# Evaluating Data Management Practices: A Case Study on Queensland Health

**ICT701 Managing Data**

**Assignment 3: Task 3 - Data report**

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**Executive Summary**

This comprehensive report, prepared for Queensland Health [QH] by XYZ Consulting, reviews the condition of data management in the healthcare industry and highlights its expanding role in modern healthcare delivery. With over 164 years of history, QH played an essential role in providing health services to the public in Queensland. The DAMA-DMBOK eleven knowledge domains framework is mainly used to compare the current management practices in QH. Although initial results highlight QH's strict data management and security measures, there are apparent gaps in data storage and operations, reference and master data policies that require urgent action. These deficiencies have consequences ranging from possible data errors to difficulties adapting to a rapidly changing digital context. QH needs to strategise and implement corrective actions to maintain efficiency in information management.

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## 1. Introduction

This report is presented to Queensland Health [QH] by XYZ consulting company to explore the importance and impact of effective data management within the healthcare sector. Data management becomes crucial for a continuously expanding organisation to monitor and protect data (University of Sunshine Coast, 2023). This research thoroughly overviews the company's existing data management status, the risks of ignoring gaps, and the advantages a robust data management strategy can deliver.

This report covers the current data management techniques. It analyses those against other best practices by the Data Management Association's Data Management Body of Knowledge [DAMA-DMBOK] to rule out potential areas for progress. While this report's primary aim is to explore data management, it also addresses the operational effectiveness and strategic decisions that impact patient care and consumer satisfaction.

This paper provides information on QH's existing data management policies and protocols compared to best practices and standards. Despite all efforts to ensure a detailed study, the unavailability of some proprietary or sensitive information has somewhat limited the study.

## 2. Body

### 2.1 Organization Overview

Operating in the public health system of the Queensland government, QH provides integrated health care services through 16 Hospitals and Health Services [HHS] primarily to residents living in Queensland, Australia (Wikipedia, 2022). QH was established in 1859 with headquarters at 33 Charlotte Street, Brisbane, Queensland, Australia. The 164-year-old organisation is the largest healthcare provider in QLD, providing inpatient, outpatient, emergency and community care services in multiple aspects of adult and child health, including maternity services, mental health and health promotion programs. QH reports employing 97,207 personnel as of 2020-21 and an annual budget of A$22.24 billion in 2021-22. The Department of Health and Ageing [DoHA] regulates QH's management and performance, including financial support, supply, procurement, HR and IT services (Queensland Health, 2022f).

### 2.2 Data Maturity Assessment

A data maturity model gauges an organisation's data management practices, progressing from initial stages to automated goals (Sebastian-Coleman, 2018). The DMBOK, formulated by DAMA International, offers an all-encompassing framework covering eleven key areas, such as data governance and quality, to enhance an organisation's data management. Its primary objective is to standardise data management processes, improving data value (Gils, 2020; Ganjhu, 2023; Sebastian-Coleman, 2018). Despite robust data management policies, QH exhibits certain areas that warrant enhancement. Following is the DAMA-DMBOK maturity assessment for each knowledge area as illustrated in the maturity assessment level table (see Appendix 1, Table 1) within QH:

1. **Data Governance**

   QH has proper standards and policies regarding personal information collection and protection. In most departments, governance policies have been established with explicit authorisations. The Information Management Strategic Governance Committee [IMSGC] defines the data custodianship and data governance guidelines by the Queensland Government that govern inter-departmental data usage. Furthermore, QH has eleven legislations for information protection and processes (Queensland Health, 2023a; Queensland Health, 2023b; Queensland Health, 2023e). With no proper information regarding the degree of execution and improvement, the maturity of this knowledge area in QH is Level 4 (Managed) (see Appendix 1, Table 1), as there are defined authorisations, policies, standards, skilled staff with clear roles and responsibilities and a well-defined legal framework for data management.

2. **Data Architecture**

   Data architecture stores and processes data in an organisation (Fleckenstein & Fellows, 2018). QH has well-defined practices for clinical records management in a centralised system called Queensland Health Informatics Services and Advisory Services. Furthermore, they have mandated terminology like SNOMEDCT-AU and LOINC for data categories. They have well-defined data integration services for internal and external applications like Enterprise Integration Platform and Secure Information Transfer Service [STS] (Queensland Health, 2023c; Queensland Health, 2023b; Queensland Health,

2023e). The maturity level of Data Architecture in QH can be evaluated to be level 3 (see Appendix 1, Table 1).

