

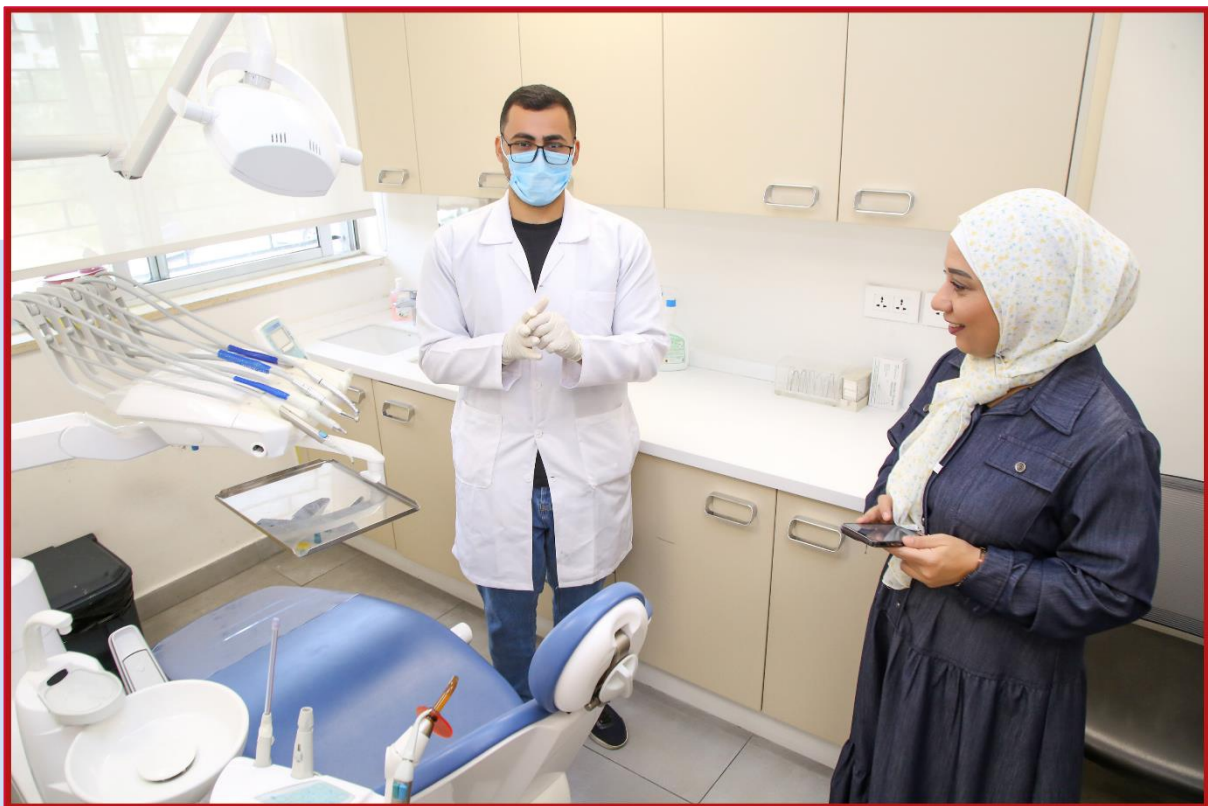


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وزارة الصحة

# Assessment of Infection Prevention and Control Practices in Jordan's Public and Private Dental Settings



**Jordan**  
**December 2024**

**USAID MEDICINES, TECHNOLOGIES, AND  
PHARMACEUTICAL SERVICES (MTaPS) PROGRAM**

*Improved Access. Improved Services. Better Health Outcomes.*

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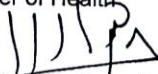
# FOREWORD

Infection Prevention and Control (IPC) is a cornerstone of patients, healthcare workers, and community safety. The Ministry of Health remains steadfast in its commitment to strengthening IPC measures across public and private healthcare settings, ensuring the delivery of high-quality care throughout Jordan.

This national assessment of IPC practices in public and private dental facilities is a key element of these efforts. It provides critical insights into IPC implementation across the country, intending to improve practices and guide enhancements in policies, training, and healthcare services. These steps are essential to preparing facilities to effectively mitigate infection risks, particularly in the context of global challenges such as antimicrobial resistance and emerging infectious diseases.

I extend my deepest gratitude to the United States Agency for International Development (USAID) and the Medicines, Technologies, and Pharmaceutical Services (MTaPS) program, as well as to all participating stakeholders and contributors, for their support in completing this assessment.

Minister of Health



Prof. Feras Ibrahim Hawari



## ACKNOWLEDGMENTS

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Additionally, the MTAps Program extends its heartfelt thanks to the technical committee overseeing the assessment. The committee, represented by members from various disciplines and sectors, played a vital role in refining and adapting the assessment tool, which was developed based on the latest scientific evidence. The tool was tailored to suit the Jordanian context, and the committee contributed significantly to the assessment visits, data review, and participation in focus group discussions, as well as the review and approval of the final report.

Finally, MTAps would like to recognize the important contributions of the Jordanian Dental Association, as well as all the dental clinics and centers that participated in the assessment. Their cooperation was key to enriching the knowledge and understanding of infection control measures and practices in the private sector. This collaboration provided valuable insights that will help in making evidence-based decisions and identifying ways to enhance infection control practices in dental clinics and centers across the country.





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## **ACRONYMS AND ABBREVIATIONS**

ACIPC	Advisory Committee for Infection Prevention and Control
AMR	Antimicrobial Resistance
CDC	Centers for Disease Control and Prevention
DD	Dental Directorate
FGD	Focus Group Discussion
IPC	Infection Prevention and Control
IPCD	Infection Prevention and Control Department
JDA	Jordan Dental Association
MoH	Ministry of Health
MTaPS	Medicines, Technologies, and Pharmaceutical Services
UNRWA	United Nations Relief and Works Agency for Palestine Refugees
USAID	US Agency for International Development





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# EXECUTIVE SUMMARY

## Background

Infection Prevention and Control (IPC) is a cornerstone of healthcare safety, protecting both health workers and patients from infectious diseases. Global health emergencies, including the COVID-19 pandemic, have highlighted the critical role of IPC in preventing antimicrobial resistance (AMR), sepsis, and the spread of infections. In Jordan, IPC implementation faces significant challenges, particularly in dental settings where supervision is limited, especially in the private sector. To address these issues, the Jordanian Ministry of Health (MOH), with support from the USAID-funded Medicines, Technologies, and Pharmaceutical Services (MTaPS), conducted a national assessment to evaluate the compliance of dental clinics with IPC practices and to identify gaps that need immediate action.

## Objectives

The assessment aimed to evaluate IPC adherence in public and private dental clinics across Jordan. Its objectives were to:

1. Measure the extent of compliance with IPC guidelines.
2. Identify key areas needing improvement.
3. Provide actionable recommendations to enhance IPC practices and reduce infection risks.

## Methods

A weighted multistage probability random sample was selected across Jordan, ensuring representation from all governorates, districts, and clinic types (primary and comprehensive healthcare centers as well as private dental clinics and centers). The sample included 604 dental clinics/centers (193 public and 411 private). Data collection involved a mixed method approach: quantitative methods (structured questionnaire and direct observations) and qualitative methods (focus group discussions (FGD)). The assessment used a structured tool adapted from the Centers for Disease Control and Prevention (CDC's) "Infection Prevention Checklist for Dental Settings" that was customized and tailored to the Jordanian context by the Advisory Committee of Infection Prevention and Control (ACIPC). The tool included 64 indicators (questions) covering six major

### Domains:

1. Administrative procedures
2. Safety of dental staff
3. Hand hygiene
4. Medical waste management
5. Preparation and sterilization
6. Environmental cleaning

## Key Findings

**Overall IPC Compliance:** The overall IPC compliance within dental settings in both sectors was not optimal. It ranged from 6.5% to 89.9% across different indicators. The lowest compliance was observed in areas like environmental cleaning, medical waste management, and handling a positive microbial sterilization test. The highest compliance was seen in areas like the availability of single-use dental tools and compliance with hand hygiene.

**Sector Comparison (Public vs. Private):** Public clinics within primary and comprehensive healthcare centers showed higher IPC compliance than private sector clinics, especially in administrative procedures, safety measures for dental staff, and adherence to sterilization protocols.

**Governorate Variations:** IPC compliance varied significantly across governorates, with the lowest compliance in Karak and the highest in Amman, Jerash, and Zarqa for public clinics. Private clinics in Aqaba showed the highest compliance among private sector facilities.

**Focus Group Insights:** Three major themes emerged: Governance, Continuous Education, and Availability and Accessibility of resources. Participants emphasized the need for a unified governing body to standardize IPC practices across sectors and highlighted the disparity in resource availability and support between public and private clinics.

## Recommendations

**Governance:** Strengthen regulatory oversight by establishing a unified governing body and regulatory framework to standardize IPC practices across both public and private sectors. Regular audits, inspections, and aligning to licensing and accreditation guidelines are essential to ensure adherence to IPC standards, especially in the private sector.

**Standardize IPC Training and Education:** Continuous education and training programs for all dental healthcare providers are critical. Programs should be mandatory for licensing, including hands-on experience and regular updates to reflect the latest IPC guidelines and technologies.

**Resource Allocation:** Address disparities in resource availability by ensuring consistent access to essential IPC materials and equipment across sectors. This includes providing clear guidance on the necessary IPC supplies for private clinics.

**Policy and Regulation:** Develop standardized IPC guidelines tailored to dental settings in Jordan, with a focus on sustainability through continuous monitoring and resource allocation to support compliance.



# I. BACKGROUND

IPC is a cornerstone of global health care delivery, acting as the primary defense against a wide range of health-related threats, including issues related to water, sanitation, and hygiene<sup>1</sup>. Effective IPC ensures the safety of both health workers and patients and is crucial in preventing significant global health emergencies such as AMR and sepsis<sup>2,3</sup>. The importance of IPC in maintaining high-quality and safe health care cannot be overstated, making it an integral part of health emergency preparedness and response<sup>4,5</sup>. The COVID-19 pandemic underscored the vital role of IPC in saving lives worldwide, highlighting the need for its continuous implementation and enhancement in health care systems<sup>6,7</sup>.

Despite its critical importance, implementing IPC policies and procedures effectively faces numerous challenges, such as limited resources, inadequate infrastructure, high workloads, insufficient training, and inconsistent adherence to IPC guidelines<sup>8,9</sup>. Health care-associated infections (HAIs) impose a substantial burden on public health, with limited surveillance and data available on their prevalence in Jordan<sup>10</sup>. Comprehensive studies are necessary to identify the national prevalence of HAIs and determine the required actions to combat these infections<sup>11</sup>.

Furthermore, each healthcare setting presents distinct challenges, necessitating tailored infection control measures to address specific needs<sup>10</sup>. In addition, the distinct needs of each health care setting underscore the necessity for tailored infection control strategies, particularly in dental practices. The Jordanian MOH has identified dental settings as particularly neglected, with minimal supervision and surveillance. This issue is exacerbated by the

fact that the majority of dental clinics and centers—approximately 4,000 registered facilities—operate within the private sector,<sup>12</sup> limiting the MOH's ability to oversee their adherence to IPC practices. Given the close contact between patients and dental practitioners, IPC measures in dental settings are especially critical to mitigate the heightened risk of infection transmission. Also, studies have shown minimal compliance with infection control strategies among Jordanian dentists in both public and private sectors<sup>8,13</sup>. However, the lack of standardized IPC measures across different sectors poses a significant challenge, undermining effective IPC implementation and efforts to prevent infection spread.

Recognizing these challenges, the Epidemics Administration at the MOH has sought support from MTaPS Jordan to conduct a national assessment of IPC practices in dental settings, encompassing both public and private clinics and dental centers. This assessment aims to evaluate compliance with IPC measures and practices among dental staff in Jordan, identify gaps and challenges, and propose necessary actions to enhance adherence to standardized IPC practices, thereby reducing the spread of infections and diseases.

Continuous assessment and education of the oral health team are crucial to ensuring adherence to IPC practices. Integrating new technologies, materials, equipment, and emerging data, underscores the need for regular evaluation and training. The CDC has established standard precautions as the minimum IPC practices applicable to all patient care settings, regardless of a patient's infection status, to prevent and protect against disease transmissions in dental



practices. These precautions include hand hygiene, the use of personal protective equipment, respiratory hygiene, sharps safety, safe injection practices, sterile instruments, and clean environmental surfaces.

The assessment aims to generate robust, evidence-based recommendations to enhance IPC practices across both public and private dental settings in Jordan.

## **Objectives**

This national assessment evaluates the current adherence to IPC measures among dental staff across Jordan, examining how well these practices align with best standards to pinpoint specific areas for improvement.

# 3. ASSESSMENT METHODOLOGY

### 3.1 Assessment Design

The assessment utilized a cross-sectional research design, facilitating data collection across different districts, sectors, and dental facilities. This allows a comprehensive comparison against standardized assessment tool criteria, ensuring a thorough examination of IPC practices in various settings.

### 3.2 Assessment Population

The assessment population comprises dental clinics and centers within Jordan, encompassing both public sector clinics from MOH health centers and private clinics and centers.

### 3.3 Inclusion Criteria:

- Dental clinics and centers listed in the official records of the Health Professions and Institutions Licensing Directorate at the Ministry of Health (MOH) are included in the assessment. This listing ensures that the clinics comply with the necessary standards and regulations, qualifying them for evaluation.
- Public clinics that are located within MOH primary and comprehensive healthcare centers.

### 3.4 Exclusion Criteria:

Public or private clinics located within hospital settings; Dental clinics within rehabilitation centers or the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) centers; Dental clinics affiliated with University Hospitals; Dental clinics within the Royal Medical Services hospitals.

These exclusion criteria were established to focus specifically on primary dental care settings within health centers and private

clinics, intentionally excluding specialized or hospital-based facilities. Hospital-based facilities were excluded because they are frequently assessed and evaluated by third-party organizations, benefit from greater oversight, and often have more stringent policy enforcement compared to primary healthcare settings. In contrast, primary healthcare settings tend to receive less attention, particularly in the enforcement and monitoring of IPC measures. By concentrating on these underexamined settings, this assessment aims to highlight their unique challenges and opportunities for improvement, emphasizing the need to strengthen IPC practices where they are most overlooked.

