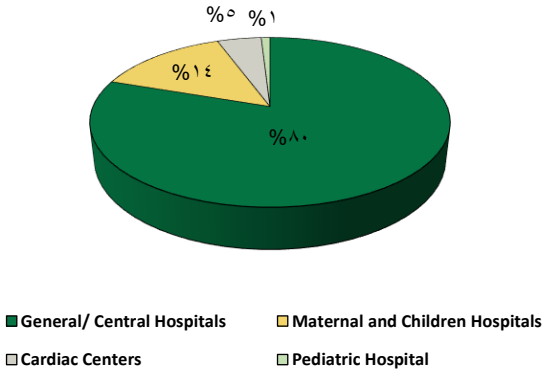


Figure 21 B: MOH hospitals by bed capacity

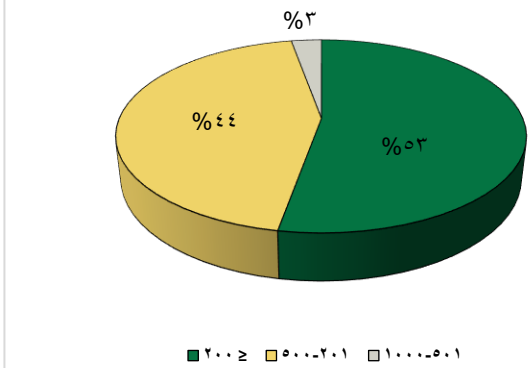


Table 14 and Figure 21 A-B show the characteristics of MOH hospitals. The majority of hospitals were General/ Central Hospitals (80%) followed by Maternal and Children Hospitals (14%). More than half of hospitals (53%) were less than 200 beds while 44% of hospitals were 201-500 beds.

Type of ICU	ICUs		ICU beds	
	N	%	N	%
Medical Surgical	106	40.3%	1431	37.8%
Neonatal ICU	63	24.0%	1304	34.4%
Pediatric Medical Surgical	28	10.6%	291	7.7%
Medical	20	7.6%	288	7.6%
Medical Cardiac	14	5.3%	162	4.3%
Pediatric Medical	8	3.0%	90	2.4%
Burn	7	2.7%	69	1.8%
Surgical Cardiothoracic	5	1.9%	25	0.7%
Respiratory	4	1.5%	59	1.6%
Pediatric Surgical	2	0.8%	14	0.4%
Prenatal	2	0.8%	11	0.3%
Trauma	2	0.8%	28	0.7%

Pediatric Cardiothoracic	1	0.4%	3	0.1%
Surgical	1	0.4%	11	0.3%
Total	**263**	**100.0%**	**3786**	**100.0%**

Table 15: Types of Intensive Care Units per bed capacity

Figure 22 A: Percentages of ICU types

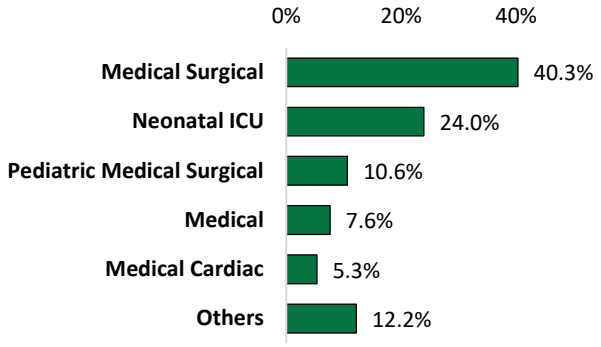


Figure 22 B: Percentages of beds by ICU types

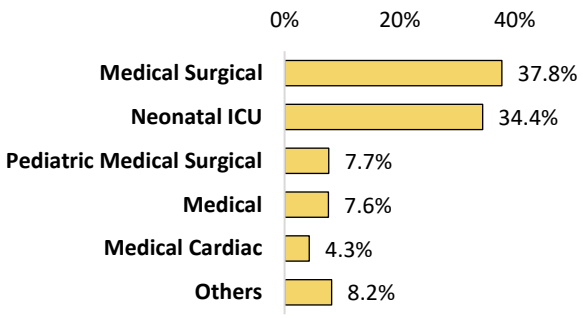


Table 15 shows the total number of ICU beds, which was 3786. The most frequent types of ICUs were medical-surgical, neonatal, pediatric medical-surgical, medical, medical cardiac, and pediatric medical ICUs. They represented 90% of all ICU types and 92% of all ICU bed capacity (Figures 22 A -B).

4.3 Device- Associated Infections (Inpatients)

4.3.1 Central Line-Associated Bloodstream Infection:

Type of ICU	Patients Days	CL Days	CLABSI		CLABSI Rate	DUR
Medical/Surgical	404291	181921	331		1.81	0.44
Neonatal Intensive Care	365641	85284	319		3.74	0.23
Pediatric Medical Surgical	75009	24790	95		3.83	0.33
Medical	68126	9819	32		3.25	0.14
Medical Cardiac	28437	7850	22		2.80	0.27
Pediatric Medical	22025	3758	12		3.19	0.17
Surgical Cardiothoracic	5174	2833	7		2.47	0.54
Burn	4166	560	0		0.00	0.13
Respiratory	1406	635	0		0.00	0.45
Surgical	432	257	0		0.00	0.59
Prenatal	49	3	0		0.00	0.06
Total	**974756**	**317710**	**818**	**Average**	**2.57**	**0.33**

Table 16: Central Line-Associated Bloodstream Infection Rates and Ratios per type of ICU

Figure 23 A: CLABSI rates by type of ICU

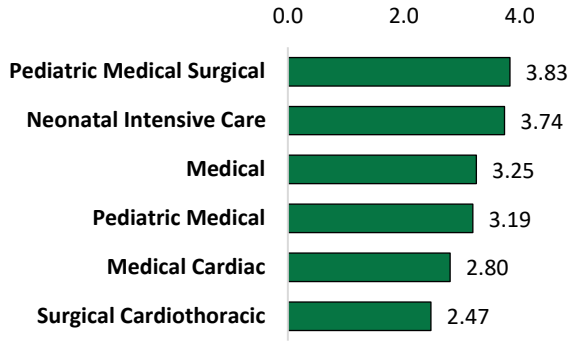


Figure 23 B: Central line DUR by type of ICU

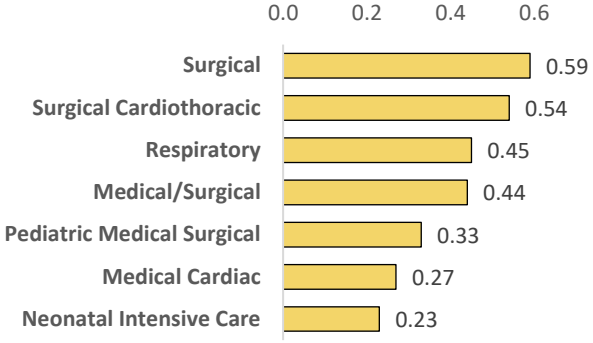


Table 16 and Figures 23 A -B shows CLABSI rates and central line utilization ratios by type of ICU. The average CLABSI rate was 2.57 per 1000 central lines days. The average central line utilization ratio was 0.33. ICUs with higher CLABSI rates were pediatric medical surgical (3.83), neonatal intensive care unit (3.74), and medical (3.25).

Adult medical/surgical ICUs per region	Patients Days	CL Days	CLABSI		CLABSI Rate	DUR
AlAhsa	29661	8482	23		2.71	0.29
AlBaha	10644	4553	3		0.66	0.43
AlJouf	9082	3166	2		0.63	0.35
AlMedina	19351	9634	6		0.62	0.49
AlQassim	33348	14510	12		0.82	0.43
AlQunfutha	11691	3986	6		1.50	0.33
AlQurayat	3685	832	3		3.61	0.23
AlTaif	14607	9164	22		2.40	0.62
Asir	27776	13181	43		3.26	0.47
Bishah	5107	3191	5		1.56	0.62
Eastern	25854	9145	18		1.96	0.35
Hafer AlBatin	14274	8324	4		0.48	0.58
Hail	10370	2567	2		0.77	0.24
Jazan	20179	11210	21		1.87	0.55
Jeddah	30936	18170	49		2.69	0.58
Makkah	37766	16922	33		1.95	0.44
Najran	17610	9028	8		0.88	0.51
Northern Borders	11649	4468	14		3.13	0.38
Riyadh	57982	28243	45		1.59	0.48
Tabouk	12719	3145	12		3.82	0.25
Total (national data)	**404291**	**181921**	**331**	**Average**	**1.81**	**0.44**

Table 17: Central Line-Associated Bloodstream Infection Rates and Ratios in Adult medical-surgical ICUs per region

Figure 24 A: CLABSI rates by region

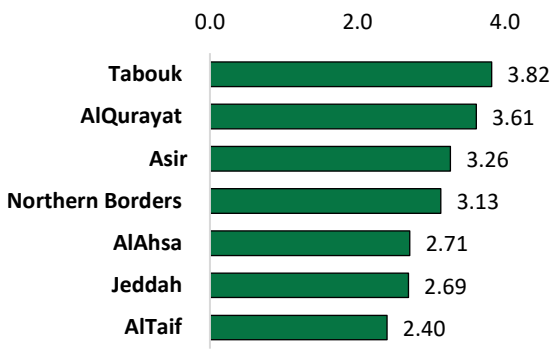


Figure 24 B: Central line DUR by region

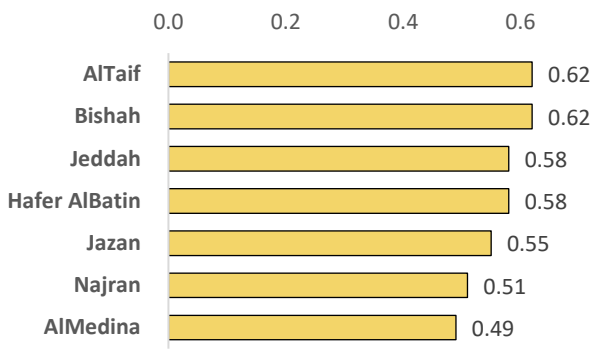
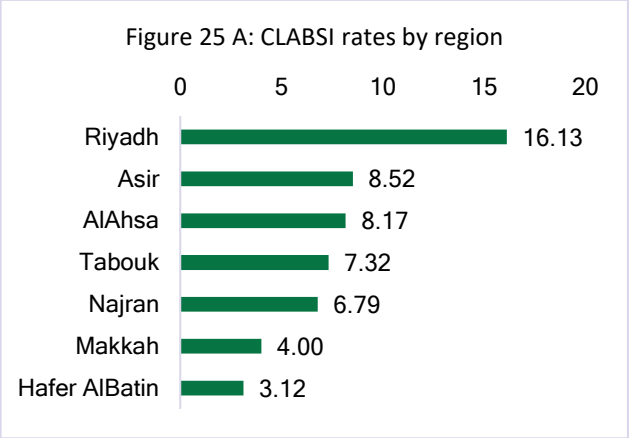


Table 17 and Figures 24 A -B shows the average CLABSI rate and central line utilization ratio in the medical-surgical ICUs in the Kingdom. The national CLABSI rate is found to be 1.81 and the central line utilization rate is found to be 0.44. The highest CLABSI rates were found to be in Tabuk (3.82) and Qurayat (3.61). The lowest rate of CLABSI is found to be in Madinah (0.62) and Jouf regions (0.63).

Pediatric medical/surgical ICUs per region	Patients Days	CL Days	CLABSI		CLABSI Rate	DUR
AlAhsa	4195	1468	12		8.17	0.35
AlBaha	1565	112	0		0.00	0.07
AlMedina AlMonawarah	10639	6633	20		3.01	0.62
AlQurayat	3002	52	0		0.00	0.02
Asir	7574	3635	31		8.52	0.47
Eastern	9479	4749	8		1.68	0.50
Hafer AlBatin	1745	321	1		3.12	0.18
Hail	3484	552	0		0.00	0.16
Jazan	4659	1967	3		1.52	0.42
Jeddah	2286	1241	3		2.42	0.54
Makkah	3578	1001	4		4.00	0.28
Najran	7341	736	5		6.79	0.10
AlQassim	5010	1305	0		0.00	0.26
Riyadh	1169	62	1		16.13	0.05
Tabouk	9283	956	7		7.32	0.10
Total (national data)	**75009**	**24790**	**95**	**Average**	**3.83**	**0.33**

Table 18: Central Line-Associated Bloodstream Infection Rates and Ratios in Pediatric medical-surgical ICUs per region



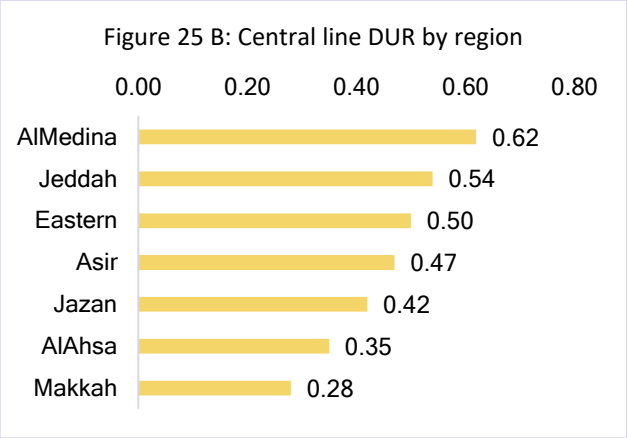


Table 18 and Figures 25 A -B shows the average national rate of CLABSI in pediatric medical-surgical ICUs and the central line utilization ratio. The national rate is found to be 3.83 and the central line utilization ratio is found to be 0.33. The rate of CLABSI in pediatric medical-surgical ICU is found to be highest in Riyadh Region (16.13), Asir (8.52), and Alahsa (8.17) and it is found to be zero in Baha, Qurayat, Hail, and Qasim regions.

Neonatal ICUs per region	Patients Days	CL Days	CLABSI		CLABSI Rate	DUR
AlAhsa	4370	2370	21		8.86	0.54
AlBaha	7796	3041	6		1.97	0.39
AlJouf	9607	2451	2		0.82	0.26
AlMedina AlMonawarah	44422	6106	38		6.22	0.13
AlQurayat	9495	1093	6		5.49	0.12
AlTaif	31578	8613	14		1.62	0.27
Asir	28138	6521	49		7.51	0.23
Eastern	19913	9317	15		1.61	0.46
Hafer AlBatin	13443	1846	4		2.47	0.14
Hail	24666	3402	9		2.65	0.14
Jazan	19435	5145	30		5.83	0.26
Jeddah	18249	4221	17		4.02	0.23
Makkah	28872	8983	26		2.89	0.31
Najran	9441	1482	11		7.42	0.15
Northern Borders	12338	2799	21		7.50	0.23
AlQassim	32135	6804	9		1.32	0.21
Riyadh	39908	8922	23		2.57	0.22
Tabouk	11835	2168	18		8.30	0.18
Total (national data)	365641	85284	319	Average	3.74	0.23

Table 19: Central Line-Associated Bloodstream Infection Rates and Ratios in Neonatal ICUs per region

Figure 26 A: CLABSI rates by region

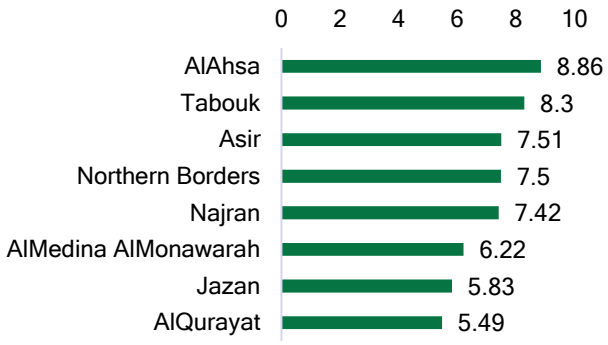


Figure 26 B: Central line DUR by region

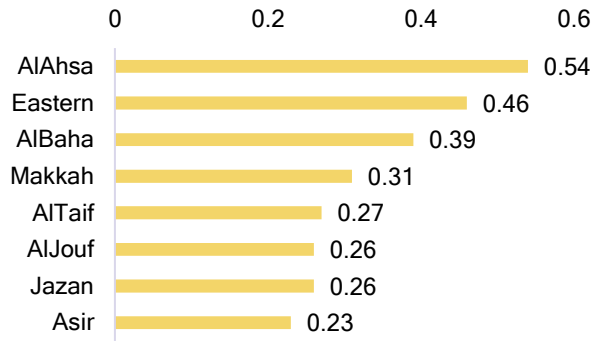


Table 19 and Figures 26 A -B shows the national rate of CLABSI in neonatal ICU and the central line utilization ratio. The national rate of CLABSI was found to be 3.74 and the central line utilization ratio to be 0.23. The CLABSI rate is highest in Alahsa region (8.86) and Tabuk (8.30) and lowest in Jouf (0.82) and Qasim (1.32) regions.