3. **Metadata management**

   The QH data standard policy's data quality and integrity section has mentioned using a standard framework to maintain and report metadata about data (Queensland Health, 2023b; Queensland Health, 2023e). Bounded by Queensland Government Enterprise Architecture [QGEA], the structured metadata management process is in maturity level 4 (Managed) (see Appendix 1, Table 1).

4. **Data Quality**

   By adopting the Queensland Health Data Quality Framework, QH has properly maintained data quality factors like accuracy and timeliness. This indicates continuous monitoring, reporting, and staff awareness needed in the policy (Queensland Health, 2023b). This robust approach to data quality management can be placed in Level 5 (Measured) (see Appendix 1, Table 1).

5. **Data modelling & Design**

   Data modelling and design is the set of guidelines to manage data (Dama International & Data Management Association, 2017). QH has proper data governance that has defined data integrity, quality and confidentiality, suggesting that they implemented data modelling practices and enterprise data standards like SNOMED CT-AU and AMT across its enterprise. The policy has mentioned the requirement of centralised repository usage. They effectively implement standardised terms for consistency (Queensland Health, 2023b). Since they have no continuous improvement policy, QH’s data modelling is between level 4 (Defined) and level 5 (Measured) (see Appendix 1, Table 1) as they have defined the standards and process and reviews and follow in a few aspects.

6. **Data Storage & Operations**

   Data storage and operations define the practices and technologies used to store, manage, utilise and protect data in an organisation (Sebastian-Coleman, 2018). Based on QH's policy and data management standards, Data Storage and Operation are in level 1 (Initial/ad-hoc) (see Appendix 1, Table 1). Although there are clear policies regarding the data migration and quality of data, standards have yet to be defined regarding storage (Queensland Health, 2023b).

7. **Data Security**

   Data security means securing the transient data and data at rest (Petkovic & Jonker, 2007). QH has clear standards and policies regarding user access control. There is a practice of classifying the data with Information security classification and handling guidelines. Compliance or statutory obligations is one of the fundamental needs for the staff. Furthermore, the shared data must be accurate and timely, and all staff must meet legislative requirements (Queensland Health, 2023b). As mentioned by Queensland Health (2023d), with the Information Privacy Act 2009 (Qld), Public Records Act 2002, proper data lifecycle and standard access control, data security in QH falls within Level 4 (Managed) (see Appendix 1, Table 1).

8. **Data Integration & Interoperability**

   Data integration and interoperability describe the flow and integration of data in an organisation (Sebastian-Coleman, 2018). QH has clarified that the Queensland Health Interoperability – Integration Platform Strategy must be followed during the data integration. Furthermore, all the staff must comply with Information Interoperability Foundations in QH, which implies a clear direction and strategy. Data interpretations are consistent across all the systems by adhering to Queensland Health Terminology standards and Department of Health Enterprise Architecture policy, Clinical data standardisation standard and the statistical and corporate data standardisation standard. Seamless integration is obtained using a structured approach (Queensland Health, 2023b). Although there are clear standards and guidelines, continuous improvements have been mentioned. Thus, the knowledge area is in level 4 (Managed) (see Appendix 1, Table 1).

9. **Document and content management**

   Document and content management is a knowledge area that encapsulates the standards for handling the data and information not stored in relational databases (Sebastian-Coleman, 2018). QH has a document lifecycle and content development strategy and implemented legislation policies like the My Health Records Rule Act 2014 (Cwth) and My Health Records Rule 2016. They have also customised standards for date and time entry in paper-based records. Data integration includes structured and nonstructured integration. ARMA International guidelines are implemented to protect the documents

and content (Queensland Health, 2023b). Hence, QH has a structured management approach with an overall maturity level of Managed (see Appendix 1, Table 1).

10. **Data Warehousing & Business Intelligence**

    Although the data warehousing portion is not explicitly mentioned in QH's policy, they have detailed, approved and consistent business intelligence and data analysis procedures (Queensland Health, 2023b; Queensland Health, 2023e). Queensland Data Linkage Framework has been implemented for any need for data linkage. Hence, the maturity level is level 3 (Defined) (see Appendix 1, Table 1).

11. **Reference & Master Data**

    No policy has been defined regarding Reference and Master Data. Hence, it can be kept in Level 0 maturity (see Appendix 1, Table 1).

