The Effective Standards of Practice Regarding the Administration within a Radiology Department

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Abstract

This study investigates the effective standards of practice within radiology department administration, focusing on evidence-based decision-making processes. Conducted at Malta's Mater Dei Hospital (MDH), the study addresses the lack of in-house, peer-reviewed studies available to inform administrative protocols within the Medical Imaging Department (MID). Utilizing a Rapid Evidence Assessment (REA), the research reviews current standards in radiology administration to enhance patient care, efficiency, and operational consistency. The REA highlights challenges in adopting evidence-based practices, such as resource limitations, technological constraints, and varying stakeholder perspectives. Findings reveal that improvements in patient care, safety culture, infection control, reporting standards, and imaging protocols are central to advancing departmental administration. The study proposes targeted recommendations for MDH, including comprehensive quality management systems, enhanced training for radiographers, and standardized protocols for administrative consistency. The study underscores the need for integrating research-backed insights into local practices to ensure MID maintains high standards of service delivery, ultimately contributing to evidence-based management practices within Malta's radiology services.

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Chapter 1 – Introduction

1.1 Background and Rationale

Ensuring that decisions regarding administrative standards of practice and protocol implementation are resultant from the latest, peer-reviewed literature is crucial in radiology. This not only supports the principles of evidence-based practice but also safeguards against relying on subjective or outdated information. Mater Dei Hospital (MDH), as Malta's sole public general hospital, bears the responsibility of upholding high administrative standards within its Medical Imaging Department (MID). However, the absence of in-house peer-reviewed studies that can be referred to prior to protocol establishment accentuates the necessity for a comprehensive Rapid Evidence Assessment (REA) regarding the current administrative standards of practice in radiology departments. This review of existing literature would guide future decision-making and help determine the effectiveness of the current administrative standards of practice (SOPs).

Abrantes et al., (2019) and McNulty (2023) explain that research and evidence-based practice serve as the foundation of modern healthcare, offering the potential to enhance patient service and departmental efficiency. By integrating the most up-to-date knowledge and evidence into practice, healthcare professionals can ensure the highest administrative standards for both patients and the professionals. This approach not only minimizes potential errors but also optimizes efficiency across healthcare settings.

By delving into recent literature, the first part of the study seeks to clarify the current administrative standards of practice, protocol implementation and challenges encountered by radiology departments through the REA. Providing a set of key elements and recommendations for appraising and integrating new evidence into administrative decisions ensures that decision-makers have a structured approach to evaluating the relevance and quality of administrative protocols and policies. Therefore, this endeavour is not merely academic, but it directly affects the efficiency and quality of patient care and human resources management provided by the MID administration. Additionally, understanding the applicability of research findings to the local context of Mater Dei Hospital is imperative, considering factors such as resource availability and patient demographics.

Furthermore, another principal goal is to subsequently equip MID leaders with evidence-backed insights to guide administrative decisions effectively. This entails identifying trends, challenges and innovations in radiology department administration standards, and translating research findings into practical recommendations for SOPs improvement. Through this process, the MID can target to remain at the forefront of evidence-based practice with regards to its administration, ensuring optimal patient care tailored to local realities.

1.2 What is a Rapid Evidence Assessment (REA)?

The most common form of evidence assessment is the conventional literature review; however, these often lack clear inclusion criteria and can introduce bias due to researchers' personal preferences. In evidence-based practice, those involved in decision -making, be they policy makers, healthcare professionals, or patients, rely on timely and comprehensive reviews to guide their choices regarding effective healthcare and treatments as Varker (2015) relates. This is where Rapid Evidence Assessments come into play. REAs aim to identify the most relevant studies comprehensively, employing explicit criteria for study selection and assessing methodological quality through independent reviewer evaluation. Unlike conventional reviews, REAs prioritize transparency, verifiability, and reproducibility, thereby mitigating the risk of bias. The steps required can be seen in Figure 1 below.

A REA serves as a valuable tool in evidence-based management with regards to administrative standards of practice and protocol implementation, by enabling researchers to quickly gather and assess existing research pertinent to a particular management decision. By systematically scouring and synthesizing the most reliable evidence within a condensed timeframe, REAs offer a concise overview of the current understanding of a given topic, facilitating evidence-informed decisions.

Figure 1

Steps in the REA Process

Barends et al. 2017

In conducting a REA, a balanced evaluation of existing scientific literature regarding a strategy, issue, or practical concern is achieved through a methodical approach to searching and critically evaluating empirical studies. However, to maintain the 'rapid' aspect, certain concessions are made regarding the scope, depth, and

comprehensiveness of the search. For instance, unpublished research will be excluded, and preference will be given to meta-analyses and controlled studies. Additionally, the appraisal of study trustworthiness may involve fewer reviewers, potentially leading to selection bias compared to a systematic review (Barends et al. 2017).

1.2.1 Why is a REA the Best Option for Policymakers?

A REA is distinct from other studies due to its focused and expedited approach. It systematically reviews existing literature using strict inclusion and exclusion criteria, ensuring relevant, reliable, and actionable insights. Unlike traditional reviews, which may lack clear criteria, REAs emphasize methodological transparency and reproducibility. Breckon et.al (2023) describes how this makes them particularly valuable for policymakers, who require timely, robust, and practical evidence to guide decision-making.

REAs streamline the process of evidence collection by concentrating on peer-reviewed studies, excluding less reliable sources like unpublished research. This balance between thoroughness and timeliness ensures the findings are both evidence-based and promptly applicable. For policymakers, an REA's structured approach minimizes bias, providing high-quality evidence to inform strategic choices, protocol adjustments, and resource allocation. The concise synthesis of findings helps align departmental practices with the latest research, enhancing policy relevance and effectiveness (Barends et al. 2017).

1.3 The Administrative Standards of Practice (SOPs) found at the MID MDH

In radiology departments, standards of practice serve to ensure high-quality, consistent, and safe radiology services for patients and staff. They define the fundamental requirements and competencies for radiologic technologists and other medical imaging staff and provide a baseline of expected skills, knowledge, and behaviour, aligning with regulatory requirements and professional standards. This ensures that all practitioners adhere to uniform quality and safety guidelines and described by Young & Smith (2022).

Policies and protocols also contribute to standardizing administrative processes. Policies are formal guidelines that govern decision-making and actions within the department, ensuring consistent, legally compliant decisions that safeguard both patients and staff. These policies cannot be altered without approval from higher management. Protocols, on the other hand, provide detailed instructions for specific radiology procedures, such as CT scans, MRIs, or ultrasounds, to ensure each patient receives a standardized, high-quality exam. While protocols are less directly related to administrative standards, their consistent application reduces the risk of error.

Therefore, in reviewing literature, each of these three concepts was examined in relation to the administration of radiology departments to gain insights that would maximize the comparison of REA findings to the SOPs at MID MDH.

1.3.1 Defining the Scope

Administrative SOPs in radiology are critical for ensuring efficiency, consistency, and safety within departments like the MID at Mater Dei Hospital. However, the absence of localized, evidence-based studies to support these protocols highlights a significant gap. A REA serves as a methodological tool to address this, rapidly consolidating and evaluating existing research to deliver actionable insights. This approach ensures that SOPs are informed by the most current and reliable evidence, tailored to enhance departmental operations and patient care (Brettle 2020).

Traditional approaches to protocol development often rely on anecdotal or outdated data, risking inefficiencies and inconsistencies. By employing an REA, MID can align its practices with international standards, addressing critical areas like patient safety, infection control, and reporting standards. The integration of REA findings into existing SOPs necessitates a strategic approach to implementation. This includes revising protocols to address identified gaps, fostering a culture of continuous education, and leveraging technological advancements. Policymakers must also consider contextual challenges, such as resource availability and stakeholder resistance, to ensure smooth adoption. By prioritizing evidence-based adjustments, MID can establish a robust framework that not only improves current practices but also positions the department as a leader in radiology administration excellence.

1.4 Research Questions

What is known in the scientific literature about the current administrative standards of practice in radiology departments and are these applicable to the MID at MDH?

This research question best aligns with the previously described objectives through the collection of evidence and understanding the current state of administrative standards of practice in radiology departments and their comparison to the MID present documents.

Additional questions that could complement the main purpose and provide deeper insights into the challenges, innovations, and decision-making processes surrounding administrative standards of practice in radiology departments are:

- What are the common challenges faced by radiology departments to provide high standards of practice within its administration?
- What innovations or advancements have been proposed or implemented in radiology departments to improve administrative standards of practice?
- What are the key factors influencing the adoption of new evidence-based practices and protocols within radiology departments?
- How do different stakeholders within radiology departments perceive the integration of recent research findings into the administrative decision-making processes?
- What are the barriers or facilitators to the translation of research findings into actionable evidence based recommendations for the Mater Dei Hospital's Medical Imaging Department?

1.5 Definitions of the Constructs

Zhaksylyk (2023) stated that research integrity is characterized by its rigorous methodology, detailed reporting, and adherence to ethical standards, such as peer review and citation of sources. It plays a crucial role in the advancement of science, allowing researchers to build on each other's work, verify findings, and develop new theories and applications. Scientific literature is therefore referred to as the body of written and published work that reports original research, reviews existing knowledge, or discusses new developments in a particular scientific field. It is a key means of communication among researchers, providing a formal way to share findings, theories, methods, and data.

Current administrative standards of practice in radiology departments should be designed to ensure the safe, efficient, and effective delivery of radiology services. These standards cover various aspects, from patient care and safety, including radiation protection, infection control and emergency preparedness, to operational efficiency that ranges from scheduling and workflow optimisation, to staff resources and training but also data management. Regulatory compliance of a radiology department also involves equipment maintenance and standard audits of image quality. These standards are often established by professional organizations, governmental agencies, and accreditation bodies and are essential for maintaining the high quality and safety of radiological services. Radiology departments must stay up-to-date with these standards to ensure compliance and deliver the best possible care to patients as defined by the Royal College of Radiologists (2022).

Scientific literature should align with current administrative standards of practice in radiology departments for several important reasons, as it ensures that new research is safe, compliant, efficient, practical, and patient-centred, facilitating its integration into clinical practice and ultimately improving the quality of care provided to patients. For example, implementation of new imaging technologies needs to be performed by evaluating and adopting equipment and techniques in a way that integrates smoothly with existing systems, and standards needs also to align with the protection of sensitive patient data and radiology systems from cybersecurity threats.

In the context of the Mater Dei Hospital's Medical Imaging Department, "barriers or facilitators to the translation of research findings into actionable evidence-based recommendations" refers to the factors that either hinder or help the process of applying scientific research findings to practical, evidence-based guidelines or practices within the department. Barriers could include not only lack of resources and resistance to integrate new practices but also the inadequacy of the research findings to be translated to the local settings, while facilitators mostly depend on administrative support and access to means.

For the MID, understanding these barriers and facilitators is crucial for successfully implementing new research findings. For example, if the department wants to adopt a new imaging technique proven to be more effective based on recent studies, the department must address potential barriers like training needs, cost, and resistance to change while leveraging facilitators such as leadership support and collaboration among staff. This approach ensures that research findings translate into improved patient care and operational efficiency within the department (NHSS 2022).

Chapter 2 – The Rapid Evidence Assessment

2.1 Framing the REA Question

A PICOC is a fundamental tool for reviewers as it aids in pinpointing studies relevant to their professional context. Each element of the PICOC framework, Population, Intervention, Comparison, Outcome, and Context, plays a critical role in sharpening the focus of the inquiry and enabling a thorough and efficient search for the most relevant evidence. By defining these components clearly, researchers can better filter studies that are both appropriate to the research question and suited to the unique aspects of the organizational setting. Table 1 below demonstrates the PICOC for the REA in this research.

Table 1

The PICOC Framework

Population	Administrators of radiology departments
Intervention	Evidence based standards of practice
Comparison	Alternative administrative approaches
Outcome	Evidence based recommendations for the administration of Mater Dei Hospital's Medical Imaging Department
Context	Radiology departments

The PICOC framework also aids in assessing whether the findings of a study are generalizable and applicable to the specific context of one's organization. It helps determine if essential factors, such as the characteristics of the population being studied, the outcomes of interest, and the organizational context, match those of the intended application. This alignment ensures that the findings are not only evidence-based but also practically relevant and implementable within the organization's unique circumstances (Barends et al. 2017).

2.2 Methodology of the Search Strategy for the REA

A comprehensive, structured search was conducted to identify studies relevant to the research question. The following databases were selected for their robust collections of healthcare and administrative research:

MEDLINE Complete (EBSCO)
PubMed Central (PMC)
Healthcare Administration Database (ProQuest)
Scopus

The search strategy involved using the primary term "Radiology Department*" in combination with one of the following terms to capture studies aligned with the research focus:

"Standards of Practice"
"Policy OR Policies"
"Protocol*"
"Administration NOT Diagnostic"

To refine the search and ensure relevance, general filters were applied across all searches:

- Date Published: Only studies published between 2019 and 2024 were included, ensuring recent and relevant insights.
- Language: Full-text studies available in English were chosen, to ensure full detail.
- Type of Studies: Empirical, peer-reviewed studies and articles that included policy reviews were selected to ensure high-quality evidence.

This approach facilitated the identification of studies that met the criteria for rigor and relevance, thus supporting a focused investigation aligned with the research objectives.

The decision to adopt a relatively short update interval for clinical protocols and policies aligns with established healthcare administrative and clinical standards, which emphasize that guidelines should be reviewed and revised within a maximum period of three years. This time frame ensures that healthcare practices remain relevant and reflect the latest research and best practices, as evidence and medical standards evolve. According to Garcia et al. (2014), recommendations become less reliable if left unchanged for more than three years, as advances in medical science and technology may render them outdated or ineffective.

International standards reinforce this approach. For instance, the European Union mandates updates to clinical guidelines within a two- to three-year period, emphasizing the need for frequent review to maintain optimal care quality and patient safety. Additionally, the World Health Organization (WHO) Handbook for Guideline Development (2014) advises a maximum revision interval of five years, although more frequent updates

are encouraged where possible. These standards underline the importance of regularly revisiting and revising protocols to ensure healthcare practices remain current, credible, and aligned with global recommendations.

2.3 The Primary Search Results

The initial search, which utilized four distinct search queries, produced a total of 250 studies. After this, 28 duplicate studies were identified and subsequently removed. Additionally, the reference lists within the retrieved studies were reviewed to identify any further relevant studies. Table 2 below provides a summary, detailing the search terms used and the number of studies identified at each stage of the process.

To enhance the trustworthiness of the selected studies, a secondary review process was implemented. A senior allied health professional specializing in radiography administration was invited to serve as an independent reviewer. This reviewer examined all the studies included in the research, which constituted a relatively small sample size, to determine whether each study adhered to the established inclusion criteria and directly addressed the research question, in alignment with the PICOC framework.

The consistency between reviewers, known as inter-rater reliability (IRR), was evaluated to assess the level of agreement on study inclusion. The IRR was quantified using the percentage agreement method, as recommended by Bonnet (2023). This process demonstrated a high level of agreement, with a 94% concordance rate between the primary and secondary reviewers. According to Belur et al. (2018), this level of agreement

is considered acceptable, indicating a robust and reliable review process that supports the credibility of the study selection and minimizes potential biases in the inclusion process.

Table 2

Search Terms and Results as in March 2024

Peer Reviewed, Full Texts, English, 2019-2024

Search Term	EBSCO	PMC	HAD	Scopus	Total
Ab(Radiology Department*) AND Ab(Standard* of Practice)	0	0	33	32	
Ab(Radiology Department*) AND Ab(Policy OR Policies)	28	13	4	27	
Ab(Radiology Department*) AND Ab(Protocol*)	40	16	2	30	
Ab(Radiology Department*) AND Ab(Administration) NOT Ab(Diagnostic)	14	1	0	10	
Articles obtained from search as in March 2024	**82**	**30**	**39**	**99**	**250**
Duplicates Removed	28				**222**

2.4 Selection of the Studies for the REA

The study selection process was organized into two distinct phases to ensure relevance and rigor in identifying appropriate studies for review.

2.4.1 Phase One:

This initial phase focused on screening the titles and abstracts of all studies identified through the primary search. Studies were vetted based on their relevance to the research topic. If an abstract did not contain sufficient detail for assessment, the study was excluded. This phase also applied specific exclusion criteria to refine the selection:

- Exclusion of studies focused on clinical diagnosis or clinical knowledge.
- Exclusion of studies addressing COVID-19 or extreme scenarios (e.g., war conditions).
- Exclusion of studies centred on student populations.

While omitting studies related to COVID-19 and other extreme circumstances may have narrowed the scope, the studies selected ultimately provided a general and practical overview of radiology department administration in standard conditions.

At the end of this phase, 48 primary studies and literature reviews met the inclusion criteria and were accepted.