4.3.2 Catheter-Associated Urinary Tract:

Type of ICU	Patients Days	UC Days	CAUTI		CAUTI Rate	DUR
Medical/Surgical	404291	313778	320		1.02	0.77
Pediatric Medical Surgical	79238	20607	30		1.45	0.26
Medical	68126	17271	32		1.85	0.25
Medical Cardiac	28437	14931	16		1.07	0.52
Pediatric Medical	22025	3006	3		0.99	0.13
Surgical Cardiothoracic	5174	2953	0		0.00	0.57
Burn	4166	1169	1		0.85	0.28
Respiratory	1406	1292	2		1.54	0.91
Surgical	432	430	0		0.00	0.99
Total (national data)	**613295**	**375437**	**404**	**Average**	**1.08**	**0.61**

Table 20: Catheter-Associated Urinary Tract Infection Rates and Ratios per type of ICU

Figure 27 A: CAUTI rates by type of ICU

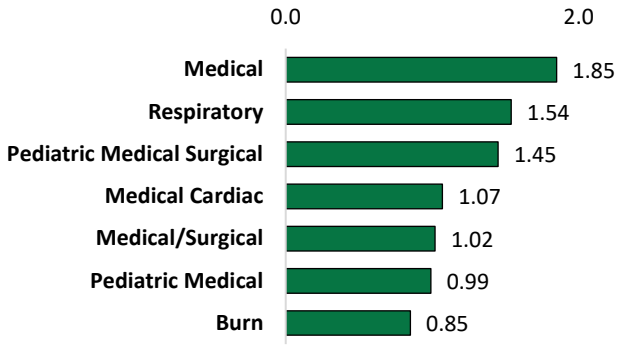


Figure 27 B: Urinary catheter DUR by ICU type

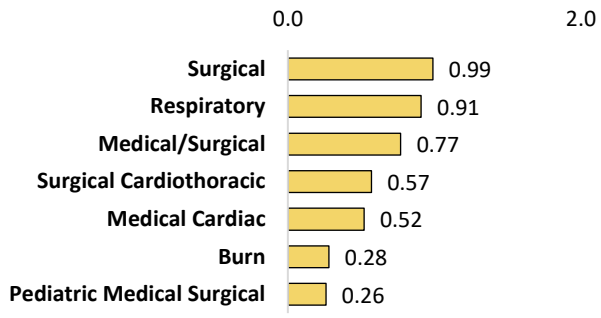


Table 20 and Figures 27 A -B shows CAUTI rates and urinary catheter utilization ratios by type of ICU. The average CAUTI rate was 1.08 per 1000 urinary catheter days. The average urinary catheter utilization ratio was 0.61. ICUs with above-average CAUTI rates included medical (1.85), respiratory (1.54), pediatric medical/surgical (1.45), and medical cardiac (1.07) ICUs.

Adult ICUs per region	Patients Days	UC Days	CAUTI		CAUTI Rate	DUR
AlAhsa	29661	12833	7		0.55	0.43
AlBaha	10644	7994	22		2.75	0.75
AlJouf	9082	7243	7		0.97	0.80
AlMedina AlMonawarah	19351	16137	8		0.49	0.83
AlQassim	33348	26227	16		0.61	0.78
AlQurayat	3685	2244	8		3.57	0.61
AlQunfutha	11691	4557	14		3.07	0.38
AlTaif	14607	12433	7		0.56	0.85
Asir	27776	22368	10		0.44	0.80
Bishah	5107	4374	1		0.22	0.85
Eastern	25854	21206	20		0.94	0.82
Hafer AlBatin	14274	11785	5		0.42	0.82
Hail	10370	8037	14		1.74	0.77
Jazan	20179	18687	12		0.64	0.92
Jeddah	30936	27941	21		0.75	0.90
Makkah	37766	30981	30		0.96	0.82
Najran	17610	14010	13		0.92	0.79
Northern Borders	11649	7941	26		3.27	0.68
Riyadh	57982	48447	54		1.11	0.83

Tabouk	12719	8333	25		3.00	0.65
Total (national data)	**404291**	**313778**	**320**	**Average**	**1.02**	**0.77**

Table 21: Catheter-Associated Urinary Tract Infection Rates and Ratios in Adult medical-surgical ICUs per region

Figure 28 A: CAUTI rates by region

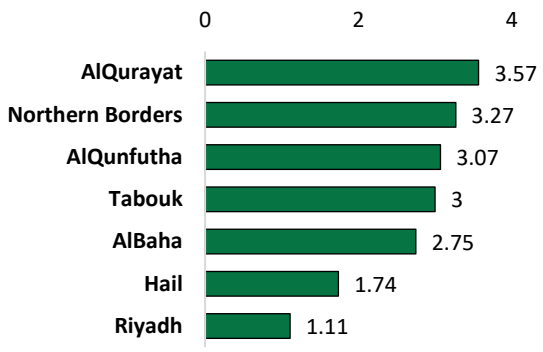


Figure 28 B: Urinary catheter DUR by region

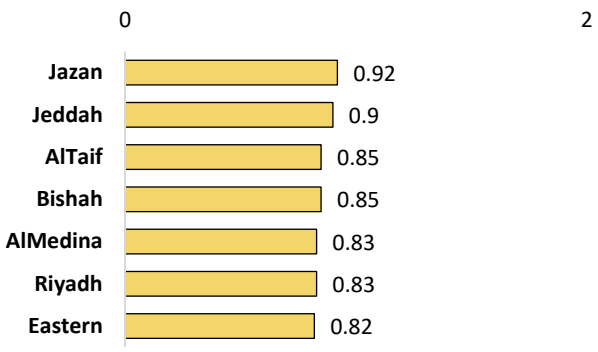


Table 21 and Figures 28 A -B shows the national rate of CAUTI in adult medical surgical ICU and urinary catheter utilization ratio in all regions. The national rate of CAUTI is found to be 1.02 and urinary catheter utilization is found to be 0.77. The highest rate of CAUTI is found to be in Qurayat region (3.57) and Northern border (3.27) and the lowest in Bishah (0.22).

Pediatric ICUs per region	Patients Days	UC Days	CAUTI		CAUTI Rate	DUR
AlAhsa	4195	603	1		1.65	0.14
AlBaha	1565	92	0		0.00	0.06
AlMedina AlMonawarah	10639	4648	5		1.07	0.43
AlQurayat	3002	75	0		0.00	0.02
AlTaif	4229	1538	0		0.00	0.36
Asir	7574	2202	4		1.81	0.29
Eastern	9479	2676	2		0.74	0.28
Hafer AlBatin	1745	499	6		12.02	0.29
Hail	3484	641	0		0.00	0.18
Jazan	4659	1783	1		0.56	0.38
Jeddah	2286	929	1		1.08	0.41
Makkah	3578	1471	2		1.36	0.41
Najran	7341	537	1		1.86	0.07
AlQassim	5010	1298	1		0.77	0.25
Riyadh	1169	119	0		0.00	0.10
Tabouk	9283	1496	6		4.01	0.16
Total (national data)	**79238**	**20607**	**30**	**Average**	1.45	**0.26**

Table 22: Catheter-Associated Urinary Tract Infection Rates and Ratios in Pediatric medical-surgical ICUs per region

Figure 29 A: CAUTI rates by region

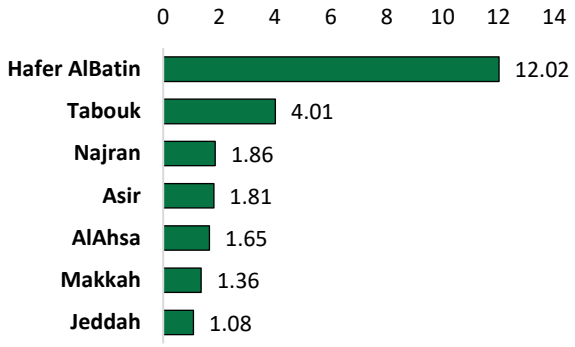


Figure 29 B: Urinary catheter DUR by region

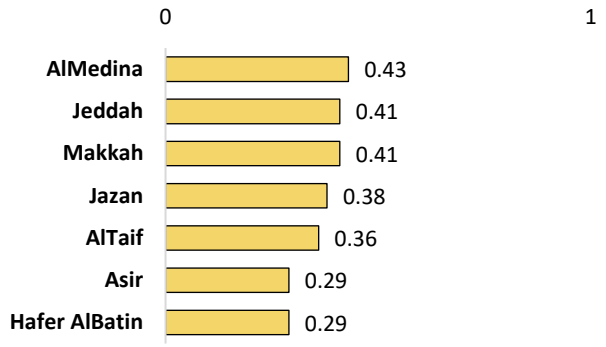


Table 22 and Figures 29 A -B shows the national rate of CAUTI and urinary catheter utilization ratio in pediatric medical-surgical ICUs. The national rate is found to be 1.02 and urinary catheter utilization is found to be 0.26. CAUTI Rate is found to be highest in the Hafrul batin region (12.02) and zero in Baha, Taif, Hail, and Riyadh regions.

4.3.3 Ventilator-Associated Pneumonia:

Pediatric/neonatal ICU per region	Patients Days	Vent Days	VAP		VAP Rate	DUR
Neonatal Intensive Care	365641	75975	79		1.03	0.20
Pediatric Medical	22025	8450	10		1.18	0.38
Pediatric Medical Surgical	79238	35934	95		2.64	0.45
Total (national data)	**466904**	**120359**	**184**	**Average**	**1.53**	**0.26**

Table 23: Ventilator-Associated Pneumonia Rates and Ratios per type of ICU

Figure 30 A: VAP rates by type of ICU

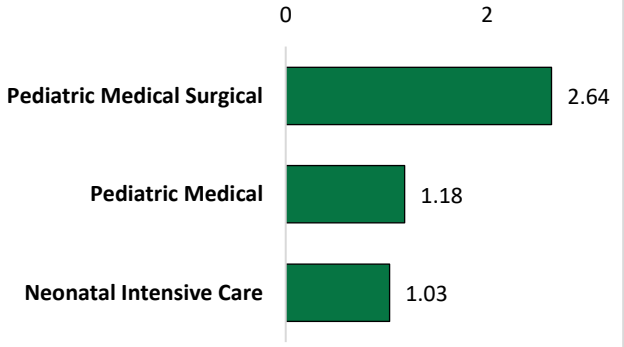


Figure 30 B: Ventilator DUR by type of ICU

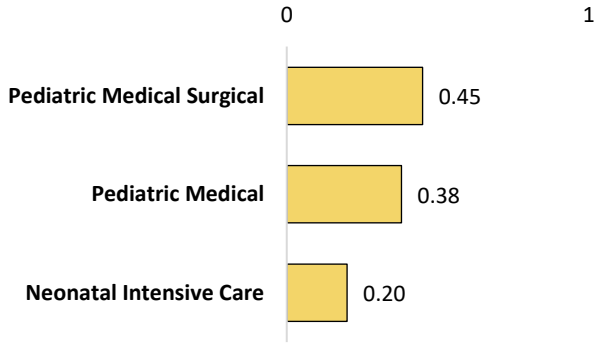
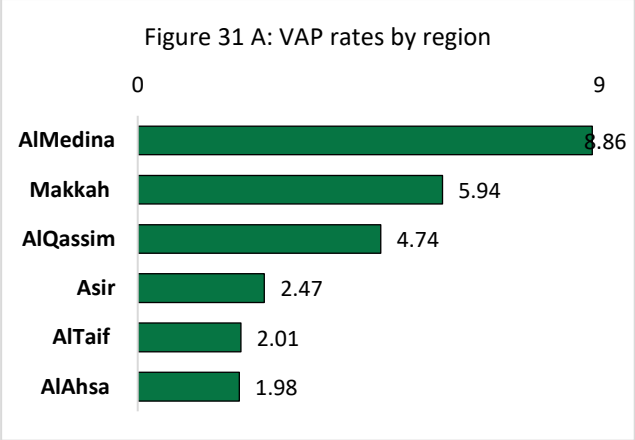


Table 23 and Figures 30 A -B shows VAP rates and ventilator utilization ratios by type of ICU. The average VAP rate was 1.53 per 1000 ventilator days. The average ventilator utilization

ratio was 0.26. ICUs with above-average VAP rates included pediatric medical surgical (2.64), pediatric medical (1.18), and neonatal (1.03).

Pediatric ICUs per region	Patients Days	Vent. Days	VAP		VAP Rate	DUR
AlAhsa	4195	3018	6		1.98	0.71
AlBaha	1565	464	0		0.00	0.29
AlMedina AlMonawarah	10639	5189	46		8.86	0.50
AlQurayat	3002	722	0		0.00	0.24
AlTaif	4229	2972	6		2.01	0.70
Asir	7574	2831	7		2.47	0.37
Eastern	9479	4346	0		0.00	0.45
Hafer AlBatin	1745	508	00		0.00	0.29
Hail	3484	1616	0		0.00	0.46
Jazan	4659	2792	2		0.71	0.59
Jeddah	2286	1427	0		0.00	0.62
Makkah	3578	1513	9		5.94	0.42
Najran	7341	1822	3		1.64	0.24
AlQassim	5010	1474	7		4.74	0.29
Riyadh	1169	344	0		0.00	0.29
Tabouk	9283	4896	9		1.83	0.52
Total (national data)	79238	35934	95	Average	2.64	0.45

Table 24: Ventilator-Associated Pneumonia Infection Rates and Ratios in Pediatric medical-surgical ICUs per region



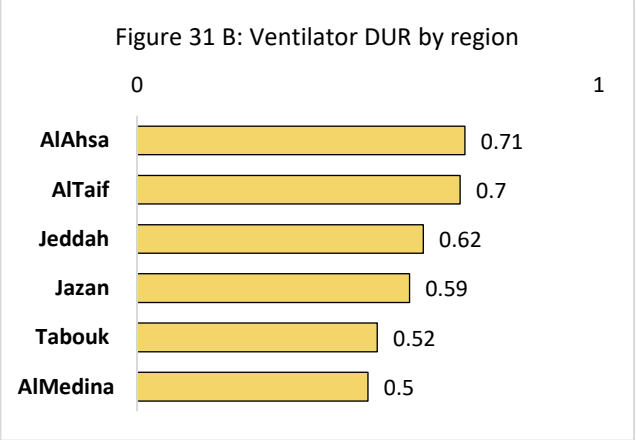


Table 24 and Figures 31 A -B shows the VAP rate and ventilator utilization ratio in pediatric medical-surgical ICUs in all regions. The national rate of VAP is found to be 2.64 and the ventilator utilization ratio is found to be 0.45. The VAP rate is found to be highest in Madinah region (8.86) and zero in Baha, Qurayat, Asir, Eastern, Hafrul Batin, Jeddah, and Riyadh regions.