### 3.5 Assessment Tool

The assessment tool collected data using direct observations and questions related to IPC practices, to workers within the dental clinics and centers (**Annex I**). The tool was adapted from the Infection Prevention Checklist for Dental Settings annexed within the CDC report titled “*Summary of Infection Prevention and Practices in Dental Settings; Basic Expectations for Safe Care*”<sup>14</sup>. The tool was refined and tailored to the Jordanian context by IPC and public health experts from the MOH and the ACIPC through multiple meetings. The tool was then approved by a Technical Ministerial Committee that thoroughly reviewed the tool and the assessment methodology. The tool consisted of 64 questions (indicators) to assess IPC compliance concerning:

- Administrative procedures to prevent and control infection: 3 questions
- Staff and patients' safety dental staff: 8 questions
- Hand hygiene: 6 questions
- Medical waste management: 9 questions



- Preparing and sterilizing dental tools: 28 questions
- Environmental cleaning inside the clinic: 10 questions

Responses were scored on a three-point Likert scale coded as 0 (not available/not used), 1 (partially/not completely), or 2 (available as recommended). Each question also included a section for comments/notes to be completed by the data collector if needed. IPC compliance was determined by identifying indicators that received a score of 2 (available as recommended), as these were considered compliant. The compliance scores were then aggregated to calculate the overall mean IPC compliance.

### 3.6 Sampling

The minimum sample size required to estimate the prevalence of compliance with IPC standards was calculated to be 385 clinics based on a 95% confidence level, a 5% margin of error, and a conservative assumption of a 50% prevalence of IPC compliance within the population. According to preliminary statistics from the MOH, there are around 4,000 licensed dental clinics and centers in Jordan, with 3,516 being private and 472 being public clinics/centers.

To ensure a meaningful comparison between public and private clinics and to obtain a more accurate estimate of IPC practices within public settings, an oversampling strategy for public dental clinics was implemented. The total sample size was determined to be 10% of the total private clinics, resulting in a sample of 369 private clinics, and 40% of the public clinics, resulting in a total of 189 public clinics. The total minimum sample size required was 558 clinics. The sampling frame included all dental clinics in Jordan that utilized two major lists—one for public and

the other for private dental clinics—distributed by governorate (n=12) and district (n=22). The Health Professions and Institutions Licensing Directorate at the MOH provided both lists.

Multistage probability random sampling technique was used to identify the sample of clinics visited for data collection. At first, dental clinics were clustered by governorate (n=12). Then, within each governorate (cluster), clinics were grouped by district. Districts were then stratified as urban or rural districts. Urban districts correspond to the main city within the governorate while the surrounding districts were considered rural districts. The number of clinics within each district was identified and multiplied by 10% for private clinics and 40% for the public clinics to calculate the number of the clinics to be sampled within each district. A random-number generator selected clinics included in the final sample. Two extra clinics from each district were identified to account for potential loss to follow-up.

### 3.7 Data Collection

Both quantitative and qualitative data collection methods were utilized throughout the assessment. For the quantitative part, a company that provided experienced assessors in healthcare surveillance and assessments, with extensive experience in IPC was contracted to provide 15 proficient assessors. To ensure standardized knowledge and establish a common assessment approach, the Infection Prevention and Control Department (IPCD) and Dental Directorate (DD), along with a team from MTaPS, supervised a comprehensive training workshop. The training focused on providing a unified understanding of IPC practices, enabling data

collectors to assess clinics with the same level of expertise and precision. It included in-depth coverage of current IPC standards and guidelines, emphasizing the importance of maintaining high standards in IPC. Additionally, the training included a session on communication skills to ensure smooth interactions with clinic staff and the efficient collection of high-quality data.

Under the supervision of the MOH and MTaPS, the assessment team conducted a pilot assessment in 30 clinics and centers across different governorates to refine the assessment tool and methodologies, ensuring the robustness of the approach. The piloting process identified several challenges and allowed the technical team from the stakeholders to propose mitigation plans. For instance, the piloting revealed that data collectors needed to answer most questions by observation and only ask open-ended questions.

Afterward, the assessment team used a digitalized assessment tool, KoboToolbox, to streamline data collection and ensure real-time submission of assessments. An information sheet (Annex 2) was shared with the assessment team, providing a clear description of the assessment scope, objectives, and a pledge to maintain the confidentiality of the collected data.

Continuous data checks were conducted, complemented by real-time monitoring methods to promptly address any challenges and maintain the integrity of the collected data. The quantitative data were collected over 20 days (April 17, 2024–May 12, 2024).

To complement the quantitative data, MTaPS, in collaboration with the IPCD, conducted a FGD with selected dentists whose clinics had been previously assessed. Dentists representing all sectors and sub-sectors were

selected in addition to one dentist who is in a leading role at the Jordan Dental Association was also selected to ensure representation of all sectors and perspectives. The purpose of the FGD was to gain a deeper understanding of the data trends and to record the opinions of dental professionals on how IPC practices can be enhanced within dental settings.

Participants of the FGD were invited to share their experiences and insights regarding current IPC practices, challenges in implementation, and available resources. They discussed specific IPC practices implemented in their clinics, how they stay updated with new guidelines, and the barriers they face, such as limited resources and inadequate training. Additionally, they explored the factors contributing to the findings of the assessment and shared effective strategies for overcoming challenges.

The insights gathered from this FGD were intended to inform the development of evidence-based recommendations for policymakers. These recommendations aim to standardize IPC practices across all dental settings in Jordan, address the identified gaps and challenges, and ultimately improve the overall quality and safety of dental care services in the country. The FGD guide is provided in Annex 3.

### 3.8 Data Analysis

**Quantitative Data:** Data was extracted in an Excel format and inspected for any potential errors before being entered into SPSS version 29 for analysis. Descriptive statistics (counts and percentages) were presented for each question/indicator. The percentage of compliance for each indicator was also presented (compliance percentage). A total

compliance score was calculated for each assessed clinic reflecting the number of indicators compliant with IPC practices. The mean compliance was then compared by sector, facility type, and governorate. All the statistical analyses were weighted to reflect oversampling within the public clinics. Accordingly, the total number of clinics, the percentages, and the mean values were weighted.

**Qualitative Data:** Transcripts of the FGD were coded and analyzed using an inductive approach to identify recurring themes and insights related to IPC practices and recommendations.

### 3.9 Data Validation

MTaPS, in collaboration with a team from the IPCD, undertook a series of data validation visits in 28 clinics and centers across various regions of Jordan. These visits were part of a comprehensive effort to ensure data quality and involved revisiting previously assessed clinics to cross-reference the initial assessment results with existing records. This approach aimed to identify and rectify any discrepancies, thereby enhancing the reliability of the data.

During these validation visits, the team carefully reviewed the records and data entries, ensuring that all information was consistent and accurate. This step was crucial in verifying the initial data collection processes and ensuring that any errors or inconsistencies were addressed promptly. Additionally, MTaPS utilized the Kappa statistical analysis, a robust measure of inter-rater agreement, to quantify the level of consistency between different data collectors. The results of this analysis showed an agreement level of 72%, indicating a high

degree of reliability and accuracy in the data collected.

By implementing these thorough data quality checks, including cross-referencing records and statistical validation, we ensured that the data used for their assessment was both robust and credible. This rigorous validation process not only strengthened the assessment's findings but also underscored the importance of meticulous data quality checks in healthcare settings' assessment.

### 3.10 Ethical Considerations

The Institutional Review Board at Al-Basheer hospital approved the assessment protocol. Ethical considerations in this assessment prioritized transparency and confidentiality in interactions with dental teams at the clinics and centers. The assessment team carefully explained the assessment objectives, emphasizing the importance of data confidentiality and explicitly assuring dental teams that no personal information will be collected. They also shared an information sheet that explicitly outlines the aim, scope, and affiliations of the assessment, providing contact information for a specialized unit at the MoH. This unit was available to validate the assessment and its goals and to address any questions related to it.

To uphold ethical standards, the assessment team pledged complete confidentiality and professionalism by signing a confidentiality form. The team also diligently disclosed any potential affiliations with the staff at assessed clinics, including personal or professional ties, to the assessment team. This disclosure aims to ensure transparency, prevent conflicts of interest, and maintain the integrity of the research. The team adhered to a rigorous ethical approach, actively communicating and

signing a conflict-of-interest form to reaffirm their commitment to impartial and unbiased data collection.



# 4. ASSESSMENT RESULTS

### 4.1 Sample Characteristics

The assessment included a total of 604 dental clinics from both the public (n=193 clinics, 32%) and the private (n=411 clinics, 68%) sectors (Figure 1). Approximately 70% of the clinics were from Amman (n=279 clinics, 46.2%), Irbid (n=86, 14.2%), and Al Zarqa (n=60 clinics, 9.9%) (Figure 2).

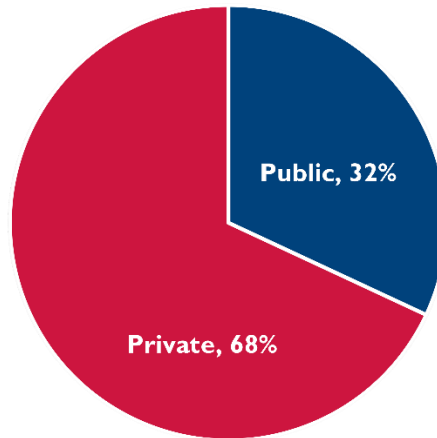


Figure 1: Distribution of Dental Clinics by Sector (N=604)

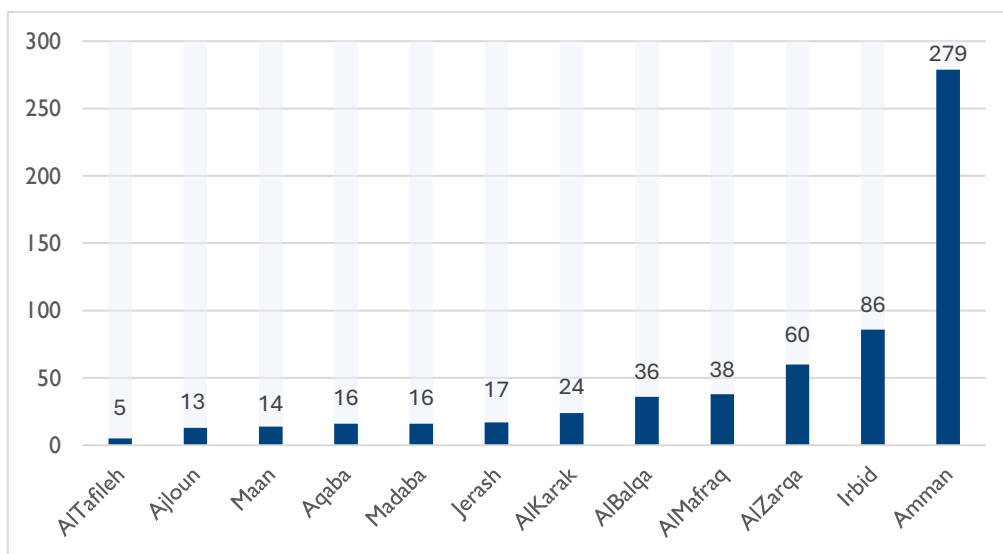


Figure 2: Distribution of Dental Clinics by Governorate (N=604)

Primary and comprehensive healthcare centers represented 22.0% and 10.3%, respectively, of the total sample assessed while private dental clinics and centers represented 60% and 7.8%, respectively. These percentages reflected a weighted sample of 10.9% for the primary healthcare centers, 5.1% for the comprehensive healthcare centers, and 9.7% for the private centers. Weighted percentage by sector and facility is presented in Table 1.

Table 1: Distribution of Dental Clinics by Sector and Facility (N=604).

Sector	Facility	Number	Percent	Weighted Percent
Public	Primary Center	133	22.0%	10.9%
	Comprehensive Center	62	10.3%	5.1%
Private	Private Clinic	362	60.0%	74.3%
	Private Center	47	7.88%	9.7%
<b>Total</b>		<b>604</b>	<b>100%</b>	<b>100%</b>

#### 4.2 IPC Compliance at the National Level

Overall, the IPC compliance percentage ranged between 6.5% (the lowest) and 89.9% (the highest) (Table 2). That is, at the national level, the lowest IPC compliance was less than 7% and the highest was less than 90%. The lowest compliance was reported for indicators (questions) related to availability of a special cleaning cart, a cleaning schedule, a tool retrieval system when the microbial test is positive, as well as an IPC focal point and program within the dental settings Table 2.

Table 2 presents the IPC compliance for each question at the national level (inclusive of all sectors in all areas). The scores are presented in descending order, meaning that the lowest compliance score is at the top of the table and the highest scores are at the bottom. The table shows that the majority of questions have a compliance percentage of less than 50%. That is, less than 50% of the clinics were in-compliance with these questions. As well, eight questions scored a compliance percentage between 30% and 50%, while 29 questions scored between 6.5% and 30%. These questions were inclusive of the six areas of the assessment and indicate higher priority for corrective IPC action. In general, these questions identified IPC gaps including availability of a designated sterilization room, proper use of PPE, sorting medical waste according to color

codes, inspection of sterilized instruments, properly cleaning and disinfecting materials and surfaces, transportation of contaminated tools to the sterilization room, proper use of cleaning products, use of medical waste bins, hand hygiene practices (between patients and washing time (technique)), use of ultrasonic, availability of indicators used for sterilization (chemical, mechanical, and biological), handling a positive microbial biological test along with availability of a retrieval system for positive tests, qualified/trained employees for sterilization, exposure to IPC training, recording expiry date on hand sanitizers, water quality, vaccination of the dental staff, transporting medical waste, availability of protocols for reporting and handling needle stick injuries, Hepatitis B testing, titer, and documentation, implant sterilization (when applicable), handling blood spills, availability of IPC focal point/program, and availability of a cleaning schedule and a special cleaning cart.