2.4.2 Phase Two:

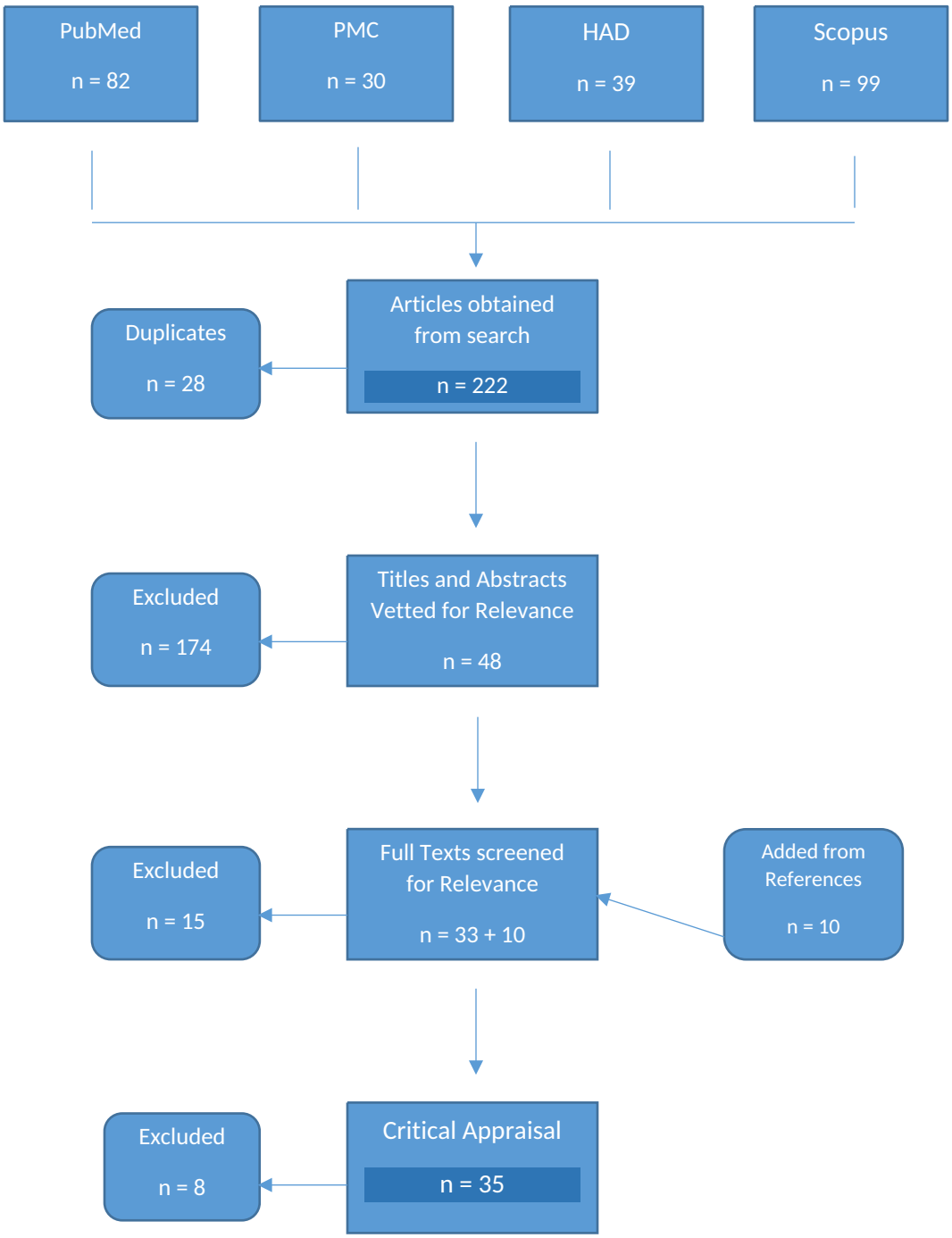
In this phase, the selection focused on a detailed evaluation of the full-text studies, with inclusion based on the following criteria:

1. Type of Study Design: Peer-reviewed articles, audits, non-randomized control studies, or cross-sectional studies.
2. Measurement: Studies, audits, or articles that included comparisons or observations of policies, protocols, or administrative methods in practice, as well as those involving framework development.
3. Outcomes: Studies proposing improvements in administrative pathways, frameworks, or policies.
4. Context: Studies relevant to radiology department administration and workflow.
5. Additionally, studies related to emergency radiology workflow were included, given that local radiologists support emergency services, making this aspect pertinent to the administrative processes of the local radiology department.

This phase resulted in 33 primary studies, with an additional 10 studies identified from reference lists. A comprehensive summary of the study selection process is illustrated in Figure 2. The critical appraisal process is described in the next section.

Figure 2

The Study Selection Process



2.5 Critical Appraisal

2.5.1 Judging the Quality of the Evidence

The studies selected up to this stage provide evidence that either supports or challenges various theoretical perspectives within the field of radiology department administration. To ensure that each study contributes robust and credible insights, a quality assessment was performed on each selected study. This evaluation focused on determining the validity and reliability of each study, following the criteria outlined below by Middleton, (2024).

Validity: Assessment of whether the study design appropriately addresses the research question and if the methodologies used are suitable for accurately measuring the intended outcomes.

Reliability: Evaluation of the consistency and reproducibility of the study findings. This includes considering sample size, data collection methods, and any potential sources of bias.

Through this quality assessment process, only studies meeting these rigorous standards were included in the final review, ensuring a solid foundation of evidence for examining the research question.

2.5.2 Methodological Appropriateness

The first step in the quality assessment involved evaluating the methodological appropriateness of the research designs used in each included study. To guide this evaluation, the classification system defined by Shadish et al. (2002) and further supported by Petticrew and Roberts (2008) was applied. This system is widely recommended for assessing the validity of studies, particularly those that aim to examine cause-and-effect relationships between interventions and outcomes.

Table 3 summarizes the classification system for assessing the methodological appropriateness of studies. This table serves as a reference to evaluate the methodological rigor of each included study, assisting in determining their validity and reliability in examining cause-and-effect relationships within the context of radiology department administration.

This classification approach enabled a structured review of each study's design to determine its suitability for establishing causal links. By referencing this established framework, the assessment ensured that studies were not only relevant but also methodologically sound, providing a strong basis for interpreting their findings within the context of radiology department administration

Although this classification system was respected, it is important to recognize that the research question at hand encompasses a wide range of topics. In light of this breadth, the recommendations outlined in the CEBMa Guidelines (Barends et al. 2017) suggest that non-randomized controlled studies are particularly suitable for application in managerial practices. These studies, which are conducted in real-world settings while

practitioners engage in their daily tasks, provide valuable insights even though they are generally considered less robust than randomized controlled trials (RCTs).

Table 3

The Classification System for Assessing the Methodological Appropriateness of Studies

Level	Description	Characteristics
A	Randomized Controlled Trials (RCTs)	- Participants are randomly assigned to intervention and control groups. - The study design allows for high control over variables and strong causal inferences. - Ideal for assessing the effectiveness of interventions.
B	**Quasi-Experimental Studies**	- Lacks random assignment; uses methods like matching or statistical controls. - May include before-and-after studies or studies using control groups not randomly assigned. - Provides reasonable evidence for causal relationships but with lower confidence than RCTs.
C	**Non-Experimental Studies**	- Observational studies without manipulation of variables, such as cohort, case-control, or cross-sectional designs. - Useful for identifying associations but limited in making causal inferences due to potential confounding factors.
D	**Descriptive Studies**	- Focuses on providing a description of a phenomenon without assessing relationships or causation. - Examples include case reports, case series, and qualitative research.
E	**Expert Opinion/Consensus**	- Based on expert opinions, expert panels, or non-systematic literature reviews. - Considered the weakest level of evidence due to lack of empirical data supporting conclusions.

The rationale for favouring non-randomized studies in this context is that they allow for the observation of interventions as they occur in practice, providing a more realistic understanding of their impact within the specific clinical environment. This approach can

be particularly beneficial when assessing how managerial strategies are implemented and their effects on operational efficiency and patient care.

Additionally, when the research focus pertains to the prevalence of a phenomenon within an organization, a cross-sectional study design is often deemed the most appropriate. According to Petticrew and Roberts (2003), cross-sectional studies enable researchers to capture a snapshot of data at a single point in time, allowing for the assessment of relationships and prevalence rates across different variables. This design is advantageous for identifying patterns and trends within organizational contexts, which can inform decision-making and policy development in radiology department administration.

2.5.3 Methodological Quality

The next step in the assessment process involved evaluating the methodological quality of each study to determine its overall trustworthiness. This evaluation focused on identifying both the strengths and weaknesses of the study's design and execution. Key factors considered included the sample size and the reliability of the measurement methods employed. To systematically assess the quality of the included studies, the evaluation criteria outlined in the CEBMa's CAT Manager App were utilized, as they are specifically designed for research related to management and organizational skills. This framework facilitated a thorough analysis of each study's methodological quality.

The studies were graded on a scale that reflects their methodological strengths and weaknesses. Below is Table 4 summarizing the scale used for this evaluation.

In this assessment process, the studies were evaluated against the above criteria, allowing for a nuanced understanding of their methodological quality. Based on the identified weaknesses, such as small sample sizes or methodological shortcomings, each study was assigned a trustworthiness level. This grading system helps to ensure that only studies with a robust methodological foundation contribute to the overall findings and conclusions regarding radiology department administration.

Table 4

Levels of Trustworthiness

Trustworthiness Level	Criteria	Description
1 (High Trustworthiness)	- No significant weaknesses identified.	- Large sample size with adequate representation.
	- Reliable measurement methods used.	- Clear and appropriate study design for the research question.
	- Results are generalizable and applicable.	
2 (Moderate Trustworthiness)	- Minor weaknesses present but do not significantly affect the findings.	- Moderate sample size or slightly flawed measurement methods.
	- Study design is appropriate but may have some limitations.	- Results may have some restrictions in generalizability.
3 (Low Trustworthiness)	- Several weaknesses that impact the validity of findings.	- Small sample size, unreliable measurement methods, or significant methodological flaws.
	- Study design may not adequately address the research question.	- Results are limited in applicability or generalizability.
4 (Very Low Trustworthiness)	- Major weaknesses render the findings largely unreliable.	- Very small sample size, poor measurement methods, and significant design flaws.
	- Findings cannot be generalized or applied meaningfully.	

2.5.4 Effect Sizes

Identifying the effect sizes of the included studies was the next step in the evaluation process. While many studies report statistical significance, it is essential to recognize that this does not always equate to practical relevance. Therefore, assessing the effect size provides a standardized measure of the magnitude of the observed effects.

To interpret the effect sizes, the scales of magnitude were correlated with Cohen's (1988) established "rules of thumb," which categorize effect sizes into small, medium, and large, as explained in Table 5 below. However, it is important to note that the impact of the effect size must be evaluated in relation to the specific outcomes being measured. This approach aligns with the CEBMa guidelines, which emphasize the context of the studies, particularly as they pertain to clinical scenarios with varied methodologies.

Table 5

Cohen's (1988) established "rules of thumb" for interpreting effect sizes

Effect Size (d)	Magnitude	Description
0.2	Small	Represents a small effect; may be noticeable but not impactful in practice.
0.5	Medium	Indicates a moderate effect; noticeable in practice and suggests some degree of practical relevance.
0.8	Large	Reflects a large effect; likely to have significant practical implications and easily noticeable in real-world scenarios.

This classification allows researchers and practitioners to interpret the effect sizes of the studies in a meaningful way, providing insight into the practical significance of the findings in the context of radiology department administration. By comparing the calculated effect

sizes against these benchmarks, it becomes easier to understand the implications of the results and their relevance to clinical practice.

This consideration is crucial because the significance of the impact must correspond appropriately to the reported effect size. As Ferguson (2016) points out, understanding the seriousness of the effect entails not only examining the statistical output but also considering the real-world implications of the findings. This comprehensive assessment ensures that the conclusions drawn from the studies are not only statistically valid but also practically meaningful within the context of radiology department administration.

2.6 The Quality of the Included Studies in the REA

After the critical appraisal, 35 studies were included in the analysis.

The data extraction table in Appendix 1 shows various types of studies related to management practices and protocols in radiology departments. These studies include observational, cross-sectional, systematic reviews, and randomized controlled trials. Cross-sectional studies were prevalent in the analysis.

With regards to the quality of the studies, only a handful of randomised controlled studies, observational studies, and systematic reviews are included, highlighting a significant gap in the established research on administrative protocols within radiology departments. Much of the other retrieved research, while useful, is considered low on the reliability scale, with many studies rated at Level D or E as per appropriateness.

This lack of robust evidence suggests that standardized administrative practices in radiology are still underdeveloped.

However, cross-sectional studies and surveys remain valuable for examining management practices in radiology. As Capili (2021) notes, these types of studies often cover a broad range of organizations, helping to reveal common patterns and trends. They provide a "snapshot" of current practices, which is valuable for understanding the methods and strategies that radiology departments employ at any given time. Although these studies might not be as trustworthy individually, their findings still offer insights into areas that may require improvement, as noted by Wang and Cheng (2020). Even with a lower reliability rating, the data from cross-sectional studies and surveys can be practical and relevant for managers and decision-makers.

In summary, while many studies score lower on trustworthiness (Levels D and E), collectively, they identify trends, highlight common challenges, and offer practical suggestions that can guide protocol development in radiology departments. Cross-sectional and observational studies, despite their limitations, provide a valuable perspective on gaps and potential improvements in real-world management practices. The generalizability of these findings also makes them relevant across various contexts, even beyond radiology, while the descriptive data sheds light on how management practices function in actual settings. Taken together, the insights from multiple studies form a broader understanding of current trends and potential areas of development within radiology administration.

An Overview of the Excluded Studies can be found in Appendix 2

Chapter 3 – The Main Findings of the REA

In the following sections, findings from the research within the studies included in the REA were organized based on specific administrative themes to give a clearer perspective on each area of interest. Dividing the research findings this way provides a structured overview, making it easier to pinpoint where gaps exist, which strategies are effective, and how these insights might inform evidence-based improvements in radiology department management. The studies referenced within the topic and their average level of methodological appropriateness can be observed at the start of each section.

3.1 Emergency Services

Barash et al. (2023) Jalal et al. (2021) Nasir et al. (2021) Ryan et al. (2019) **(Level E)**

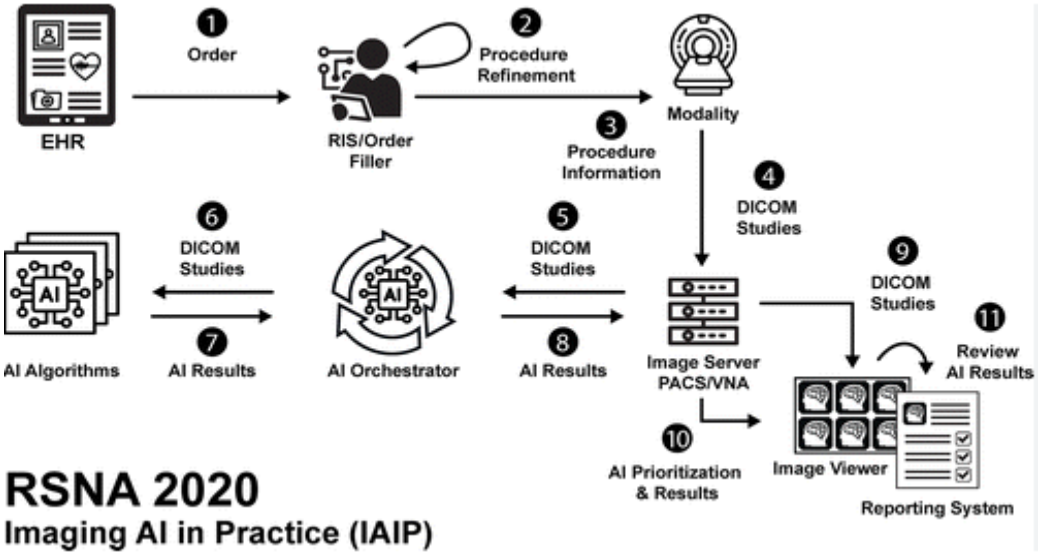
The findings presented in four of the studies included in this REA related to emergency services, illustrate critical aspects of radiology's evolving role in emergencies, particularly in response to increased demand in the service and mass casualty incidents (MCIs) with great emphasis on the need for systematic preparedness in radiology departments.

The surge in demand for emergency radiology services is a pressing issue described mostly by Jalal et al. (2021). Radiologists are under pressure to provide timely, accurate reports with low discrepancy rates and quick turnaround times. This increased workload

necessitates efficient management and strong support systems to maintain a high quality of care. AI has emerged as a promising tool to mitigate the increased workload in radiology by automating repetitive tasks, reducing diagnostic errors, and improving efficiency. An example can be seen in Figure 3 below.

Figure 3

Imaging AI in Practice



(Wiggins et al. 2021)

The integration of AI spans various stages of the radiology imaging pathway, from referral entry optimization, as proposed by Barash et al. (2023), to image post-processing and clinical decision support. In fact, AI can enhance the efficiency of imaging studies by automating protocolling, improving image quality, assisting in detailed imaging analyses, prioritizing urgent cases, and support clinical decisions. These capabilities can

significantly improve the workflow in emergency and trauma radiology departments, aligning with the demands of increased radiology services.

MCIs require a distinct approach, and both Nasir et al. (2021) and Ryan et al. (2019) define the need of shifting from providing the best possible care for individual patients to offering the minimum acceptable care for the maximum number of patients. Therefore, triage management, institutional policies, ethical implications, and the role of radiology are crucial components of MCI response. In fact, during MCIs, there is high reliance on radiography services such as CT scans, which is crucial for identifying and managing injuries. Radiology departments must be prepared for MCIs through preplanning workflows, equipment deployment, and staff training, which includes adequate mobilization.

In this instance, the radiology department administrative processes are required to control utilization of imaging resources, response scalability and cancellation of non-urgent examinations. Regular MCI simulations are essential for identifying improvement areas and ensuring staff familiarity with their responsibilities. Nonetheless, AI can be useful in these circumstances as described by Barash et al. (2023), by enhancing radiology workflows, image processing, and reduce radiologist burnout during MCIs.

3.1.1 Adoption of these Research Findings

Despite its potential, the implementation of AI in radiology faces significant challenges. AI algorithms require substantial data, computational power, and interdisciplinary expertise. Ensuring these algorithms are applicable to the local MID and the island's patient

populations is difficult. Ethical and privacy concerns, including maintaining patient trust, obtaining consent, and avoiding bias is a scenario that one might envisage with the understanding that some hospital systems presently still run on paper forms. Barash et al. (2023) describes that scepticism and resistance among radiologists further complicate AI adoption as their primary concern would be ensuring that new practices do not compromise diagnostic accuracy and patient safety, highlighting the need for reliable and secure system designs. Others might see the potential benefits but could be cautious due to concerns over job security. In addition, AI integration is an ongoing process requiring continuous updates and validation, while MCI preparedness requires periodic simulations and updates to protocols based on emerging threats and experiences from past incidents as both Nasir et al. (2021) and Ryan et al. (2019) point out.