Neonatal ICUs per region	Patients Days	Vent. Days	VAP		VAP Rate	DUR
AlAhsa	4370	3017	1		0.31	0.69
AlBaha	7796	1375	2		1.45	0.18
AlJouf	9607	1120	1		0.89	0.11
AlMedina AlMonawarah	44422	14034	15		1.06	0.31
AlQurayat	9495	927	0		0.00	0.10
AlTaif	31578	4573	0		0.00	0.14
Asir	28138	5438	17		3.12	0.19
Eastern	19913	6094	2		0.33	0.30
Hafer AlBatin	13443	3444	0		0.00	0.26
Hail	24666	2892	0		0.00	0.12
Jazan	19435	2190	0		0.00	0.11
Jeddah	18249	3482	0		0.00	0.19
Makkah	28872	7404	16		2.16	0.26
Najran	9441	3088	3		0.97	0.33
Northern Borders	12338	2121	0		0.00	0.17
AlQassim	32135	5239	5		0.95	0.16
Riyadh	39908	7912	13		1.64	0.20
Tabouk	11835	1625	4		2.46	0.13
Total (national data)	**365641**	**75975**	**79**	**Average**	**1.03**	**0.20**

Table 25: Ventilator-Associated Pneumonia Rates and Ratios in Neonatal ICUs per region

Figure 32 A: VAP rates by region

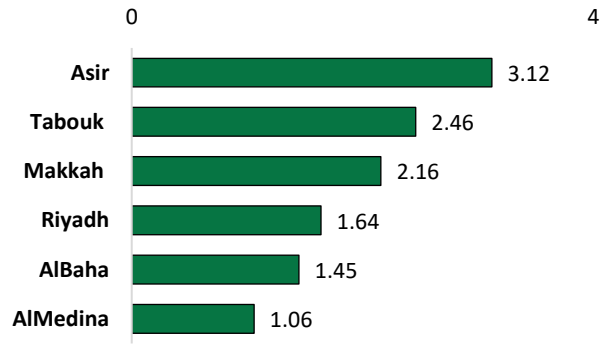


Figure 32 B: Ventilator DUR by region

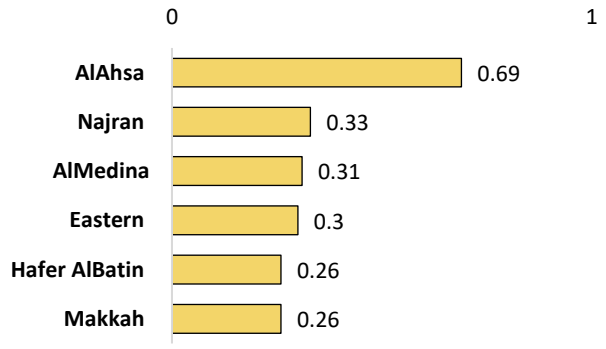


Table 25 and Figures 32 A -B shows the VAP rate and ventilator utilization ratio in neonatal ICUs in all regions of the Kingdom. The national rate of VAP is found to be 1.03 and the device utilization ratio is found to be 0.20. The highest rate of VAP is found to be in Asir (3.12) and zero in Qurayat, Taif, Hafrul Batin, Hail, Jeddah, Jaza and Northern borders.

4.3.4 Ventilator-Associated Event:

Type of adult ICU	Patients Days	Vent Days	VAE		VAE Rate	DUR
Burn	4166	301	2		6.64	0.07
Medical	68126	10659	60		5.62	0.15
Medical Cardiac	28437	5146	15		2.91	0.18
Medical/Surgical	404291	205401	864		4.20	0.51
Prenatal	49	2	0		0.00	0.04
Respiratory	1406	946	0		0.00	0.67
Surgical	432	241	0		0.00	0.55
Surgical Cardiothoracic	5174	1752	3		1.71	0.33
Total (national data)	**512081**	**224448**	**944**	**Average**	**4.20**	**0.43**

Table 26: Ventilator-Associated Event Rate and Device Utilization Ratio per type of Adult ICUs

Figure 33 A: VAE rates by type of ICU

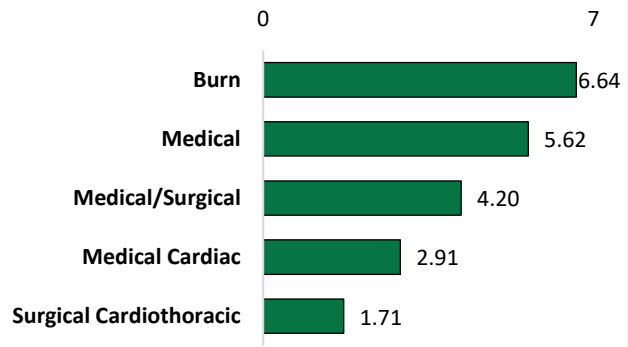


Figure 33 B: Ventilator DUR by type of ICU

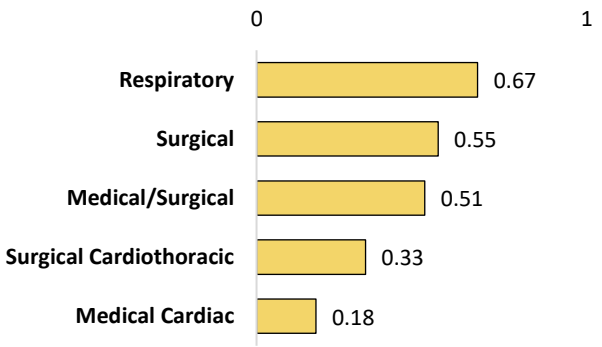
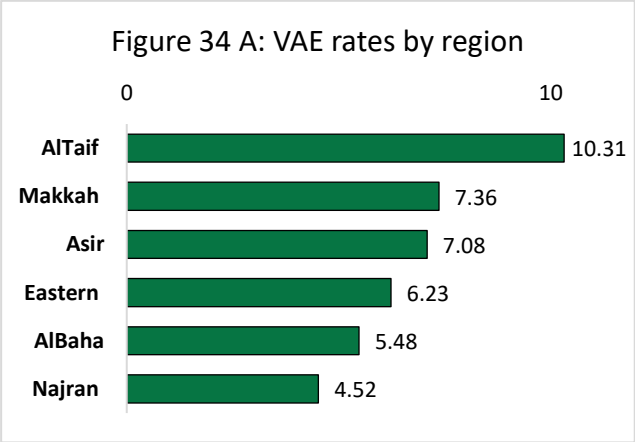


Table 26 and Figures 33 A -B shows VAE rates and ventilator utilization ratios by type of ICU. The average VAE rate was 4.20 per 1000 ventilator days. The average ventilator utilization ratio was 0.43. ICUs with above-average VAE rates included burn (6.64), medical (5.62), medical/surgical (4.20), and medical cardiac (2.91) ICUs.

Adult ICUs per region	Patients Days	Vent. Days	VAE		VAE Rate	DUR
AlAhsa	29661	7635	26		3.41	0.26
AlBaha	10644	5107	28		5.48	0.48
AlJouf	9082	3535	13		3.68	0.39
AlMedina AlMonawarah	19351	10167	8		0.79	0.53
AlQassim	33348	15429	36		2.33	0.46
AlQunfutha	11691	4067	3		0.74	0.35
AlQurayat	3685	1381	6		4.34	0.37

AlTaif	14607	7661	79		10.31	0.52
Asir	27776	13546	96		7.08	0.48
Bishah	5107	2228	0		0.00	0.44
Eastern	25854	14767	92		6.23	0.57
Hafer AlBatin	14274	10165	1		0.10	0.71
Hail	10370	4778	11		2.30	0.46
Jazan	20179	13219	31		2.34	0.65
Jeddah	30936	21051	75		3.56	0.68
Makkah	37766	21327	157		7.36	0.56
Najran	17610	7516	34		4.52	0.42
Northern Borders	11649	4466	20		4.47	0.38
Riyadh	57982	31577	129		4.08	0.54
Tabouk	12719	5779	19		3.28	0.45
Total (national data)	**404291**	**205401**	**864**	**Average**	**4.20**	**0.51**

Table 27: Ventilator-Associated Event Rate and Device Utilization Ratio in Adult medical-surgical ICUs per region



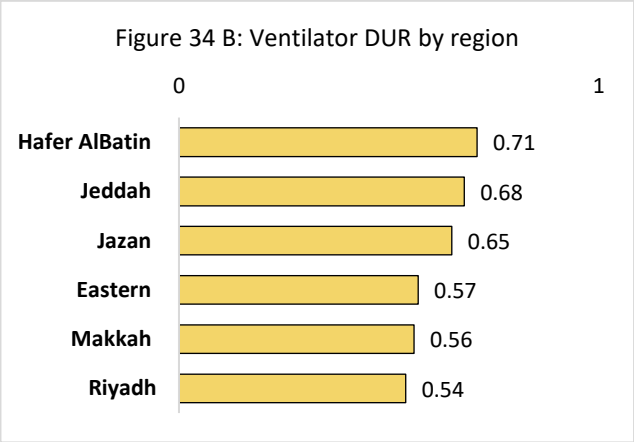


Table 27 and Figures 34 A -B shows the VAE rate and ventilator utilization ratio in adult medical-surgical ICUs in the Kingdom. The national VAE rate is found to be 4.20 and the device utilization ratio to be 0.51. The VAE rate is found to be highest in Taif region (10.31) and lowest in Bishah and Hafrul batin regions.

4.4 Device- Associated Infections (Outpatients)

Dialysis information	Total Number
Total number of Dialysis Centers included in Surveillance Program	MOH= 128 Davita= 23 Diaverum= 39
National Rate of Dialysis Events	0.86

Total number of patients registered in HESN, for chronic hemodialysis (Patient months)	147360
Total number of events	**1270**

Table 28: Data of Dialysis Centers

Table 28 shows Dialysis events (DE) rates by the type of vascular access. A total of 1270 dialysis events were detected during 147360 months of surveillance in 190 dialysis centers in 2022. The average DE rate was 0.86 per 100 patient months.

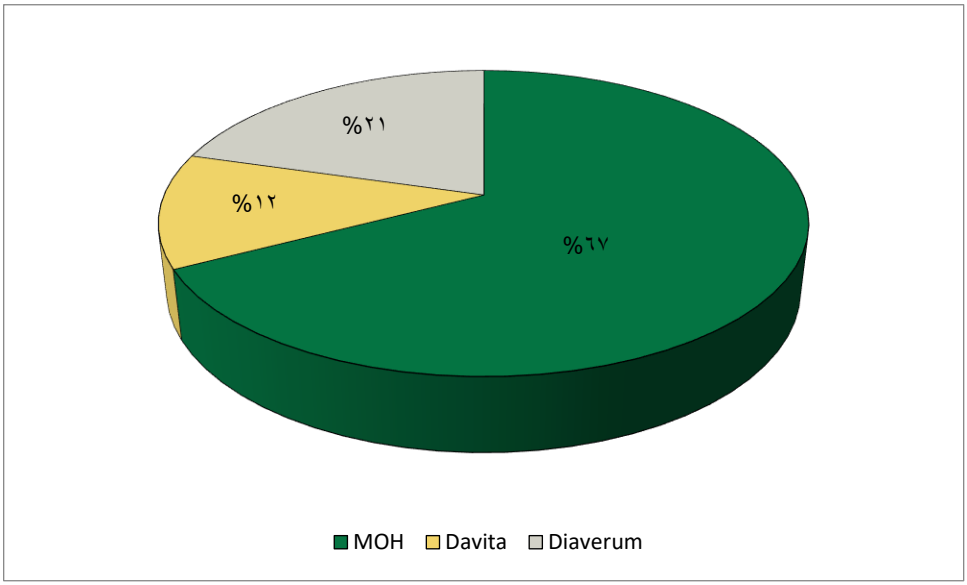


Figure 35 A: Dialysis Centers included in Surveillance Program

Region	Number of patient months	Number of events	Dialysis event rate
AlAhsa	2744	64	2.33
AlBaha	2548	57	2.23
AlJouf	1531	11	0.71
AlMedina AlMonawarah	82910	82	0.09
AlQurayat	591	27	4.50
AlTaif	1586	13	0.81
Asir	1981	41	2.06
Bishah	805	2	0.24
Eastern	4646	170	3.65
Hafer AlBatin	1523	14	0.91
Hail	5011	2	0.03
Jazan	4903	78	1.59
Jeddah	631	10	1.58

Makkah	11385	46	0.40
Najran	3217	57	1.77
Northern Borders	1558	41	2.63
AlQassim	2708	60	2.21
Riyadh	14438	448	3.09
Tabouk	2644	47	0.01
Davita	33344	522	1.64
Daverum	57928	514	0.51
Total (national data)	**238632**	**2306**	**0.97**

Table 29: Rates of Dialysis Events per Regions

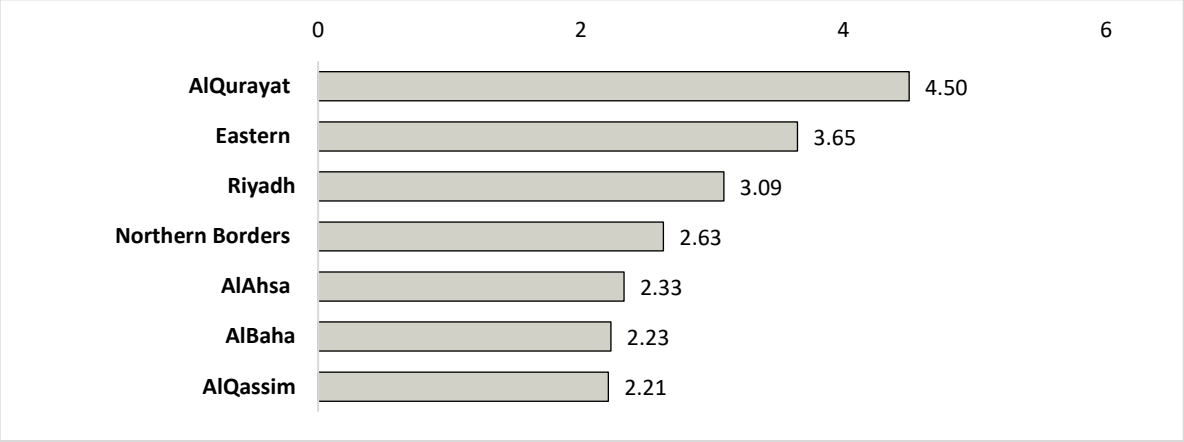


Figure 36: Rates of Dialysis Events per Region

Table 29 and Figure 36 show the national rate of dialysis events in all the regions of the Kingdom. The national rate of dialysis events is found to be 0.97. The dialysis event rate is found to be highest in the Eastern region (3.65) and lowest in Tabuk (0.01) and Madinah (0.09) regions.

4.5 Procedure- Associated Infections

Names of the procedures	Procedure	SSI	SSI Rate	NHSN Benchmark
Caesarian Section (CSEC)	71919	640	0.89	1.84
Cholecystectomy (CHOL)	6236	8	0.13	0.63
Appendectomy (APPY)	3597	25	0.70	1.41
Fixation (FX)	2985	19	0.64	1.70
Coronary artery bypass graft (CBGE)	1031	32	3.10	2.94
Cardiac surgery (CARD)	556	27	4.86	1.29

Total	86324	751	0.87	NA

Table 30: Total Numbers and rates of Surgical Site Infections per procedure

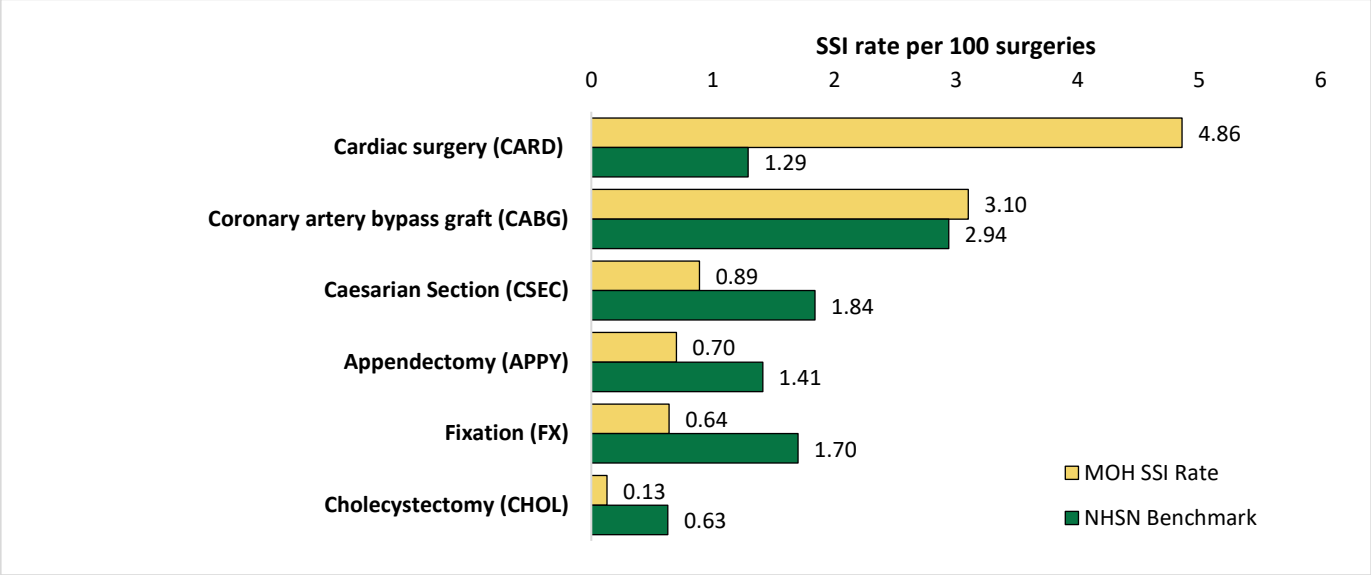


Figure 37: SSI rates in MOH and NHSN

Table 30 and Figure 37 show SSI rates in MOH hospitals for selected surgeries in 2022 with the NHSN benchmark. A total of 751 SSI events were detected during the surveillance of 6 surgeries in MOH hospitals in 2022. The average SSI rate was 0.87 per 100 surgeries surveyed. The highest SSI rate was associated with cardiac surgery (4.86) and coronary artery bypass grafting (3.10) and the lowest was cholecystectomy (0.13). All SSI rates were found to be higher than the NHSN benchmarks.