A total of 16 questions had a compliance percentage between 50% and 59% (n=8 questions) and or between 61% and 79%.



Table 2: Overall Percent Compliance in IPC within Dental Clinics

Assessment Area/Theme	Compliance percent %	Question (Indicator)
Env. Health	7%	Does the clinic have a special cleaning cart that has been allocated to the dental room and conforms to the specifications of cleaning carts?
Env. Health	7%	Is there a cleaning schedule?
Preparing and sterilizing	7%	If the microbial test is positive, is there a retrieval system to take back the tools?
Admin. procedures	7%	Is there a program (person with a specialized role) to prevent and control infections in the center/clinic?
Preparing and sterilizing	8%	If the microbial test is positive, what additional procedures are followed?
Safety of the staff	10%	Is there a record of the anti-HBs titer for the dental staff working in the clinic, and a documentation of these tests for new employees?
Preparing and sterilizing	10%	Are the implants sterilized before use?
Env. Health	10%	Are blood spills incidents handled as instructed by the guidelines and policies?
Safety of the staff	10%	Is there a protocol for dealing with needle stick injury cases and documenting them on a reporting form?
Safety of the staff	11%	Hepatitis B vaccine is provided if anti-HBs titer is less than or equal to 10 or if there was an exposure and records are kept and documented?
Preparing and sterilizing	11%	Are there solid, closed plastic boxes available for transporting sterile instruments to the storage area?
Preparing and sterilizing	11%	Is the bacterial quality of the water checked (bacterial test for total coliform bacilli) at least once a month?
Preparing and sterilizing	12%	Is the biological indicator used at least once a month and are there laboratory results?
Hand Hygiene	15%	Is the expiry date of the hand sanitizer (alcohol-based hand rub) clearly written and its not used after that date?
Admin. procedures	17%	The dental staff working in the clinic are trained on infection prevention and control policies and procedures?
Preparing and sterilizing	18%	Are mechanical indicators available to determine the efficiency of sterilization?
Preparing and sterilizing	19%	Has a qualified employee been allocated to clean and sterilize tools and equipment?
Preparing and sterilizing	20%	Is the chemical indicator used with each set separately?
IPC measures	20%	Is the staff adherent to the hand hygiene time either when washing by water and soap or by alcohol-based rub? (20- 30 seconds: when using water and soap) (30-40 seconds: when using alcohol-based rub)
Hand Hygiene	21%	Does the dental staff wash their hands between each patient?
Preparing and sterilizing	21%	Does the clinic have an Ultrasonic Cleaner machine?
Medical Waste	21%	Are there closed medical waste bins suitable for the workload at the clinic and open by foot?
Preparing and sterilizing	25%	Are there solid, closed plastic boxes available for transporting contaminated tools to the sterilization room?
Env. Health	25%	Are the products used in accordance with policies for the cleaning and disinfection process? (Mop for cleaning the floor, special cloth towels for wiping surfaces)
Preparing and sterilizing	25%	Are all packages of sterilized instruments inspected and marked with the sterilization date?
Env. Health	25%	Are cleaning and disinfecting materials used correctly?
Medical Waste	26%	Is medical waste sorted based on a color guide?
Preparing and sterilizing	27%	Are personal protective equipment properly used in cleaning and sterilization rooms?
Preparing and sterilizing	29%	Is there a central (sterilization) room for sterilizing equipment and instruments within the clinic?
Preparing and sterilizing	32%	Are dental handles reprocessed (disinfected or sterilized)?
Preparing and sterilizing	36%	Is there a special sink to clean equipment and instruments before sterilization?
Preparing and sterilizing	39%	Is maintenance of sterilization devices carried out periodically and as per the manufacturer's instructions?
Preparing and sterilizing	40%	How are digital sensors treated if used?
Preparing and sterilizing	40%	Are personal protective equipment available for cleaning and sterilization rooms in sufficient quantities?
Preparing and sterilizing	42%	Are all sealed and sterilized instrument containers inspected before use and ensured that they are not perforated and meet the specifications?
IPC measures	42%	Does the dental staff wear the PPE in the right way?
Preparing and sterilizing	49%	Are there designated cabinets for storing sterile tools that meet the storage conditions in terms of (temperature and humidity)?
Preparing and sterilizing	50%	Is the cleaning product (Enzyme) available and is used in the concentration and time of exposure as per the manufacturer's instructions?
IPC measures	51%	Does the staff doff the PPE in the right way between each patient?
Medical Waste	51%	Does the dental staff recap an aesthetic injection after use?
Preparing and sterilizing	54%	Are the impression trays thoroughly cleaned and disinfected between each patient?
Env. Health	54%	Does the clinic have environmental cleaning and disinfection materials?
Preparing and sterilizing	55%	Are blood and contaminants cleaned immediately after use and removed before sterilization?
Env. Health	55%	Are absorbent sheets (draw sheets) used on the patient's chair table and changed between each patient?
Medical Waste	59%	Does the dental staff deal safely with sharp tools and dispose of them appropriately immediately after use?
Hand Hygiene	61%	Is hand sanitizer available in an adequate number in the clinic
Hand Hygiene	62%	Is there a sink, soap, and single-use towels to wash and dry hands?
IPC measures	62%	Are Personal Protective Equipment (PPE) including gown, face shield, and eye goggles, in adequate amounts?
Medical Waste	64%	Does the clinic have sharp disposal containers (Sharp Container) that are made of solid material and cannot be reopened, available in sufficient numbers and appropriate sizes, and not expired?
IPC measures	66%	Are all parts of the dental chair disinfected regularly (at the start and the end of working hours)?
IPC measures	70%	Are all parts of the dental chair that are exposed to splashes in the clinic cleaned and disinfected between each patient?
Preparing and sterilizing	74%	Is there a water treatment unit to be used for sterilization?
Preparing and sterilizing	79%	Are tools and equipment placed in special sterilization packages when performing the sterilization process, and is the packaging done correctly?
IPC measures	80%	Are single-use equipment and tools used?
IPC measures	82%	Are single-use saliva suction tubes available and disposed of properly between each patient?
IPC measures	84%	Is a mouth solution (antiseptic mouthwash) available?
Env. Health	85%	Are all parts of the patient chair intact and free of defects and damage?
IPC measures	90%	Is the chair controlled by a foot control panel?



### 4.3 IPC Compliance by Sector

IPC compliance percent was aggregated by sector (public vs. private) to further explore areas of potential gaps in IPC practices. The findings demonstrated that the public sector seems to have a higher IPC compliance percent compared to the private sector in most IPC assessment areas. Tables 3 to 7 further compared the compliance percentage for each indicator between the public and the private sectors. In each table, the gap is presented by a green (where IPC compliance percentage is higher) and a red indicator

(where IPC compliance percentage is smaller).

Compliance percent for administrative procedures to prevent and control infection indicators are presented in Table 3. While more than one third of assessed public clinics reported “policies and procedures are in place and implemented in an optimal manner”, only 2% of the assessed private clinics reported such policies and procedures. Similar results were also reported for IPC related stickers (posters) and IPC training of all staff, during the last three years.

Table 3: Compliance Percent for Administrative Procedures to Prevent and Control Infection Assessment Indicators.

	No.	Question	Answers	Sector			
				Public		Private	
Administrative procedures to prevent and control infection	1	Is there a program (person with a specialized role) to prevent and control infections in the center/clinic?	0: none.	28	35.4%	359	88.0%
			1: Policies and procedures exist but are not implemented optimally.	23	29.1%	41	10.0%
			2: Policies and procedures are in place and implemented in an optimal manner.	28	35.4%	8	2.0%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	2	Are stickers related to the infection prevention and control program available and meet the specifications (cleanable, can be disinfected, and non-absorbable) inside the clinic?	0: Not available.	37	46.8%	350	85.8%
			1: There are stickers, but they do not meet the specifications, or they are in a place that is not clearly visible and does not meet the purpose.	19	24.1%	37	9.1%
			2: Stickers are available, and they meet the specifications and are in places that can be clearly seen and distributed in a manner that meet the purpose.	23	29.1%	21	5.1%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	3	The dental staff working in the clinic are trained on infection prevention and control policies and procedures?	0: No, the dental staff is not trained.	22	27.8%	193	47.4%
			1: Not all staff are trained or there is no clear and documented training program.	30	38.0%	160	39.3%
2: All staff are trained during the last three years and there is a clear and documented training program			27	34.2%	54	13.3%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>407</b>	<b>100.0%</b>	



Safety of the dental staff assessment indicators by sector are presented in Table 4. The gap in proper anti-Hepatitis B titer testing and in Hepatitis B vaccination is evident between the public and the private sectors.

in IPC compliance percentage for having a sink, soap, and a single use towel to wash and dry hands was almost non-existent (public (60.8%) and private (62.0%)). Gaps in IPC compliance were noted in adherence to hand washing protocol and in the availability of hand sanitizers.

Table 5 presents compliance percent for hand hygiene assessment indicators. The gaps

Table 4: Compliance Percent for Safety of the dental staff working in the clinic Assessment Indicators.

	No.	Question	Answers	Sector			
				Public		Private	
Safety of the dental staff working in the clinic	4	Is there a record of the anti-HBs titer for the dental staff working in the clinic, and a documentation of these tests for new employees?	0: There is no record of anti-HBs titer test for the staff.	39	49.4%	363	89.0%
			1: There is a record, but not all staff tests are documented, or the tests of the new employees are not documented.	10	12.7%	28	6.9%
			2: All staff have been examined, and there is a record of the tests for all staff including new employees.	30	38.0%	17	4.2%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	5	Hepatitis B vaccine is provided if anti-HBs titer is less than or equal to 10 or if there was an exposure and records are kept and documented?	0: The staff is not vaccinated and there is no anti-HBs titer record.	22	27.8%	151	37.0%
			1: The staff is vaccinated and there is no documented and periodically updated record.	25	31.6%	238	58.3%
			2: The staff is vaccinated and there is a documented and periodically updated record.	32	40.5%	19	4.7%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	6	Is there a protocol for dealing with needle stick injury cases and documenting them on a reporting form?	0: There is no protocol for dealing with needle stick injury cases or there is no reporting form.	29	36.7%	342	83.8%
			1: There is a protocol for dealing with needle stick injury, but the reporting form is not filled out.	8	10.1%	58	14.2%
2: There is a protocol for dealing with needle stick injury and a reporting form is filled out.			42	53.2%	8	2.0%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	

Table 5: Compliance Percent for Hand Hygiene Assessment Indicators

	No.	Question	Answers	Sector			
				Public		Private	
Hand Hygiene	7	Is there a sink, soap, and a single use towels to wash and dry hands?	0: There is no near sink or soap or single use towels.	4	5.1%	33	8.1%
			1: There is a near sink but no soap or single use towels.	27	34.2%	122	29.9%
			2: There is a near sink, soap, and single dose towels.	48	60.8%	253	62.0%
		<b>Total</b>	<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
	8	Does the dental staff wash their hands between each patient?	0: The dental staff doesn’t adhere to the hand washing protocol.	19	24.1%	139	34.1%
			1: Some dental staff wash their hands, or some don’t adhere to the hand washing protocol.	35	44.3%	195	47.8%
			2: All staff are adherent to the hand washing protocol.	25	31.6%	74	18.1%
		<b>Total</b>	<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
	9	Is hand sanitizer available with an adequate number in the clinic	0: Hand sanitizers are not available.	2	2.5%	53	13.0%
			1: Hand sanitizers are not adequately available (only available in one area and it’s not accessible for everyone).	9	11.3%	125	30.6%
			2: Hand sanitizers are adequately available.	69	86.3%	230	56.4%
<b>Total</b>		<b>80</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>		
10	Is each hand sanitizer bottle used one time without refilling and before its expiry date	Do not apply	77	98.7%	355	87.0%	
		0: Hand sanitizer bottles are either refilled or used after their expiry date	1	1.3%	50	12.3%	
		1: Hand sanitizers bottles are used before the expiry date, but they are refilled	0	0.0%	2	0.5%	
		2: Hand sanitizer bottles are used before the expiry date, and they are not refilled	0	0.0%	1	0.2%	
		<b>Total</b>	<b>78</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
11	Is the expiry date of the hand sanitizer (alcohol-based hand rub) clearly written and it’s not used after that date?	0: The expiry date of the hand sanitizer is not written	22	27.8%	361	88.5%	
		1: The expiry date is written but it is used after that date	9	11.4%	23	5.6%	
		2: The expiry date is written and its not used after that date.	48	60.8%	24	5.9%	
	<b>Total</b>	<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>		

Compliance percent for IPC-measure indicators are presented in Table 6. A gap in IPC compliance percentage for adherence to the hand hygiene time was evident (26.6% for the public and 18.6% in the private ).

The observed gaps in IPC compliance percentages for adequate availability and usage in the PPE , appropriately wearing and doffing PPEs, regular cleaning and disinfection of the dental chair, were minimum.