A study by Kuo et al. (2024) also aligns with the REA findings. Although not related to radiology, it describes how different stakeholders within are likely to have varied perceptions regarding the integration of the research findings into administrative decision -making processes. In view of this, administration is likely to focus on how AI and MCI preparedness can improve departmental efficiency, reduce costs, and enhance patient throughput while aligning with the hospital's overall goals and regulatory requirements. Patients may question how these changes would affect the quality of care they receive, but also if it effects their privacy.

Support from hospital leadership and clear policies promoting the adoption of new practices and technologies as well as comprehensive training programs to familiarize staff are the strongest facilitators to allow the implementation for these processes.

Interdisciplinary collaboration among radiologists, radiographers, IT staff, and administrators can pave the way to an effective system.

Demonstrating the benefits of AI and MCI preparedness through pilot projects, case studies, and evidence-based outcomes also aligns these new practices with recognized standards and guidelines (e.g., American College of Radiology Appropriateness Criteria). By addressing these barriers and leveraging the facilitators, Mater Dei Hospital's Medical Imaging Department can translate research findings into actionable evidence-based recommendations , ultimately enhancing patient care and departmental efficiency.

Both AI integration and MCI preparedness are essential for enhancing the role of radiology in emergency medicine. AI can address the increased demand for radiology services by improving efficiency and accuracy, but its implementation must overcome significant challenges. MCI preparedness ensures radiology departments are ready to handle sudden patient surges through systematic planning and training. Combining AI's technological advancements with robust MCI preparedness strategies can significantly enhance radiology's ability to respond to both routine and crises effectively.

3.2 Patient Care

Hazell & Samith (2024) Iv Kyrazis et al. (2023) Van den Berg et al. (2019) Vaz Zavaletta et al. (2022)	**(Level D and E)**

Four studies that were included in the REA concern compliance in relation to patient care standards. Two of these specify recommendations for Transgender and Gender Diverse (TGD) individuals while another investigates the requirements of parents of paediatric patients undergoing radiological procedures; both circumstances represent unique challenges in healthcare. The other paper addresses patient complaints directed toward radiology departments in general. While the nature of patient concerns differs, all groups highlight critical issues in healthcare provision, such as discrimination, lack of proper training, and the need for patient-centred care.

The increasing visibility and acceptance of TGD individuals contrast sharply with the persistent fear and anxiety parents experience when their children undergo radiological examinations. Over 1 in 200 adults and 1 in 100 high school students identified as TGD in the US in 2022 as Herman et al. (2023) states, reflecting a broader societal acceptance in the present time. Despite this, TGD individuals face significant disparities in healthcare, including radiology, where they often encounter ignorance and discrimination. On the other hand, parents of paediatric patients regularly enter radiology departments with preconceived fears about radiation and the unfamiliar environment, which can exacerbate their anxiety and affect their perception of the quality of the care given.

Both these specific groups report significant disparities and negative experiences in radiology. TGD individuals frequently encounter a lack of knowledge and sensitivity from healthcare providers, leading to discomfort and miscommunication. For instance, over 70% of TGD patients have had negative imaging experiences according to Iv Kyrazis et al. (2023), which is often due to a non-inclusive environment. Vaz Zavaletta et al. (2022) confirms this and emphasizes the use of incorrect terminology. Similarly, Hazell & Samith, (2024) notice how parents of paediatric patients often feel they are not adequately informed about the radiological procedure, leading to stress and dissatisfaction with the care their children receive. They appreciate when radiographers manage to balance technical skill with a compassionate, child-centred approach, yet many still express concerns over inadequate communication and rushed procedures. In paediatric care, radiographers must establish a bond with both parents and children, using friendly, professional behaviour to ease the examination process.

When addressing general complaints, such as waiting times and lack of communication, interventional radiology had the highest complaint rate compared to other modalities. The findings by Van den Berg et al. (2019) highlight the importance of addressing patient dissatisfaction to improve patient-centred care by enhancing patient time and communication, especially in high-risk areas like interventional radiology and cross-sectional imaging. Therefore, radiologists and radiographers play a crucial role in shaping patient experiences.

3.2.1 How can these REA findings be Implemented?

- Developing and implementing inclusive and standard of care guidelines that emphasize the proper use of terminology and affirming language for TGD patients would allow for an evidenced-based approach towards the kind of attention they require.

- Both TGD individuals and parents of paediatric patients suffer from the inadequate training of healthcare providers. A common solution for improving care in both contexts and mentioned in all the studies is the need for targeted education and training. Brief educational sessions for medical professionals can significantly reduce provider transphobia and improve TGD patient experiences. This should include training on the use of appropriate language and effective communication strategies. Similarly, parents of paediatric patients emphasize the importance of radiographers being well-trained in child -centred care.

- Effective communication is often lacking, which can lead to miscommunication and discomfort. This is particularly problematic both for TGD patients when incorrect pronouns and names are used as well as for parents who need clear explanations to alleviate their fears. Implementing family centred care approaches in paediatric radiology as suggested by Hazell & Samith (2024), to ensure that care is not only patient-centred but also includes parents in the process, helps build trust and reduce anxiety.

The adoption of new evidence-based protocols within radiology departments is therefore influenced by setting up new guidelines and protocols and improving cultural competency of staff through training. This training must be continuous and include updates on the latest research findings and best practices. In addition, one needs to implement

innovations in technology for gender inclusivity such as developing gender-neutral patient identification systems. Different stakeholders within radiology departments may have varying perceptions regarding the integration of recent research findings into administrative decision-making. Nonetheless, leaders must actively support and promote inclusivity and patient-centred care aiming at shifting the MID's culture to one that prioritizes inclusivity and patient-centred care and not just direct the adoption of new practices. This requires a commitment to ongoing education and the fostering of an inclusive environment.

Although improving patient satisfaction scores and reducing complaints is important for administrators, Van den Berg et al. (2019) note that the logistical aspects of implementing new practices is also a major concern. Limited financial and human resources can hinder the implementation of comprehensive training programs and new guidelines while in some cases staff may also tend to resist new practices due to comfort with established routines or scepticism about the effectiveness of new methods. There is also an emphasis that incorporating feedback from patients and families can help tailor new practices to better meet their needs, making the transition more acceptable to staff. TGD individuals and parents of paediatric patients face different specific challenges within radiology departments by addressing these barriers and leveraging facilitators, radiology departments; like Mater Dei Hospital's Medical Imaging Department, can successfully implement evidence-based recommendations. These experiences underline the importance of patient-centred care, appropriate communication, and continuous education for healthcare providers.

3.3 Safety Culture

Aggarwal et al. (2020)	Aldhebaib & Singh (2023)
Angcahan & de Guzman (2023)	Bowers et al. (2022)
Burns et al. (2021)	McGowan et al. (2023)
Rosier et al. (2020)	**(Level D)**

Improving patient safety and administrative practices involves addressing a range of complex issues. Seven papers in relation to safety culture in radiology were retrieved; each highlights distinct but interconnected aspects of improving radiology department practices.

3.3.1 Patient Safety Improvement

Both the patient safety programs and radiation protection efforts emphasize adherence to protocols as empirical for improving overall satisfaction. The use of quality improvement methodologies, for example Define, Measure, Analyse, Improve, and Control (DMAIC), that enhance Root Cause Analysis (RCA) satisfaction, as described by Rosier et al. (2020), aligns with the broader focus on adhering to safety protocols as mentioned in the other studies. Additionally, both areas address the need to simplify processes and enhance coordination, reflecting a shared goal of reducing human error and technical failures. Contrarily, the opportunity of improvement differs significantly in view that patient safety programs are concerned with procedural improvements and enhancing staff satisfaction through structured methodologies while radiation protection focuses more on technical adherence and physical safety measures.

The greatest challenge radiology departments face is ensuring consistent adherence to safety and quality protocols. This includes compliance with radiation protection measures and standardized error reporting. Burns et al. (2021) also mentions that ineffective communication during handoffs and transitions can lead to misunderstandings and errors, affecting both patient safety and procedural efficiency. Standardizing work documentation would therefore help to maintain consistency.

3.3.2 Cybersecurity in Radiology

Bowers et al. (2022) describe the importance of cybersecurity precautions, to address vulnerabilities within radiology settings. Radiology departments are increasingly susceptible to cyberattacks due to the high value of radiology data, but the nature of risks differs as cybersecurity deals with external threats such as cyberattacks and data breaches. While patient safety focuses on internal procedural and human factors, cybersecurity findings highlight the need to protect radiology systems from breaches, complementing patient safety efforts that aim to create safer, more reliable processes.

Preventative measures also vary in this case as cybersecurity solutions include IT-focused strategies like encryption and firewalls. Regular system updates for the picture archiving and communication system (PACS), and training staff to recognize phishing attempts and other threats is crucial, while patient safety improvements involve process-related changes such as standardizing procedures. This shows that both cybersecurity and patient safety improvements emphasize the importance of anticipatory actions; with regards to cybersecurity, this is done through securing servers and training against

phishing, while patient safety is achieved through structured reviews and implemented changes.

3.3.3 Medical Errors in Radiology

Both the medical error study described by Aggarwal et al. (2020) and the safety improvement initiatives outlined above recognize the importance of categorizing errors into technical, organizational, and human factors to develop targeted mitigation strategies. Strategies for reducing errors are mentioned, such as standardizing protocols and enhancing staff training, are common to both approaches.

Aggarwal et al. (2020) further classifies errors in diagnostic radiology and provides historical and statistical data on error rates, while patient safety improvements focus on enhancing specific procedural aspects to boost safety and satisfaction.

3.3.4 Fall Prevention in Radiology

Angcahan & de Guzman (2023) delineate fall prevention strategies, and like all the other studies describing patient safety programs they aim to protect patients through systematic safety measures. They all emphasize the use of structured risk assessment tools and incident reporting to mitigate risks, and recognize the importance and need for improved training and awareness among staff to enhance patient safety and prevent incidents.

In addition, since most of the recommendations in the literature are often contextualized for low- and middle-income countries (LMICs), and propose patient safety improvements

that are generally applicable across various healthcare settings, Angcahan & de Guzman (2023) ‘s study specifically targets risks and mitigation strategies for older adults in radiology settings.

3.3.5 Handoff Practices in Radiology

Handoff practices, as examined by Burns et al. (2021) were also integrated as a patient safety improvement and this paper stresses the importance of clear communication and continuity of care to prevent errors and enhance safety.

Handoff practices incorporate reliability science principles similar to structured improvement methodologies used in patient safety programs however, handoff practices primarily focus on communication transitions between staff and departments, while patient safety programs address broader procedural and systemic improvements within radiology. The focus of improvement in handoff practices emphasizes individual and organizational levels, whereas patient safety programs aim to refine specific processes.

3.3.6 Radiation Protection

Aldhebaib & Singh (2023) and McGowan et al. (2023) focus on radiation protection and stress the importance of adhering to safety protocols and training to prevent errors and ensure safety through knowledge of equipment use. Similarly to patient safety programs, radiation protection prioritizes measures to safeguard individuals. They focus on

establishing standardized procedures, using specialized tools, and maintaining compliance with best practices.

Nonetheless, there are important differences between these areas. Radiation protection is centred specifically on physical safety measures, such as the use of protective gear and ensuring safe device operation to minimize radiation exposure. In contrast, patient safety programs adopt a broader approach, addressing a range of procedural and process-based safety issues. This includes developing standardized processes and improving protocols to minimize risks across diverse healthcare practices, beyond just technical and equipment safety.

3.3.7 Summation of Findings

All the studies included in this section conclude that continuous education is necessary to keep staff updated on new safety protocols, technological advancements, and emerging threats. Radiology departments must balance multiple protocols, including those related to patient safety, error reduction, cybersecurity, and radiation protection. Ensuring that all departmental policies and practices align with the latest research and regulations can be complex and resource-intensive and it can only be adhered to through continuous staff training.

Technological advancements include automated systems for managing patient data and imaging, which will contribute in reducing human error and improve efficiency. Advanced radiology technologies offer better accuracy and less radiation exposure and although many stakeholders view the integration of recent research findings positively, recognizing

the potential for improved patient safety, efficiency, and quality of care, resistance to change can also hinder the adoption of new protocols or technologies, leading to slow implementation of improvements. New practices and protocols must be therefore relevant and practical according to current departmental operations. Evidence-based recommendations that address existing challenges are therefore more likely to be adopted.

The voluntary nature of error reporting can also lead to underreporting, making it difficult to get a comprehensive understanding of issues. Prevention tools, such as standardized risk assessment protocols, would help protect patients in MID but the literature also mentions that strong leadership support, clear communication of benefits, and a culture of continuous improvement would ensure better adherence to new practices and protocols. By addressing both technical and human factors, and continuously evaluating and improving processes, radiology departments can significantly improve radiology holistically and patient care while enhancing safety.

3.4 Improving Service Quality

Adem et al. (2023)	Chen et al. (2022)
Chilanga et al. (2022)	Marbouh et al. (2020)
Olisemeke et al. (2014)	Sauré et al. (2020)
Zattar da Silva et al. (2021)	**(Level D)**

Out of the studies presented, seven address various challenges and solutions in healthcare, particularly in the radiology department, with a focus on patient scheduling

discrepancies, referral information mistakes, and equipment downtime that all lead to the disruption of the service's quality.

For example, Marbouh et al. (2020) and Zattar da Silva et al. (2021) provide a comprehensive look at the multifaceted nature of no-shows, emphasizing the inefficiencies caused by missed appointments in radiology; where no-show rates can be as high as 80%. They identify multiple factors influencing no-shows, such as patient anxiety, scheduling issues, and environmental barriers but this issue leads to wasted resources and increased costs due to underutilized equipment and staff time. One of the strategies proposed to decrease no-shows includes employing predictive analytics for dynamic scheduling. Such an initiative is also echoed in the patient scheduling study by Sauré et al. (2020) who find that deterministic models are often sufficient, thus simplifying the scheduling process without significant performance loss, concluding that integrating shortening waiting times and using automated reminders is also a means of mitigation. These schemes primarily focus on preventive strategies. On the other hand, Sauré et al. (2020) study claims that deterministic models may overlook the unpredictability highlighted in no-show rates and equipment downtimes. A hybrid model incorporating both deterministic and stochastic elements, as mentioned in other studies by Marbouh et al. (2020) and Zattar da Silva et al. (2021) might provide a more balanced approach.

The study on patient waiting times in ultrasound departments by Chen et al. (2022) suggests optimal appointment intervals and room assignment strategies to reduce waiting times and balance workloads amongst radiologists. It uses simulation models to validate its findings, for optimisation of outpatient scheduling, and leads to integrate these advancements as a reactive measure, rather than a preventive one. All these mentioned

researches in this section emphasize the importance of efficient scheduling to minimize waiting times and resource idleness. Nevertheless, the scheduling study's incorporation of stochastic service times offers a more adaptable approach to real-world inconsistency, suggesting that purely deterministic models, while effective, may not fully capture the complexity of healthcare operations. This can be fully translated into MDH's MID due the unpredictability of the patient influx and a systematic review conducted in 2014 by Olisemeke et al. proves this approach (NHSS 2022).

Chilanga et al. (2022) highlight another significant system challenge, emphasizing the crucial role of comprehensive referral information in ensuring appropriate radiology imaging procedures. The study points out that involving radiographers in referral assessments can boost efficiency and reduce errors. Accurate pre-imaging assessments are essential to assign exams appropriately; however, issues like inefficient scheduling and poor room allocation contribute to extended patient wait times, which can harm both patient satisfaction and department efficiency. This aligns with Sheehan et al. (2020), which also aims to minimize errors through procedural verification, particularly by using continuous checklists. Both studies advocate for improved communication and the use of detailed, structured information to prevent errors and reduce wasted time. Their findings support the integration of advanced scheduling solutions that incorporate real-time adjustments, offering a fair and efficient approach.

Radiology equipment downtime due to breakdowns and the lack of maintenance contracts can exacerbate no-show issues by reducing available slots and increasing patient waiting times resulting in significant appointment and revenue losses. Adem et al. (2023) show that maintenance policies are also an integral part of a radiology department

and while this study is more focused on operational logistics and equipment management, its implications for patient scheduling and no-show mitigation are definitely as significant.

While each study offers valuable insights into specific aspects of radiology department operations, they collectively accentuate the importance of integrating multiple strategies such as predictive analytics, and the integration of both proactive and reactive measures to enhance efficiency.

3.5 Infection Control

Adomako et al. (2022) Jimenez et al. (2023) Nyirenda et al. (2019) **(Level D)**

Three studies that were included within the REA specifically address infection control measures, recommendations and guidelines within radiology department environments. Despite the different contexts, where one focuses on the presence of pathogens on radiology equipment, one formulates recommendations and the other examines surveys across various radiology department environments, all three studies highlight critical challenges and gaps in infection prevention and control (IPC) practices. Although each study underscores the need for improved IPC practices, they also reveal differing priorities and approaches to achieving this goal, reflecting the broader issues faced in healthcare systems globally.

Adomako et al. (2022) conduct a study in Ghana adopting a practical, hands on approach, by combining observational and experimental methods to audit infection control practices

directly within a radiology department. This dual-phase approach allows for a thorough examination of both the already existing cleaning procedures and the actual bacterial contamination on radiology equipment. By using empirical evidence, which directly links observed practices with the presence of nosocomial pathogens, the study provides concrete data on the effectiveness of current cleaning agents and practices, making it a strong case for immediate, targeted interventions. This experimental component provides evidence of the persistence of pathogens even after cleaning, suggesting that existing IPC practices are not just inconsistent, but also ineffective in eliminating dangerous bacteria. However, its focus on a single department in one hospital limits its generalizability.

In contrast, Nyirenda et al. (2019) primarily relies on observational data to assess compliance with Standard Infection Control Precautions (SICP) among radiographers. The study identifies critical gaps in hand hygiene, use of personal protective equipment (PPE), and the lack of national guidelines. While it highlights the systemic issues, such as inadequate resources and the absence of national guidelines, its reliance on observational data without an experimental component limits the ability to link practices directly to outcomes,. However, the development of recommendations points towards a proactive approach to improving infection control, even if these recommendations are not immediately implementable due to resource constraints.