Overall, QH has implemented managed data management policies in most domains and knowledge areas with some exceptions, mainly reference and master data. This indicates that QH needs further improvement in the data management standards.

### 2.3 Analysis of Current Data Management Practices

Upon reviewing QH's data maturity assessment based on DMBOK, it can be evident that although many knowledge areas are well-defined and implemented, there are still some gaps and risks in the policy framework. With no concern regarding the Reference and Master data in policy and procedure, there is a risk of data inconsistency among various departments (Cervo & Allen, 2011). Additionally, the lack of data warehousing guidelines indicates the potential fallout in the data storage and retrieval process (Agarwal et al., 2022). Furthermore, continuous improvement is not a part of the standards for several knowledge areas, including Data Modeling and design, Data Security and so on. This might result in the incapability of adapting to a changing environment (Allen & Cervo, 2015). With such gaps in the current data management practices, QH faces some data risks. As QH implements level 4 data governance practices, this may result in an inability to enforce consistently and review standards. Inadequate policy regarding storage might lead to a risk of data loss and breaches (Sebastian-Coleman, 2018).

Gaps in data management practices pose severe risks to the organisation's data standards. Data consistency, standardised operations and rich data insights can be obtained by improving data security and filling the gaps regarding data storage and business intelligence in the current policies (Mahanti, 2021).

## 3. Conclusions

The data management competencies of Queensland Health (QH) are remarkable, especially in the knowledge area of data governance and data quality and security. This audit, however, points out significant shortcomings, particularly in Data Storage and operations and Reference and Master Data. As data management practices directly impact patient care and operational effectiveness, closing the identified gaps is essential. It is crucial to continuously improve these areas for QH to adapt to the changing digital landscape. Overall, QH can attend to exceptional standards in healthcare data management through targeted and step-based improvement initiatives, further boosting patient care and overall operation.

## 4. Recommendations

It is crucial for an organisation as critical as QH to follow improved and optimised data management policies (Abraham et al., 2019). To utilise the full potential of data and mitigate data-related risks, QH can implement the following strategic steps:

1. Stage-based approach for improvement in maturity: From initial awareness of the employees to regular feedback and improvement of the existing policy, it will help the organisation to keep up with the requirements of rapid technological evolution (Gonzalez, 2018).
2. Employee training: QH must focus on training the employees about the needs and requirements of robust data management requirements. This increases the employee's capacity to implement best practices (Pearce, 2023).
3. Regular audits of policies and procedures implementation should be conducted. Sensitive organisations like OH must be updated to comply with the latest digital needs to avoid data management-related problems by regularly auditing performance (Bull et al., 2014; Dama International & Data Management Association, 2017).

4. To resolve the problems in gap analysis, OH must use a stage-based approach to create and implement policies about reference and master data and eventually improve it from the ad hoc stage to the optimised stage. Additionally, they must make optimised policies regarding data warehousing by using the latest SQL and NoSQL databases (Sebastian-Coleman, 2018; Dama International & Data Management Association, 2017).

**References**

Abraham, R., Schneider, J., & Brocke, vom. (2019). Data governance: A conceptual framework, structured review, and research agenda. *International Journal of Information Management*, *49*, 424–438. https://doi.org/10.1016/j.ijinfomgt.2019.07.008

Agarwal, S., Tiwari, M. D., & Tiwari, I. (2022). E Governance Data Center, Data Warehousing and Data Mining: Vision to Realities. In *Google Books*. CRC Press. E Governance Data Center, Data Warehousing and Data Mining - Google Books

Allen, M., & Cervo, D. (2015). Multi-Domain Master Data Management: Advanced MDM and Data Governance in Practice. In *Google Books*. Morgan Kaufmann. Multi-Domain Master Data Management - Google Books

Bull, F. C., Milton, K., & Kahlmeier, S. (2014). National policy on physical activity: the development of a policy audit tool. *Journal of Physical Activity and Health*, *11*(2), 233–240.

Cervo, D., & Allen, M. (2011). Master Data Management in Practice: Achieving True Customer MDM. In *Google Books*. John Wiley & Sons. Master Data Management in Practice - Google Books

Dama International, & Data Management Association. (2017). *DAMA-DMBOK: Data management body of knowledge (2nd edition)* (D. Henderson & S. Earley, Eds.). Technics Publications, LLC.