4.6 Healthcare-Associated Multidrug-Resistant Organisms

Total MDROs	Number	Percent	Rank
Acinetobacter species	360	24.9%	1
Klebsiella species	347	24.0%	2
Methicillin-Resistant Staphylococcus aureus (MRSA)	269	18.6%	3
Carbapenem Resistant Enterobacteriaceae (CRE)	246	17.0%	4
Pseudomonas species	179	12.4%	5
Vancomycin-resistant Enterococcus (VRE)	43	3.0%	6
Ceph-R Klebsiella (Cephalosporin Resistant Klebsiella)	1	0.1%	7
Total	1445	100.0%	---

Table 31: MDRO Data in MOH Hospitals

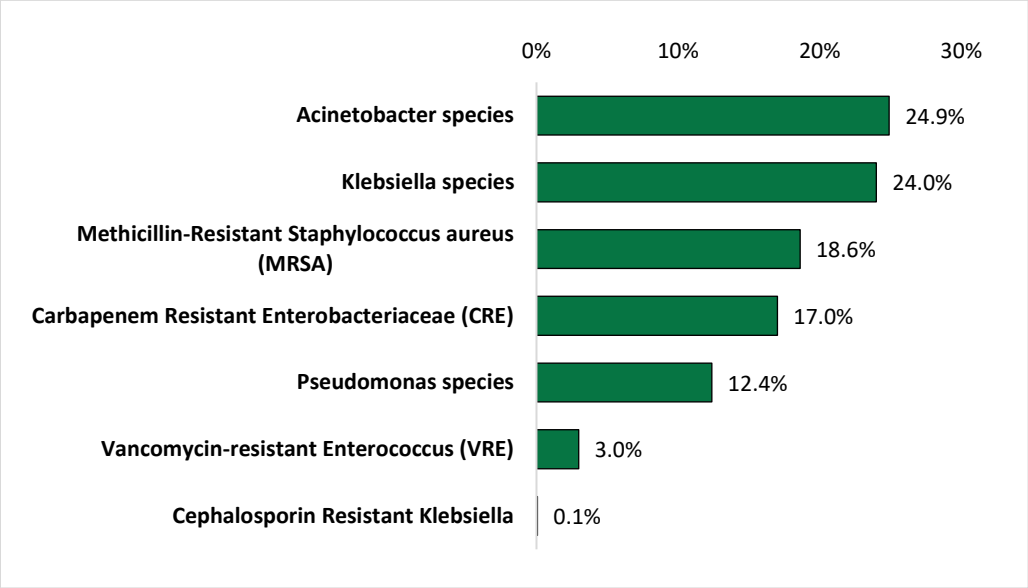


Figure 38: Frequency of Multidrug-Resistant Organisms

Table 31 and Figure 38 show MDRO rates in MOH hospitals. A total 1445 MDRO were detected in the MOH hospital during 2022. Most Gram positive MDROs were methicillin-resistant staphylococcus aureus (MRSA) and to less extent vancomycin-resistant enterococcus (VRE). The most frequent Gram negative MDROs were Acinetobacter species and Klebsiella species (24.9 and 24 percent respectively).

4.7 Trend of Healthcare-Associated Infections International

Year	CLABSI	CAUTI	VAE
2017	1.82	1.62	-
2018	2.6	2.03	-
2019	1.99	1.45	-
2020	2.59	1.07	-
2021	2.32	0.92	3.18
2022	1.81	1.02	4.20

Table 32: Trends of Healthcare-associated Infections in Adult Medical Surgical ICU

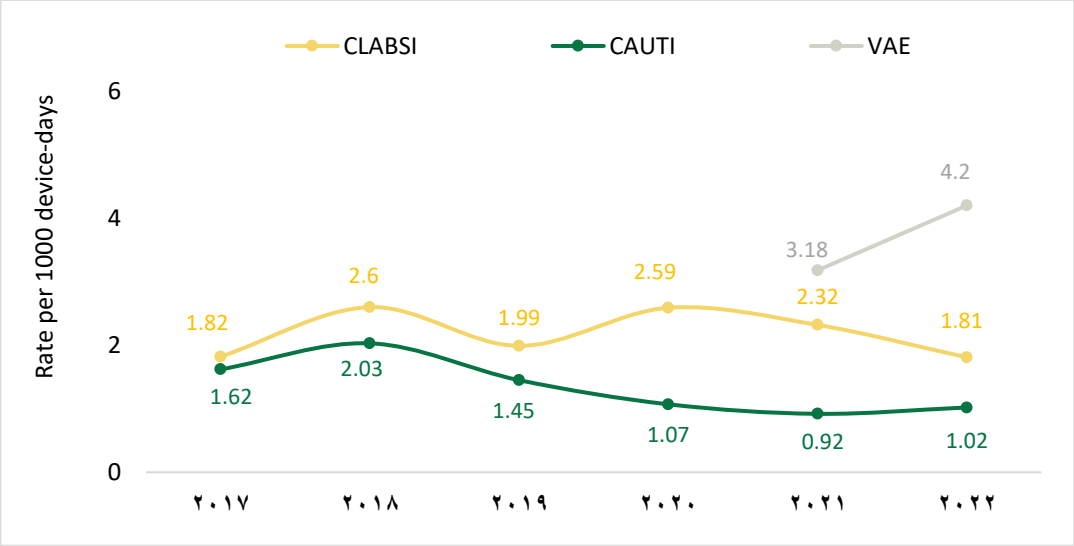


Figure 39: Trends of Healthcare-associated Infections in Adult Medical Surgical ICU

Table 32 and Figure 39 show the trends of device-associated HAI rates in adult medical-surgical ICUs in MOH hospitals between 2017 and 2022. In adult medical surgical ICUs, there was a slight decrease in CLABSI rate during 2022 compared to 2021. And CAUTI and VAE rates were increased.

Year	CLABSI	CAUTI	VAP
2017	3.07	0.5	1.22
2018	2.58	1.04	1.29
2019	2.23	0.48	1.32
2020	1.45	0.2	0.32
2021	3.72	0.67	1.92
2022	3.83	1.45	2.64

Table 33: Trends of Healthcare-Associated Infections in Pediatric Medical Surgical ICU

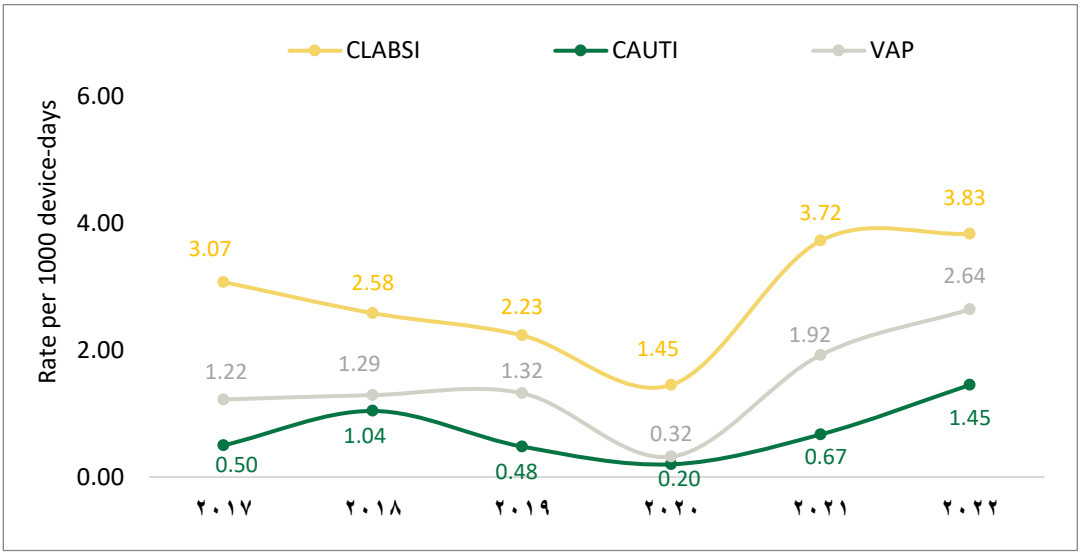


Figure 40: Trends of Healthcare-Associated Infections in Pediatric Medical Surgical ICU

Table 33 and Figure 40 show the trend of healthcare-associated infections in the pediatric medical-surgical ICU. CLABSI, CAUTI, and VAP all are higher in 2022 as compared to 2021.

Year	CLABSI	VAP
2017	4.73	1.21
2018	6.61	2.3
2019	4.52	1.52
2020	2.9	0.85
2021	3.87	0.7
2022	3.74	1.03

Table 34: Trends of Healthcare-Associated Infections (Rates) in Neonatal ICU

Table 34 show the trend of healthcare-associated infections in neonatal ICU. CLABSI and VAP are found to be higher in 2022 as compared to 2021.

4.8 Benchmarks (NHSN, GCC, INICC & MOH)

NHSN: National Health Safety Network- **GCC:** Gulf Cooperation Council

INICC: International Nosocomial Infection Control Consortium- **MOH:** Ministry of Health

Type of ICU	NHSN	GCC	INICC	MOH
CLABSI				
Adult Medical Surgical	0.8	2.6	4.93	1.81
Pediatric Medical Surgical	1.2	3.1	6.07	3.83
Neonatal ICU	1.12	5.0	5.17	3.74
CAUTI				
Adult Medical Surgical	1.71	3.3	5.34	1.02
Pediatric Medical Surgical	2.5	N/A	5.6	1.45
VAP				
Pediatric Medical Surgical	0.7	2.4	7.9	2.64
Neonatal ICU	0.81	1.8	9.54	1.03
VAE				
Adult Medical surgical	7.76	-	-	4.20

Table 35: International Benchmarks for CLABSI, CAUTI, VAP, and VAE

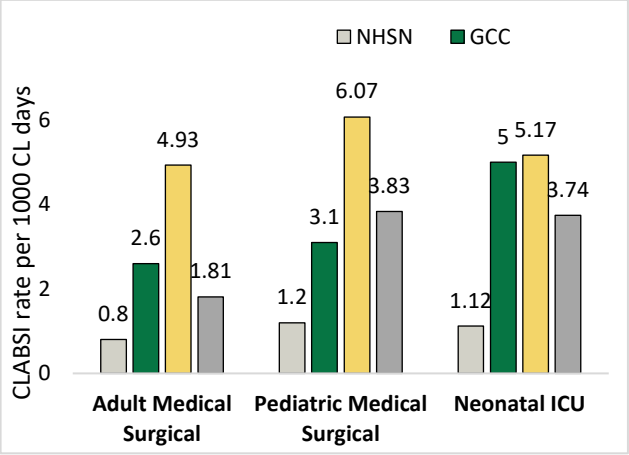


Figure 41 A: International Benchmarks for CLABSI

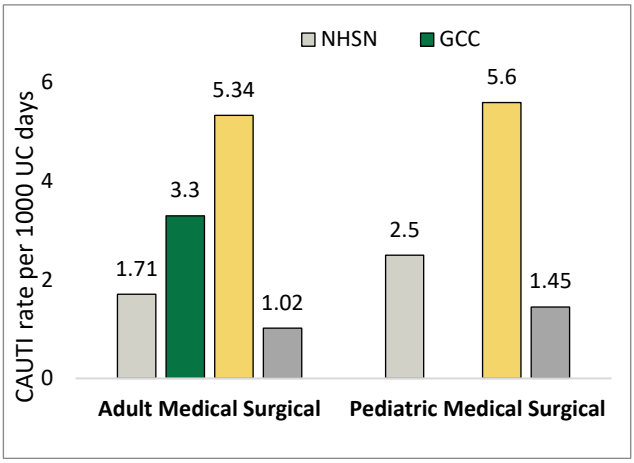


Figure 41 B: International Benchmarks for CAUTI

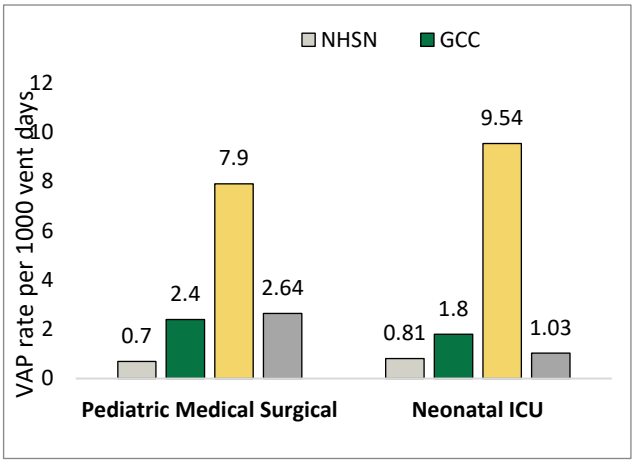


Figure 41 C: International Benchmarks for VAP

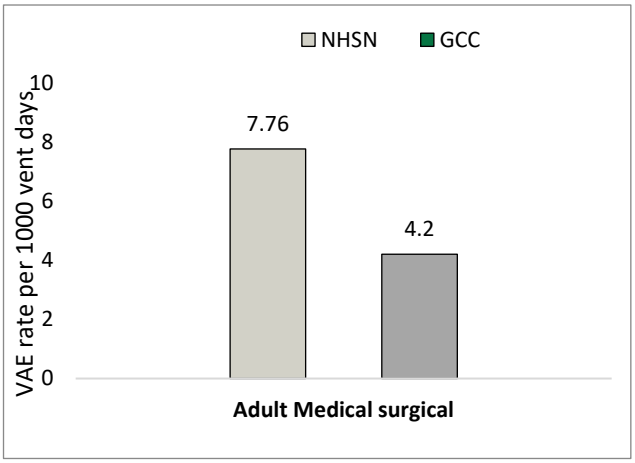


Figure 41 D: International Benchmarks for VAE

Table 35 and Figures 41 A-D show benchmarking of device-associated HAIs of MOH hospitals in 2022 with international benchmarks. CLABSI rates were generally higher than NHSN and lower than INICC, and GCC rates. CAUTI rates were generally lower than all benchmarking rates. Pediatric VAP rates were generally higher than NHSN and lower than INICC and almost the same as GCC rates. Neonatal VAP is higher than NHSN and lower than GCC and INICC rates. VAE rates were lower than NHSN rates, which is the only available benchmark.

5. HAIs Outbreak & Rapid Response Team (RRT) Program

1.1 Highlights

- In 2022, a total of 508 HAIs outbreaks (1675 cases), including 123 COVID-19 outbreaks (563 cases), were identified and reported from healthcare facilities to the GDIPC.
  - 11 outbreaks required GDIPC supporting management.
  - 72 cases co-infected with COVID-19 and other microorganisms (e.g., *Klebsiella pneumonia*, *Candida auris*, and *Acinetobacter baumannii*).
- The number of HAI outbreaks reported to the GDIPC in 2022 increased by 316%, compared to 2021.
- The GDIPC outbreak department received notifications of HAI outbreaks from:
  - All 20 KSA regions.
  - 82 MOH hospitals.
  - 6 private hospitals in Riyadh and Jeddah regions.
- 74% of the HAIs MDRO outbreaks occurred in the adult ICUs.
- The most infectious agents causing HAI outbreaks in 2021-2022 were:
  - ***Candida auris:*** 146 out of the 385 HAI outbreaks (38%) with 345 cases. These candida cases were reported from 13 regions.
  - ***Klebsiella Pneumoniae*** (CRE, ESBLS): 105 out of the 385 HAI outbreaks (27%) with 358 cases.
  - ***Acinetobacter Baumannii***: 75 out of the 385 HAI outbreaks (20%) with 256 cases.
  - ***Other Organisms***: 59 out of the 385 HAI outbreaks (15%) with 153 cases.
- The overall percentage of deaths associated with HAI outbreaks was 41%. The highest was among patients who were infected with *Klebsiella pneumoniae* (ESBLs, CRE) (42%), *Candida auris* (41%), and *Acinetobacter bumannii* (40%).
- Nine cases of Monkeypox (no death), and six cases of MERS (1 death), were reported.
- Daily (365) and weekly (52) reports of HAI outbreaks were issued in 2022.