Jimenez et al. (2023) take a different and more theoretical approach by reviewing existing surveys related to IPC in radiology department environments. This study identifies and comments on existing surveys instruments, particularly the lack of focus on immediate precautionary practices while neglecting broader systemic issues like antimicrobial

stewardship, workplace design, and education standards. While it provides a critical overview of the existing literature, its indirect approach by focusing on the tools used to measure IPC rather than on the practices themselves, makes it less actionable in terms of immediate policy or practice changes. However, it argues for the development of a validated, comprehensive IPC survey tailored to the radiology department setting, which would facilitate consistent monitoring and improvement of IPC practices across different environments. It also highlights the need for a standardized approach to evaluating IPC practices, which could lead to broader, more generalizable findings.

Both studies by Adomako et al. (2022) and Nyirenda et al. (2019) highlight the significant impact of resource limitations on infection control practices. The first set in Ghana reveals how inadequate knowledge and compliance, coupled with a lack of surveillance programs, exacerbate the spread of hospital-acquired infections (HAIs) and similarly, the latter findings in Malawi indicate that the lack of national guidelines and essential infection control resources directly contribute to low compliance with infection control practices. The study's emphasis on the introduction of interventional radiology and the associated increase in HAI risks further highlights the vulnerability of such settings to infection outbreaks.

The recommendations developed by Nyirenda et al. (2019), although limited by lack of expert review and validation, provide a framework for improving infection control practices in Malawi. These recommendations are practical and tailored to the specific challenges observed, such as inadequate hand hygiene and improper use of PPE. However, their implementation is contingent on the availability of resources and support from hospital management, which may be difficult to secure in resource-constrained environments. In

keeping, Adomako et al. (2022)'s findings suggest that more immediate and targeted interventions are necessary to improve compliance with infection control protocols in Ghana's radiology departments. The study's experimental evidence provides a strong basis for advocating for stricter cleaning protocols and more effective disinfectant agents. However, the applicability of these recommendations may be limited by resource availability.

While not focused on a specific geographic context, Jimenez et al. (2023) suggest that the variability in resources, education, and protocols across different regions affects the effectiveness of IPC practices. It underscores the need for standardized tools that can be applied across different radiology department settings, which could help mitigate the disparities observed in resource-limited environments. This study then calls for the development of a validated IPC survey tailored to radiology department settings is a broader, more systemic recommendation. While it may not address the immediate needs of resource-limited settings, it offers a pathway towards standardization and benchmarking, which could ultimately lead to more consistent and effective IPC practices across diverse contexts.

3.5.1 Challenges Involved

According to the findings from the Ghanaian and Malawian studies, as well as the review of IPC surveys, radiology departments face several common challenges in maintaining high administrative standards of practice. There is a lack of uniformity in cleaning

protocols, leading to variable sanitation standards within departments and radiographers often neglect proper hand hygiene, increasing the risk of pathogen transmission.

The absence of formalized infection control protocols leads to discrepancies and variability in practice and enforcement, thus complicating efforts to maintain high standards of care across the radiology departments. Without centralised policies or recommendations, individual departments lack direction, consistency in implementing IPC practices and limited access to essential resources, all contributimg to the persistence and spread of HAIs within radiology departments. Inadequate monitoring, evaluation of infection rates and insufficient control measures prevent timely interventions to avoid spread.

3.5.2 Proposed Improvements

In order to enhance administrative standards in radiology departments regarding infection control, the Malawian study formulated sets of IPC recommendations focusing on specific areas. The Ghanaian study emphasized the importance of auditing existing cleaning procedures to identify gaps and areas for improvement, giving evidence that the hands-on approach helps ensure that cleaning practices are not only implemented but are also effective. Recognizing the lack of similar comprehensive assessment tools in a the MID MDH shows that there is a call for developing validated IPC surveys tailored to the radiology department setting and such tools would facilitate consistent monitoring and benchmarking of IPC practices.

Several factors influence the successful adoption of evidence-based practices within radiology departments, such as resource availability and management support. Before implementing new protocols, the studies advocate for expert validation to ensure recommendations are evidence-based and contextually appropriate to the department. To keep practices current, it is suggested that IPC recommendations undergo revisions every five years, incorporating the latest research findings. The existence of national or institutional guidelines significantly influences the standardization and adoption of infection control measures but the presence of strong empirical evidence, such as the findings from Adomako et al. (2022), can drive the adoption of more rigorous and effective infection control practices. In addition, the recognition of knowledge gaps implies a need for improved training and education programs for radiology staff. The knowledge and compliance of healthcare professionals with infection control measures are crucial. In the Ghanaian study, inadequate hand hygiene and inconsistent cleaning practices were partly attributed to lack of training and awareness.

3.5.3 Stakeholder perception

The studies imply that different stakeholders within radiology departments may have varying perceptions of integrating research findings into administrative decision-making. Radiographers and other staff may perceive the integration of research findings as beneficial but challenging, especially if it requires significant changes to existing practices. For instance, Nyirenda et al. (2019) indicate that radiographers in Malawi struggle and feel frustrated with compliance due to resource limitations, suggesting a potential resistance or difficulty in adopting new practices that require more resources.

Administrators, while likely to value the role of research in improving patient outcomes and reducing healthcare-associated infections, tend to focus on feasibility, cost-effectiveness, and the logistical and staffing demands of new protocols—concerns that are particularly relevant in resource-constrained settings. Similarly, policymakers may advocate for integrating research findings into broader protocols, as Jimenez et al. (2023) suggests, but must also balance these efforts against available resources and the need for localized adaptations. Although patients are not directly involved in decision-making, patient safety remains a core priority. Standardized infection control improvements are designed with patient protection in mind, without affecting their care.

For Mater Dei Hospital's Medical Imaging Department to effectively translate research findings into actionable, evidence-based recommendations, efforts should focus on securing necessary resources, establishing clear, standardized guidelines, and implementing practical audits. This approach should be supported by ongoing training, strong leadership, and a culture committed to patient safety and continuous improvement. An integrated strategy that combines practical and theoretical approaches is essential to a robust infection prevention programs in radiology department environments, ensuring that IPC practices are both evidence-based and practically applied to enhance healthcare safety.

3.6 Radiologist Reporting Standards

Castillo et al. (2022) Khoshpouri et al. (2020) McGrath et al. (2022) Vosshenrich et al. (2023) **(Level D)**

Four studies selected for the REA examine different characteristics of radiology practice from the radiologist reporting aspect and while each study offers unique insights, their findings collectively emphasize the importance of enhancing radiology reporting services though structured systems.

3.6.1 Standardization and Consistency in Reporting

Vosshenrich et al. (2023) and Castillo et al. (2022) both underscore the significance of standardization in radiology reporting from different angles. Vosshenrich et al. (2023) focus on linguistic standardization through structured reporting templates, demonstrating that these templates significantly reduce variability in report language, thereby increasing standardization and improving report clarity and consistency. This is demonstrated by the 27.4% decrease in document vector spread, indicating that reports became more homogeneous and distinguishable over time.

In contrast, Castillo et al. (2022) highlight the critical role of clinical information in improving the accuracy and relevance of radiology reports. Their systematic review shows that when clinical information is standardized and made available to radiologists, it significantly enhances the accuracy, confidence, and clinical relevance of radiology reports. Emphasising on the importance of context in diagnostic accuracy means being

better equipped to make accurate and confident diagnoses, thus improving the overall quality of patient care. This resonates with the broader aims of the studies by Vosshenrich et al. (2023) and McGrath et al. (2022), which also have the intention to improve the quality and reliability of radiology reports, though through different mechanisms namely structured reporting and efficiency tools, respectively.

3.6.2 Efficiency and Workflow Optimization

McGrath et al. (2022) provide a detailed exploration of radiologist productivity and institutional infrastructure as key factors in enhancing radiology reporting efficiency. Their study advocates for the adoption of advanced tools such as AI-driven reporting templates and optimized room environments to streamline a radiologist's workflow. These interventions aim at reducing burnout and improving productivity, reflecting the same goals of Vosshenrich et al. (2023) thus leading to a more efficient and standardized reporting processes

However, while McGrath et al. (2022) focus on enhancing efficiency within the radiology department though individual improvement, Khoshpouri et al. (2020) point to the wider, systemic, institutional inconsistencies that can undermine such efforts. Their study examines the variability in how academic radiology departments handle outside studies and second opinion consultations and reveal significant discrepancies in practices, especially within the archiving system's inclusion policies, suggesting that a lack of standardization at the institutional level can lead to inefficiencies and potential financial challenges.

3.6.3 Adopting the Findings

Khoshpouri et al. (2020) point out that academic radiology departments vary widely in their approaches to handling outside studies, with no universal guidelines on integrating and interpreting these cases. This inconsistency presents challenges for maintaining uniform standards of practice across institutions, with added legal and financial implications that make administrative decisions more complex and potentially affect the overall quality of care. The adoption of a standardized best practices statement for second-opinion consultations on outside studies could help align practices across institutions, thereby enhancing administrative and clinical standards. However, the lack of consensus around best practices, coupled with legal and financial implications, can slow the adoption of such protocols. Additionally, the speed of adoption locally can be affected by factors like governmental bureaucracy and public-private partnership legislation, as discussed by NHSS (2022).

Vosshenrich et al. (2023) observe that structured reporting templates, while helpful for ensuring linguistic standardization, are not uniformly used. Free-text reporting remains common and lacks the consistency and reliability that standardized templates provide. Castillo et al. (2022) further supports this, noting that without clear guidelines or criteria, radiologists may struggle to maintain the accuracy and relevance of their reports, potentially affecting patient care. Advancements like structured reporting templates and AI tools, as highlighted by McGrath et al. (2022), are generally welcomed by radiologists for their potential to improve quality and efficiency. However, these innovations can also introduce concerns, such as impacts on workflow and the need for additional training.

Implementing departmental guidelines that specify required clinical information can significantly enhance report accuracy and relevance. Additionally, integrating advanced technologies like AI tools and improved workstation setups can boost productivity and reporting quality, though such innovations may require substantial investment. Castillo et al. (2022) stresses that referrers must be educated on providing relevant clinical information; without adequate training and awareness, standardized criteria for clinical information may not be adopted effectively. Strong leadership and a commitment to evidence-based practices, as emphasized by Khoshpouri et al. (2020) and McGrath et al. (2022), are key to successfully translating research findings into practice. These studies underscore that leadership support is crucial in overcoming barriers to implementing standardized practices.

In conclusion, although each study examines these themes from unique angles, they collectively emphasize the need for variable but complementary methodologies to enhance the quality of radiology reporting. Across the studies, standardization consistently emerges as a priority, whether through structured reporting, standardized clinical information, or unified institutional practices. Standardization is seen as vital to advancing radiology reporting quality, efficiency, and reliability, forming a foundation for more consistent and high-quality patient care in radiology.

3.7 Administrating Imaging Protocols

Bantas et al. (2023) Kisembo et al. (2021) Raele et al. (2022) Ramazan et al. (2022) **(Level D)**

The above four studies offer interrelated insights particularly in the context of image quality through evidence-based practice (EBP), and the implementation of clinical imaging guidelines (CIGs). These studies collectively underscore the tension between practical experience and research-based evidence in radiography while highlighting barriers to effective working practice.

A central theme and significant challenge seen in Raele et al. (2022) and Ramazan et al. (2022) is the persistent reliance on clinical experience over research-based evidence among radiographers. Raele et al. (2022) emphasize that radiographers often prioritize subjective judgment and personal evaluation of techniques rather than relying on research, suggesting a disconnection between practice and evidence. Similarly, Ramazan et al. (2022) highlight that although EBP is valued, it is applied rarely, as radiographers rely on outdated knowledge from their fundamental education and clinical experience. Radiographers therefore often modify imaging techniques based on personal judgment rather than standardized protocols, leading to inconsistencies in practice. This reflects a broader issue identified by both studies, namely the gap between the theoretical appreciation of EBP and its practical implementation.

Bantas et al. (2023) indirectly supports this observation by demonstrating that, despite the availability of quality assurance programs, image rejection rates remain high due to

errors that could be mitigated through better adherence to standardized practices and retraining. This suggests that while radiographers may recognize the importance of certain practices, the application is inconsistent, possibly due to a lack of integration between evidence and daily routines.

3.7.1 Impact of Technological Factors

The studies by Bantas et al. (2023) and Raele et al. (2022) also explore the role of technological advancements in radiographic practice. Bantas et al. (2023) report that differences in image rejection rates, and their reasons, are partly influenced by the software and methodologies employed, indicating that technological tools can shape practice outcomes. Correspondingly, Raele et al. (2022) discuss how the shift from film to digital radiography has led to modifications in techniques, often without sufficient research support. This points out that the rapid evolution of technology in radiography may outpace the ability of practitioners to integrate research-based evidence into their modified practices, leading to inconsistencies and potential quality issues.

In contrast, Kisembo et al. (2021) focus on the broader systemic factors influencing the implementation of CIGs, using the Theoretical Domains Framework (TDF) to categorize barriers and facilitators. This study highlights that successful implementation of guidelines is reliant not just on individual radiographers' knowledge and behaviour but also on organizational and systemic factors. This perspective complements the findings of Bantas et al. and Raele et al., by suggesting that factors specific to a department and the availability of technology can either hinder or facilitate the adoption of best practices.

One must also keep in mind though that the compatibility of new practices with existing technologies and software in use within the department is another limiting factor. Departments with outdated technology may struggle to implement new evidence-based practices effectively, therefore, if Mater Dei Hospital (MDH) uses incompatible radiology imaging equipment, this could be a significant barrier to implementing new research findings that require specific technological capabilities.

3.7.2 Barriers to Effective Practice and Training Needs

The need for training and overcoming barriers is a recurring theme across these studies. Bantas et al. recommend retraining radiographers, especially in positioning and exposure, to reduce image rejection rates and emphasize on practical, department-specific training needs, while Kisembo et al. advocate for a more theoretical, framework-based approach to understanding and addressing barriers that is more tailored to address the identified barriers to implementing CIGs. Ramazan et al. expand on this by also identifying specific barriers to EBP, such as lack of time, support, and access to literature, and they argue that advanced practitioners, who have more education and ownership of protocols, are better equipped to overcome these barriers.

They further suggest that hierarchical structures within radiography may inhibit less experienced radiographers from engaging with EBP, implying that training alone is insufficient without addressing the broader organizational culture. Therefore, existing educational frameworks may not be sufficient to keep up with advancements in

technology and updated evidence-based practices (Bantas et al., 2023; Ramazan et al., 2022).

3.7.3 Common Challenges Faced by Radiology Departments

Kisembo et al. and Ramazan et al. describe how systemic and organizational factors, such as lack of time, support, and hierarchical structures, inhibit the adoption of new practices and the effective implementation of clinical imaging guidelines. Bantas et al. suggest standardizing rejection menus and terminology across departments to enhance quality assurance programs while Kisembo et al. propose using the TDF to categorize and address barriers to implementing clinical imaging guidelines. This approach would involve developing tailored interventions based on identified barriers and facilitators but this level of standardization would help in reducing variability and improving consistency in practice.

Ramazan et al. highlight the role of advanced practitioners in promoting evidence-based practices. Radiographers with more advanced education and those who receive continuous training are more likely to engage with and implement new protocols. Empowering these practitioners through postgraduate education and protocol ownership could lead to improved adoption of new strategies but departments also need to incorporate new technologies in a way that aligns with the application of evidence-based practices. While Raele et al. (2022) note that technology can lead to technique modifications, these should be guided by research to ensure they are beneficial.

Radiographers are not the only stakeholders in play; a supportive organizational culture that values EBP and provides time and resources for its implementation is crucial. Hierarchical structures that discourage initiative among less experienced radiographers can be a barrier even though advanced practitioners provide a central role. Administrators may recognize the need for standardization and training but may face challenges in implementing these due to systemic issues such as resource constraints and resistance to change in certain occasions as noted by both Bantas et al., and Kisembo et al. In addition, similar to other departments, lack of time, access to recent literature, and organizational support could impede the translation of research into actionable practices (Ramazan et al., 2022).

Empowering advanced practitioners within MDH's MID could facilitate the adoption of evidence-based practices through their influence and expertise while creating a framework like the TDF to understand and address specific barriers at MDH could help in developing targeted interventions that are more likely to be successful. Standardizing procedures, terminology, and rejection criteria across the department would reduce variability and improve the consistency of practice, making it easier to implement evidence-based recommendations (Bantas et al., 2023).

In conclusion, while all four studies acknowledge the importance of evidence-based practice, they reveal significant challenges in its implementation within radiography. Without bridging this gap between reliance on experience and the disconnection from research, the potential benefits of EBP will remain unrealized. Technological, departmental, and systemic factors also contribute to this issue, indicating that solutions

must be multifaceted, involving both practical retraining and systemic interventions. Ultimately, these studies argue for a more integrated approach where experience and evidence are not seen as opposing forces but as complementary aspects of radiographic practice, with the goal of enhancing both the quality and consistency of imaging outcomes by creating standardisation. Therefore, while there are significant challenges, there are also opportunities for Mater Dei Hospital's Medical Imaging Department to improve its standards of practice by empowering advanced practitioners and adopting a tailored framework for interventions.

3.8 Evidence Based Policies and Frameworks

Fadlallah et al. (2019) Pereira de Almeida et al. (2022) **(Level C)**

The two studies, one by Pereira de Almeida et al. (2022) and the other by Fadlallah et al. (2019) offer contrasting perspectives on the roles of evidence and narratives in professional practice and policy-making in radiology departments' administration. Both studies stress the significance of systematic approaches but they diverge markedly in their focus and implications.

Pereira de Almeida et al. (2022) delve into the internal dynamics of radiology departments, emphasizing the importance of Quality Management Systems (QMS) and Evidence-Based Practice (EBP) in enhancing healthcare delivery. Their study is methodical, highlighting how structural improvements, such as increased radiographer involvement in Quality Assurance (QA) activities and the use of research evidence, can

lead to better patient outcomes thus focusing more on organizational practices. Conversely, Fadlallah et al. adopt a broader outlook, examining the influence of narratives on health policy-making. Their systematic review suggests that narratives can significantly affect policy-making decisions, not necessarily always in a positive way and, is therefore, externally focused on the interface between communication and policy.