Table 6: Compliance Percent for IPC Measures Assessment Indicators

	No.	Question	Answers	Sector			
				Public		Private	
Infection prevention and control measures	12	Is the staff adherent to the hand hygiene time either when washing by water and soap or by alcohol-based rub? (20-30 seconds: when using water and soap) (30-40 seconds: when using alcohol-based rub)	0: the staff is not adherent to the hand hygiene time	18	22.8%	175	42.9%
			1: Some staff are adherent to the hand hygiene time	40	50.6%	157	38.5%
			2: All staff are adherent to the hand hygiene time	21	26.6%	76	18.6%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	13	Are Personal Protective Equipment (PPE) including gown, face shield, eye goggles, in adequate amounts?	0: PPE is not available in the clinic	2	2.5%	7	1.7%
			1: PPE not adequately available, or they are not used	26	32.9%	148	36.3%
			2: PPE are adequately available, and they are used	51	64.6%	253	62.0%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	14	Does the dental staff wear the PPE in the right way?	0: The staff doesn't wear the PPE in the right way	8	10.7%	61	15.3%
			1: Some staff wear the PPE in the right way	35	46.7%	164	41.2%
			2: All staff wear the PPE in the right way	32	42.7%	173	43.5%
		<b>Total</b>		<b>75</b>	<b>94.9%</b>	<b>398</b>	<b>97.5%</b>
	15	Does the staff doff the PPE in the right way between each patient?	0: The staff doesn't doff the PPE in the right way between each patient	10	12.8%	65	16.5%
			1: Some staff members doff the PPE in the right way between each patient	29	37.2%	120	30.5%
			2: All staff members doff PPE in the right way and dispose it between each patient	39	50.0%	208	52.9%
		<b>Total</b>		<b>78</b>	<b>97.5%</b>	<b>393</b>	<b>96.3%</b>
	16	Are all parts of the dental chair disinfected regularly (at the start and the end of working hours)?	0: Not regularly.	4	5.1%	28	6.9%
			1: Some parts of the dental chair are cleaned and disinfected regularly	24	30.4%	107	26.2%
			2: The dental chair in the clinic is cleaned and disinfected regularly	51	64.6%	273	66.9%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
17	Are all parts of the dental chair that are exposed to splashes in the clinic cleaned and disinfected between each patient?	Not all of these parts are cleaned or disinfected	2	2.5%	27	6.6%	
		These parts are cleaned but not between all patients	20	25.3%	97	23.8%	
		All parts of the dental chair that are exposed to splashes are cleaned and disinfected in the clinic and between patients	57	72.2%	284	69.6%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
18	Is the chair controlled by a foot control panel?	0: The chair is not controlled by a foot control panel.	1	1.3%	6	1.5%	
		1: A foot control panel is available, but it is not used or is broken	6	7.6%	36	8.8%	
		2: The chair is controlled by a foot control panel.	72	91.1%	366	89.7%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
19	Are single-use saliva suction tubes available and disposed properly between each patient?	0: Single-use saliva suction tubes are not available.	0	0.0%	1	0.2%	
		1: Single-use saliva suction tubes are available but are not disposed properly or between each patient.	2	2.5%	83	20.3%	
		2: Single-use saliva suction tubes are available and are disposed properly between each patient.	77	97.5%	323	79.2%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
20	Is a rubber dam available in the clinic and used and disposed of correctly?	0: Rubber dam is not available inside the clinic.	22	28.2%	85	20.9%	
		1: Rubber dam is available in the clinic but is not disposed of properly when used.	1	1.3%	83	20.4%	
		2: Rubber dam is available and disposed of properly when used.	5	6.4%	165	40.5%	
		- <b>Not applicable</b> (the procedure that requires its presence is not performed this clinic)	50	64.1%	74	18.2%	
	<b>Total</b>		<b>78</b>	<b>100.0%</b>	<b>407</b>	<b>100.0%</b>	
21	Are single-use equipment and tools used?	0: Reused for more than one patient	2	2.5%	17	4.2%	

		1: It can be reused more than once with the same patient	18	22.8%	60	14.7%
		2: It is used only once for one patient	59	74.7%	331	81.1%
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
22	Is a mouth solution (antiseptic mouthwash) available?	0: Mouth solution (antiseptic mouthwash) is not available.	14	17.7%	40	9.8%
		1: Mouth solution (antiseptic mouthwash) is available, but it is not used.	3	3.8%	21	5.1%
		2: Mouth solution (antiseptic mouthwash) is available and used.	62	78.5%	347	85.0%
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>

Assessment indicators related to medical wastes are presented in Table 7. Evident IPC compliance gaps were reported in the use of closed medical waste containers with bins that are suitable for the workload and open on foot and in the segregation of medical waste.

Similar gaps were also noted in the use of sharp disposal containers made of solid material, which cannot be reopened and are available in sufficient numbers and appropriate sizes, in the safely handling sharp tools and dispose of them immediately after use., in recapping of the anesthetic injection, And in the proper handling of the waste of Amalgam dental fillings and the empty capsules.

Compliance indicators for preparing and sterilizing dental tools are presented in Figure 3. availability of suitable sterilization room

(32.9% for public and 27.9% for private) presented a minimal gap between the two sectors. Availability of a dedicated sink for cleaning equipment and instruments before sterilization also showed a minimal gap.

Availability of “Enzymatic cleaner” presented an evident gap between the public and the private sectors. A gap in IPC compliance in allocating qualified and trained employees to clean and sterilize tools and equipment was evident between the two sectors. Still, a minimal gap was observed in availability of PPEs in cleaning and sterilization’s rooms.

The gap in the use of an ultrasonic cleaner was noted as only 2.5% of the public clinics and 23.8% of the private clinics reported using such machine.



Table 7: Compliance Percent for Medical Waste Assessment Indicators

	No.	Question	Answers	Sector			
				Public		Private	
Medical Waste	23	Are there closed medical waste bins suitable for the workload at the clinic and opens by foot?	0: Closed medical waste bins are not available	5	6.3%	198	48.5%
			1: Closed medical waste bins are available but are not suitable for the workload in the clinic or it doesn't open by foot	41	51.9%	141	34.6%
			2: Closed medical waste bins are available and they are suitable for the workload, and they open by foot	33	41.8%	69	16.9%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	24	Is medical waste sorted based on a color guide?	0: Medical waste is not sorted based on a color guide	2	2.6%	313	76.7%
			1: Not all medical waste is sorted based on a color guide	17	21.8%	29	7.1%
			2: All medical waste is sorted based on a color guide	59	75.6%	66	6.2%
		<b>Total</b>		<b>78</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	25	Does the clinic have sharp disposal containers (Sharp Container) that are made of solid material and cannot be reopened, available in sufficient numbers and appropriate sizes, and not expired?	0: Sharps disposal containers (Sharp Box) are not available.	1	1.3%	88	21.6%
			1: Sharps disposal containers (Sharp Box) are not available, but it is of poor quality, not made of a solid material or open easily, or not available in insufficient numbers, or expired.	4	5.0%	85	20.8%
			2: Available, of good quality, made of solid material, can't be reopened, in sufficient numbers, and not expired.	75	93.8%	235	57.6%
		<b>Total</b>		<b>80</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	26	Does the dental staff deal safely with sharp tools and dispose it in the appropriate way immediately after use?	0: Dental staff doesn't deal safely with sharp tools and don't dispose it immediately after use.	1	1.3%	83	20.3%
			1: Dental staff deal safely with sharp tools but don't dispose it immediately after use	13	16.7%	102	25.0%
			2: Dental staff deal safely with sharp tools and dispose it immediately after use	64	82.1%	223	54.7%
		<b>Total</b>		<b>78</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	27	Does the dental staff recap anesthetic injections after use?	0: It is not recapped at all	3	3.8%	26	6.4%
			1: Some staff recap anesthesia injections, but not in the correct way	23	29.1%	185	45.3%
			2: All staff recap the anesthesia injections in the correct manner after use	53	67.1%	197	48.3%
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
28	Is the waste of dental fillings (Amalgam) and empty capsules sorted by placing them in a container and handing them over to the Environmental Directorate	0: It is not sorted, placed in a container, and delivered to the Environmental Directorate.	15	20.0%	125	72.7%	
		1: It is sorted but is not placed in a closed container or delivered to the Environmental Directorate .	4	5.3%	26	15.1%	
		2: It is sorted, placed in a closed container, and delivered to the Environmental Directorate .	56	74.7%	21	12.2%	
		- Amalgam capsules are not available/not applicable	4	5.1%	235	57.7%	
	<b>Total</b>		<b>75</b>	<b>94.9%</b>	<b>172</b>	<b>42.2%</b>	
29	Are extracted teeth collected in a special container before handing them to the Environmental Directorate?	Does not apply	75	94.9%	173	42.4%	
		0: Not collected.	0	0.0%	59	81.9%	
		1: It is collected but not in a special container, or it is not disposed of properly.	0	0.0%	10	13.9%	
		2: It is collected, placed in a special container, and delivered to the Env. Directorate.	1	100.0%	3	4.2%	
				3	3.8%	163	40.0%
	<b>Total</b>		<b>1</b>	<b>1.3%</b>	<b>72</b>	<b>17.6%</b>	

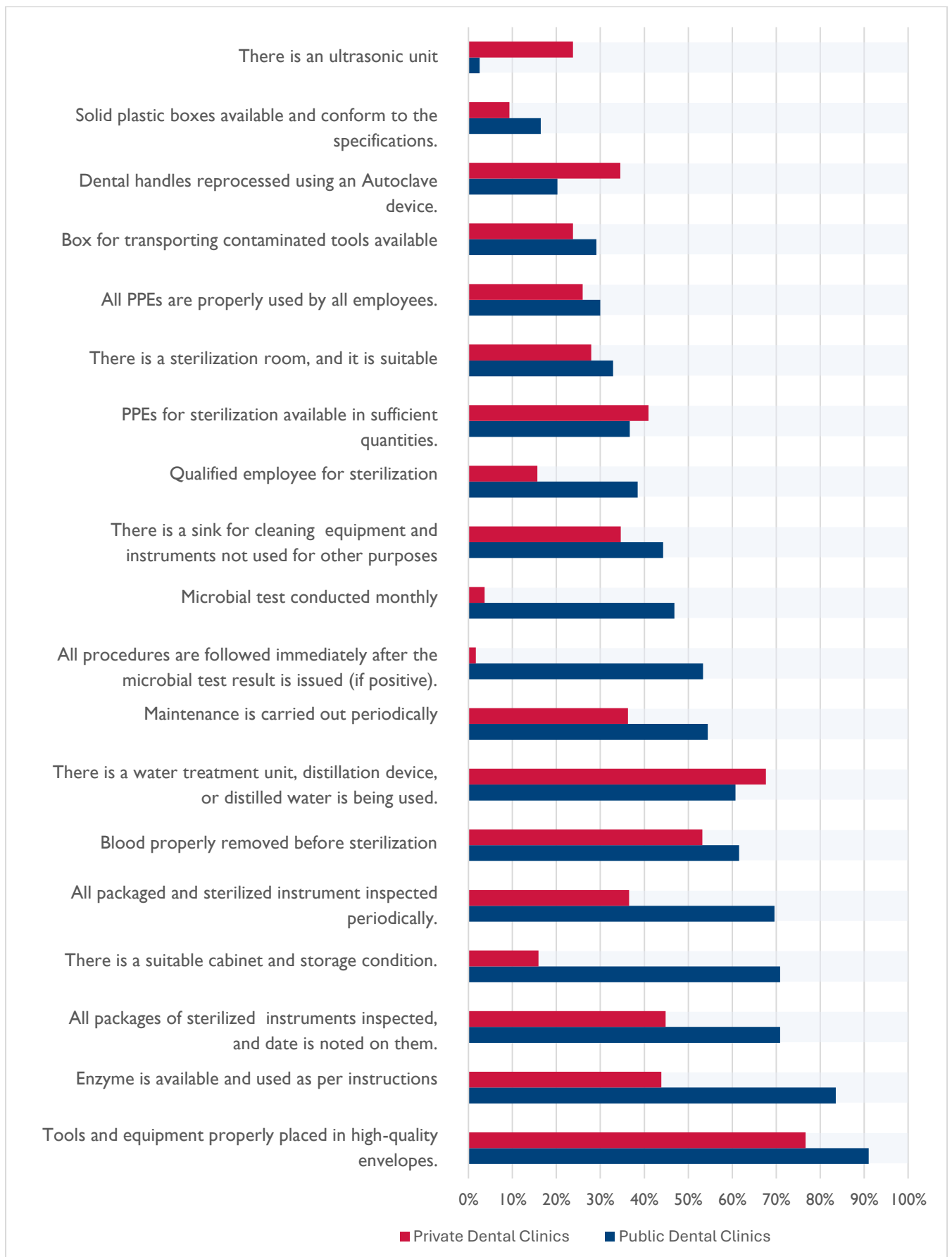


Figure 3: Compliance Percent for Preparing and Sterilizing Dental Tools Assessment Indicators

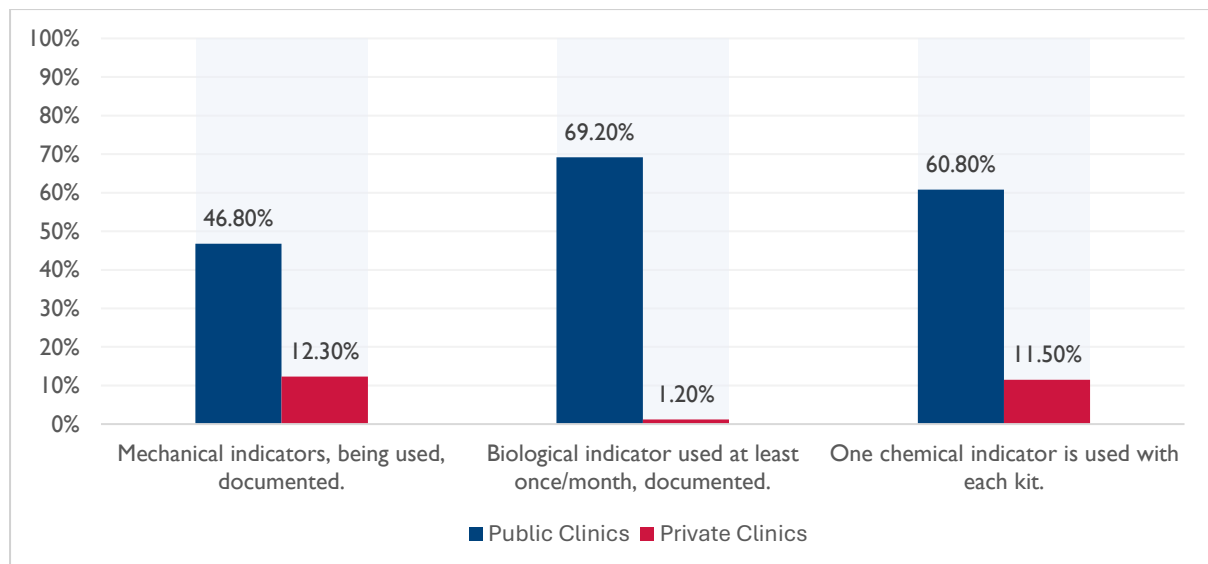


Figure 4: Compliance Percent for Assessment Indicators Related to Sterilization (Mechanical, Chemical, and Biological Indicators)

Compliance indicators for environmental cleaning inside the clinic assessment are presented in Table 8.