Implemented improvement activities:

1. Central assessment validation visits. The GDIPC team have visited 11 health care facilities in 8 regions, and 25 unreported HAI outbreaks were detected.
2. Verification visits to zero reporting hospitals were done by the RHD utilizing Clearance and Clarification forms for Notification Indicator improvement.
3. Activation of Rapid Response Team to manage HAI outbreaks using corrective action plans according to the level of outbreak (outbreak level A and B).
4. Improving the HAIs reporting process in hospitals with zero reporting during 2019-2021 (44 hospitals). 59% of the targeted hospitals were improved in the reporting process.

2.2 Introduction

The HAIs Outbreak and Rapid Response Team (Outbreak-RRT) Department in the GDIPC monitors and follows up outbreaks in healthcare facilities in all the regions of the Kingdom. The department aims to investigate all HAI outbreaks and identify what and how infections have been acquired inside health facilities that may infect patients or health practitioners.

MOH-GDIPC/Outbreaks-RRT department is working to identify, track, and respond to HAI outbreaks in hosptals, using approved GDIPC forms and an electronic platform that were developed to facilitate the documentation of HAIs outbreak notification, investigation, and responses. MOH-GDIPC/Outbreaks-RRT department classify and confirm HAI outbreaks by the type of microorganisms, the number of cases, and outcomes according to the classification matrix. The department team responds and investigates the incidents of HAI outbreaks, and emerging and reemerging diseases, using notification and investigation forms (Guideline 2022). This includes epidemiology of specific bacterial, fungal, and viral outbreaks in healthcare facilities, including:

- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-resistant *Enterococci* (VRE)
- Carbapenem-resistant *Enterobacteriaceae* (CRE) and ESBLs.
- *Pseudomonas aeruginosa*
- *Acinetobacter baumannii*
- *Clostridium difficile*
- *Legionella*
- (Covid-19)
- MERS-CoV
- *Candida. auris*
- *Serrartia*
- *Burkhorderia*
- Others

This annual report collates and summarizes information related to HAI outbreaks for the year of 2022. It also describes and addresses the challenges that the hospital infection control (IC) departments,

regional IC directorates/clusters, and GDIPC have faced in preventing and controlling HAI outbreaks. The GDIPC hopes this annual report will help in controlling HAI outbreaks and preventing them.

2.4 Findings

2.4.1 HAI Outbreaks and Cases

Figure 1: Number of Reported HAI Outbreaks, 2015 – 2022

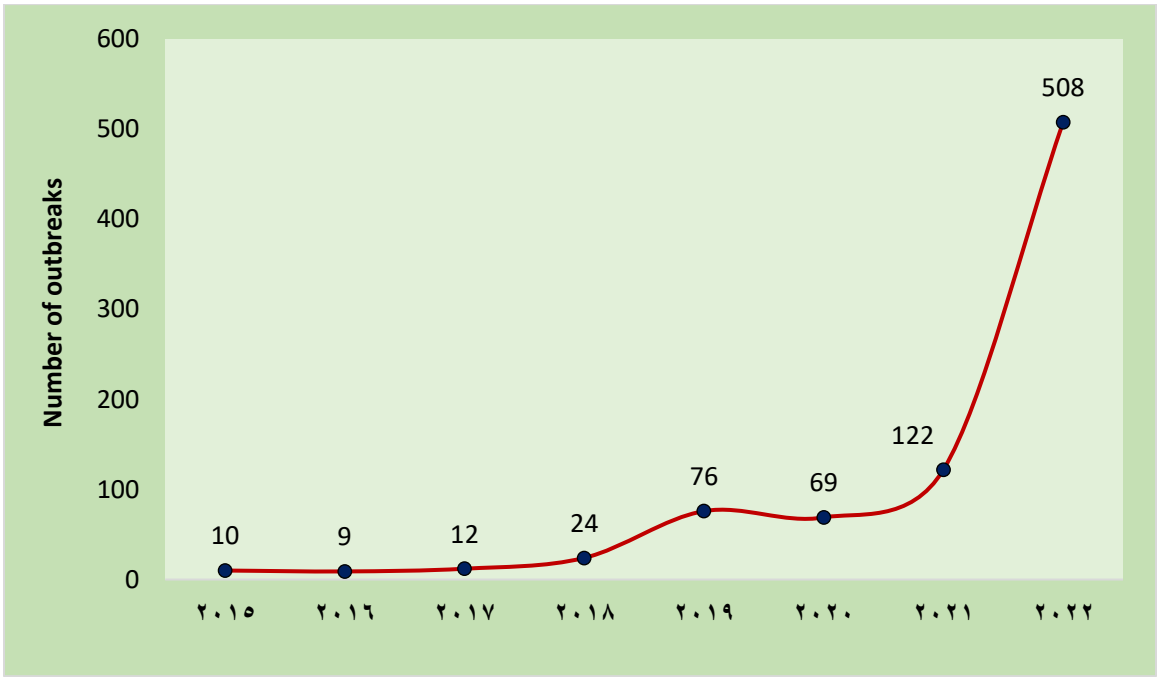


Figure 1 shows the total number of reported HAI outbreaks over years (2015 – 2022). There was an increase in the number of the HAI outbreaks in each year compared to the previous year, except in 2016 and 2020. The highest increase was recorded in 2022. The reported HAI outbreaks increased from 2021 to 2022 by 316% due to process improvement in training, awareness, and notification after updating the guidelines.

Figure 2: Trend of Confirmed HAI Outbreaks per Month, 2021 – 2022

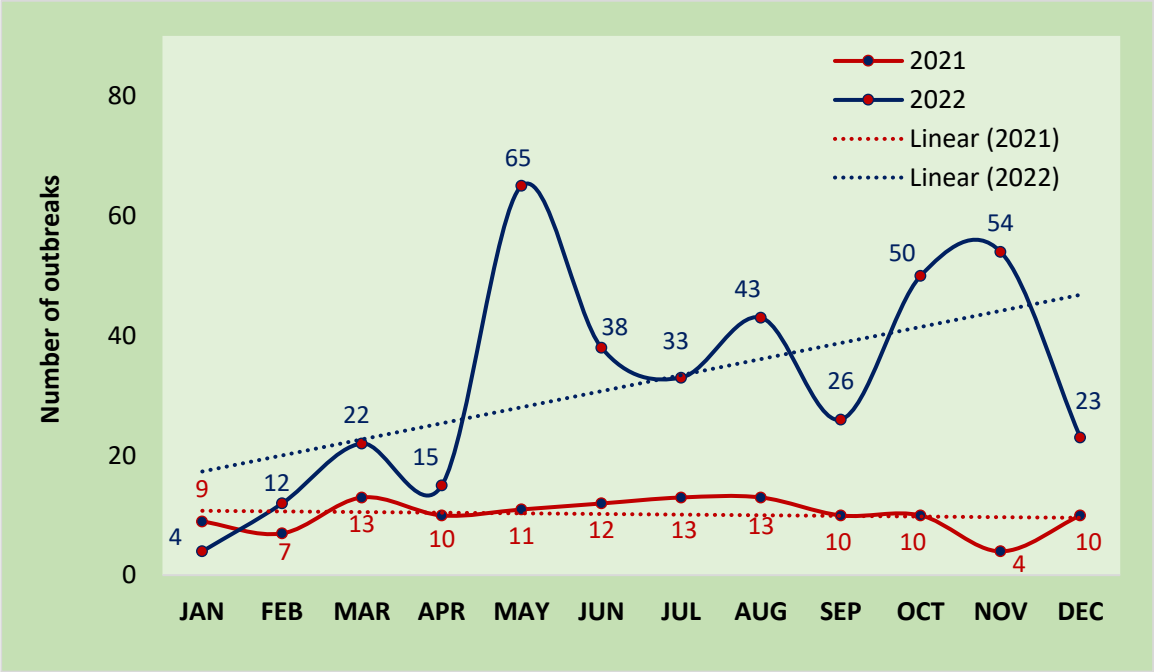
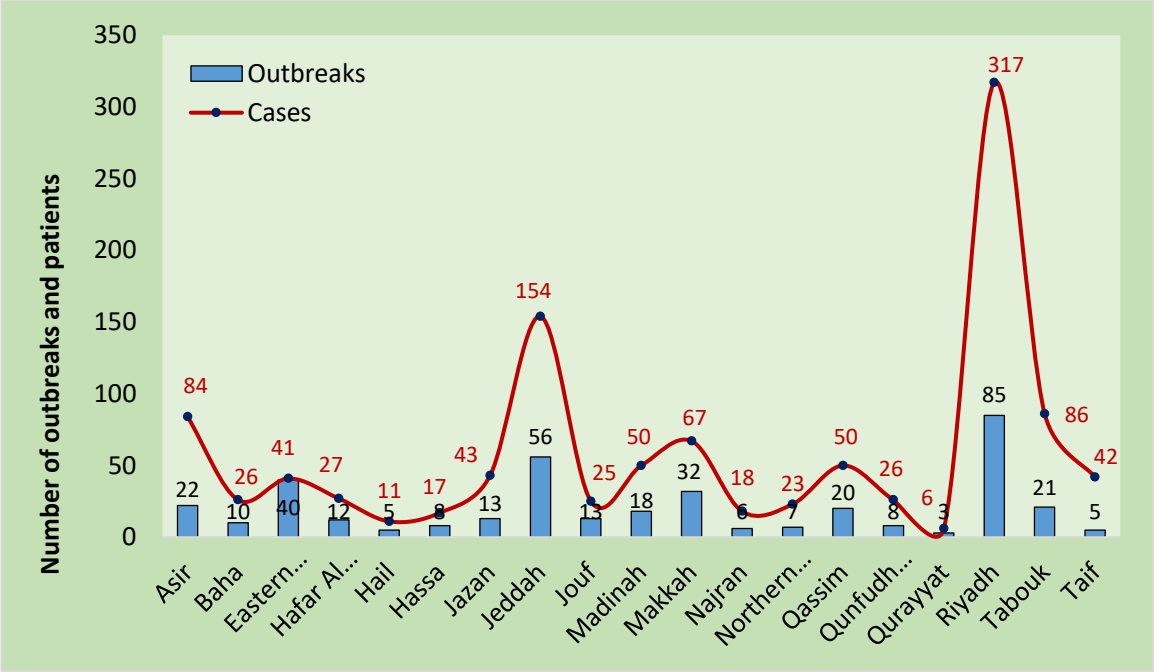


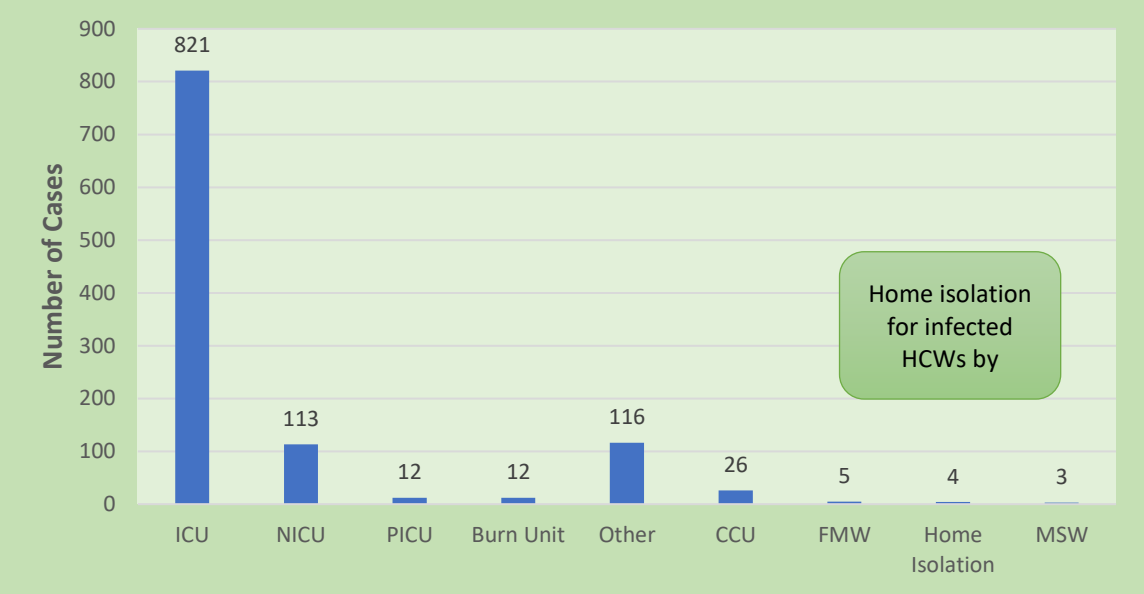
Figure 2 depicts the total number of HAI outbreaks per month among 2021 and 2022. In 2022, the highest number of reported HAI outbreaks was recorded in May (65 outbreaks), and the lowest number was recorded in January (4 outbreaks).

Figure 3: Total Reported HAI Outbreaks and Cases by Region in 2022



During 2022, most of the regions have reported outbreaks to the GDIPC except Bisha (reported Covid -19 outbreaks only). The highest number of outbreaks and cases was recorded in Riyadh (85 confirmed HAIs outbreaks and 317 cases), followed by Jeddah (56 confirmed HAIs outbreaks and 154 cases). The region that reported the lowest number of outbreaks was Qurayate (3 outbreaks).

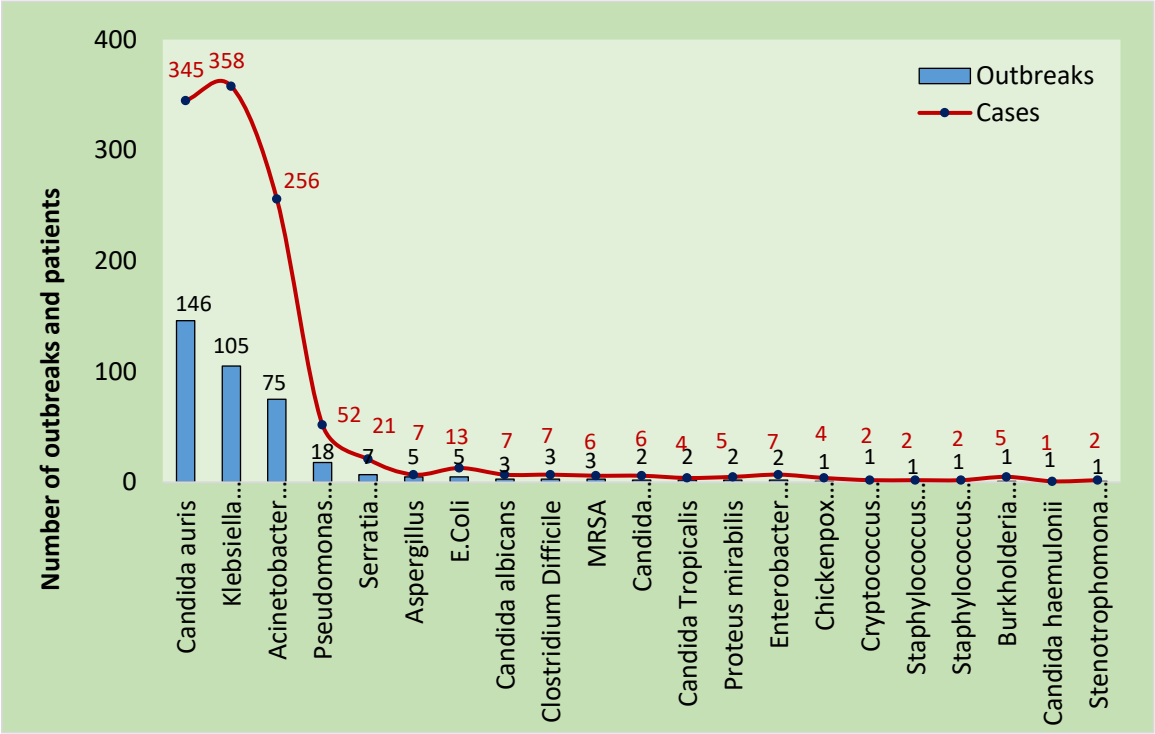
Figure 4: Distribution of Reported HAI MDROs Outbreak Cases per Unit, 2022



In 2022, adult ICU and NICU recorded the highest number of HAI cases.