Otherwise, at the heart of both studies lies a discussion on the utility of evidence versus narrative. Pereira de Almeida et al. stress the importance of EBP, with positive perceptions among radiographers regarding the use of scientific evidence in clinical practice. The study argues that systematic evidence is crucial for effective QA and continuous improvement in healthcare settings. In contrast, Fadlallah et al. present a more complex view of narratives in policy-making. While narratives can indeed inspire and catalyse policy changes, they can also lead to misleading or harmful outcomes if not grounded in solid evidence. This contrast highlights a key tension, namely the methodological rigor and objectivity valued in evidence-based approaches versus the emotional and persuasive power of narratives in influencing decision-making.

3.8.1 Methodological Rigor

Pereira de Almeida et al.'s study profits from a clear and structured methodological approach, using factor analysis to identify key dimensions of quality management and evidence use. Their findings are actionable and provide a framework for improving radiology practices. Fadlallah et al. (2019), however, comment on the methodological rigor in the existing studies about narratives used in the systematic reviews. They point

out that the studies they reviewed often lacked clear definitions, theoretical frameworks, and rigorous evaluation methods, making it difficult to isolate the impact of narratives. This critique highlights the challenge of studying complex, multicomponent interventions like narratives, where the line between cause and effect is blurred (Paparini et al. 2021).

Both studies agree on the need for improvement in their respective areas and in either case there is acknowledgment of the study's limitations and the need for further research. Pereira de Almeida et al. call for greater radiographer involvement in QA activities and the integration of EBP, suggesting that these are pivotal for enhancing the quality of care. Their recommendations are practical and grounded in the daily realities of healthcare professionals, but point out the geographical limitations of their study and the exclusion of top management perspectives, suggesting future studies should include broader and qualitative methods. Fadlallah et al. (2019) also call for more rigorous primary research and better conceptualization of narratives but go further by addressing the ethical considerations in using narratives for policy-making. They emphasize that narratives should be evidence-based and ethically sound, pointing to the potential dangers of narratives that are not rooted in solid evidence. This adds a layer of ethical scrutiny to the use of narratives, which is less prominent in Pereira de Almeida et al.'s discussion of EBP.

In conclusion, while both areas of study are under-researched, the challenges in researching narratives are more methodological and conceptual in nature, requiring innovative approaches to study effectively. The two studies offer complementary but contrasting insights into improving healthcare practices and policies. Pereira de Almeida et al. advocate for a structured, evidence-based approach within healthcare settings,

emphasizing the importance of internal improvements. Fadlallah et al. (2019) highlight the power and pitfalls of narratives in shaping health policies, urging caution and the need for stronger evidence-based approaches in their use. Together, these studies suggest that while evidence is indispensable for improving clinical practices, narratives, if used carefully and ethically, can be powerful tools in shaping broader health policies. However, the challenge lies in balancing these approaches to ensure that both healthcare delivery and policy-making are grounded in rigorous, reliable evidence.

3.8.2 Challenges Faced to Provide High Standards of Practice

According to the findings of Pereira de Almeida et al., radiology departments face several challenges in maintaining high standards of practice within their administration, the first being the lack of radiographer involvement in QA and other activities aimed for improvement of the services. Only a small percentage of radiographers participate in management responsibilities or quality committees, which limits their influence on administrative practices and decision-making processes. Due to this, radiographers are often ignorant of the QA and improvement documentation within their departments. This lack of awareness hinders the effective implementation of QMS, as those responsible for delivering care may not be fully engaged with or knowledgeable about the protocols and standards they are expected to follow. Building organizational capability through rigorous documentation, procedure adherence, and better information support is suggested in the studies. This includes improving the mechanisms for updating standards and protocols based on new research and evidence.

Increasing radiographer involvement in QA and improvement activities is a key recommendation, which could be achieved through targeted training and education, ensuring that radiographers are more engaged in the processes that directly affect their work. Pereira de Almeida et al. also highlight a notable deficiency in patient involvement, suggesting that patient perspectives and feedback, which are crucial for maintaining high standards of care, are not sufficiently integrated into administrative processes. This shows a need for better implementation and communication of standards and protocols, particularly in how they are used in clinical practice. This fragmentation can lead to inconsistencies in care and a lack of cohesion across different departments and teams.

Proposing that radiology departments integrate more scientific evidence into clinical and administrative practices would not only improve the quality of care but also ensures that administrative decisions are based on the latest research findings as already explained in a systematic review by Halligan & Altman (2007). Implementing a structural model that incorporates factors such as QA activities and patient involvement can help radiology departments systematically enhance their means to form policies and standards of practice and it is as crucial for continuous improvement. Management is seen as a key driver in the integration of research findings, but their commitment to providing the necessary support, such as resources for research and time for staff to engage with new evidence, can vary.

3.9 - Synthesis of the REA findings

In synthesis, the REA findings present a multi-faceted analysis of radiology department challenges, emphasizing the critical need for strategic integration of AI, robust MCI preparedness, and enhanced patient-centred care. Evidence highlights that radiology's evolving role in emergencies requires both technological integration and systematic preparation to manage increased demands and mass casualty incidents effectively. Patient care requires specific sensitivity, especially for TGD and paediatric patients, where inclusive language, patient-centred practices, and effective communication mitigate negative experiences. Adherence to safety protocols, rigorous infection control measures, and cybersecurity safeguards are essential for maintaining a high standard of care amidst rising cyber threats and infection risks. Consistent reporting standards, structured protocols, and evidence-based policies are pivotal in reducing diagnostic variability, aligning practice with modern technological capabilities, and strengthening quality assurance.

Despite the promising role of EBP, implementation barriers, including resource limitations, resistance to change, and technological disparities, must be addressed through structured guidelines, better retraining, and fostering a supportive organizational culture. Ultimately, these challenges reveal the necessity for Mater Dei Hospital's Medical Imaging Department to adopt a comprehensive, interdisciplinary approach that harmonizes administrative, clinical, and technological strategies, balancing practical needs with research-driven improvements.

Chapter 4 – Medical Imaging Department Document Review and Comparison

In the following chapter, research findings from studies included in the Rapid Evidence Assessment are compared with the Standard Operating Procedures (SOPs), Protocols, and Policies available in the communal SharePoint documents at the Medical Imaging Department at Mater Dei Hospital. These documents, accessible to all staff, serve as a foundation for examining the alignment between research and current administrative practices. The findings were organized by key administrative themes, mirroring the structure of the REA, to offer a clearer perspective on each area relevant to the study questions. This comparison takes the form of a literature review, which systematically synthesizes both the external research findings and internal administrative documentation to create arguments related to the study's administrative focus with regards to the research questions.

A literature review, in this context, is a structured synthesis of the current knowledge, comparing published research with MDH's administrative SOPs, protocols, and policies. By critically analysing these sources, this chapter aims to evaluate the consistency between evidence-based recommendations and the department's administrative practices. This method allows for highlighting any gaps, overlaps, or opportunities for improvement specific to administration, as clinical SOPs are outside the scope of this study.

The MID documentation has all been reviewed and updated since 2023 and can all be accessed through the link https://govmt.sharepoint.com/sites/MDHMedicalImaging.

4.1 Emergency Services

The REA findings focus on the evolving role of radiology in emergency services, especially in managing the increased demand for radiology services and mass casualty incidents. The discussion highlights the potential of AI to mitigate the pressure on radiologists by automating various tasks and enhancing efficiency. The integration of AI is also explored across different stages of the imaging process, such as image post-processing, clinical decision support, and triage management. The findings also discuss the ethical, operational, and logistical challenges of incorporating AI, along with the importance of systematic preparedness and simulation-based training.

On the other hand, the five SOPs directly related to emergency services at MID provide guidelines and protocols for mobile radiography, which is an integral part of casualty x-rays and trauma imaging within emergency settings. They emphasize the safety of radiographers and patients during bedside mobile imaging and trauma radiography, addressing radiation exposure, infection control, and manual handling during patient transfers. These documents outline policies for performing imaging procedures under different conditions for example, trauma, NG tube placement, preventive maintenance etc. and stresses the importance of communication between referrers and radiographers regarding the justification and safety of mobile imaging. Additionally, it details the major incident response protocols for the radiology department, emphasizing how to handle surges in patient numbers during emergencies.

One can argue that the research findings are broader, focusing on radiology's role as a whole in emergency services, while discussing AI as a solution for improving radiology workflows and managing major incidents. Meanwhile, the MID SOPs are more specific, providing practical guidelines for mobile radiography and trauma care, as well as protocols for maintaining equipment and staff safety during emergencies. Therefore, the mitigation of the emergency workflow is still not in the pipeline, and there is still no mentioning of AI but focuses on manual safety protocols, equipment usage, and human factors in mobile and trauma radiography.

A common emphasis is the management of major incidents. As described in the previous section the research findings delve deeply into MCI preparedness, stressing triage importance, workflow optimization, and the significance of planning and simulations. MID also has set up their major incident protocols within the past few months but focuses on coordinating staff and equipment during high patient influx rather than MCI-specific radiology strategies. It prioritises ensuring an organized and effective response by the MID radiographers in the event of an incident that overwhelms the emergency radiographers. All staff must be familiar with their roles in the plan and need to continue their usual duties unless instructed otherwise by the emergency response team or leaders, thus the references for continuous training for radiographers that are not usually part of the emergency imaging unit. The plan is flexible, and includes recommendations for future actions such as ensuring the functionality of essential equipment, contingency plans for system failures, and adequate preparation and protection for staff.

Another comparison is that the MID SOPs are primarily concerned with patient and radiographer safety, including radiation control, manual handling and transferring of

patients, and infection prevention for both staff and patient while the research finding are more focused on efficiency and preparedness. There is an emphasis about this efficiency particularly through systematic and strategic planning and technological advancements in emergency radiology but do not delve in the day-to-day guidelines for the running of the service. In fact, the research findings stresses the need for interdisciplinary collaboration and staff training while the MID SOPs emphasise on hands-on skills and is more procedural, meaning the daily operational protocols for mobile radiography and trauma imaging in emergency settings.

4.2 Patient Care

While the research findings explore the complexities and challenges radiology departments face in providing inclusive and patient-centred care, the SOPs and protocols at the Medical Imaging Department of Mater Dei Hospital, highlight patient rights, responsibilities, and informed consent processes.

Providing a comparison with a focus on patient-centred care the research findings emphasizes the unique challenges faced by vulnerable groups like TGD individuals and parents of paediatric patients, stressing the importance of inclusive and compassionate care. It discusses the emotional and psychological aspects of patient care, citing research that highlights patient dissatisfaction due to lack of training and inclusive protocols. On the other hand, the MID protocols provide a general, operational framework aimed at improving the patient experience through standardized procedures such as consent

forms, communication protocols, and guidelines for handling complaints. While it addresses patient-centred care indirectly, it focuses more on procedural compliance than on addressing the nuances of emotional needs or inclusivity.

MID lacks, a specific focus on inclusivity for marginalized groups. While it outlines steps for proper communication and obtaining informed consent, it does not mention or address the unique needs of groups like TGD individuals or how MID aims to create an inclusive environment. The emphasis is on general patient care, which may not adequately cover diverse needs. Most of the research findings related to radiology departments inclusivity, and other articles providing standard of care, such as Coleman et al. (2022), discuss how ignorance and discrimination lead to negative patient experiences and call for specialized, continuous training to ensure cultural competency and to create a comfortable environment for all patients.

Otherwise, both the REA findings and the MID SOPs acknowledge the importance of effective communication, although the established research takes a more detailed approach by linking communication breakdowns directly to patient dissatisfaction, particularly when incorrect pronouns are used for TGD patients or when parents of paediatric patients feel inadequately informed about procedures. MID then focuses on operational communication, providing staff with tools like AIDET to improve interactions with patients, including welcoming them, introducing oneself, and explaining procedures. Panchuay (2023) describes how designed to keep patients informed and make them feel heard, AIDET stands for the five communication behaviours that create positive care interactions: acknowledge, introduce, duration, explanation and thank you.

While this structured approach is practical, the REA findings suggest that communication should be adapted based on the patient's specific emotional and psychological state, something MID policies do not emphasize as strongly.

The solutions proposed by the research findings are evidence-based, emphasizing training, continuous education, and creating gender-neutral identification systems; they therefore do not explicitly discuss patient responsibilities but instead focuses on patient experiences, particularly the negative ones that arise from inadequate care. The outline implies that improving patient care is more about the healthcare providers' actions, specifically, their sensitivity, communication, and professionalism, rather than about the patients' responsibilities. Meanwhile, although the MID SOPs set out clear protocols to ensure patients understand their procedures and have their rights respected, it does not directly address systemic barriers like staff bias or insufficient training, which the research identifies as crucial for improving care quality.

MID SOPs is detailed about the rights and responsibilities of patients attending the MID, emphasizing the patient's responsibility to be well-prepared and respectful while also expecting staff to create a supportive environment. This approach implies a two-way relationship, where both patients and staff have roles to play in the care process.

Both units recognize the importance of addressing patient complaints. MID outlines the procedures for handling complaints, including steps for escalating unresolved issues. This structured process focuses on ensuring accountability and customer satisfaction. The research takes a broader view of complaints, associating them with deeper systemic issues in radiology, such as lack of inclusivity and poor communication, particularly in high-risk areas like interventional radiology. It suggests that addressing complaints goes

beyond resolution processes; it requires improving the entire system's approach to patient care.

In conclusion, while MID provides a robust procedural framework for ensuring patient care providing practical steps for ensuring smooth operations and compliance with existing standards, the research findings argue for a more personalized, patient-centred approach that acknowledges and addresses the specific emotional and psychological needs of vulnerable patient groups advocating for systemic changes to radiology care. Both perspectives are necessary, but integrating the patient-centred, inclusive approach from the research into the operational SOPs could significantly enhance patient care in the MID.

4.3 Safety Culture

As in the research findings, the MID SOPs provide insights into the safety culture in radiology, each addressing patient safety, procedural adherence, and the role of structured protocols. Both sectors emphasize the need for improving safety but approach the issue from slightly different perspectives. Thus, whereas the research delves into safety challenges, including cybersecurity and communication, the MID SOPs are yet again more procedural, focusing on structured management in the imaging department.

The research findings address complex, high-level systemic challenges that radiology departments face, and presents the broader picture of ensuring consistent adherence to protocols across multiple domains, and by doing so, it brings attention to multidimensional

safety risks, such as external threats for example, cyberattacks and internal procedural errors, as in handoffs and fall prevention. In contrast, the MID SOPs is more focused on the procedural details that drive patient safety and operational efficiency providing a concrete structure of daily operational protocols in the form of pathways, particularly related to patient assessment and imaging room management. While both sections touch upon adherence to protocols, the SOPs are primarily concerned with internal, department -specific operations, offering a step-by-step approach to maintaining hygiene, safety, and operational flow.

A relatable discussion can be noted because the REA findings identify communication failures, especially during handoffs and transitions, as a leading cause of errors in radiology. It suggests that improved standardized documentation and clearer communication during staff transitions are vital to ensuring patient safety and process efficiency. This discussion is based on findings by Burns et al. (2021), which show that communication breakdowns often lead to misunderstandings and medical errors. On the other hand, the SOPs at MID emphasize communication as part of procedural standards, highlighting protocols for handover periods, adherence to communication practices between radiographers, radiologists, and physicians, and daily operational requirements. This similarity on the importance of communication just shows that the research tackles it from a problem-based perspective whereas MID focuses on preventative and structured communication protocols already built into daily operations.

Another similarity is the mention of the importance of standardization and error reduction, the research approaches it from an investigative perspective, aiming to identify root causes, while MID focuses on regular, preventive training to ensure that errors do not

occur in the first place. In the research findings, there is also a section focused on reducing medical errors through categorizing errors into technical, organizational, and human factors. It emphasizes quality improvement methodologies for identifying and mitigating these errors, highlighting that structured methodologies should be used to improve both patient safety and staff satisfaction. The SOPs then mention training and competency as a major part of maintaining safety, stressing that all personnel should be trained in infection control, radiation safety, and patient assessment.

A notable distinction is the research's inclusion of cybersecurity concerns. It highlights the vulnerability of radiology departments to cyberattacks and data breaches, stressing the importance of IT-focused preventative measures such as encryption and staff training on cybersecurity threats. This contrasts with the MID SOPs, where cybersecurity is not mentioned at all, even though the MID is run by an intranet and digital information system, including clouds for patient data storage.

Radiation protection is a crucial aspect of radiology. The research mentions it as part of its broader exploration of safety challenges, presenting it as one of many areas in need of improvement while stressing that adherence to safety protocols and technical competency in equipment use are essential to minimizing radiation-related risks. MID, on the other hand, integrates radiation protection into its SOP for patient safety, additionally addressing practical measures such as PPE use, equipment checks, and compliance with the ALARA principle ("As Low as Reasonably Achievable"). This approach is more hands-on, focusing on the specific actions staff must take in everyday operations, whereas the research tackles the issue from a broader and more theoretical approach.