Fleckenstein, M., & Fellows, L. (2018). Modern Data Strategy. In *Google Books*. Springer. Modern Data Strategy - Google Books

Ganjhu, P. K. (2023, May 24). *The DAMA-DMBOK Functional Framework: A Comprehensive Approach to Effective Data Management*. Medium. https://pawankg.medium.com/the-dama-dmbok-functional-framework-a-comprehensive-approach-to-effective-data-management-3de06af66cf2

Gils, B. van. (2020). Data Management: a gentle introduction: Balancing theory and practice. In *Google Books*. Van Haren. Data Management : a Gentle Introduction - Google Books

Gonzalez, L. (2018, October 20). *Chapter 1: Data Management, Governance and Interoperability - Data Interoperability Guide - UN Statistics Wiki*. Unstats.un.org. https://unstats.un.org/wiki/display/InteropGuide/Chapter+1%3A+Data+Management%2C+Governance+and+Interoperability#:~:text=Put%20in%20place%20a%20data

Mahanti, R. (2021). Data Governance and Data Management: Contextualizing Data Governance Drivers, Technologies, and Tools. In *Google Books*. Springer Nature. Data Governance and Data Management - Google Books

Office of the Government Chief Information Officer. (n.d.). *Prepared by the Office of the Government Chief Information Officer Data Management Maturity Assessment ADVICE NOTE*. https://prod-g2g-assets.s3.amazonaws.com/documents/Data_Management_Maturity_Assessment_Advice_Note.pdf

Pearce, G. (2023, October 12). *Data Management Proficiency: Practical Insights for Quality, Security and Trust*. ISACA. https://www.isaca.org/resources/news-and-trends/isaca-now-blog/2023/data-management-proficiency#:~:text=

Petkovic, M., & Jonker, W. (2007). *Security, privacy, and trust in modern data management*. Springer Berlin Heidelberg. https://books.google.com.au/books?id=Tca3vVbnRc0C

Queensland Health. (2023a). *Data and application custodianship -Standard*. https://www.health.qld.gov.au/__data/assets/pdf_file/0021/930108/qh-imp-469-3.pdf

Queensland Health. (2023b). *Data management -Standard*. https://www.health.qld.gov.au/__data/assets/pdf_file/0011/1210142/qh-imp-279-4.pdf

Queensland Health. (2023c). *Enterprise Architecture -Policy 1. Statement*. https://www.health.qld.gov.au/__data/assets/pdf_file/0028/396055/qh-pol-402.pdf

Queensland Health. (2023d, September 23). *Queensland Health Privacy Policy*. Www.health.qld.gov.au. https://www.health.qld.gov.au/system-governance/records-privacy/queensland-health-privacy-policy

Queensland Health. (2023e, September 27). *ICT policies*. Www.health.qld.gov.au. https://www.health.qld.gov.au/system-governance/policies-standards/ict-policies

Queensland Health. (2023f, August 14). *Statistical Services Branch*. Www.health.qld.gov.au. https://www.health.qld.gov.au/hsu

Sebastian-Coleman, L. (2018). Navigating the Labyrinth: An Executive Guide to Data Management. In *Google Books*. Technics Publications. Navigating the Labyrinth - Google Books

University of Sunshine Coast. (2023). *1.2 The importance of managing data*. Usc.edu.au. 1.2 The importance of managing data: Managing Data (usc.edu.au)

Wikipedia (2022). *Queensland Health*. Wikipedia; Wikimedia Foundation. https://en.wikipedia.org/wiki/Queensland_Health

## Appendices

### Appendix 1: Chart and table for Data Maturity and DAMA-DMBOK framework

According to Sebastian-Coleman (2018) and the Office of the Government Chief Information Officer (n.d.), the ordered set of levels in data maturity commonly includes:

| Level of maturity | Criteria |
|---|---|
| Level 0: No capability | No assessment at all |
| Level 1: Initial or Ad Hoc | Little governance with limited tools, roles and control |
| Level 2: Repeatable | Emerging Governance with some roles and control |
| Level 3: Defined | Data is integrated with organisation and measurable improvements. |
| Level 4: Managed | Centralised governance, risk management and data quality |
| Level 5: Optimized | Continuous improvement, reduced risk, data quality measurement metrics. |