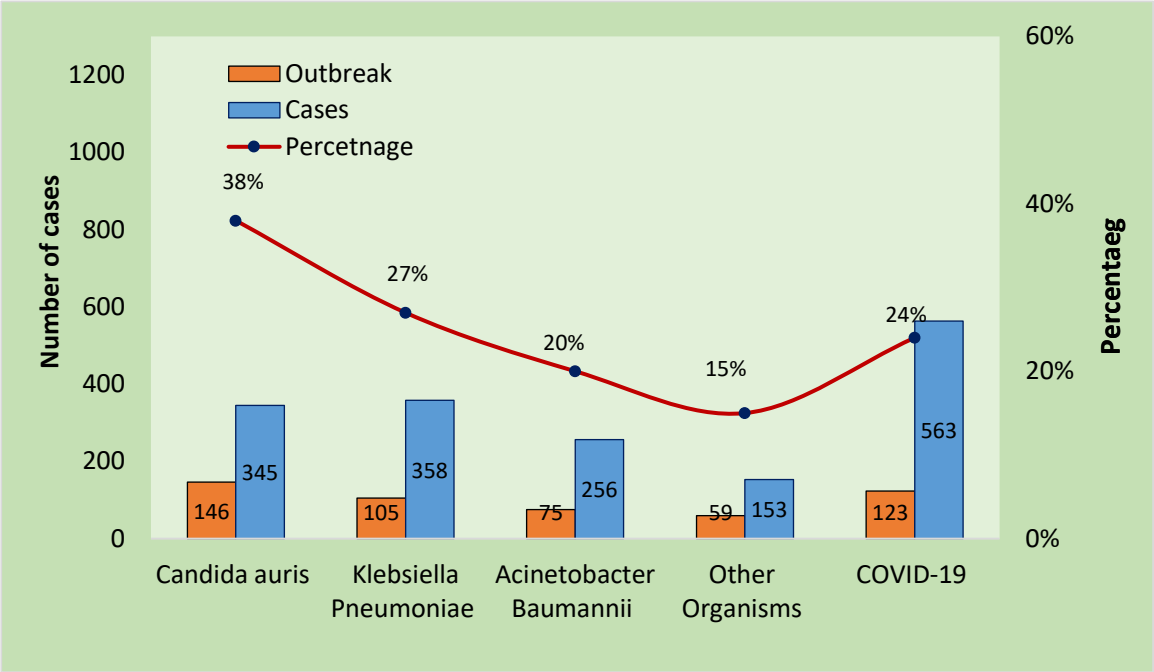
ICU: Intensive Care Unit, NICU: Neonatal Intensive Care Unit, PICU: Pediatric Intensive Care Unit, CCU: Critical Care Unit, FMW: Female Medical Ward, MSW: Male Surgical Ward.

Figure 5: Total HAI Outbreaks & Cases per Isolated Organisms, 2022



A total of **21** different microorganisms were identified during 2022. The most commonly reported infectious agents causing outbreaks in healthcare facilities were *Candida. auris* (146, **38%**), *Klebsiella pneumoniae* (105, **27%**), and *Acinetobacter baumannii* (75, **20%**), while other microorganisms have accounted for (59, **15%**) of total reported outbreaks.

Figure 6: The Highest Recorded Microorganisms in HAI Outbreaks, 2022



- ***Candida auris***: 146 out of the 385 HAI outbreaks (38%) with 345 cases. These candida cases were reported from 13 regions.
- ***Klebsiella Pneumoniae* (CRE, ESBLS)**: 105 out of the 385 HAI outbreaks (27%) with 358 cases.
- ***Acinetobacter Baumannii***: 75 out of the 385 HAI outbreaks (20%) with 256 cases.
- **Other Organisms**: 59 out of the 385 HAI outbreaks (15%) with 153 cases.

Table 1: Total Reported HAI Outbreaks by Most Common HAI Pathogens, 2021 – 2022

HAI Pathogen	Number of Outbreaks 2021	Number of Cases in 2021	Number of Outbreaks 2022	Number of Cases in 2022
Klebsiella pneumoniae (CRE, ESBLS)	42	211	105	358
Candida auris	28	97	146	345
Acinetobacter baumannii	25	96	75	256
Other Organisms	27	92	59	153
Total HAI Outbreaks	122	496	385	1112

In 2022, the most common isolated organism associated with HAI outbreaks was C. auris with 146 HAI Outbreaks (38%) and 345 cases (31%). In overall the reason of increased number of notification/ cases due to resource availability. In other hand the *Klebsiella Pneumoniae* was the most common isolated organism associated with HAI outbreaks in 2021 with 42 outbreaks (34%) and 211 cases (43%).

Table 2: Percentage of death associated with the highest recorded HAI Outbreaks, 2021- 2022

HAI Pathogen	Percentage of death 2021	Percentage of death 2022
Acinetobacter Baumannii (MDROs)	52%	40%
Klebsiella Pneumonia (CRE, ESBLS)	51%	42%
Candida Auris	45%	41%
Overall Percentage of death associated with highest recorded outbreaks	50%	29%

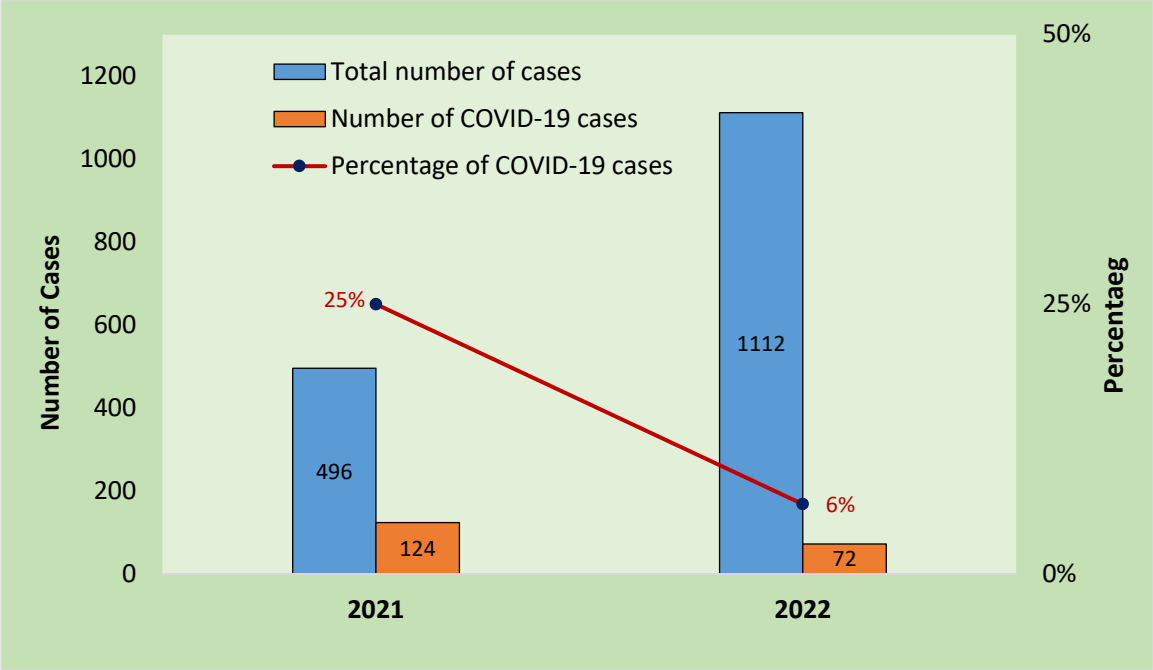
In 2021, the overall percentage of death associated with highest recorded outbreaks was 50%. The highest percentage was among patients who were infected with Acinetobacter bumannii MDROs (52%), followed by Klebsiella pneumoniae (ESBLs, CRE) (51%), and Candida auris (45%).

In 2022, the overall percentage of death associated with highest recorded outbreaks was 41%. The highest percentage was among patients who were infected with Klebsiella pneumoniae (ESBLs, CRE) (42%), followed by Candida auris (41%) and Acinetobacter bumannii MDROs (40%).

The overall percentage of death associated with highest recorded outbreaks was decrease in 2022 by 9%, that could be due to early infection control intervention, management and notification after updating the guidelines.

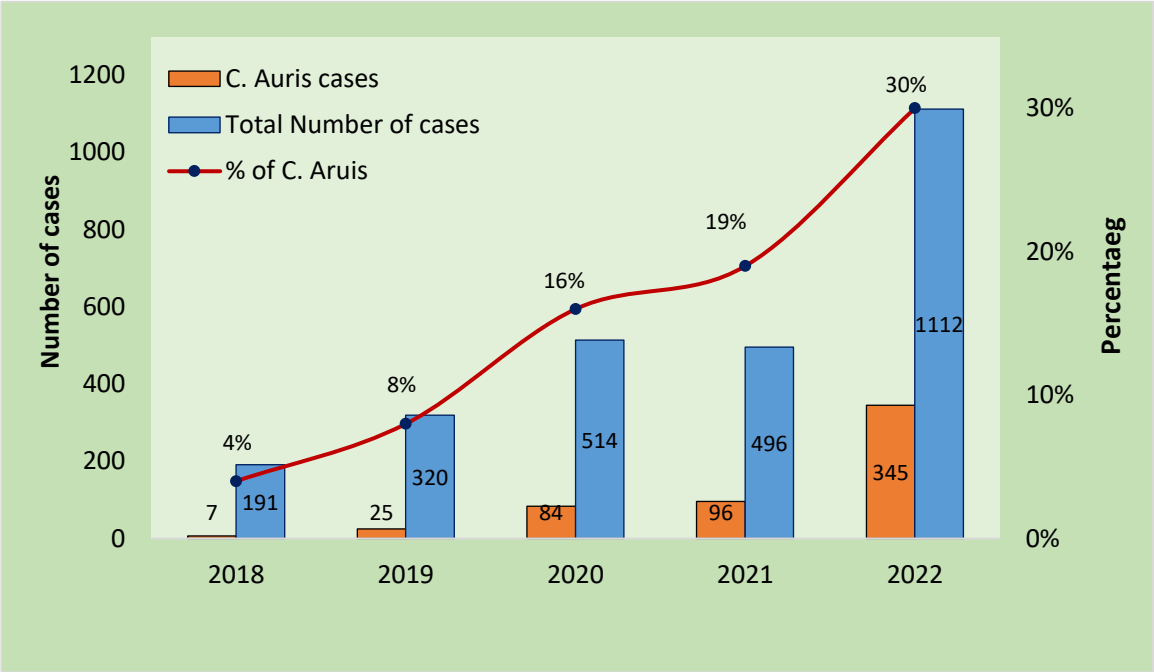
2.4.2 MDROs and Covid-19 Co-Infection Outbreaks

Figure 7: Number of MDRO Cases Co-infected with COVID-19, 2021 – 2022



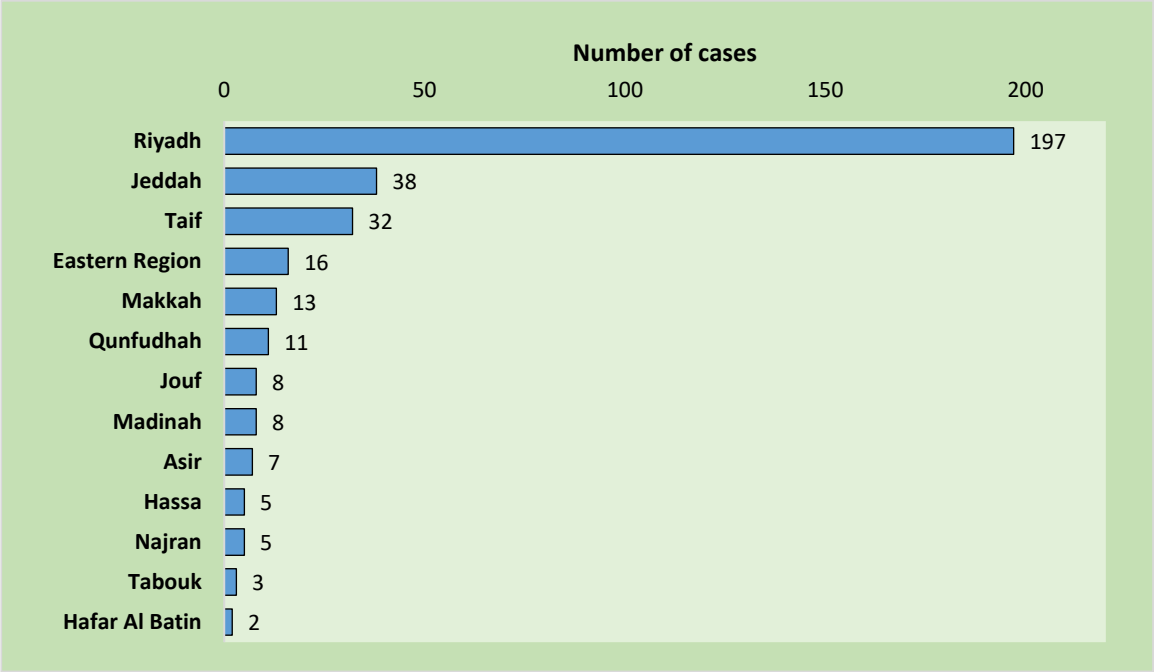
In 2022, out of the 1112 cases, 72 MDRO cases were co-infected with Covid-19 (6%). In 2021, out of 496 outbreak cases, 124 were MDRO cases associated with COVID-19 patients (25%).

Figure 8: Trend of *Candida auris* and Total Outbreak Cases in MOH Hospitals Over Years, 2018-2022



In 2022, 345 *C.auris* cases were recorded from 13 regions (30% of the total outbreak cases). The percentage of *C.auris* cases out of the total outbreak cases increased over years due to process improvement in training, awareness, and notification after updating the guidelines.

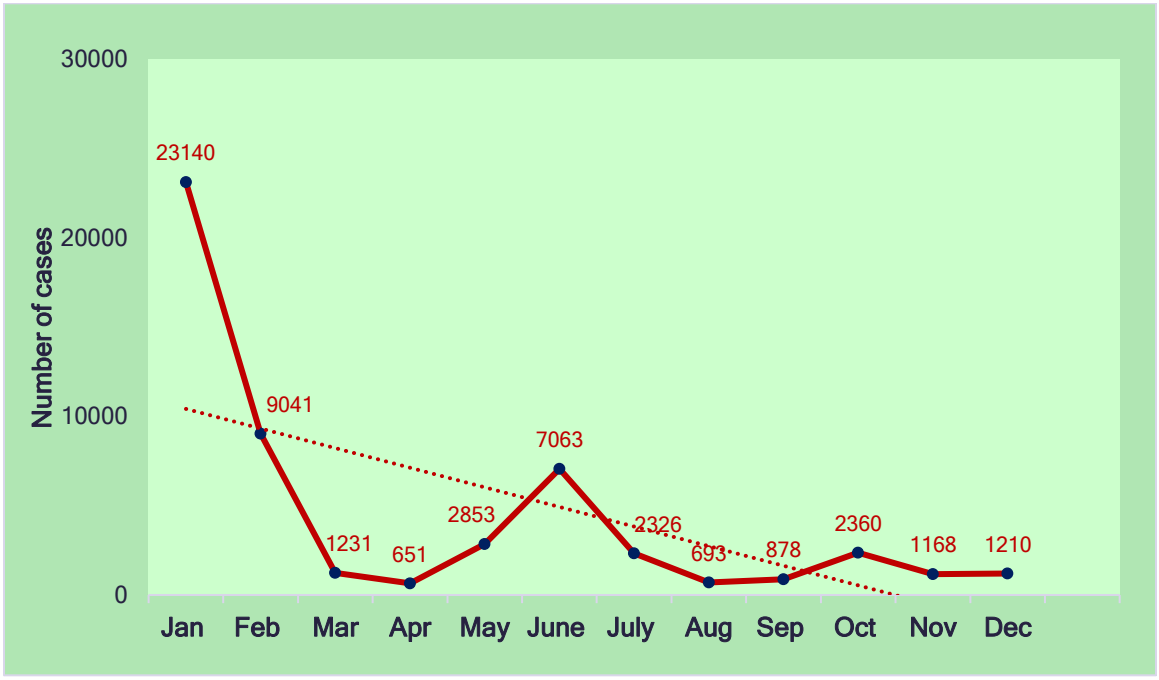
Figure 9: Number of *Candida auris* Cases per Region, 2022



Riyadh region reported 197 C. auris cases; the highest number of cases among the 13 regions in 2022, representing 18% of the total reported HAI outbreak cases (1112).