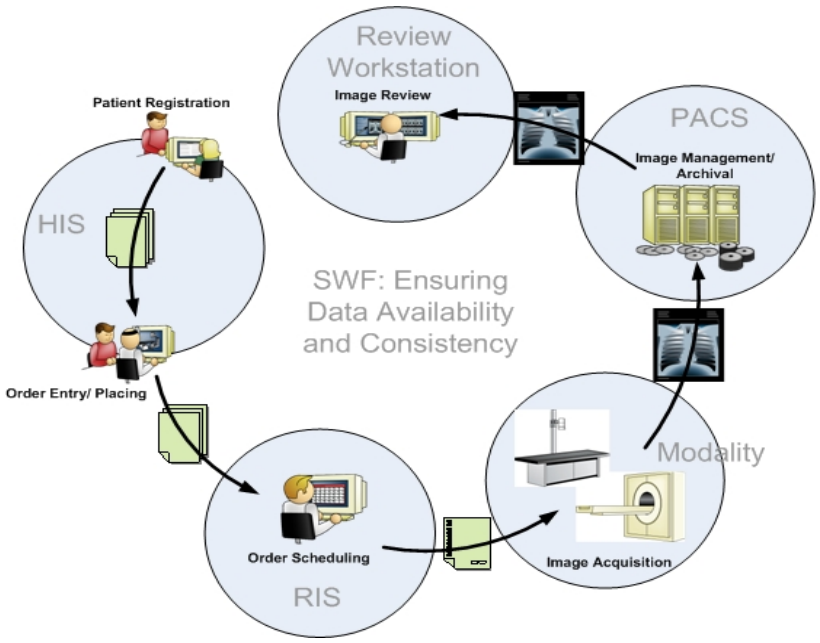
In conclusion, the research mentions that improvement in radiology safety culture must be approached through a balance of technical and human factors, with continuous education and strong leadership being critical for driving change. It emphasizes the importance of leadership in promoting a culture of continuous improvement and the role of anticipatory actions whereas MID focuses on the practical application of protocols and improving operational management through SOP adherence, suggesting that day-to-day operational consistency will lead to enhanced patient safety. While leadership is also implied in ensuring adherence to these procedures, MID is less focused on systemic changes and more on following established protocols. Both perspectives are valuable, but they operate on different levels of safety culture, and although the SOPs focus on the application of standards to ensure consistency and reduce risk at the operational level, systemic improvement as within the research, should be an integral part of the running of MID in order to foresee future hiccups.

4.4 Improving Service Quality

A comparison between the section of the research findings which present studies addressing service quality challenges in radiology departments, and the present MID policies, demonstrates differences and potential areas for improvement by contrasting research insights with operational practices. The imaging system can be observed in Figure 4 below.

Figure 4

The Imaging System



(Braunstein, 2022)

4.4.1 Patient Scheduling and No-Shows

The REA findings emphasizes the inefficiencies caused by no-shows and scheduling discrepancies, in which the studies propose the use of predictive analytics, dynamic scheduling, and hybrid models to manage the unpredictability of patient attendance and equipment downtime. MID SOPs reflect a rigid approach to scheduling, rescheduling, and cancellations, relying primarily on manual notifications and fixed procedures. A clear example of these are; a maximum of two postponements allowed and strict deadlines for illness-based cancellations amongst others. While the policies aim to streamline resource use, they lack the proactive, data-driven methods recommended in the research findings and therefore do not provide mitigation plans for the improvement of service quality.

The research suggests that MID could enhance its scheduling protocols by adopting more advanced, predictive methods to minimize no-shows and reduce inefficiencies as MID's reliance on rigid procedural rules may overlook the benefits of integrating dynamic scheduling models, which can better accommodate unpredictable scenarios as the aforementioned patient illness and equipment breakdowns.

4.4.2 Referral Information and Imaging Accuracy

The critical role of accurate referral information accentuated in the REA findings, and their advocacy for involving radiographers in referral assessment to improve pre-imaging accuracy are the main suggestions given. They emphasize procedural verification and the importance of communication between staff to reduce errors, which can lead to unnecessary delays and wasted resources. MID also ensures clear communication, however this is done through forms and administrative protocols and therefore do not directly address the issue of improving referral accuracy or assessing referral quality as part of the workflow. On the other hand, MID lacks the involvement of radiographers in referral assessment.

Integrating this practice into the MID's workflow could reduce delays and improve patient outcomes. Focusing on procedural rigor for refusals and cancellations is useful, but it does not incorporate the more proactive, error-prevention strategies suggested by the research.

4.4.3 Equipment Downtime

MID policies address equipment downtime, specifically MRI disruption protocols, and focuses on reactive measures like logging the fault and informing staff. There is no mention of preventive maintenance or predictive models to minimize these disruptions unlike the research findings that points out that equipment downtime exacerbates scheduling and no-show problems, emphasizing the importance of robust maintenance policies. Predictive maintenance and equipment management can significantly impact patient throughput and minimize service disruptions.

The research advocates for a more forward-thinking approach by stressing the use of predictive maintenance to avoid equipment failures, whereas MID primarily reacts to problems once they occur. Adopting preventive maintenance strategies could significantly reduce downtime and improve overall service quality, aligning MID's protocols with the proactive models discussed in the REA findings.

4.4.4 Patient Communication

The research suggests that reducing waiting times and improving patient satisfaction can be achieved through more efficient scheduling and communication strategies, including automated reminders and better management of patient influx using stochastic models. MID does implement a clear, though somewhat rigid, communication strategy for appointment scheduling, re-scheduling, and cancellations, relying on postal mail, phone calls, and SMS. While effective, it lacks the flexibility and automation as proposed in the

research, potentially resulting in inefficiencies as also described in a scoping review regarding adoption of automated appointments in healthcare by Woodcock (2022).

The communication strategies described in MID SOPs are manual and limited in scope compared to the more adaptable, automated solutions mentioned in REA. By leveraging technology to provide dynamic, real-time updates and reminders, MID could improve patient satisfaction and reduce appointment failures.

4.4.5 Conclusions on Improving Service Quality

In summary, while MID provides a well-organized set of operational guidelines, it would benefit from integrating the research-driven insights of the REA findings. Although structured, MID administrative measures often appears reactive, especially regarding equipment downtime and patient scheduling issues. The protocols address problems after they arise rather than preventing them through dynamic adjustments or predictive tools.

The latter's emphasis on predictive analytics, maintenance strategies, hybrid scheduling models, and preventive measures could significantly enhance service quality in the MID. A clear gap exists between the proactive strategies suggested by the research and the reactive nature of MID’s current practices. Implementing predictive tools and real-time adjustments could streamline operations and reduce inefficiencies, particularly in scheduling, equipment maintenance, and resource allocation.

The research proposes more innovative and flexible solutions to address real-world complexities and generally promotes proactive measures, to anticipate and prevent

service disruptions whereas MID policies, though effective in certain areas, may hinder the department's ability to operate at peak efficiency.

4.5 Infection Control

When comparing the above review of infection control literature in section 9.5 with MID's SOPs and guidelines, several critical points emerge, highlighting differences and synergies between theoretical approaches in the research findings and practical application in infection control practices within radiology departments.

MID provides clear, actionable infection control guidelines tailored to specific procedures in a radiology department environment, such as safe disposal of sharps, routine cleaning of ultrasound equipment, and protocols for hand hygiene. These SOPs are pragmatic, offering step-by-step instructions that can be immediately implemented to minimize infection risks. In contrast, the REA evaluates infection control practices through three distinct research studies, each of which identifies gaps and challenges in implementing effective infection control measures. While the studies by Adomako et al. (2022) and Nyirenda et al. (2019) provide critical data and observations regarding current IPC shortcomings, they highlight systemic issues such as resource limitations, lack of national guidelines, and inadequate training. Jimenez et al. (2023), meanwhile, focuses on the need for standardized IPC evaluation tools. Although these insights are valuable, they are more theoretical and propose future steps, such as the development of comprehensive surveys, which may not lead to immediate changes in practice.

The research studies illustrate how inconsistent cleaning practices are exacerbated by resource shortages and the absence of national infection control policies thus hindering the successful implementation of effective infection control measures. While these suggest interventions such as targeted cleaning audits and stronger disinfectants, their recommendations are often constrained by feasibility in resource-limited environments. MID's SOPs, however, assume the availability of resources, particularly personal protective equipment (PPE), disinfectants, and safety-engineered needles. The SOPs offer specific guidelines on the use and disposal of PPE, handling of contaminated materials, and cleaning protocols for patient equipment. However, the practical implementation of these procedures might be hindered in settings like those described in the REA findings, where limited access to basic supplies like gloves or masks compromises IPC effectiveness. Hence, while the SOPs set by MID provide a clear framework, the resource constraints outlined in the research findings highlight potential challenges to their applicability if situations arise that create an under-resourced environment.

The studies in the REA also stress the need for ongoing evaluation and monitoring of IPC practices, calling attention to the persistent presence of pathogens even after cleaning, as demonstrated by Adomako et al. (2022). This experimental evidence is crucial because it exposes weaknesses in existing protocols, advocating for more stringent monitoring and stricter adherence to hygiene practices. The study underscores the importance of linking observational practices directly to outcomes, something that is less emphasized in MID's SOPs. In contrast, the SOPs outline routine cleaning and spill management protocols but do not explicitly address how compliance with these

procedures should be monitored or how their effectiveness will be evaluated. The lack of emphasis on empirical feedback mechanisms, such as microbial testing or audits, in MID suggests that while the guidelines are clear, they may be implemented without ensuring their efficacy, an issue that the research findings highlight as critical.

Otherwise, both sectors advocate for systematic approaches to infection control, but they diverge on the issue of customization versus standardization. MID represents a standardized approach, offering uniform guidelines applicable to staff across the department. These procedures, such as "handwashing before and after patient contact" or "disinfection of ultrasound probes," ensure consistency in infection prevention practices. Conversely the research argues for more customized infection control strategies that is tailored to the specific challenges of each environment. Jimenez et al. (2023) supports the development of tailored survey tools to monitor IPC practices, reflecting the need for regional adaptations based on available resources and institutional capacity.

Another contrasting note is that MID does not explicitly consider stakeholder challenges or the complexities of securing resources and management support. It assumes that infection control measures will be readily adopted if the procedures are clearly outlined whereas the literature presents infection control as a complex issue requiring input from multiple stakeholders, including patients. The studies point out that while radiographers may appreciate the importance of IPC measures, they are frustrated by resource limitations and the logistical challenges of adhering to guidelines. Administrators, on the other hand, are concerned with the cost-effectiveness and feasibility of implementing new IPC protocols, especially in resource-constrained settings. By omitting these

considerations, the MID SOPs may overlook practical hurdles to implementation, particularly in environments that mirror the challenges identified in the literature, which must not be overlooked locally.

While MID SOPs are necessary for maintaining infection control with the MDH radiology department, they still require to be grounded in empirical evidence and tailored to local conditions. The REA studies offer valuable insights into the systemic challenges faced by radiology departments, particularly in resource-limited settings, where the applicability of guidelines is severely constrained by practical issues such as limited access to PPE and cleaning supplies. Ultimately, effective IPC requires the integration of both practical, clear guidelines as observed in MID SOPs and ongoing empirical evaluation and customization to ensure that policies are not only theoretically sound but also practically implementable in diverse healthcare environments.

4.6 Radiologist Reporting Standards

In a radiology department, the failure to implement the principles highlighted by the REA findings raises several significant concerns. There are currently no established guidelines, official criteria, or protocols governing radiologist imaging reporting. Independent research conducted within MDH's MID has revealed a lack of standardized practices among radiologists, aside from digital reporting templates, which are primarily set up by individual radiologists and used exclusively for reporting normal findings.

The literature shows that without structured reporting templates, reports may vary in terminology and style, leading to ambiguity, inconsistency, and errors in interpretation. This can affect clinical decision-making and reduce the reliability of reports, as noted by Vosshenrich et al. (2023). Also, as Castillo et al. (2022) emphasized, the lack of standardized clinical information could hinder radiologists from making accurate, contextually relevant diagnoses. This could lead to misdiagnoses or incomplete reports, undermining patient care.

Research shows that AI tools and optimized workflows significantly enhance radiology efficiency. Without these tools, radiologists may face increased burnout, longer reporting times, and reduced productivity, potentially resulting in reporting backlogs. Despite the recent introduction of AI in certain areas of the MDH radiology department, there are still no established standards for its implementation. Adopting advanced technologies or optimizing workstations requires substantial investment. As McGrath et al. (2022) highlight, failing to make these investments can cause departments to fall behind in efficiency and raise operational costs, particularly in light of the increasing reporting workload, as demonstrated in Figure 5 below.

The need for educating referrers on providing standardized clinical information, as noted by Castillo et al. (2022), suggests that without proper training and departmental guidelines, the adoption of new reporting practices could be slow. This delay in implementation can perpetuate outdated, inefficient processes. In summary, not adopting these standardization and efficiency measures can lead to inconsistent report quality, lower productivity, institutional inefficiencies, and even financial and legal complications

within the radiology department. Leadership support as from the referring stage and strategic investments are essential to avoid these pitfalls.

Figure 5

Average Activity per Month for All Imaging Modalities at MDH MID

	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	**Sep-24**
X-RAYS	3763	4026	3888	3725	3874	4075	4138	4236	4328	4207	4108	4083	**4151**
CT	1063	1128	1075	1049	1041	1124	1090	1112	1135	1132	1161	1180	**1223**
MRI	703	812	839	668	650	877	853	748	897	866	905	768	**1020**
US	1044	1289	1384	1117	1183	1320	1359	1421	1434	1493	1498	1476	**1545**
NM	181	177	186	163	168	210	209	175	207	185	193	170	**202**
MAMMO	70	94	85	81	76	100	103	86	102	93	96	100	**112**
ANGIO	71	82	81	68	75	77	79	72	73	79	66	64	**66**
FLUORO	14	25	35	22	23	30	23	23	25	28	20	22	**25**
BD	279	318	323	261	219	310	343	317	347	329	331	354	**414**
DEN	297	446	411	353	301	411	439	411	478	347	393	321	**326**

(MDH Medical Imaging Monthly Report (Sept 2024) @gov.mt/sharepoint)

4.7 Administrating Imaging Protocols

Comparing the Radiographers' Induction Manual and the few guidelines for administering imaging protocols at MID with the insights from the four studies on evidence-based practice (EBP) in radiography reveals both parallels and tensions in addressing the challenges of radiographic practice.

In the REA findings, the studies collectively emphasize the importance of EBP in radiography, particularly in promoting image quality and standardizing practices across departments. However, the studies highlight that the actual integration of EBP into radiography remains limited, as radiographers tend to rely on experience rather than research-based techniques. Raele et al. (2022) and Ramazan et al. (2022) emphasize that this disconnect often results from insufficient training and a lack of organizational support for EBP, which prevents radiographers from regularly updating their knowledge and skills. This detachment poses a significant barrier to consistent imaging quality, as highlighted by the high image rejection rates noted by Bantas et al. (2023), suggesting that theoretical awareness of EBP is insufficient without systemic support and structured training. On the other hand, MID guidelines emphasize structured, continuous professional development (CPD) and protected time for learning. This includes the Cross -Training Program, which is designed to support lifelong learning and technical competence within the Medical Imaging Department. Unlike the training gaps noted in the studies, the manual suggests a commitment to fostering a supportive learning environment, reinforced by mechanisms like an on boarding buddy system, where an employee serves as a new hire's support, and various CPD opportunities.

This systematic approach embraced by MID addresses some of the issues raised in the literature findings, particularly the need for structured learning pathways that keep practitioners up-to-date on research-based practices. However, the MID manual could benefit from explicitly incorporating evidence-based principles, ensuring radiographers understand how to integrate the latest research findings into practical imaging techniques.

The studies in the REA also identify a range of systemic and organizational barriers to EBP. For instance, Kisembo et al. (2021) and Ramazan et al. (2022) note that time constraints, hierarchical structures, and limited access to resources can inhibit radiographers' engagement with EBP. The induction manual does partly address these issues by emphasizing a collaborative culture with structured support systems, which can potentially empower less experienced radiographers. Moreover, the use of tools such as skills profiling frameworks and personal development plans within the manual could help alleviate hierarchical barriers by providing all radiographers with clear pathways to skill enhancement and responsibility. However, while the manual outlines support structures, it lacks specific strategies to actively encourage a culture of evidence integration, which the published studies argue is critical for overcoming departmental resistance to change. Kisembo et al.'s (2021) recommendation of using the Theoretical Domains Frameworks to identify and address barriers in imaging guideline implementation could enhance the manual's effectiveness. Incorporating such a framework might enable MID to tailor interventions to the unique challenges within, potentially leading to better adherence to EBP and a more research-informed practice environment.

In MID, the manual references structured competencies and adherence to guidelines, especially in specialized areas like MRI, to ensure radiographers uphold quality standards. However, the manual could further emphasize the importance of aligning technological practices with evidence-based research, particularly as Mater Dei Hospital continues updating its imaging equipment. To improve imaging outcomes and ensure consistency, MID should develop standardized protocols specifically for new technologies, as emphasized in the literature. This step is critical to reducing variations in

practice and aligning with evidence-based standards. While technological advancements offer efficiency gains, as noted by Raele et al. (2022) and Bantas et al. (2023), they can also create inconsistencies in image quality when not supported by research-driven standardization. These inconsistencies, often caused by variations in technology, software, or reliance on personal judgment, highlight the importance of clear, research-backed protocols and conformity by radiographers.

Additionally, MID could enhance its practices by explicitly addressing image rejection protocols and quality control procedures. Studies, such as those by Bantas et al. (2023), underline the importance of uniform terminology and standardized rejection criteria across radiology departments. Implementing these measures at MID would foster a more reliable and cohesive practice environment, reducing discrepancies in image quality caused by subjective technique adjustments.

Although the current manual implicitly supports standardization through its training plans, certification emphasis, and cross-training programs, it could further benefit from explicitly integrating these evidence-based practices into its guidelines. By doing so, MID would strengthen its commitment to consistent, high-quality imaging and support radiographers in maintaining best practices aligned with evolving technologies.

While both the studies and the MID guidelines emphasize training and continuous development, there is a clear gap in how EBP is directly applied. The studies argue for a stronger alignment between research and practice, whereas the manual primarily focuses on support and structured learning without explicitly prioritizing evidence-based adjustments. Incorporating a structured framework for EBP within the MID induction manual could bridge this gap, promoting both practical skill development and alignment

with up-to-date radiographic research. This would support MDH's goals of enhancing radiography quality standards and consistency across the department, ultimately benefiting patient outcomes and departmental efficiency.

4.8 Evidence Based Policies and Frameworks

The two studies described in the REA related to this topic are only comparable to one document provided by MID, the "Policy on Developing Quality Documents". These studies offer contrasting approaches to quality management in radiology, highlighting different strategies for improving practice and policy within healthcare settings.