The availability of environmental cleaning and disinfection materials, in sufficient quantities, was not an evident gap between the two sectors. Still, a gap between sectors was noted for the proper usage of cleaning and disinfection materials (including concentration and exposure time).

Nonetheless, cleaning carts were noted in 15.2% and only 4.7% of the public and private clinics, respectively. Staff members properly dealing with blood spills according to instructions were reported in 35.4% of the public clinics and 4.7% of private clinics.



Table 8: Compliance Percent for Environmental Cleaning Inside the Clinic Assessment Indicators

	No.	Question	Answers	Sector			
				Public		Private	
Environmental Health inside the clinic	57	Does the clinic have environmental cleaning and disinfection materials?	0: The clinic does not have environmental cleaning and disinfection materials.	8	10.1%	13	3.2%
			1: Some materials are available, or materials are available in insufficient quantities.	20	25.3%	181	44.4%
			2: All environmental cleaning and disinfection materials are available in sufficient quantities.	51	64.6%	214	52.5%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	58	Are cleaning and disinfecting materials used in the correct manner?	0: Cleaning and disinfection materials are not used in the correct manner.	15	18.8%	113	27.7%
			1: Cleaning and disinfection materials are used, but there are parts of the cleaning and disinfection process that are incorrect.	30	37.5%	208	51.0%
			2: Cleaning and disinfection materials are used in the correct manner (concentration and exposure time).	35	43.8%	87	21.3%
		<b>Total</b>		<b>80</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	59	Does the clinic have a special cleaning cart that has been allocated to the dental room and conforms to the specifications of cleaning carts?	0: The clinic does not have a special cleaning cart.	61	77.2%	346	84.8%
			1: A cleaning cart is available but does not meet the specifications.	6	7.6%	43	10.5%
			2: A cleaning cart is available and conforms to specifications	12	15.2%	19	4.7%
		<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
	60	Are the products used in accordance with policies for the cleaning and disinfection process? (Mop for cleaning the floor, special cloth towels for wiping surfaces)	0: No special products available.	13	16.3%	39	9.6%
			1: There are products available that do not comply with special policies.	36	45.0%	280	68.6%
			2: All products matching specific policies are available.	31	38.8%	89	21.8%
		<b>Total</b>		<b>80</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>
61	Are all parts of the patient chair intact and free of defects and damage?	0: There are obvious defects and damage in the chair, which hinders its cleaning and disinfection.	8	10.1%	14	3.4%	
		1: There is minor defect but far from the area where the service is provided or there is a covered damage.	10	12.7%	41	10.0%	
		2: The chair is intact, in good condition, and easy to clean and disinfect.	61	77.2%	353	86.5%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
62	Are absorbent sheets (draw sheets) used on the patient chair table and changed between each patient?	0: Absorbent sheets are not changed	3	6.1%	11	3.3%	
		1: Absorbent sheets are used without changing them between each patient.	11	22.4%	92	27.3%	
		2: They are used and changed between each patient.	35	71.4%	234	69.4%	
		Does not apply	29	37.2%	71	17.4%	
	<b>Total</b>		<b>49</b>	<b>62.0%</b>	<b>337</b>	<b>82.6%</b>	
63	Are blood spills incidents handled as instructed by the guidelines and policies?	0: Staff lack the knowledge of how to deal with blood spills.	23	29.1%	239	58.6%	
		1: Staff know how to deal with blood spills, but they don't adhere to the instructions.	28	35.4%	150	36.8%	
		2: Staff members deal with blood spills according to instructions.	28	35.4%	19	4.7%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	
64	Is there a cleaning schedule?	0: No cleaning schedule.	53	67.1%	357	87.5%	
		1: Yes, but not according to day and date.	12	15.2%	31	7.6%	
		2: Available and arranged by day and date.	14	17.7%	20	4.9%	
	<b>Total</b>		<b>79</b>	<b>100.0%</b>	<b>408</b>	<b>100.0%</b>	



### Mean IPC Compliance per Sector

Figure 5 demonstrates the total number of questions (indicators) that were considered complaint (coded as 2 in the IPC question) by sector. Overall, the mean IPC compliance was 22.4 indicators (question) out of the 59 indicator. Among the public sector, mean IPC

compliance was higher at the public clinics (29.24) compared to the private (20.64) clinics. Therefore, the mean IPC compliance in public clinics was 41.6% higher than the private clinics.

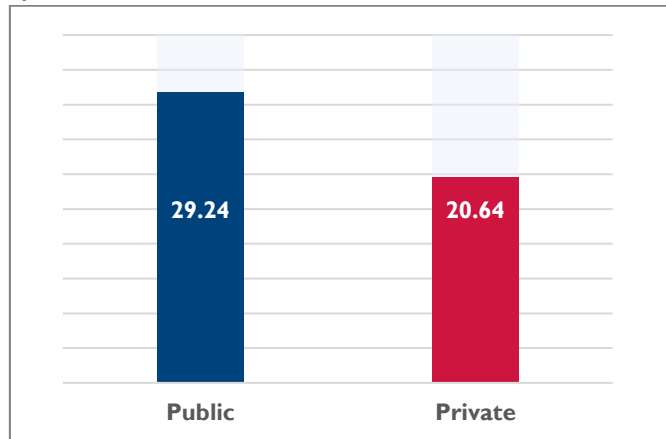


Figure 5: Mean IPC Compliance in the Assessed Public and the Private Clinics.

### Mean IPC Compliance Percent by Facility

Mean IPC compliance was highest for the comprehensive healthcare center (33.27), followed by the primary healthcare centers

(27.45), private centers (26.32), and then private clinics (19.91) (Figure 6).

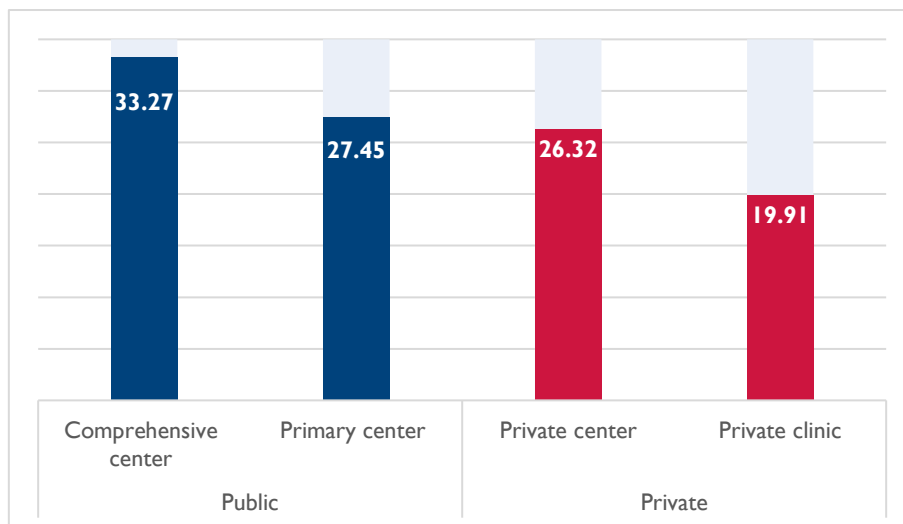


Figure 6: Mean IPC Compliance in the Assessed Dental Clinics by Facility

Mean IPC compliance percent was calculated by dividing the mean IPC compliance by the total number of questions used to calculate the mean (n=59 questions). The mean IPC percent by facility is presented in Figure 7.

The highest mean compliance percentage was within the comprehensive healthcare centers (56.4% compliance) followed by primary healthcare centers (46.5%) and private centers (44.6%) and then private clinics

(33.8%). These results may reflect more engagement of some of the comprehensive healthcare centers in accreditation programs that need proper investment in IPC measures.

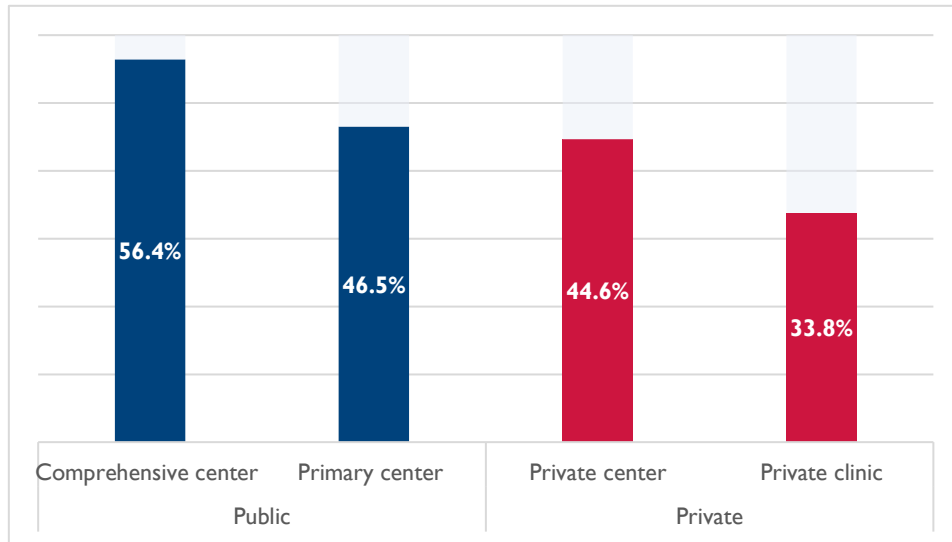


Figure 7: Mean IPC Compliance Percent in the Assessed Clinics by Facility.

### Mean IPC Compliance Percent by Governorate

Mean IPC compliance percent fluctuated by governorate with Karak scored the lowest percent for both the public and private clinics while Amman, Jerash and Zarqa scored the highest for public clinics only. However,

Aqaba scored the highest for private clinics (51%). Compliance level by governorate and sector ranged between 20% and 65% (Figure 8).

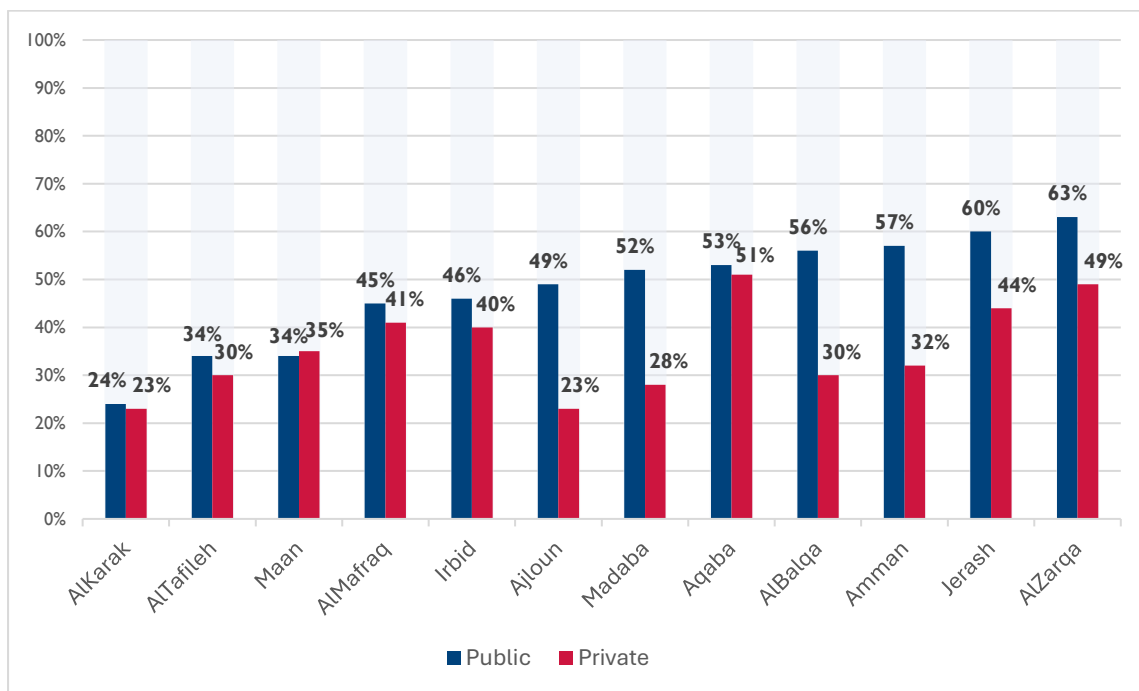


Figure 8: Mean IPC Compliance Percent by Governorate and Sector



## Post-hoc Data Analysis

A post-hoc analysis was conducted to explore how established training, policies, and clinic infrastructure (such as centralized sterilization rooms) impact IPC compliance percentages. The analysis showed that mean IPC compliance nearly doubled in clinics with established IPC programs, trained staff, protocols for needle-stick injuries, adherence to a 5- moments handwashing rule, and availability of hand sanitizers. Additional factors associated with higher compliance included adequate PPE availability, appropriate use of PPE, closed medical waste bins, color-coded waste sorting, dedicated sanitation rooms, and qualified personnel assigned to clean and sanitize dental tools and equipment. These indicators demonstrate that investing in IPC-related capacity building, including policies, guidelines, and training, significantly improves compliance levels.

For instance, the mean (SD) IPC compliance percentage was 64.5% (16.8) in clinics with a dedicated IPC role or program, compared to 35.2% (16.8) where such roles were absent ( $P=0.000$ ). When dental staff had training in IPC measures, mean (SD) compliance was 54.7% (18.4), compared to 33.8% (16.3) in clinics without IPC training ( $P=0.000$ ). Table 9 below shows the effect of selected IPC indicators on overall compliance percentages.