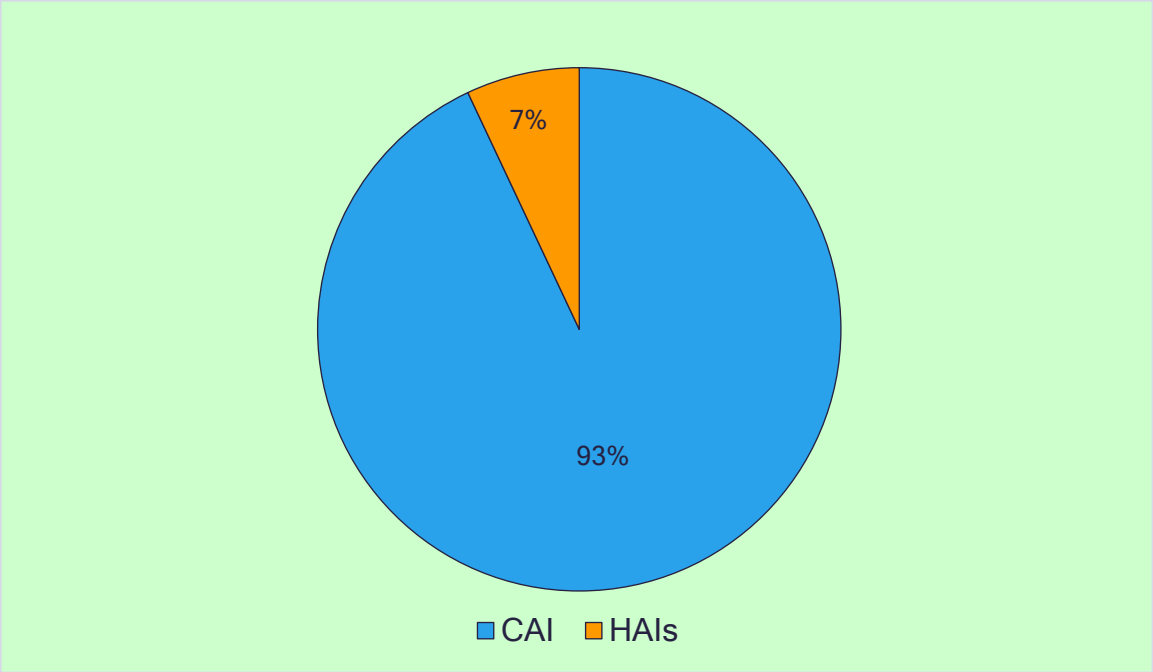
2.4.3 Covid-19 Overview

Figure 10: COVID-19 Cases Distribution Among HCWs per Month, 2022



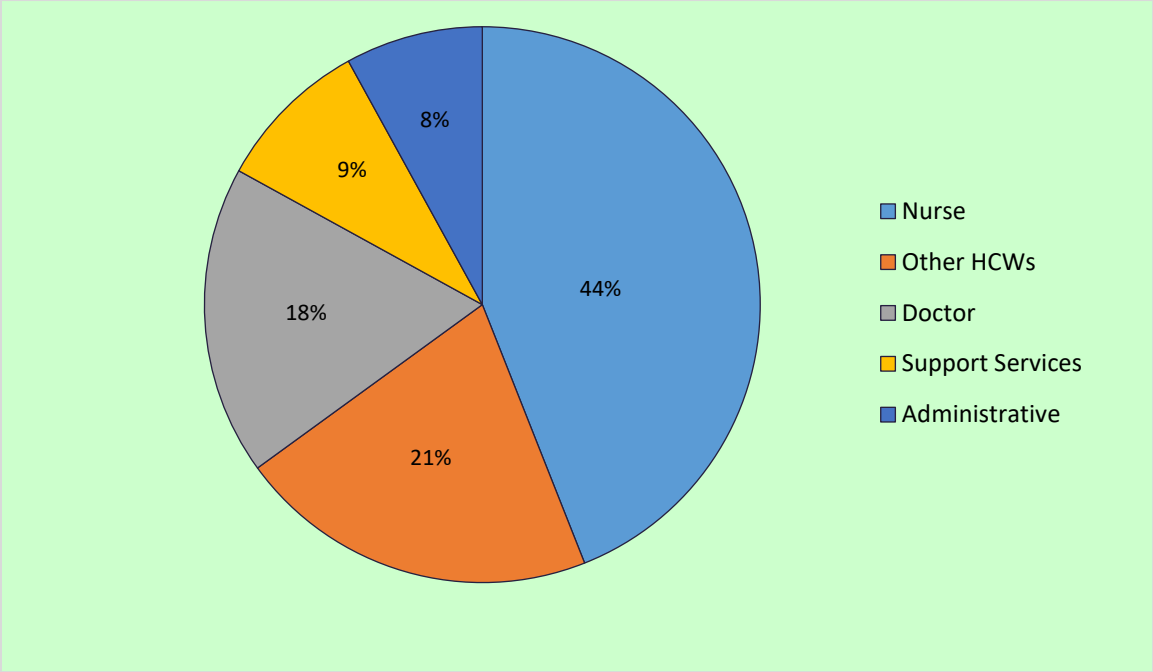
The highest number of COVID-19 cases among HCWs was 23140 cases and reported in January, and the lowest was 651 in April. In general, there was a downward trend in COVID-19 cases among HCWs over months in 2022.

Figure 11: COVID-19 Cases Distribution among HCWs by Source of Infection, 2022



7% of COVID-19 Cases were acquired in healthcare facilities and 93% were reported as community acquired infection CAIs.

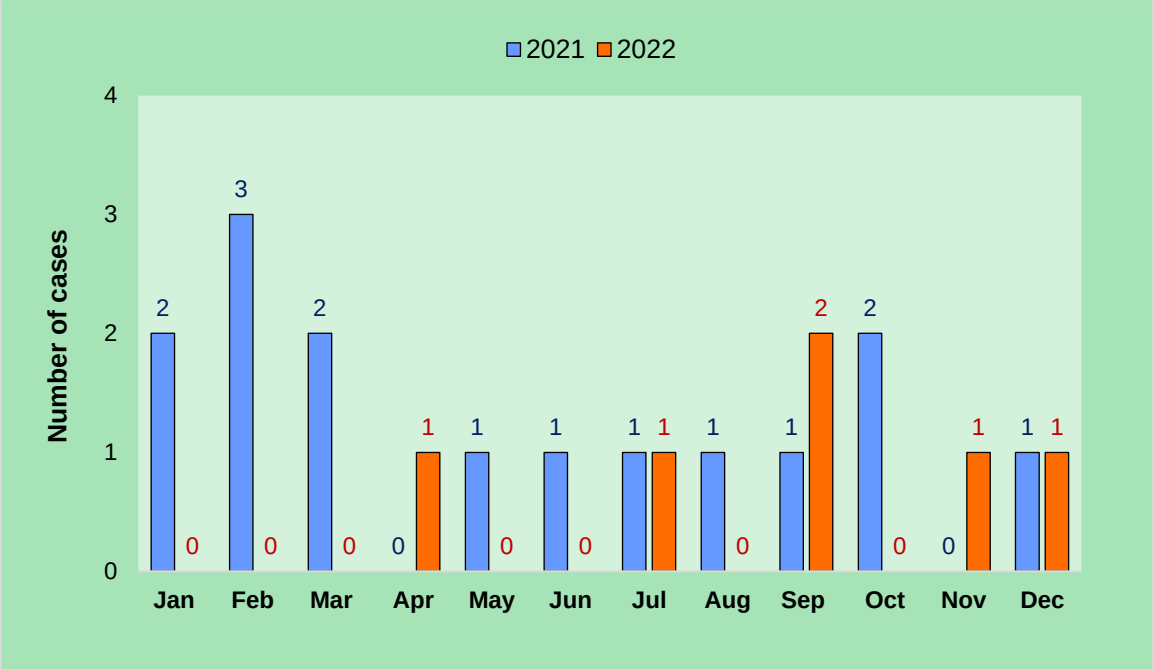
Figure 12: COVID-19 Cases distribution among HCWs per job category, 2022



Covid-19 cases were more common among nurses compared to other HCWs with 44%.

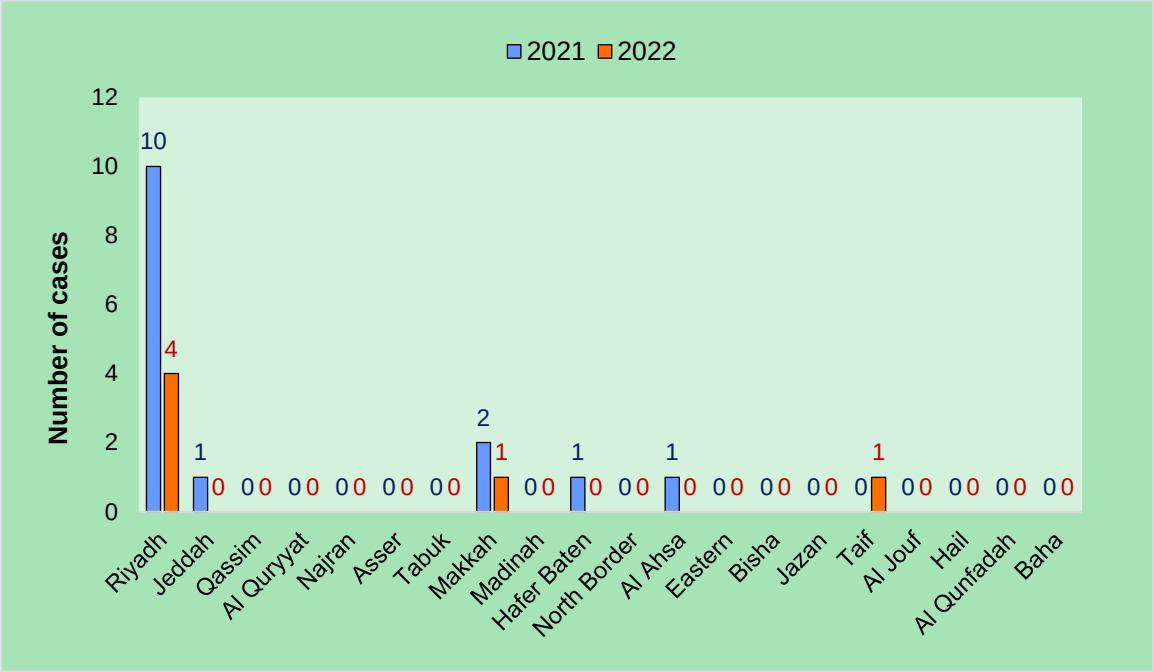
2.4.4 MERS- CoV Outbreaks Overview

Figure 13: MERS-CoV Case Distribution Over Months, 2021 - 2022.



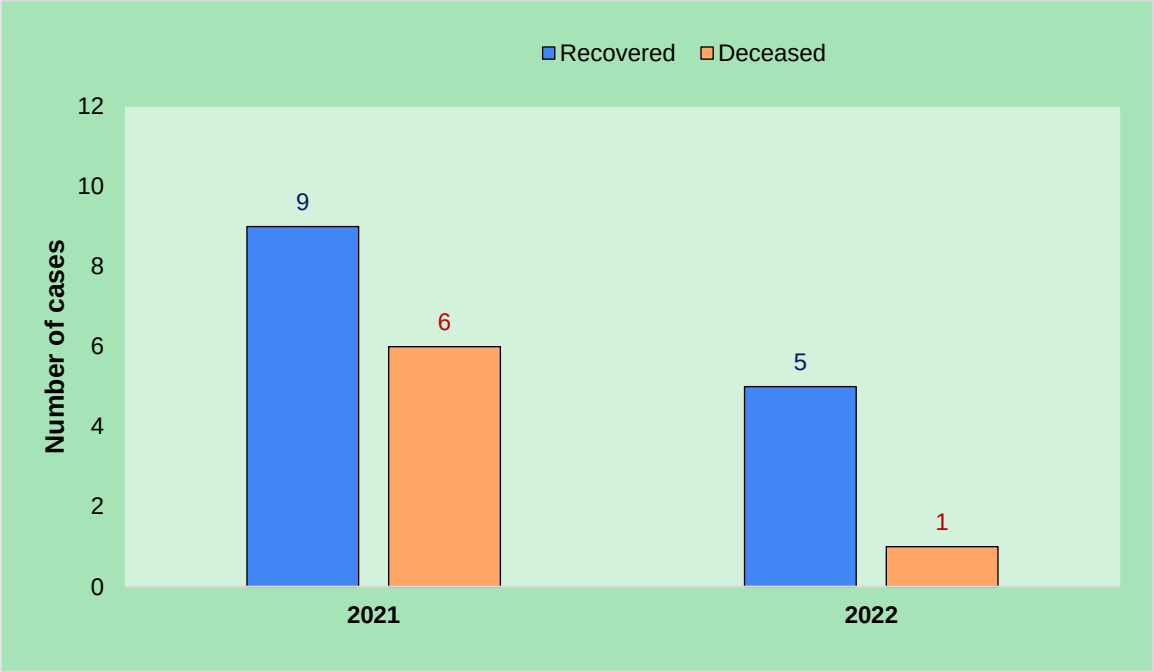
Six MERS CoV cases were recorded in 2022, while 15 cases were recorded in 2021

Figure 14: Distribution of MERS CoV Cases per Regions, 2021-2022



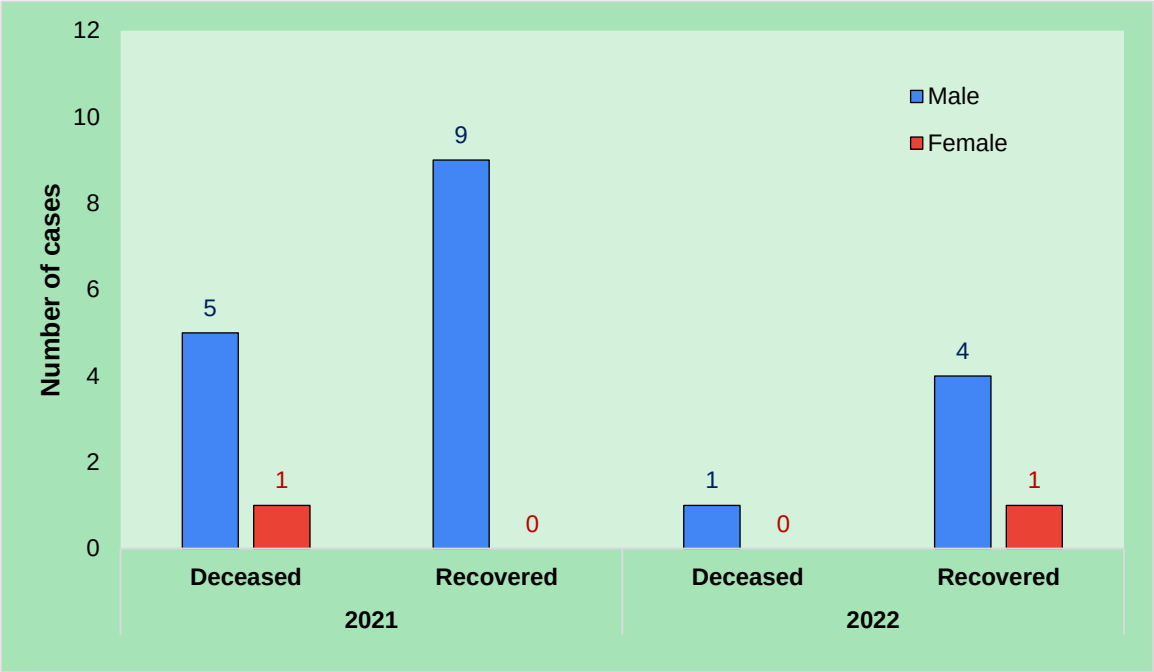
Riyadh region recorded the highest MERS CoV cases in 2021 (10 cases) and in 2022 (4 cases)

Figure 15: Outcomes of MERS CoV Cases, 2021-2022



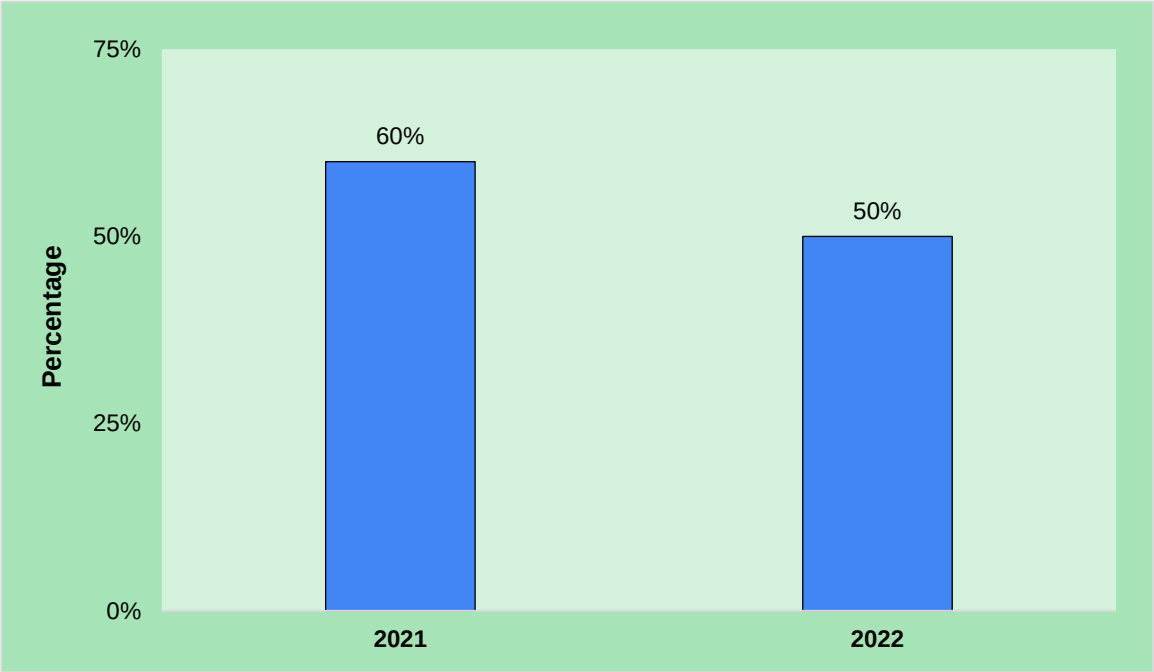
In 2022, 1 MERS CoV case died and 5 cases recovered. In 2021, 6 cases died, and 9 cases recovered.