Pereira de Almeida et al. (2022) focus on using quality management systems and evidence-based practice to drive internal improvements in radiology departments. Their structured, research-oriented methodology is similar to the procedural guidelines outlined in MID's policy, which sets out a highly regimented approach to drafting quality documents, including rigorous requirements for documentation format, version control, and standardized language. In contrast, Fadlallah et al. (2019) underscore the importance of narratives in policy-making, noting that while narratives can powerfully shape health policies, they risk misguidance if not grounded in evidence. This broader, conceptual framework diverges from the MID policy's procedural emphasis but aligns with its caution against unverified narratives. This policy, for instance, insists on review and verification before finalization, reflecting an implicit awareness of the need to prevent subjective or anecdotal content from compromising document integrity.

Pereira de Almeida et al.'s (2022) focus on internal departmental improvements mirrors MID's objective of enhancing internal standards and maintaining consistent documentation across the radiology department. Both stress quality assurance within healthcare processes, albeit with the literature focusing more on clinical practices and MID on procedural consistency. On the other hand, Fadlallah et al.'s (2019) broader focus on the role of narratives in policy-making reflects an outward-looking approach, examining the impact of communication on policy. This contrasts with MID's narrower scope, which is explicitly concerned with document control within a specific institutional framework rather than external policy influence. Thus, while Pereira et al. and MID are internally focused on quality assurance, Fadlallah et al. target broader policy implications beyond the immediate operational level.

Ethically, Fadlallah et al. argue for grounded, evidence-based narratives in policy, acknowledging that unchecked narratives could mislead. MID's version control, review mechanisms, and document tracking indirectly address ethical concerns, ensuring that changes in documentation are traceable and justifiable thus paralleling Fadlallah's ethical caution by instituting control against misinformation. The MID policy insists on a standardized format with clear responsibilities for authorship, review, and authorization to ensure consistency and accountability. Similarly, Pereira de Almeida et al. (2022) use factor analysis to identify key quality management dimensions, aiming for objective, reproducible results. In contrast to this, Fadlallah et al. (2019) criticize the lack of rigor in narrative-based studies, citing the need for solid frameworks to evaluate narratives' influence on policy, a challenge that aligns with MID's emphasis on methodical precision.

Pereira de Almeida et al. (2022) make actionable recommendations for enhancing radiology practice through QA and EBP. Similarly, MID sets practical standards for creating and maintaining quality documents, such as using templates and controlling version updates, thereby promoting a consistent workflow in documentation processes. Both demonstrate practical, on-the-ground relevance in their respective fields. Fadlallah et al.'s (2019) recommendations are more abstract, focusing on narrative's potential for both positive and negative policy impacts, lacking direct application to everyday healthcare operations.

In conclusion, while Pereira de Almeida et al. and MID support structured, evidence-based practices within healthcare, Fadlallah et al. highlight the power of narrative as a tool with potential risks, advocating for a balanced approach to policy-making. Both perspectives affirm that rigorous methodology and ethical safeguards are crucial in healthcare settings, whether in daily clinical practices or policy development. Overall, MID's policy aligns well with the literature's recommendations on sustaining evidence-based practices and frameworks, sharing several core concepts with the findings in these studies.

Chapter 5 - Translation of Research findings into Recommendations

The comparison between the Mater Dei Hospital's Medical Imaging Department SOPs and the REA findings reveals a mix of barriers and facilitators that influence the translation of research into actionable, evidence-based recommendations across various areas. While the MID SOPs establish a reliable, structured framework that ensures consistency in operations, there are clear gaps where incorporating insights from the REA findings could enable a more innovative, patient-focused, and efficiency-oriented approach.

In particular, integrating evidence-based practices could improve MID's responsiveness to diverse patient needs, optimize workflows, and increase overall service quality. However, achieving this would require focused support from leadership to champion the necessary changes, as well as investments in staff training to equip personnel with the skills needed for modernized practices. Additionally, the adoption of adaptive technologies—such as AI for emergency response optimization or predictive maintenance tools for managing equipment downtime—could address many current procedural limitations. Bridging these gaps through targeted actions would help turn research insights into practical improvements, making MID’s practices not only efficient but also aligned with the latest standards in patient care and operational effectiveness.

Additionally, practical limitations, such as limited resources, technology, and management support, affect the feasibility of implementing recommended standards. Complex changes, like those needed for infection control or cybersecurity, require substantial investment in training and technology that may not always be available.

Stakeholder perspectives add another layer of complexity to the research implementation. The study notes significant variability in how different groups, namely administrators, radiologists, and support staff, perceive the integration of research findings. These varying priorities and concerns can affect decision-making and adherence to new standards, slowing the adoption of changes. Finally, there is a strong emphasis on the need for regular updates to policies and protocols. However, maintaining a continuous review cycle is resource-intensive and without the necessary funding and time, healthcare settings may struggle to keep standards current, which could affect their relevance and effectiveness over time.

Below is Table 6, which outlines the barriers and facilitators to implementing Evidence-Based Practices (EBP) in the Medical Imaging Department (MID). It summarizes current limitations in the Standard Operating Procedures (SOPs) and demonstrates how insights from the literature can be leveraged to address these challenges. By connecting these limitations with actionable strategies derived from the Rapid Evidence Assessment (REA) findings, this table emphasizes the potential for enhancing the MID's processes. It highlights how incorporating research findings can overcome barriers, foster a more adaptive approach, and drive evidence-based improvements in radiology administration.

Table 6

Barriers and Facilitators to Implement the Findings

Barriers (SOP Limitations)	Facilitators (Adapting Literature Insights)
Lack of Standardization -SOPs often rely on anecdotal data rather than EBP, leading to inconsistent practices.	**Structured Protocols and Reporting** -Structured templates for radiology reporting reduce variability and improve clarity, enhancing SOP consistency. -Implement standardized protocols derived from REA findings to ensure uniformity in imaging techniques and administrative tasks.
Resistance to Change -Staff may prioritize outdated knowledge and personal judgment over EBP.	**Training and Education** -Continuous education programs ensure that staff stay updated on new practices and feel confident in adopting them. -Use targeted education to bridge the gap between research and practice, focusing on practical benefits.
Inefficient Scheduling and Workflow Management -High no-show rates and equipment downtime disrupt operational efficiency.	**AI and Predictive Analytics** -Advanced tools for dynamic scheduling and workload balancing optimize patient flow and resource use. -Implement AI-driven scheduling tools and integrate them with SOPs to proactively manage no-shows and maximize efficiency.
Infection Control Gaps -SOPs lack comprehensive infection control protocols, increasing HAI risks.	**Validated IPC Surveys and Audits** -Develop tailored infection control surveys and regular audits to monitor compliance and address gaps effectively. -Adopt rigorous cleaning and hygiene standards informed by experimental data to strengthen IPC measures.
Resistance to Technological Integration -Skepticism toward AI and technological solutions hinders innovation.	**Demonstrating Benefits of AI and Automation** -Pilot projects can display the advantages of AI in radiology, such as reducing radiologist burnout and error rates. -Address resistance through leadership endorsement, clear policies, and collaborative decision-making involving all stakeholders.
Poor Communication and Patient Engagement -Inadequate communication leads to patient dissatisfaction and complaints.	**Patient-Centered Approaches** -Emphasize family-centered care in pediatric radiology and inclusive practices for diverse populations -Train staff in effective communication strategies and implement patient feedback mechanisms to refine SOPs based on user experiences.
Limited Resource Allocation -Resource constraints prevent timely updates to SOPs and limit the implementation of best practices.	**Leveraging Cost-Effective Practices** -Adopt hybrid-scheduling models and prioritize high-impact, low-cost interventions. -Use REA findings to prioritize scalable interventions that align with budgetary constraints.

Chapter 6 - Deductions and Limitations

6.1 Deductions derived from the Study

The study highlights significant opportunities to enhance patient care, operational efficiency, and evidence-based decision-making within the Medical Imaging Department at Mater Dei Hospital. By integrating structured protocols and frameworks, the study aligns radiology operations with evidence-based standards, emphasizing the need for continuous improvement and technological advancements. The implementation of quality assurance measures, standardized reporting, and patient-centred practices can improve both patient outcomes and departmental workflow.

However, the SOPs at MID currently lack a crucial auditing aspect that is essential for ongoing quality improvement. Without regular auditing, it is difficult to ensure that protocols are being followed effectively and that any necessary adjustments are made to address gaps. This could lead to missed opportunities for refinement in clinical practices or operational procedures. Additionally, the absence of patient questionnaires to assess patient experience prevents the department from gathering valuable feedback on areas for improvement. These questionnaires are critical for identifying where patient care can be enhanced and where staff can improve communication or procedural efficiency.

Although challenges like limited resources exist, the adoption of evidence-based practices provides a clear path to address identified gaps, such as the need for standardized guidelines and improved infection control. The integration of innovations like AI in radiology workflows, along with robust cybersecurity protocols, will better equip the

department to meet emerging demands in emergency care and patient data security. Prioritizing patient-centred approaches, including the introduction of patient feedback mechanisms and continuous training for radiology staff, will further strengthen service quality, ensuring a safer, more efficient, and resilient healthcare environment.

The study's strengths lie in its comprehensive approach, utilizing a Rapid Evidence Assessment to systematically evaluate current administrative standards. This methodology identified critical gaps in operational efficiency and translated findings into actionable recommendations, underscoring the importance of quality management systems, standardized protocols, and ongoing staff training tailored to the needs of Mater Dei Hospital's Medical Imaging Department.

6.2 Limitations of the Study

The dissertation on effective standards of practice in a radiology department outlines several limitations encountered during the research process. One primary challenge was the lack of localized evidence at Mater Dei Hospital, which necessitated reliance on external peer-reviewed studies. This approach, however, may not fully account for unique local factors, such as specific resource availability and patient demographics. Furthermore, the Rapid Evidence Assessment (REA) used in this study required a narrower scope, excluding certain studies and limiting the number of reviewers. This restriction, while making the assessment feasible, also introduced a risk of selection bias, potentially affecting the comprehensiveness of findings.

Methodological variability across the studies reviewed also posed a limitation, as differences in study designs and levels of rigor affected the reliability of results. For instance, the research included cross-sectional studies, which generally offer lower reliability than randomized controlled trials. This variability can make it challenging to standardize practices and recommendations effectively.

These limitations may therefore affect the research's applicability, generalizability, and the practicality of implementing its recommendations within Mater Dei Hospital’s Medical Imaging Department.

Chapter 7 – Conclusion

This study has emphasized the importance of evidence-based administrative standards in radiology, particularly within the unique context of Mater Dei Hospital's Medical Imaging Department. By employing a Rapid Evidence Assessment (REA), this research has identified both the strengths and gaps in existing protocols. Key areas such as patient care, infection control, safety culture, and the standardization of reporting were critically analysed, providing actionable insights tailored to enhance operational efficiency and patient outcomes.

Findings underline the significance of integrating research-backed insights into local practices, ensuring that protocols are not only theoretically sound but also practical and contextually relevant. The recommendations outlined, including improved training for radiographers, standardized operating procedures, and strategic adoption of advanced

technologies like AI, aim to bridge the gap between global best practices and local challenges.

Nonetheless, the study also acknowledges its limitations, including resource constraints and the inherent complexities of translating evidence-based recommendations into action. Future research could explore longitudinal studies to measure the impact of these implementations.

This research concludes that consistent efforts to integrate the latest research, coupled with a commitment to ongoing education, can foster a culture of continuous improvement in Mater Dei's Medical Imaging Department. These advancements not only reflect best practices in radiology but also ensure the department's alignment with evolving patient needs and global healthcare standards. By fostering a culture of continuous improvement, grounded in evidence-based management, the radiology department can enhance both its service delivery and its role as a model for healthcare administration.

For future directions, research could explore the integration of advanced technologies like AI in radiology workflows, further stakeholder engagement to overcome barriers to adoption, and the application of the study's insights across other departments or hospitals to generalize findings and foster broader systemic improvements.

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Appendix 1 - Data Extraction Table

1st Author &Year	Study Design and Sample Size	Sector/Population	Main Findings	Effect Sizes	Limitations	Level of Design
1. Adem 2023	Cross Sectional Study n = 3	Equipment downtime policy and strategy planning in Ghana.	Post-installation training of equipment is insufficient. This lack of contributes to difficulties in equipment operation. More training proved to improve use and maintenance of radiology equipment and service delivery. This must be maintained regularly and therefore necessary in managing risks and establishing expectations for safe, high quality and effective radiology services. This leads to less downtime of services and lost revenue. Maintenance agreements is expensive but necessary.	p = 0.001 95% CI	Study only involves 3 teaching hospitals in Ghana.	D
2. Adomako 2022	Observational Study n = 7 Randomised Controlled Study with pre -test n = 128	Infection control protocol on radiology equipment.	Observation of radiographers showed that they practiced only partial infection control measures. Bacteria were found on radiology equipment even after cleaning, proving these items to be fomites of nosocomial pathogens and causes of possible infections. *Staphylococcus* being the most predominant pathogenic isolate identifies. Recommendations for radiology departments to adopt effective infection control protocols and enforce proper hand hygiene though periodic screening.	*p* = 0.5835	Only 2 specific cleaning agents were tested and radiographers were aware of them being observed.	C
3. Aggarwal 2023	Observational Cross Sectional Study n = 77	Patient safety errors reports analysed retrospectively.	The study identified a range of errors in radiology practice. Common issues included wrong patient identification and errors related to incorrect imaging protocols and interpretations. Strategies proposed to reduce errors included implementing standardized imaging protocols, conducting pre-procedure time-outs for verification, and enhancing post-installation training to improve process reliability and reduce the occurrence of errors. The shift towards viewing patient safety as a system property, rather than focusing solely on individual errors, was emphasized. This approach promotes a "Just Culture" where errors are seen as opportunities for system improvement rather than individual fault, fostering a culture of learning and improvement in radiological practice.	No Effect Sizes	Only voluntary reporting was considered in data collection and only 2 modalities were recorded.	D

4. Aldhebaib 2022	Cross Sectional Study n = 101	Radiation protection protocols.	Most radiographers comply with radiation protection protocols when the level of danger is higher or moderate. 94.1% of radiographers consistently wore lead aprons during procedures, but only 53.5% regularly used lead gloves and thyroid collars due to unavailability or lack of knowledge., unlike the high rates reported in studies focused solely on interventional radiology. 75.3% regularly used gonadal shielding for patients, and 75% adhered to proper collimation, exceeding rates reported in other studies.	No Effect Sizes	A larger sample size would be required to obtain better evidence.	D
5. Angcahan 2023	Article	Safety against patient falls in Philippines radiology departments.	Accidental falls are a leading cause of injury and mortality among older adults globally, with a significant impact in the Philippines where 53.6% of older Filipinos experience falls, leading to functional declines. Radiology departments and radiologic technologists (RTs) are crucial in preventing falls among older adult patients, despite limited awareness of safety standards among healthcare professionals in low- and middle-income countries. There is a need to establish an incident reporting system for sentinel events, develop risk assessment tools, and define competencies for RTs to prevent falls, highlighting the importance of promoting a safety culture in radiology departments to protect older adult patients.	No Effect Sizes	Findings only limited to in low- and middle-income countries.	E
6. Bantas 2023	Cross Sectional Study n = 76,325	Comparison in digital image rejection rates and the reasons for rejection.	Positioning errors were the most significant cause of image rejections across all anatomic body regions, emphasizing the critical role of radiographers in guiding and positioning patients accurately to produce high-quality images. Patient-related errors were higher at outpatient exams, contradicting the expectation that emergency and inpatient exams would lead to more rejections. The variability in radiographers' interpretation of image quality and lack of a standardized method for defining rejection reasons, could introduce bias.	No Effect Sizes	Inconsistencies in image rejection software versions and categorization criteria on the reliability and comparability of image rejection rates (RR) and reasons give limitations.	D

7. Barash 2023	Cross Sectional Study n = 40	Evaluation if ChatGPT-4 can be used as a decision tool for selecting examinations and generating radiology referrals in the Emergency Dept.	High-quality referral notes are crucial for radiologists to select the appropriate imaging examination. ChatGPT-4 demonstrated consistency with the American College of Radiology Appropriateness Criteria (ACR AC) and matched the imaging examinations performed in the emergency department (ED) for all cases, showing its potential in recommending suitable imaging studies and protocols. Radiologists, for their clarity, clinical relevance, and differential diagnosis rated radiology referrals generated by ChatGPT-4 highly.	No Effect Sizes	Radiologists should stay informed and updated about the capabilities and limitations of large language models like ChatGPT-4.	D
8. Bird 2022	Article	Policy recommendation for inclusion within a radiology department.	Despite societal progress, LGBTQIA+ individuals in radiology and radiation oncology departments still encounter discrimination and exclusion. Harassment and lack of inclusivity negatively influence their well-being and productivity. Effective policies are crucial to protect LGBTQIA+ staff and ensure equitable treatment across various aspects, including leave entitlements, representation in data collection, and access to safe facilities like bathrooms. Building inclusive workplaces requires both organizational practices and individual cooperation. Staff and department leaders can contribute by using inclusive language, addressing micro-aggressions, and challenging normative assumptions. Leadership is fundamental in developing and enforcing policies.	No Effect Sizes	This is only a proposal.	E
9. Bowers 2022	Cross Sectional Study n = 36	Cyberattacks and information breaches.	Loss of patient records in medical imaging is mostly due to human error on a clinician level. Radiologists and imaging technicians can prevent breaches by improving cyber hygiene, including restricting physical access to devices, regularly updating software, replacing legacy systems, disabling USB ports, utilizing application whitelisting, updating anti-malware software, and backing up data. Implementing these preventive measures can significantly reduce the risk of PHI loss, business disruptions, and costly lawsuits, ensuring better security for medical imaging data.	No Effect Sizes	Breaches are not always reported or identified.	D