The impact of these indicators on mean IPC compliance was evident across both public and private sectors, suggesting that IPC training and policy implementation can positively influence compliance in all clinic types. Mean compliance values by indicator for each sector are presented in Table 9.

Table 9: Mean IPC Compliance Percent by Selected IPC indicators

IPC indicator	Indicator level	Mean IPC Compliance (%)	Std. Deviation	P-value	Public Dental Settings		Private Dental Settings		P-value
					Mean IPC Compliance (%)	Std. Deviation	Mean IPC Compliance (%)	Std. Deviation	
Is there a program (person with a specialized role) to prevent and control infections in the center/clinic?	No	35.2	16.8	0.000	40.34	17.66	34.54	16.64	0.001
	Yes (Compliance)	64.5	15.8		66.34	15.00	57.89	17.87	
Are dental staff trained on IPC measures?	No	33.8	16.3	0.000	40.60	17.66	32.86	15.92	0.004
	Yes (Compliance)	54.7	18.4		66.42	15.31	48.82	17.03	
Is there a protocol for dealing with needle stick injury cases and documenting them on a reporting form?	No	34.5	16.4	0.000	34.03	14.92	34.58	16.58	0.000
	Yes (Compliance)	61.9	16.6		63.51	14.62	54.08	23.72	
Does the dental staff adhere to the 5 seconds rule when washing hands?	No	32.8	15.7	0.000	42.12	18.06	31.34	14.79	0.002
	Yes (Compliance)	54.9	17.7		65.43	17.42	51.35	16.43	
Is hand sanitizer available with an adequate number in the clinic	No	25.7	14.3	0.000	37.68	15.78	25.01	13.9	0.000
	Yes (Compliance)	44.7	16.9		51.36	21.02	42.74	14.95	
Are Personal Protective Equipment (PPE) including gown, face shield, eye goggles, in adequate amounts?	No	24.9	14.4	0.000	39.72	18.39	22.15	11.8	0.001
	Yes (Compliance)	44.9	16.4		55.02	20.26	42.85	14.68	
Does the dental staff wear the PPE in the right way?	No	28.5	15.6	0.000	40.45	19.31	26.14	13.54	0.005
	Yes (Compliance)	49.5	14.8		63.07	15.01	46.98	13.36	

IPC indicator	Indicator level	Mean IPC Compliance (%)	Std. Deviation	P-value	Public Dental Settings		Private Dental Settings		P-value
					Mean IPC Compliance (%)	Std. Deviation	Mean IPC Compliance (%)	Std. Deviation	
Are there closed medical waste bins suitable for the workload at the clinic and opens by foot?	No	33.0	16.3	0.000	39.64	18.48	32.08	15.8	0.003
	Yes (Compliance)	53.7	16.6		63.23	15.64	49.17	15.21	
Is medical waste sorted based on a color guide?	No	31.7	15.5	0.000	29.23	14.11	31.82	15.54	0.001
	Yes (Compliance)	53.7	16.4		56.26	18.24	51.48	14.27	
Is there a central (sterilization) room for sterilizing equipment and instruments within the clinic?	No	31.9	16.1	0.000	41.93	17.99	30.1	15.1	0.002
	Yes (Compliance)	50.8	16.8		65.47	17.28	47.51	14.92	
Has a qualified employee been allocated to clean and sterilize tools and equipment?	No	33.2	16.4	0.000	40.34	17.66	34.54	16.64	0.001
	Yes (Compliance)	54.6	16.1		66.34	15.00	57.89	17.87	

#### 4.4 Qualitative Data (Focus Group Discussion):

The FGD yielded a rich discussion that presented various perspectives and introduced new insights into the challenges dentists face, which hamper their adherence to IPC practices and measures. The findings are categorized into three main themes: Governance, Continuous Education, Availability, and Accessibility.

##### Theme I: Governance

Participants emphasized the need for a unified governing body to standardize policies and procedures across both public and private sectors. They highlighted that such a body would ensure all dentists adhere to IPC policies and measures consistently. For example, private sector dentists noted that, although they keep records of needlestick incidents (a requirement), there is no designated agency to report these incidents to. Consequently, no action is taken, and incidents must be managed individually.

There was a noticeable variation in adherence to IPC measures between the public and private sectors. Public sector

participants attributed their higher adherence to the support received from the MOH. This support includes resources, equipment, materials, updated policies and guidelines, and the presence of designated IPC focal points at the facility and directorate levels. These focal points oversee performance and provide daily guidance. In contrast, private sector participants identified the lack of monitoring, evaluation, and support from both the MOH and the Jordan Dental Association (JDA) as significant challenges. This lack of support leads to inconsistent adherence to IPC measures and best practices in the private sector.

- “We [the private sector] need the ministry’s support as well. We need them to oversee our work and monitor it. Who are we supposed to report incidents to?” -Participant from the private sector.
- “Even with the presence of a standardized guideline, you can’t guarantee a standardized application without the ministry’s continuous support. We don’t know when they update a policy or develop a new guideline. We are very destined; we need to be under the same



*umbrella.” -Participant from the private sector.*

The findings underscore the importance of establishing a unified governing body to oversee and standardize IPC practices across all dental settings in Jordan. The disparity between the public and private sectors highlights the need for comprehensive support mechanisms, including monitoring, evaluation, and resource allocation, to ensure consistent adherence to IPC measures. Addressing these governance issues is crucial for improving IPC compliance and overall patient safety in dental clinics.

### Theme 2: Continuous Education

Another recurring theme is continuous education. Participants from both sectors repeatedly stated that a lack of knowledge and awareness among dentists, dental hygienists, nurses, and assistants is a significant barrier to achieving best IPC practices in dental settings. They also highlighted the absence of a standardized IPC guideline for dental settings, which further complicates consistent adherence to IPC measures.

Although the JDA mandates that all members take IPC training every five years as part of their license renewal procedures, participants deemed the training insufficient. They cited that the training is only an hour and a half long, conducted online without any hands-on experience, and delivered by an instructor who is not an expert in IPC.

Moreover, participants from the public sector noted that only IPC focal points receive the training offered by the MOH, whereas the training should be expanded to include all healthcare providers involved. Private sector participants mentioned that their only source of up-to-date IPC

information is online resources, which may not always be relevant to the Jordanian context.

- *"The last time I took a proper course on IPC was during my undergraduate studies. I haven't had comprehensive training on IPC, and I don't even know where to receive such training if I wanted to."* - Participant from the public sector.
- *"The JDA and the MOH should collaboratively provide such training for everyone from all sectors. The healthcare providers' knowledge and awareness about IPC is the foundation of implementing IPC practices in dental settings and all healthcare settings."* - Participant from the private sector.

The data gathered from the FGD highlights the urgent need for a national training platform that ensures continuous learning and hands-on training for all personnel in dental settings. Additionally, the development and dissemination of standardized IPC guidelines for dental settings are crucial. Such measures would address the gaps in knowledge and awareness, fostering a more robust implementation of IPC practices across both public and private sectors. This approach would ensure that all dental healthcare providers are equipped with the necessary skills and information to maintain high standards of IPC.

### Theme 3: Availability and Accessibility

Quantitative data has shown that adherence to disinfection and sterilization measures, along with the availability of related resources (materials and equipment), is noticeably higher in MOH facilities compared to private sector facilities. Participants from MOH facilities explicitly stated that this adherence results from the provision of all necessary

resources, such as chemical and biological indicators, disinfectors, and autoclaves, by the MOH.

The MOH provides logistical and technical support for all its facilities and supplies all necessary resources, including materials, equipment, tests, devices, and maintenance. This provision ensures that the MOH oversees the purchase of such resources from trusted sources and allocates a governmental budget to cover these expenses.

Participants from the private sector stated that the high cost of these resources is a significant barrier, as it costs around 7 JOD to take IPC precautions per patient, while insurance companies' pricing, which covers the broadest segment of patients, does not exceed 2 JOD for some important procedures such as tooth extraction. Furthermore, the high cost is not the only barrier faced by private sector dentists. They also stated that they do not know where to buy the resources and lack confidence in the quality of products sold commercially to private sector dentists.

- *"Even if I want to provide chemical and biological indicators to ensure the quality of sterilization by the autoclave I have, I don't know where to buy them." – Participant from the private sector.*
- *"I don't take appointments from insured patients because I won't be able to afford buying all of these resources if I accept the procedures pricing of insurance companies." – Participant from the private sector.*
- *"Provision of these resources, having regular maintenance for the autoclave, and not having to worry about the availability of disinfectants, personal protective equipment, and indicators are the main facilitators to*

*adhering to IPC best practices in my clinic." - Participant from the public sector.*

The data highlights a significant disparity in the availability and accessibility of IPC resources between the public and private sectors. The MOH's comprehensive provision of necessary resources and support enables higher adherence to IPC measures in public facilities. In contrast, private-sector dentists face considerable challenges due to high costs, limited access to reliable suppliers, and insufficient insurance reimbursement rates. Addressing these issues requires the establishment of a more equitable system for resource distribution and support, ensuring that all dental settings have access to high-quality IPC materials and equipment. This approach would promote uniform adherence to IPC practices across both sectors, ultimately enhancing patient safety and care standards.



# 5. DISCUSSION AND CONCLUSION



The national IPC assessment of Jordanian dental settings provides a comprehensive analysis of IPC adherence, highlighting an urgent need for improvements across both public and private sectors. Results revealed substantial variability in compliance rates, with the highest overall IPC compliance reaching 89.9%, while the lowest plummeted to a concerning 6.5%. This wide range underscores the inconsistency in IPC implementation, pointing to critical gaps that must be addressed to ensure a safer healthcare environment.

Compliance with IPC standards was notably higher in public dental clinics than in private ones, particularly in areas such as administrative procedures, staff safety, and sterilization protocols. For instance, over one-third of public clinics reported having comprehensive policies and procedures in place, compared to only 2% of private clinics. Similarly, a higher percentage of public clinics maintained proper documentation of anti-Hepatitis B titers and provided necessary vaccinations, in contrast to significantly lower compliance in private clinics.

The assessment identified several critical deficiencies in IPC practices, including the lack of specialized cleaning carts and schedules, inadequate PPE use, poor hand hygiene practices, and insufficient sterilization of dental tools. Compliance rates were particularly low for indicators such as the availability of a designated sterilization room, proper medical waste management, and the use of appropriate cleaning and disinfecting materials.

A major challenge identified was the limited oversight and supervision of dental clinics, particularly within the private sector. With approximately 4,000 registered dental facilities in Jordan, most of which are private,

the MOH faces significant challenges in ensuring consistent IPC adherence. This issue is compounded by the close physical interactions inherent in dental care, heightening the risk of infection transmission.

FGD with dental professionals further illuminated practical challenges in IPC implementation. Participants reported barriers such as high workloads, limited resources, and insufficient training. They emphasized the need for continuous education and regular updates to IPC guidelines to keep pace with new technologies and materials in dental care. Addressing these barriers will require a multifaceted approach, including better resource allocation, enhanced training programs, and stronger regulatory frameworks.

Our results indicate that capacity building in IPC best practices is linked to higher compliance levels. Specifically, the data suggest that mean IPC compliance percentages doubled in clinics with established infection control programs, trained staff, protocols for managing needle-stick injuries, adherence to the 5-second handwashing rule, availability of hand sanitizers, sufficient PPE, proper PPE usage, closed medical waste bins, color-coded waste sorting, dedicated sanitation rooms, and qualified staff for cleaning and sanitizing dental tools. These indicators demonstrate that investment in IPC-related capacity building, including policies, guidelines, and training, significantly improves compliance levels, directly enhancing the safety of both dental staff and patients.

The assessment's findings advocate for a standardized approach to IPC across all dental settings, including clear, enforceable guidelines and policies tailored to the specific



needs of different types of dental facilities. Regular monitoring and evaluation, coupled with ongoing education and training for dental staff, are essential to improve compliance rates and ensure the safety of patients and healthcare workers alike.

In conclusion, this national assessment provides a critical evaluation of IPC practices in Jordanian dental settings, revealing significant areas for improvement. By addressing the identified gaps and implementing targeted interventions, the MOH can enhance IPC compliance, reduce infection risks, and improve the overall quality and safety of dental care services in the country. Achieving these goals will require collaboration between public health authorities, dental professionals, and other stakeholders to build a robust and sustainable IPC framework.

## Recommendations

To strengthen IPC practices within dental settings in Jordan, the following recommendations are proposed. These measures address key areas such as administrative procedures, dental staff safety, hand hygiene, medical waste management, and standardized IPC policies. By implementing these recommendations, dental clinics can improve IPC compliance, enhance patient safety, and ensure a consistent approach across both public and private sectors.

### Administrative Procedures

Establish and update IPC-related administrative policies, including hiring and training dedicated IPC staff in dental settings. Disseminate IPC guidelines to all clinics, with emphasis on private sector needs. Ensure the JDA and MOH distribute IPC instructions

containing up-to-date guidelines and reporting contacts.

### Safety of Dental Staff

Ensure standardized record-keeping for vaccination, testing, and needle-stick injury protocols, including proper documentation of vaccination and titer levels. Distribute comprehensive manuals on dental staff safety practices to all clinics.

### Hand Hygiene

Regularly update and disseminate hand hygiene policies, including guidelines on single-use items, sanitization resources, and expiration tracking for sanitizers. Develop and share manuals on best hand hygiene practices.

### Medical Waste Management

Develop and enforce policies for waste management, including collection, storage, and disposal procedures. Ensure necessary resources, such as medical bins and disposal contracts with waste management companies, are in place. Distribute manuals clarifying roles and responsibilities in waste management and engage the Environmental Cleaning Directorate for process oversight.

### Dental Tool Sterilization

Provide all clinics with ultrasonic units for sterilization, along with guidelines on cleaning, disinfecting, and sterilizing tools. Ensure consistent use and documentation of sterilization indicators. Specify sterilization room standards and integrate sterilization compliance checks into licensing renewals.

### Environmental Cleaning in Dental Clinics

Ensure availability of JFDA-approved cleaning materials and carts and disseminate guidelines on the correct use of these resources. Regularly update and distribute lists of

approved materials and specifications for cleaning tools.