Figure 16: MERS CoV Outcomes by Gender, 2021-2022.



In 2022, out of the 5 males exposed to MERS CoV, 1 deceased and 4 recovered, and the only female exposed to MERS CoV was recovered. In 2021, 5 males 1 female deceased, and 9 males recovered.

Figure 17: MERS Cov Cases Exposed to Infected Camels, 2021-2022



The percentage of MERS-CoV cases with history of close contact with camels was higher in 2021 (60%) than in 2022 (50%).

6. 2022 GDIPC Publication

Articles

Journal of Infection and Public Health 15 (2022) 1020–1024

Contents lists available at ScienceDirect

Journal of Infection and Public Health

journal homepage: www.elsevier.com/locate/jiph

Original article

Epidemiological and clinical characteristics of COVID-19 mortality among healthcare workers in Saudi Arabia: A nationwide study

Bashaier A. Aljohar[a,1,*], Mohammed A. Kilani[b,1], Anfal A.Al Bujayr[a], Tabish Humayun[a], Manar J. Alsaffar[a], Khalid H. Alanazi[a]

[a] General Directorate of Infection Prevention and Control, Ministry of Health, Riyadh, Saudi Arabia
[b] Public Health Authority, Riyadh, Saudi Arabia

ARTICLE INFO

Article history:
Received 7 February 2022
Received in revised form 29 July 2022
Accepted 10 August 2022

Keywords:
COVID-19
Deaths
Mortality
Frontline
Healthcare worker
Occupational risk
Pandemic

ABSTRACT

Background: Healthcare workers (HCWs) have been highly affected by COVID-19 due to their fundamental duties in diagnosing, caring, and treating the rapidly increasing number of infected patients. Thus, are facing the occupational risk of COVID-19 infection and mortality.
Purpose: To investigate the COVID-19 disease clinical characteristic and associated factors among HCWs in Saudi Arabia.
Methods: This was a nationwide, retrospective analytical study conducted from 5th of March 2020–21 st of August 2021. All deceased HCWs who were diagnosed with COVID-19 were included in this study.
Results: As of August 21, 2021, a total of 305 deaths were recorded due to COVID-19 infection among HCWs in all Saudi healthcare facilities. The case fatality rate was 0.35%. Deaths were highest among physicians (40.0%). Most of deceased HCWs acquired the infection from the community (80%). 71% of deceased HCWs had at least one chronic medical condition. Most of them were admitted to ICU before they passed away (83.6%). Three significant variables predicting ICU admission were presence of one or more comorbidities, hypertension, and chronic respiratory diseases
Conclusion: HCWs are at higher risk for exposure to COVID-19 due to their occupational risk. Our study encourages future research to provide more comprehensive information regarding COVID-19 morbidity and mortality among HCWs.
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1

Epidemiological and clinical characteristics of COVID-19 mortality among healthcare workers in Saudi Arabia: A nationwide study

American Journal of Infectious Diseases and Microbiology, 2022, Vol. 10, No. 3, 102-106
Available online at http://pubs.sciepub.com/ajidm/10/3/3
Published by Science and Education Publishing
DOI:10.12691/ajidm-10-3-3

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Hand Hygiene Compliance among Healthcare Workers, Ministry of Health Hospitals, the Kingdom of Saudi Arabia for the Year 2018

Imtithal J. AlSaihati[1], Bashaier A. Aljohar[2], Tabish Humayun[2,*], Zainah M. Alshahrani[2], Faiza A. AlFozan[2], Khalid Hamadan Alanezi[2]

[1]Adaa Health Department (Assistant Minister Project Office), Ministry of Health, Riyadh, Kingdom of Saudi Arabia
[2]Infection Prevention and Control Department, General Directorate of Infection Prevention and Control, Ministry of Health, Riyadh, Kingdom of Saudi Arabia
*Corresponding author: drtabish.ipc.miero ph@gmail.com

Received May 08, 2022; Revised June 11, 2022; Accepted June 23, 2022

Abstract **Background:** Microorganisms are mostly transmitted through the hands of healthcare workers in any healthcare setting. This transmission can be from healthcare workers to the patients and from their surrounding environment. This ultimately leads to increased healthcare-associated infections and to the resistance against the antimicrobials and the cost of healthcare-associated infections increases accordingly. **Objectives:** To observe the practice of hand hygiene and to calculate the hand hygiene compliance rate among healthcare workers of Ministry of Health Hospitals in the Kingdom of Saudi Arabia. **Methods:** The hand hygiene practice of healthcare workers in 318 Ministry of Health hospitals was observed by direct observation during the year 2018. This was done as a part of the National Hand Hygiene Program during the year 2018. The data was collected using the World Health Organization Hand Hygiene observation form. The compliance rate was calculated among different healthcare professionals, hospital departments and work shifts. **Results:** A total of 511,079 opportunities were observed over a period of one year. The overall hand hygiene compliance rate was found to be 70%. The compliance was found to be highest after the blood/body fluids exposure (85%), followed by after touching the patients (76%), followed by clean

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2

Hand Hygiene Compliance among Healthcare Workers, Ministry of Health Hospitals, the Kingdom of Saudi Arabia for the Year 2018

International Journal of INFECTION CONTROL

ORIGINAL ARTICLE

Rates of urinary catheter-associated urinary tract infection in Saudi MOH hospitals: a 2-year multi-centre study

Yvonne S. Aldecoa[1], Adel Alanazi[2], Ghada Bin Saleh[1], Nasser Alshanbari[1], Tabish Humayun[1]*, Faisal Alsheddi[1], Aiman El-Saed[2], Mohammed Alqahtani[1] and Khalid H. Alanazi[1]

[1]Surveillance Department, General Directorate of Infection Prevention and Control (GDIPC), Ministry of Health (MOH), Riyadh, Kingdom of Saudi Arabia; [2]Infection Prevention and Control Department, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia

Abstract

Background: The published rates of catheter-associated urinary tract infection (CAUTI) in Saudi Arabia were derived from single-centre studies or nationally non-representative studies.
Objectives: The aim of this study was to estimate CAUTI rates and urinary catheter utilisation (UCU) ratios in 99 Saudi Ministry of Health (MOH) hospitals from all regions.
Methods: A prospective surveillance study was conducted in 15 different types of intensive care units (ICUs) between January 2018 and December 2019. The data were entered into the Health Electronic Surveillance Network (HESN) programme. The methods of the US National Healthcare Safety Network (NHSN) and the Gulf Cooperation Council (GCC) centre for infection control were used.
Results: During 2 years of surveillance covering 919,615 patient-days and 573,720 urinary catheter days, a total of 965 CAUTI events were identified. The overall MOH CAUTI rate was 1.68 (95%confidence interval (CI) 1.58–1.79) per 1,000 urinary catheter days, and the overall UCU was 0.624 (95%CI 0.623–0.625). CAUTI rates were highest in paediatric medical (5.73) and adult medical (2.02) ICUs. UCU were highest in neurosurgical (0.795) and medical surgical (0.743) ICUs. CAUTI standardised infection ratios across different ICUs in Saudi MOH hospitals were 16% lower than NHSN hospitals, 47% lower than GCC hospitals and 69% lower than International Nosocomial Infection Control Consortium (INICC) hospitals. Urinary catheter standardised utilisation ratios across different ICUs in Saudi MOH hospitals were 15% higher than NHSN hospitals, 9% higher than INICC hospitals and 13% lower than GCC hospitals.
Conclusions: The current study is a unique national CAUTI benchmark that can potentially help in the fight against healthcare-associated infection.

Full Read - Click Here

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Rates of urinary catheter-associated urinary tract infection in Saudi MOH hospitals: a 2-year multi-centre study

Guidelines

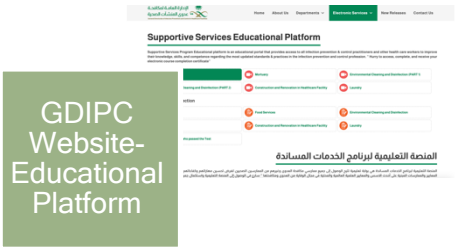
Guidelines	Link
Sterile Service Unit (SSU) Guideline in Primary Health Care (Arabic Version)	Click Here
Best Guidance for Selecting, Evaluating & Monitoring of the Infection Prevention & Control Supplies & Equipments (2nd Edition)	Click Here
Infection Prevention & Control Core Components Guidelines Manual, 2022.	-
Infection Prevention & Control Guidelines in the Operating Room (OR) 2022.	Click Here
The Most Frequently Asked Questions Regarding the Ebola Virus Disease.	Click Here
The Guidelines for Prevention and Control of Ebola and Marburg Viruses, 2022.	-
The Interim Guidelines for Moneypox 2022.	Click Here
Respiratory Protection Program (RPP) Guideline.	Click Here
Respiratory Protection Program Implementation Requirements.	Click Here
Best Practices of Environmental Health for Prevention & Control of Infections in Healthcare Facilities Guidelines .	Click Here
Healthcare-Associated Infections (HAIs) Outbreak Management Manual V.7.	Click Here
BICSL training guidelines in Hajj 1443 -Arabic.	Click Here
National Guide for Auditors in Infection Control Auditing Strategies for Healthcare Facilities.	Click Here
Infection Control Auditing Visits Protocol	Click Here

Tools

Tools	Link
Infection Control Auditing Tool 2023.	Click Here
Infection Prevention & Control Core Components Tool 2022.	-

Educational Materials

The scientific content of lectures & videos has been constructed & uploaded to the GDIPC YouTube channel & the GDIPC website related to the updated guidelines in both Arabic and English languages. Educational posters have been posted on the GDIPC website in relation to the updated guidelines.



7. Challenges

Multiple challenges were identified in 2022 that need to be addressed in order to improve infection prevention and control activities:

1. **Technical issues** in the electronic auditing programs platforms, RPP platforms, outbreak platform, and HESN plus:

- Due to the non-availability of Dashboards and data quality tables in the HESN plus System, MDRO data could not be monitored by the hospital and regional coordinators and at the GDIPC level accurately.
- Non-integration of Patient Electronic Medical Records between all Departments in hospitals and the HESN Plus System.

2. **Poor Data Quality:** Receiving invalid or incomplete data entry.

3. **Poor Data Management:**

- Poor utilization of electronic HAI surveillance data in outbreak detection, and improper implementation of HAI bundles in some hospitals.
- Poor utilization of the program electronic platform dashboard by the program RPP and supportive service program regional coordinators. Due to this poor utilization, the key performance indicators (KPIs) became difficult to be monitored.

4. **Lack of human capacities and the continuous turnover** of trained Infection Control Practitioners in hospitals and coordinators in regions hinder the effective implementation of IPC activities:

- A limited number of infection control practitioners as well as nurses in critical units (ICUs, NICUs).

5. **Non-Compliance from some Infection Control Practitioners in hospitals, ICA auditors, and coordinators in regions with published policies, guidelines, and education materials resulting in poor implementation of IPC activities including**:

- Poor implementation of the screening policy for patients on admission and contact tracing of patients during outbreaks.
- Improper specimen collections from patients during outbreaks.
- Delayed or underreported reporting of HAI outbreaks from some regions to the GDIPC due to misunderstanding of the guideline.
- Poor adherence to the guidelines and auditing visits criteria from ICA auditors, such as the time specified for the visit - the method of evaluation of standards - not dividing visits among the evaluation team - reviewing all documents.
- Non-participation of all auditors certified by the GDIPC in the evaluation visits and the absence of an even distribution of some auditors in the scheduled visits.
- Inadequate follow-up of the program implementation by the program's coordinators assigned in the regions.
- Inappropriate implementation & monitoring of the corrective action plan established by the healthcare facilities post the auditing visits by the coordinators in the health directorates or clusters.
- Poor implementation and inadequate follow-up of the regional RPP and supportive services regional annual plans developed by the regional coordinators.
- Inadequate monitoring of the attendance rate for the Supportive service program electronic educational platform by the regional coordinators.

8. Overall Recommendations

1. Expand the HAIOS program in 2023 to include additional participants (3 courses for a total of 120 participants), however, more training facilities and more coordinators must be included.
2. More training and refresher courses in Surveillance.
3. Celebrate the respiratory protection program week to improve the awareness of healthcare workers, visitors, and patients.
4. Improve IPC team members' skills & knowledge regarding the product evaluation process.
5. Update the RPP educational platform contents based on the updated guideline that is linked to ICA's new version 2023 updates.
6. Improve the supportive services program educational platform content and attendance rate.
7. Conduct an online training course for HCWs who are assigned to reprocessing endoscopies.
8. Improve the level of awareness & competence of the accredited auditors through continuous training and using the educational platform and the guidelines approved by the GDIPC.
9. More Infection Control Practitioners should be appointed.
10. Fixed trained Infection Control Practitioners, not be shifted, or transferred to other departments.
11. Permanent solutions to solve the technical issues in the new HESN Plus.
12. Integration of Patient Electronic Medical Records between all departments in hospitals and the HESN Plus system.
13. HESN plus dashboard should be developed.
14. Ensure the complete data entry of Surgical Site Infections. Surgical Site Infections Surveillance should be calculated, and a national benchmark should be created.
15. Starting the Pediatric VAE Module in MOH Hospitals of KSA.
16. Implementation of CLABSI Prevention Tools must be continued and emphasized.
17. Develop a plan to achieve at least 80% reporting of HAI outbreaks for all regions (MOH and private hospitals with 100 beds or more).
18. Develop a plan to more reduction of the case-fatality rate of the most common HAI outbreak pathogens.

19. Ensure and monitor the availability of supplies in the hospitals.
20. Adhere to and follow the list of tasks assigned to the ICA's regional coordinators/supervisors.
21. Adhere to the periodic meetings of the regional coordinators and auditors to identify the main weaknesses in the auditing reports and discuss any further challenges.
22. Strengthen the role of regular follow-up of the hospitals' corrective action plans by the regional coordinators to effectively address and solve the defects.
23. Empower the regional coordinators to effectively utilize the GDIPC FORM and POWER PI in analyzing data of healthcare facilities and monitoring the overall program compliance among regional healthcare facilities.
24. Involving all certified auditors in the auditing visits at their region.
25. Provide technical and advisory support to healthcare facilities to ensure the effective implementation of corrective action plans by healthcare facilities and clusters.
26. Adhere to following up on the accuracy and quality of evaluation reports at all regions by the regional coordinators.
27. Developing a HAIs outbreak Guideline for the year 2023.
28. Develop a guideline for disinfection in Endoscopy Unit (DEU).
29. Develop a guideline for the infection control audits and related tools for Sterilization Service Department (CSSD) auditing.
30. Update the second version of the CSSD guideline.
31. Update current respiratory protection program, and supportive services program guidelines & related tools according to the new ICA 2023 updates.
32. Unify the forms used for recording sterilization operations within the CSSD and other units in all healthcare facilities to maintain sterility and quality management.
33. Integrate the supportive services program and RPP under the auditing program due to the common aspects of both programs.
34. Initiate improvement projects for the ICA lowest-scoring departments of the supportive services.