10. Burns 2021	Article	Patient safety.	Handoffs are crucial for ensuring safe care transitions in radiology by communicating patient information and transferring decision-making responsibility, occurring frequently in both diagnostic and interventional radiology. Applying principles from reliability can improve handoffs in radiology through strategies aimed at the individual, team, and organizational levels, helping to minimize errors and enhance care. Improved understanding and implementation of effective handoff practices can lead to better patient safety, transition radiology practices toward high-reliability organizations, and advance overall care quality in radiology departments.	No Effect Sizes	Generalised findings.	E
11. Castillo 2020	Systematic Review	Standards of clinical information given and effects on radiology report	Providing clinical information to radiologists improves the accuracy, clinical relevance, and reporting confidence of radiology report but does not significantly affect the reporting time. The study highlights the need for standardized guidelines for referrers to provide relevant clinical information. Educating referrers on their importance and establishing criteria standards can enhance the quality of radiology reports and improve diagnostic performance. Despite technological advancements, inadequate clinical information in requests remains an issue. The study recommends improving communication between referrers and radiologists, through interventions like departmental guidelines and educational initiatives.	No Effect Sizes	No obvious limitations	C
12. Chen 2022	Cross Sectional Study n = 13985	Appointment scheduling and patient assignment affect waiting time.	Appropriate scheduling and room assignment effect patient waiting time and workload. Multiple examination rooms, different types of patients and multiple body parts were considered in a simulation model. These models aimed to balance radiographers' workloads, maintain high equipment utilization rates, and reduce patient waiting times, addressing gaps in previous research. Future research should consider patient no-shows and equipment heterogeneity. Additional methodologies like system dynamics and AHP approaches could be explored for improved efficiency in appointment scheduling and examination room assignments, potentially including priority-based routing strategies.	r = 0.39 CI 95%	No-shows are not considered and it is assumed all rooms have identical functions and equipment.	D

13. Chilanga 2022	Cross Sectional Study n = 279	Radiographers knowledge on assessing referrals in imaging.	Radiographers frequently use referral information for numerous critical purposes, which is essential for patient safety and high-quality radiological services. Involving radiographers in assessing referrals enhances their professional responsibility and fosters better collaboration with radiologists and referring clinicians. The study highlights the need for systematic evaluation and supplementation of referral information by radiographers, emphasizing that proper training is vital for maintaining ethical standards and high-quality professional practice.	Chi Square = 0.7	Different organisational legislations in respective departments and country could have influenced the responses on the use of referral information within their institutions.	D
14. Fadlallah 2019	Systematic Review	Health policy making	Narratives can positively influence health policy-making by inspiring and empowering policy inquiries, initiating policy discussions, and aiding advocacy and lobbying efforts. However, they must be carefully constructed and presented to be effective as these can sometimes lead to negative outcomes, such as the adoption of ineffective therapies, exaggerated risk perceptions, and biased resource allocation, highlighting the need for narratives to be rooted in evidence. The evidence base on the impact of narratives in health policy-making is limited and methodologically weak. There is a need for research that is more rigorous, clear definitions, and frameworks to understand better how narratives can effectively influence policy.	No Effect Sizes	Not specific to radiology departments only.	C
15. Hazell 2024	Cross Sectional Study n = 12	Perception of paediatric care in imaging.	Establishing a sense of trust with the paediatric patient is perceived as positive by the parents. It is essential to provide care based on individual needs and perspectives of the child while involving the parents. Healthcare professionals require knowledge regarding the developmental stages of children in order to provide a holistic approach, therefore training in paediatric imaging. Addressing the parents regarding pre-conceived negative feelings and anxiety due to unknown environments promotes better care.	No Effect Sizes	Generalisability of findings as 2 private hospitals were involved and no public ones.	D

16. Jalal 2021	Literature Review No Samples Sizes	Emergency Radiology Protocols.	AI is being utilized across various stages of the emergency department (ED) and emergency room (ER) workflow. This includes optimizing order entry to reduce unnecessary imaging, supporting the protocolling and acquisition of high-quality medical images, enhancing post-processing to reveal information beyond human detection, and aiding diagnostic decisions by prioritizing acute cases. While AI systems in emergency radiology show significant potential, many algorithms are still in the research phase and require clinical validation before widespread use. For AI to be effectively integrated into emergency and trauma radiology, it must be validated in real-world clinical scenarios and demonstrate benefits for a wide range of stakeholders, including patients, healthcare providers, and hospital administrators. Successful implementation could significantly improve patient care, particularly for acute cases.	No Effect Sizes	The development of these systems necessitates substantial technical effort and financial investment, with an emphasis on transparency and adherence to medical ethics.	E
17. Jimenez 2023	Literature Review	Infection prevention and control in medical imaging.	Survey research on infection prevention and control (IPC) in medical imaging (MI) predominantly examines initial aspects of IPC, rather than systemic issues such as policy, education, and stewardship. IPC surveys often put a stronger emphasis on staff knowledge and practice and are tailored to specific MI staff, interventions, and settings, addressing challenges related to resource variability, education, and training across different regions. The nature of current IPC studies in MI complicates benchmarking practices and indicates infrequent reference to national guidelines. It is recommended to use a validated survey based on comprehensive frameworks for ongoing IPC monitoring and evaluation.	No Effect Sizes	IPC surveys are used in organisations rather than published in peer-reviewed journals, hence results presented in this study are only applicable to included studies available in peer-reviewed journals.	E

18. Khoshpouri 2019	Cross Sectional Study n = 126	Uniformity of policies regarding the handling of second opining consultations of imaging studies.	Most academic radiology departments add outside imaging studies to their PACS without requiring an internal report and bill third-party payers for second opinion consultations. There is no uniform policy on handling second opinion consultations, with departments showing flexibility to meet referring physicians' needs. Developing standardized best practices would benefit patient care, address medico-legal and financial implications, enhance quality and safety, and improve clarity for radiologists regarding malpractice mitigation and reimbursement.	No Effect Sizes	The numerous exceptions to the policies suggested by several institutions and department chairs who deal with outside studies might have been subject to selection bias.	D
19. Kisembo 2021	Systematic Review of protocols	Behaviour-related determinants for implementing evidence-based interventions in diagnostic imaging.	This systematic review helps develop strategies to target specific behaviours that influence the adoption of EBIs. The "Bonn Call for Action" outlines priority actions to strengthen radiation protection for patients and health workers. One priority is implementing Clinical Imaging Guidelines (CIG) to justify medical exposures and reduce unnecessary imaging. Effective interventions require understanding the behaviours of healthcare professionals (HCPs) and addressing barriers such as social influence, beliefs about consequences, and environmental context. The Theoretical Domains Framework (TDF) can inform the development of tailored behaviour change interventions, enhancing appropriate imaging utilization, reducing unnecessary exposure, and improving healthcare outcomes, particularly in resource-limited settings.	No Effect Sizes	Lack of contextual information and data coming from primary researchers.	C

20. Kyrazis 2023	Literature Review No Samples Sizes	Radiology Department Policies.	Radiology departments can optimize care for transgender and gender diverse (TGD) patients at various stages, including electronic health records (EHRs), registration, scheduling, patient instructions, physical environment, staff training, language use in radiology reporting, institutional policies, and employee recruitment. In radiology, TGD patients report particularly negative imaging experiences, emphasizing the need for inclusive practices to improve their healthcare encounters. Radiology departments should educate staff on using chosen names, gender identities, and pronouns appropriately. Creating a welcoming environment involves implementing non-discrimination policies, gender-neutral signage, and all-gender facilities. Image acquisition should be trauma-informed and patient-centred, and radiology reports should use respectful language, avoiding unnecessary gender references.	No Effect Sizes	No mentionable limitations.	E
21. Marbouh 2020	Literature Review Retrospective Case Study No Samples Sizes	Radiology Dept. MENA region appointment scheduling.	Utilizing electronic health records and predictive models to identify patients likely to miss appointments, enabling overbooking strategies and dynamic scheduling systems to reduce no-show rates. Implementing automated reminders (texts, calls, emails) and establishing a dedicated cancellation line with supportive communication encourages timely cancellations. Considering financial penalties for missed appointments, alongside strategies to reduce patient anxiety to ensure patients are more likely to attend their appointments.	No Effect Sizes	Only X-Ray and MRI clinics were considered.	E
22. Mc Gowen 2023	Case Studies n = 10	Radiation safety practices for transgender and non-binary patients in Ireland.	Current radiation safety guidelines in Irish radiology departments do not adequately address the needs of TGNB patients radiation safety. There is a clear gap in education and training for radiographers on how to interact with and ensure radiation safety for TGNB patients. Participants emphasized the importance of cultural competence and professional development. Radiographers often rely on traditional gender markers, which can exclude or misrepresent TGNB patients. Fear of causing offense and lack of guidance contribute to reluctance among staff to propose and implement inclusive measures. These findings emphasize the necessity of updating protocols, enhancing education, and fostering a supportive environment.	No Effect Sizes	Study is small scale and opinion of TGNB patients should also be sought.	E

23. McGrath 2022	Article	Techniques for optimizing productivity and efficiency for radiologists.	Implementing best practices in radiology is essential for increased workloads, complexity, and demands for faster turnaround times, which enhances both patient outcomes and clinician well-being. Achieving productivity requires individual effort, departmental support, investment in informatics and AI, hiring ancillary staff, and providing in-service training for radiologists. Practices that adopt these productivity techniques will attract and retain top talent, ensure superior patient care, and be well-prepared for upcoming AI-driven changes in radiology.	No Effect Sizes	These are only proposed theories.	E
24. Nasir 2021	Literature Review No Samples Sizes	Emergency Radiology Policies and Framework.	Radiology department policies are crucial for the correct workflow and planning of mass casualty incidents. The support of AI within the framework improves workflow, patient safety, reduces burnout and decreases healthcare costs. The comprehensive knowledge of policies, plans, ethics and work dynamics during MCIs can help radiologists assist senior colleagues. Planning and training provides the skills to allow the correct workflow. Protocolling of the processes improves efficiency.	No Effect Sizes	Generalisability of findings and focus on radiologists.	E
25. Nyirenda 2019	Cross Sectional Study n = 62	Radiographers' infection control and policy framework knowledge in Malawi.	The study created seven sets of infection control recommendations for radiographers based on a questionnaire and literature. Recommendations for radiographers to facilitate infection control procedures were developed. Support of authorities and equipment for these recommendations to be implements is necessary. Continuous training is crucial. Infection control policies have been found effective to reduce injuries and cross infection.	No Effect Sizes	Recommendations need to be reviewed before implementation therefore may not be applicable everywhere.	D

26. Pereira de Almeida 2022	Cross-Sectional Study n = 101	Radiology Department Policies and Framework in Portugal.	Radiology departments require patient inclusion in decision-making, involvement of radiographers in quality assurance activities, and implementation of quality monitoring mechanisms to enhance their quality management systems. Radiographers show a positive attitude towards evidence -based practice (EBP). A new framework based on four factors—Support for Information, Organizational Capability to Technical Quality of Care, Patient Involvement, and Evidence-Based Radiology—should guide the development of strategic policies to improve diagnostic procedures and professional practices in Algarve's radiology departments.	r = 0.92 CI 95%	Only the radiographer perspective is considered and sampling was only regional.	D
27. Ramazan 2022	Cross Sectional Study n = 13	Radiographers' perception of using EB optimisation strategies.	Radiographers rarely utilize evidence-based practice (EBP) to implement optimisation strategies in daily practice, preferring to rely on their training, education, and departmental protocols instead of current literature and research. Key obstacles hindering the adoption of EB optimisation strategies include reluctance to change established practices, insufficient support from superiors, lack of empowerment, and personal ownership of protocols, particularly among radiographers without advanced practice. The findings highlight the need to empower radiographers to take ownership of EBP implementation and optimisation strategies in clinical settings, suggesting a requirement for increased support and encouragement to engage with and apply current evidence-based research.	No Effect Sizes	Results limited to the UK and to radiographers with degrees. Recruitment was made through social media.	D

28. Rawle 2023	Cross Sectional Study n = 12	Radiographers' decision-making process in modifying imaging techniques.	Radiographers primarily base their imaging technique decisions on image quality and personal experience rather than research-based evidence. This reliance may lead to outdated practices and suboptimal outcomes. There is a significant gap in the adoption of EB practice in radiography due to the lack of available research. Increased research on current imaging techniques and equipment is necessary to make radiographers more literate and encourage the incorporation of research-based evidence into clinical practice. Radiographers perceive a balanced relationship with radiologists, focusing on optimizing image quality while radiologists determine projections. Both roles should integrate research-based evidence, patient circumstances, and clinical experience to deliver effective patient care.	No Effect Sizes	Only private sector radiographers were interviewed.	D
29. Rosier 2020	Theoretical paper and Case Study review Cross Sectional Study n = 55	Patient safety in Radiology.	The patient safety team addressed dissatisfaction with the Root Cause Analysis (RCA) process by applying a structured improvement framework. Using post-RCA surveys to measure satisfaction, they successfully increased levels among participants and facilitators. The team utilized process improvement methodologies to enhance their own workflows, learning about measuring complex processes, selecting appropriate metrics, and standardizing work, leading to improvements in the quality of their patient safety program. By improving the RCA process, the patient safety team strengthened the department's ability to report, learn from, and prevent patient safety events. This effort has resulted in a more robust and continuously improving patient safety program, fostering a stronger overall culture of safety within the department.	No Effect Sizes	Other departments may find difficulty in obtaining data required to apply the same methods.	D
30. Ryan 2020	Literature Review	Radiology major incident planning and recommendations.	Diagnostic radiology is crucial in mass casualty incident (MCI) responses but is often underrepresented in major incident planning (MIP) and simulations. Radiologists frequently lack familiarity with their roles. Key issues in previous MCIs include staff alert mechanisms, patient identification and tracking, scan ordering, and result communication. Simulations can help address these issues and prepare staff. There is a need for the development of reliable MCI alert technology. Identifying limitations of local imaging resources and capacity is essential for effective radiology utilization in MCIs.	No Effect Sizes	Generalisability of findings.	E

31. Sauré 2020	Theoretical Study And Cross-Sectional Study.	Appointment scheduling	The research links prioritising and appointment scheduling by incorporating stochastic service times, accounting for both pre-service waiting time and day-of-service idle and overtime, and provides a model adaptable for both deterministic and stochastic service times. Numerical analyses show that deterministic models perform almost as well as stochastic models, even with significant variability in service time distributions, suggesting that incorporating stochastic service times might not significantly improve scheduling policies. The paper includes a comprehensive literature review of advance and appointment scheduling and suggests future research avenues, including using non-linear approximation architectures and addressing within-day waiting and idle times in more complex models.	No Effect Sizes	Not specific to radiology departments only.	D
32. Sheehan 2020	Randonmised Controlled Study n = 76,468	Quality improvement to detect errors in radiology examination ordering.	The study demonstrated that electronic trigger tools were highly effective in detecting "wrong-side" misidentification errors in radiology examination ordering. These tools identified significantly more errors compared to checklist-based methods alone, highlighting their utility in enhancing error detection rates. Despite this, the electronic triggers did not capture a substantial number of errors detected by pre-imaging checklists. This stresses the continued importance of checklist-based. The findings suggest a need for developing additional trigger tools to complement existing methods and maximize error detection rates.	1. p < 0.00 001; 95% CI 2. p = 0.02; 95% CI	Although the tool can improve the errors, checklist cannot be excluded.	C
33. Van den Berg 2019	Cross Sectional Study n = 94	Malpractice in radiology.	Written patient complaints about radiological services are infrequent, and nearly half are of low severity. The frequency has not increased over time, and complaints are most often related to interventional radiology and cross-sectional imaging. Common issues include quality, safety, timing, access, and communication. Outpatients and shared complaints involving departments like surgery and orthopaedics are prevalent. The invasive nature of interventional radiology and long waiting times for elective procedures are notable triggers. To reduce complaints, prioritizing staff education and continuous improvement systems targeting identified issues is noted and routine patient satisfaction surveys.	p = 0.001 95% CI	Focus on unsolicited complaints in a European tertiary care setting, potential underreporting, and the lack of patient feedback on complaint resolution.	D

34. Vosshenrich 2023	Cross Sectional Study n = 767,256	Structured radiology reporting.	The transition to structured reporting templates from free-text reporting significantly enhanced linguistic standardization in radiology reports. Additionally, the distinguishability of different report types increased, improving the clarity and specificity of the reports. Structured reporting templates maintained high consistency over time indicating stable and uniform reporting practices. Higher report standardization and consistency may reduce variance between different radiologists or institutions, enhancing readability and comprehensibility for report recipients. This can improve clinical decision-making and reduce miscommunication. This is important for patient planning and clinical routines. This also eases workflow and research scenarios.	Overall p = 0.06	Vector model used is only one kind.	D
35. Zattar da Silva 2021	Comparative Study No Samples Sizes Case Study n = 2515	Capacity planning in Radiology Departments.	A finite-horizon Markov Decision Process (MDP) model was developed to allocate radiology capacity, accounting for varying no-show probabilities of ambulatory patients in order to minimize waiting, overtime, and penalty costs through dynamic programming optimization. Applied to real data from a Brazilian public hospital, the optimal policy achieved the lowest total daily cost in 212 out of 216 scenarios. Double overbooking and two resources available in overtime were key recommendations, with an alternative policy prioritizing outpatients performing closest to the optimal. Radiology department managers can minimize system costs by observing the state of the system and making informed decisions on patient admissions.	Case Study r = 0.5	Generalisability of findings and focus on one modality at a time.	E

Appendix 2 - Overview of Excluded Studies

1. Adamsbaum 2024	Full text is not in English.
2. ESR 2019	Clinical audits importance from radiological societys' perspective.
3. Larson 2020	Not relatable to radiology departments.
4. Perchik, 2022	The study is about inclusion of radiology recruits.
5. Qurashi 2022	Perceptions regarding accreditation programmes of radiology professionals.
6. Recht 2020	Not an empirical article.
7. Sitareni 2023	Full article not available.
8. Tsapaki 2022	QA and QC of Ultrasound machines to reduce diagnostic errors.