### Activate the ACIPC Governing Committee Role

Establish a unified governing committee to standardize IPC policies across sectors, facilitating coordination between practitioners and authorities. Implement legislation mandating IPC adherence in all dental settings, aligned with WHO standards, and monitor compliance through a joint MOH and JDA task force.

### Develop a National Training Platform

Implement accredited CPD programs focused on sterilization and IPC best practices. Provide ongoing, hands-on IPC training tailored to the Jordanian context. Establish strict IPC qualifications for new hires, including an onboarding process with dedicated IPC modules.

### Standardize IPC Guidelines

Develop and update IPC guidelines tailored to dental settings. Regularly communicate these standards and guidelines to all dental practitioners across all sectors to ensure uniform practices across sectors.

### Implement a Risk Register

Mandate a risk register for all clinics to document potential IPC hazards. Regular MOH and JDA reviews will support the development of preventive strategies based on identified trends.

### Establish an Occurrence Variance Reporting (OVR) System

Create a national OVR platform for reporting IPC breaches, equipment failures, and exposure incidents. Use OVR data to inform IPC training, policymaking, and workplace safety improvements.

### Create an IPC Dental Hub

Develop a centralized IPC Dental Hub with access to guidelines, policies, training modules, and resources specific to dental settings. Update regularly to include the latest IPC information and integrate it into a unified platform for seamless access.

### Implement Unified IPC Key Performance Indicators (KPIs)

Establish standardized KPIs, covering sterilization indicators, waste management, PPE use, and hand hygiene. Regular MOH and JDA monitoring should identify non-compliance areas and provide support as needed.

### Disseminate the MOH's Dental Clinics' Supplies Purchase Request

Provide private clinics with standardized guidelines on necessary IPC supplies through the MOH's purchase request process, ensuring access to essential IPC equipment and materials across all dental settings.

By implementing these recommendations, Jordan can improve adherence to IPC standards in dental settings, ultimately enhancing patient safety and care quality across the country.

## 6. ANNEXES

## Annex (I): The refined and tailored assessment tool:

### National Assessment of Infection Prevention and Control (IPC) Practices in Public and Private Dental Settings in Jordan:

- Name of facility (clinic/center): .....
- Day and Date:.....
- Assessor(s): .....
- Number of dental units (chairs): .....
- Number of dentists working in the clinic: .....
- Number of dental assistants: .....
- Number of staff (other than above): .....

*	Administrative procedures to prevent and control infection	0	1	2	Notes
1.	Is there a program (person with a specialized role) to prevent and control infections in the center/clinic?				0: none. 1: Policies and procedures exist but are not implemented optimally. 2: Policies and procedures are in place and implemented optimally. <b>Notes:</b>
2.	Are stickers related to the infection prevention and control program available and meet the specifications (cleanable, can be disinfected, and non-absorbable) inside the clinic?				0: Not available. 1: There are stickers, but they do not meet the specifications, or they are in a place that is not visible and does not meet the purpose. 2: Stickers are available, and they meet the specifications and are in places that can be seen and distributed in a manner that meets the purpose. <b>Notes:</b>
3.	Are the dental staff working in the clinic trained on infection prevention and control policies and procedures?				0: No, the dental staff is not trained. 1: Not all staff are trained or there is no clear and documented training program. 2: All staff are trained and there is a clear and documented training program. <b>Notes:</b>



*	Safety of the dental staff working in the clinic	0	1	2	Notes
4.	Is there a record of the anti-HB titer for the dental staff working in the clinic and documentation of these tests for new employees?				<p>0: There is no record of an anti-Hepatitis B titer test for the staff.</p> <p>1: There is a record, but not all staff tests are documented, or the tests of the new employees are not documented.</p> <p>2: All staff have been examined, and there is a record of the tests for all staff, including new employees.</p> <p><b>Notes:</b></p>
5.	Hepatitis B vaccine is provided if the anti-HBs titer is less than or equal to 10 or if there was an exposure and records are kept and documented.				<p>0: The staff is not vaccinated and there is no anti-HB titer record.</p> <p>1: The staff is vaccinated and there is no documented and periodically updated record.</p> <p>2: The staff is vaccinated and there is a documented and periodically updated record.</p> <p><b>Notes:</b></p>
6.	Is there a protocol for dealing with needle-stick cases and documenting them on a reporting form?				<p>0: There is no protocol for dealing with needle-stick cases or there is no reporting form.</p> <p>1: There is a protocol for dealing with needle-stick, but the reporting form is not filled out.</p> <p>2: There is a protocol for dealing with needle-stick and a reporting form is filled out.</p> <p><b>Notes:</b></p>
7.	Is there a documented post-exposure program?				<p>0: There is no post-exposure program.</p> <p>1: There is a post-exposure program but there is no documentation.</p> <p>2: There is a documented post-exposure program.</p> <p><b>Notes:</b></p>

*	Hand Hygiene	0	1	2	Notes
8.	Is there a sink, soap, and a single-use towel to wash and dry hands?				<p>0: There is no near sink or soap or single-use towels.                      1: There is a nearby sink but no soap or single-use towels.                      2: There is a nearby sink, soap, and single-use towels.  <b>Notes:</b></p>
9.	Does the dental staff wash their hands with each patient?				<p>0: The dental staff doesn’t adhere to the hand washing protocol.                      1: Some dental staff wash their hands, and some don’t adhere to the hand-washing protocol.                      2: All staff are adherent to the hand washing protocol.  <b>Notes:</b></p>
10.	Is hand sanitizer available in an adequate number in the clinic?				<p>0: Hand sanitizers are not available.                      1: Hand sanitizers are not adequately available (only available in one area and it’s not accessible for everyone).                      2: Hand sanitizers are adequately available.  <b>Notes:</b></p>
11.	Is each hand sanitizer bottle used one time without refilling and before its expiry date?				<p>0: Hand sanitizer bottles are either refilled or used after their expiry date.                      1: Hand sanitizer bottles are used before the expiry date, but they are refilled.                      2: Hand sanitizer bottles are used before the expiry date, and they are not refilled.  <b>Notes:</b></p>
12.	Is the expiry date of the hand sanitizer (alcohol-based hand rub) written and is it not used after that date?				<p>0: The expiry date of the hand sanitizer is not written.                      1: The expiry date is written but it is used after that date.                      2: The expiry date is written, and it is not used after that date.  <b>Notes:</b></p>



13.	Are the staff adherent to standard precautions when dealing with each patient independently?				<p>0: Standard precautions are not followed when dealing with each patient independently.</p> <p>1: Standard precautions are followed by some of the staff with each patient or some precautions are followed by all the staff.</p> <p>2: Standard precautions are followed by all the staff with each patient independently.</p> <p><b>Notes:</b></p>
*	<b>Infection prevention and control measures</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>Notes</b>
14.	Is the staff adherent to the hand hygiene time either when washing with water and soap or by alcohol-based rub? (20-30 seconds when using water and soap) (30-40 seconds when using alcohol-based rub)				<p>0: the staff is not adherent to the hand hygiene time.</p> <p>1: Some staff are adherent to the hand hygiene time.</p> <p>2: All staff are adherent to hand hygiene time.</p> <p><b>Notes:</b></p>
15.	Is personal protective equipment (PPE) including gown, face shield, and eye goggles, available enough?				<p>0: PPE is not available in the clinic.</p> <p>1: PPE is not adequately available or is not used.</p> <p>2: PPE is adequately available and is used.</p> <p><b>Notes:</b></p>
16.	Does the dental staff wear the PPE in the right way?				<p>0: The staff doesn’t wear the PPE in the right way.</p> <p>1: Some staff wear the PPE in the right way.</p> <p>2: All staff wear the PPE in the right way.</p> <p><b>Notes:</b></p>
17.	Do the patients wear overshoes inside the clinic?				<p>0: Overshoes are not available at the clinic’s entrance.</p> <p>1: Overshoes are available but are not used by the patients.</p> <p>2: Overshoes are available, and they are used by patients.</p> <p><b>Notes:</b></p>





18.	Does the staff doff the PPE in the right way between each patient?			<p>0: The staff doesn’t doff the PPE in the right way between each patient.                  1: Some staff members doff the PPE in the right way between each patient.                  2: All staff members do PPE in the right way and dispose of it between each patient.  <b>Notes:</b></p>
19.	Are all parts of the patient chair disinfected after each patient and regularly (at the start and the end of working hours)?			<p>0: No parts of the patient chair in the clinic are cleaned and disinfected regularly and between each patient.                  1: Some parts of the patient chair are cleaned and disinfected between one patient and another and/or some parts of the chair are cleaned and disinfected periodically.                  2: All parts of the patient chair are cleaned and disinfected periodically and between each patient.  <b>Notes:</b></p>
20.	Is the chair controlled by a foot control panel?			<p>0: The chair is not controlled by a foot control panel.                  1: A foot control panel is available, but it is broken.                  2: The chair is controlled by a foot control panel.  <b>Notes:</b></p>
21.	Are single-use saliva suction tubes available and disposed of properly between each patient?			<p>0: Single-use saliva suction tubes are not available.                  1: Single-use saliva suction tubes are available but are not disposed of properly or between each patient.                  2: Single-use saliva suction tubes are available and are disposed of properly between each patient.  <b>Notes:</b></p>



22.	Is a rubber dam available in the clinic and used and disposed of correctly?				<p>0: Rubber dam is not available inside the clinic.                  1: Rubber dam is available in the clinic but is not disposed of properly when used.                  2: Rubber dams are available and disposed of properly when used.                  - <b>Not applicable</b> (the procedure that requires its presence is not performed in this clinic)  <b>Notes:</b></p>
23.	Is a mouth solution (antiseptic mouthwash) available?				<p>0: Mouth solution (antiseptic mouthwash) is not available.                  1: Mouth solution (antiseptic mouthwash) is available, but it is not used.                  2: Mouth solution (antiseptic mouthwash) is available and used.  <b>Notes:</b></p>

*	Medical Waste	0	1	2	Notes
24.	Are there closed medical waste bins suitable for the workload at the clinic and do they open by foot?				<p>0: Closed medical waste bins are not available.                  1: Closed medical waste bins are available but are not suitable for the workload in the clinic or don't open on foot.                  2: Closed medical waste bins are available, and they are suitable for the workload, and they open on foot.  <b>Notes:</b></p>
25.	Is medical waste sorted based on a color guide?				<p>0: Medical waste is not sorted based on a color guide.                  1: Some medical waste is sorted based on a color guide.                  2: All medical waste is sorted based on a color guide.  <b>Notes:</b></p>



26.	Does the dental staff deal safely with sharp tools and dispose of them in the appropriate way in the yellow bag immediately after use?			<p>0: Dental staff don't deal safely with sharp tools and don't dispose of them immediately after use.</p> <p>1: Dental staff deal safely with sharp tools but don't dispose of them immediately after use.</p> <p>2: Dental staff deal safely with sharp tools and dispose of them immediately after use.</p> <p><b>Notes:</b></p>
27.	Does the dental staff recap injections after use?			<p>0: Injections are recapped.</p> <p>1: Some staff members recap injections.</p> <p>2: Injections are not recapped after use at all.</p> <p><b>Notes:</b></p>
28.	Does the clinic have sharp disposal containers (Sharp Container) made of solid material that cannot be reopened available in enough numbers and appropriate sizes and not expired?			<p>0: Sharps disposal containers (Sharp Box) are not available.</p> <p>1: Sharp disposal containers (Sharp Box) are available but of poor quality, not made of solid material, do not open easily, are not available in enough numbers, or are expired.</p> <p>2: Sharps disposal containers are available in enough numbers, of good quality, made of solid material, can't be reopened, and not expired.</p> <p><b>Notes:</b></p>
29.	Is the waste of dental fillings (Amalgam) and empty capsules sorted by placing them in a container and handing them over to the Environmental Health Directorate?			<p>0: It is not sorted, placed in a container, or delivered to the Environmental Health Directorate.</p> <p>1: It is sorted but is not placed in a closed container or delivered to the Environmental Health Directorate.</p> <p>2: It is sorted, placed in a closed container, and delivered to the Environmental Health Directorate.</p> <p>- <b>Not applicable:</b> Amalgam capsules are not available</p> <p><b>Notes:</b></p>



30.	Are extracted teeth collected in a special container before placing them in yellow bins?				<p>0: Not collected in a special container.</p> <p>1: They are collected but not in a special container or the special container is not disposed of in the yellow bins.</p> <p>2: They are collected, placed in a special container, and placed into yellow bins.</p> <p><b>Notes:</b></p>
*	<b>Preparing and sterilizing dental tools</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>Notes</b>
31.	Are single-use instruments available at the clinic?				<p>0: There are no single-use instruments.</p> <p>1: Not all instruments and equipment are single-use.</p> <p>2: All instruments and equipment are single use.</p> <p><b>Notes:</b></p>
32.	Is there a central (sterilization) area/room for sterilizing equipment and instruments within the clinic?				<p>0: There is none.</p> <p>1: There is a sterilization room/area but it’s not suitable.</p> <p>2: There is a sterilization room/area and it’s suitable.</p> <p><b>Notes:</b></p>
33.	Is the sterilization room divided into at least two areas and includes a work line in one direction and with appropriate characteristics (in terms of location, design, and protection from humidity and high temperatures)?				<p>0: There is none</p> <p>1: There is a sterilization room/area but it’s not suitable.</p> <p>2: There is a sterilization room/area and it’s suitable.</p> <p><b>Notes:</b></p>
34.	Is there a special sink to clean equipment and instruments before sterilization?				<p>0: There is no sink for cleaning equipment and instruments before sterilization.</p> <p>1: There is a sink for cleaning equipment and instruments before sterilization, but it’s also used for other purposes.</p> <p>2: There is a sink for cleaning equipment and instruments before sterilization and it’s not used for other purposes.</p> <p><b>Notes:</b></p>



35.	Is the cleaning product (Enzyme) available and is it used in the concentration and time of exposure as per the manufacturer instructions?			<p>0: It is not available.                  1: It is available but not used correctly.                  2: It is available and used as per the manufacturer instructions.  <b>Notes: (Other products are used, specify)</b></p>
36.	Has a qualified employee been allocated to clean and sterilize tools and equipment?			<p>0: There is no qualified and trained employee allocated.                  1: There is an unqualified and untrained employee allocated.                  2: There is a qualified and trained employee allocated.  <b>Notes:</b></p>
37.	Is personal protective equipment available for cleaning and sterilization rooms?			<p>0: Personal protective equipment for cleaning and sterilization rooms is not available.                  1: Some personal protective measures are available but in insufficient quantities.                  2: All personal protective equipment is available in sufficient quantities.  <b>Notes:</b></p>
38.	Are heavy-duty gloves used to clean tools and equipment before sterilizing them?			<p>0: Heavy-duty gloves are not used to clean tools and equipment before sterilizing them.                  1: Gloves are used occasionally or by some employees only.                  2: Heavy-duty gloves are always used by all employees.  <b>Notes:</b></p>
39.	Does the clinic have an ultrasonic cleaner machine?			<p>0: No ultrasonic cleaning unit is available.                  1: There is an ultrasonic cleaning unit that is not being used or is broken.                  2: There is an ultrasonic cleaning unit that is used.  <b>Notes:</b></p>



40.	Are blood and contaminants cleaned immediately from equipment after use and removed before sterilization?			<p>0: Blood and contaminants are not removed immediately after use.</p> <p>1: Blood and contaminants are not removed properly or are not removed immediately after use.</p> <p>2: Blood and contaminants are properly removed immediately after use.</p> <p><b>Notes:</b></p>
41.	Are there designated cabinets for storing sterile tools that meet the storage conditions in terms of temperature and humidity?			<p>0: No designated storage cabinets are available.</p> <p>1: Designated storage cabinets are available but without suitable storage conditions.</p> <p>2: Designated cabinets with suitable storage conditions are available.</p> <p><b>Notes:</b></p>
42.	Are there solid, closed plastic boxes available for transporting contaminated tools to the sterilization room?			<p>0: No box is available to transport contaminated instruments to the sterilization area/room.</p> <p>1: A box is available to transport contaminated tools, but it does not meet specifications.</p> <p>2: A box for transporting contaminated tools is available and conforms to the specifications.</p> <p><b>Notes:</b></p>
43.	Are solid, closed plastic boxes available for transporting sterile instruments to the storage area?			<p>0: Solid, closed plastic boxes are unavailable.</p> <p>1: Boxes are available for transportation but do not meet specifications.</p> <p>2: Solid, closed plastic boxes are available for transportation.</p> <p><b>Notes:</b></p>
44.	Is personal protective equipment used in cleaning and sterilizing rooms, correct?			<p>0: Personal protective equipment is not used.</p> <p>1: Some personal protective equipment is used but not each</p>



				<p>time as instructed or not by all staff members.</p> <p>2: Personal protective equipment is used correctly as instructed each time and by all staff members.</p> <p><b>Notes:</b></p>
45.	Are dental handles reprocessed (disinfected or sterilized)?			<p>0: Handles are not reprocessed.</p> <p>1: Handles are re-treated with a highly effective disinfectant.</p> <p>2: Handles are reprocessed using an Autoclave device.</p> <p><b>Notes:</b></p>
46.	Are tools and equipment placed in special sterilization packages when performing the sterilization process and is the packaging done correctly?			<p>0: Tools and equipment are not placed inside special sterilization packages when performing the sterilization process.</p> <p>1: Tools and equipment are placed in poor-quality or incorrect self-adhesive envelopes.</p> <p>2: Tools and equipment are correctly placed in high-quality envelopes.</p> <p><b>Notes:</b></p>
47.	Are all packages of sterilized instruments inspected and marked with the sterilization date?			<p>0: Packages are not inspected nor marked with the sterilization date.</p> <p>1: All packages of sterilized instruments are inspected, but the sterilization date is not noted on them.</p> <p>2: All packages of sterilized and packaged instruments are inspected periodically, and the sterilization date is noted on them.</p> <p><b>Notes:</b></p>
48.	Are all types of indicators available to determine the efficiency of sterilization?			<p>0: Chemical, biological, and mechanical indicators are not available.</p> <p>1: Chemical, biological, and mechanical indicators are available but are not used.</p>



				2: Appropriate chemical, biological, and mechanical indicators are used correctly. <b>Notes:</b>
49.	Is the biological indicator used at least once a month and are there laboratory results?			0: The biological indicator is not available, not in use, or there is no evidence of its use. 1: The biological indicator is used, but for longer periods than recommended, and there are laboratory results. 2: The biological indicator is used at least once a month and there are results to prove this. <b>Notes:</b>
50.	Is the chemical indicator used with each set separately?			0: The chemical indicator is not available, not in use, or there is no evidence of its use. 1: Only one chemical indicator is used with each sterilization package (more than one kit). 2: One chemical indicator is used with each kit. <b>Notes:</b>
51.	If the microbial test is positive, are all records of mechanical and chemical indicators, as well as sterilization procedures, reviewed to help determine if operator error has occurred?			0: No sterilization records or procedures are available for review. 1: Procedures were performed but no records were kept. 2: Procedures were carried out and records were reviewed. <b>Notes:</b>
52.	Are implants sterilized before use?			0: Implants are not sterilized. 1: Implants are cleaned but not sterilized. 2: Implants are sterilized. <b>Notes:</b>
53.	Are the impression trays thoroughly cleaned and disinfected between each patient?			0: Not cleaned or disinfected. 1: Cleaned but not disinfected. 2: Cleaned and disinfected. <b>Not applicable</b> <b>Notes:</b>





54.	Is there a water treatment unit to be used for sterilization?				<p>0: There is no water treatment unit inside the clinic.                  1: There is, but it is disabled.                  2: There is a water treatment unit, and it is being used.  <b>Notes:</b></p>
55.	Are all sealed and sterilized instrument containers inspected before use to ensure that they are not perforated and meet the specifications?				<p>0: Not all sterilized packaged instruments are inspected.                  1: All sealed and sterilized instrument packages are checked but not periodically.                  2: All packaged and sterilized instrument packages are inspected periodically.  <b>Notes:</b></p>
56.	Are single-use equipment and tools reused?				<p>0: They are used for more than one patient.                  1: They are used for more than one patient after being disinfected or sterilized.                  2: They are used for one patient only.  <b>Notes:</b></p>
57.	Is maintenance of sterilization devices carried out periodically and as per the manufacturer's instructions?				<p>0: Maintenance is not carried out.                  1: Maintenance is carried out, but the manufacturer's instructions are not followed completely.                  2: Maintenance is carried out periodically and the manufacturer's instructions are followed completely.  <b>Notes:</b></p>
*	<b>Environmental Cleaning Inside the Clinic</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>Notes</b>
58.	Does the clinic have environmental cleaning and disinfection materials?				<p>0: The clinic does not have environmental cleaning and disinfection materials.                  1: Some materials are available, or materials are available but in insufficient quantities.                  2: All environmental cleaning and disinfection materials are available enough.</p>



				<b>Notes:</b>
59.	Are cleaning and disinfecting materials used in the correct manner?			0: Cleaning and disinfection materials are not used correctly. 1: Cleaning and disinfection materials are used, but there are parts of the cleaning and disinfection process that are incorrect. 2: Cleaning and disinfection materials are used correctly. <b>Notes:</b>
60.	Does the clinic have a special cleaning cart that has been allocated to the dental room and conforms to the specifications of cleaning carts?			0: The clinic does not have a special cleaning cart. 1: A cleaning cart is available but does not meet the specifications. 2: A cleaning cart is available and conforms to specifications. <b>Notes:</b>
61.	Are the products used following policies for the cleaning and disinfection process (mop for cleaning the floor, special cloth towels for wiping surfaces, etc.)?			0: No special products are available. 1: There are products available that do not comply with special policies. 2: All products matching specific policies are available. <b>Notes:</b>
62.	Are all parts of the patient chair intact and free of defects and damage?			0: There are obvious defects and damage in the chair, which hinders its cleaning and disinfection. 1: There are minor defects but far from the area where the service is provided, or damage is covered. 2: The chair is intact, in good condition, and easy to clean and disinfect. <b>Notes:</b>



63.	Are absorbent sheets (draw sheets) used on the patient chair changed between each patient?			<p>0: Absorbent sheets are not used.</p> <p>1: Absorbent sheets are used without changing them between each patient.</p> <p>2: They are used and changed between each patient.</p> <p><b>Notes:</b></p>
64.	Are blood spill incidents handled as instructed by the guidelines and policies?			<p>0: Staff lack the knowledge of how to deal with blood spills.</p> <p>1: Staff know how to deal with blood spills, but they don’t adhere to the instructions.</p> <p>2: Staff members deal with blood spills according to instructions.</p> <p><b>Notes:</b></p>
65.	Is the workplace disinfected and cleaned daily?			<p>0: The workplace is not cleaned and disinfected daily.</p> <p>1: It is cleaned but not daily and not disinfected regularly.</p> <p>2: Cleaned daily and disinfected regularly.</p> <p><b>Notes:</b></p>
66.	Is there a cleaning schedule?			<p>0: No cleaning schedule.</p> <p>1: Yes, but not according to and date.</p> <p>2: Available and arranged by day and date.</p> <p><b>Notes:</b></p>



## Annex (2): Information Sheet

### National Assessment of IPC Measures and Practices in Public and Private Dental Clinics and Centers

(This evaluation was approved by the MOH, represented by Minister of Health Dr. Firas Al-Hawari, and the Jordanian Dental Association, in coordination with all concerned parties.)

#### **Evaluation Objective:**

Dentistry is considered a surgical profession that requires direct contact with oral tissues and fluids, including blood and saliva, by medical staff. The danger is that these fluids may contain microbes that cause infectious diseases, such as HIV and hepatitis. Failure to adhere to infection control measures and practices may lead to the spread of epidemics and diseases that may threaten the public health of citizens.

Therefore, the MOH, represented by the IPC Department, decided to provide technical support to workers in the dental profession in implementing infection control practices based on international standards. To identify gaps and improvement opportunities, the Ministry accordingly will comprehensively assess infection control practices in representative samples of both dental clinics located in health centers affiliated with the MOH and dental clinics and centers within the private sector.

Your clinic has been chosen randomly to participate, and no identification (names of the dental clinic or center, health center, doctor, or staff) will be used in the assessment and analysis of the data or results. Also, no legal issue or administrative action will arise against the clinics or centers, or their owners, as a result of this assessment. All information collected through this assessment will be treated with complete confidentiality and privacy.

The evaluator (full name) was officially authorized by the MOH to assess this clinic for the reasons mentioned above and to take confidentiality and privacy precautions. Your cooperation will contribute to facilitating the assessment and supporting the improvement of infection control practices in dental clinics in the public and private sectors, which will lead to improving the health level of Jordanian citizens.

**For more information, please contact the Service Recipient Voice Unit:**

**T:065004545**

## Annex (3): FGD Guide

### IPC Assessment in Dental Settings: Focus Group Discussion (FGD)

#### **FGD purpose:**

MTaPS program in collaboration with the MOH conducted a nationwide IPC assessment in dental settings across the public and the private sector. MTAaPS recruited data collectors to conduct the assessment in a randomized sample of 600 clinics dispersed across Jordan in primary and comprehensive health centers, private clinics, and private centers. You were one of the dentists whose clinic has been previously assessed; you are invited today to participate in this Focus Group Discussion (FGD) to help us better understand the data we collected throughout the assessment process.

#### **Introduction (5 minutes):**

*Thank you for agreeing to participate in this FGD. We are very interested to hear your valuable opinion on the findings of the IPC Assessment in Dental Settings and to record your opinions on how the MOH can create policies to enhance IPC practices within dental settings. Your participation is voluntary. You may withdraw from this study at any time without any consequences. **Distribute consent forms and let participants sign them. (Consent form attached).***

- The purpose of this study is to deepen the understanding of the data trends identified while analyzing collected data during the assessment to inform recommendations targeting decision-makers.
- The information you give us is completely confidential, and we will not associate your name with anything you say in the FGD.
- We would like to audio record the FGDs so that we can make sure to capture the thoughts, opinions, and ideas we hear from the group. No names will be attached to the focus groups and the records will be permanently deleted as soon as they are transcribed.
- You may refuse to answer any question or withdraw from the study at any time.
- We understand how important it is that this information is kept private and confidential. We will ask participants to respect each other's confidentiality.
- If you have any questions now or after you have completed the questionnaire, you can always contact the MTAaPS team.

#### **Ground Rules (3 minutes)**

- Encourage open and honest discussion.
- Explain that there are no right or wrong answers.
- Ask participants to respect each other's opinions and speak one at a time.
- Request participants to keep mobile phones in silent mode.



## Questions (90 minutes)

- *Part One: General Questions:*
  1. Can you describe what IPC practices and measures you make sure to implement in your clinic/center?
  2. How do you stay up to date with new IPC guidelines and policies? What are your resources?
  3. Are there specific IPC practices that you find particularly difficult to implement? Can you elaborate?
- *Part Two: Assessment findings' Questions:*
  4. Based on the assessment data, we observed [specific finding]. Does this resonate with your experience? Why or why not?
  5. What factors do you think contribute to the findings of the assessment whether positive or negative findings?
- *Part Three: Barriers and facilitators:*
  6. What are the main barriers you encounter or perceive while implementing IPC measures and practices?
  7. Can you share any strategies or solutions that have worked well in overcoming these barriers?
  8. What facilitators or resources are available for you and dentists in your sector (specify if private or public) that help you effectively implement IPC measures and practices?
- *Part Four: Recommendations for policymakers:*
  9. Based on our discussion, what recommendations would you suggest for improving IPC practices in dental settings?
  10. How can dental associations or public health organizations better support dentists in implementing effective IPC measures?
- *Part Five: Additional comments or inputs from the participants (Open discussion)*

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