*Table 1 Maturity assessment level table*

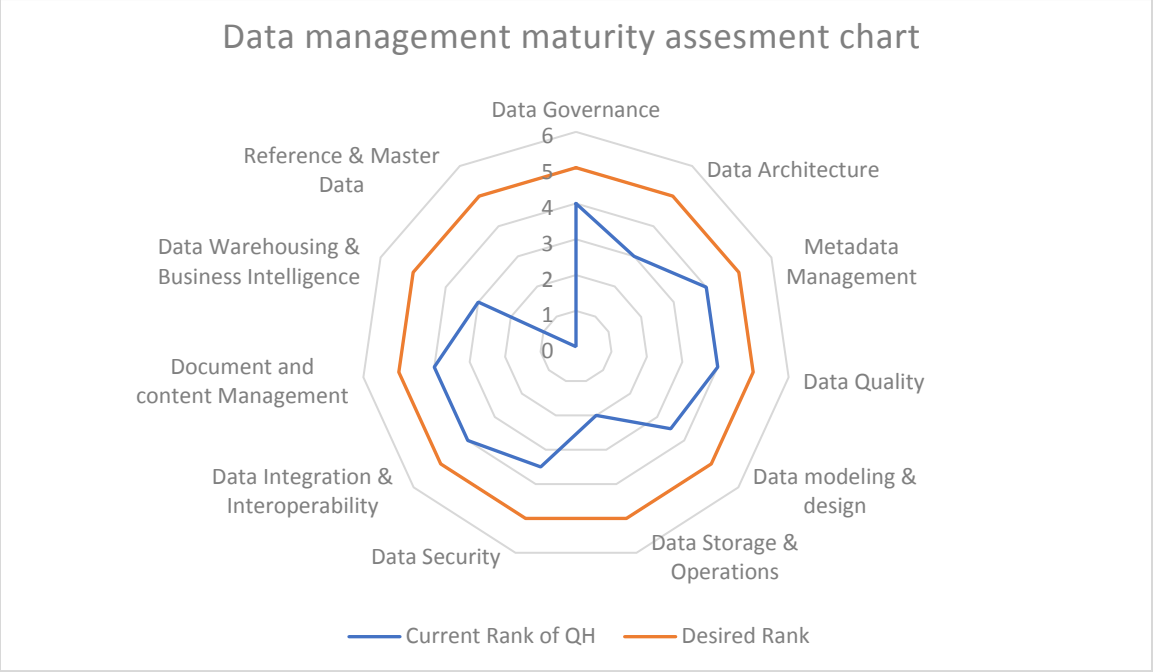


*Figure 1 Data Management Maturity Assessment Chart*

**Appendix 2: Maturity Level Assessment Table**

Based on the activity (operational maturity), tools (tool integration), standards (defined standards and procedures) and people and resources (human resources and skills), each knowledge area is assessed on four different maturity levels. Finally, the overall maturity level of each domain has been calculated.

**2.1 Maturity Levels Explanation**

Based on the research (Sebastian-Coleman, 2018), levels assigned for categories in the assessment table are as follows:

1. Not started: The knowledge domain has not been addressed.
2. In process: Undergoing efforts to implement policies.
3. Functional: Well-established practices and processes.
4. Effective: Effective knowledge is management with optimised practices.

The following assessment table has been created based on the detailed study of maturity levels in various knowledge domains in QH (Queensland Health, 2023a; Queensland Health, 2023b; Queensland Health, 2023c; Queensland Health, 2023d; Queensland Health, 2023e).

| Knowledge Area | Activity | Tools | Standards | People and Resources | Maturity level |
|---|---|---|---|---|---|
| Data Governance | 4 | 3 | 4 | 4 | Level 4: Managed |
| Data Architecture | 3 | 3 | 3 | 3 | Level 3: Functional |
| Metadata Management | 4 | 3 | 4 | 3 | Level 4: Managed |
| Data Quality | 4 | 3 | 4 | 4 | Level 5: Optimised |
| Data modeling and design | 4 | 3 | 4 | 4 | Level 4: Managed |
| Data storage and operations | 2 | 1 | 1 | 1 | Level 2: In process |
| Data security | 4 | 3 | 4 | 4 | Level 4: Managed |
| Data integration and interoperability | 4 | 4 | 4 | 4 | Level 4: Managed |
| Document and content management | 4 | 3 | 4 | 4 | Level 4: Managed |

| | | | | | |
|---|---|---|---|---|---|
| Data warehousing and business intelligence | 3 | 3 | 3 | 3 | Level 3: Functional |
| Reference and master data | 1 | 1 | 1 | 1 | Level 0: No capability |

*Table 2 Data Management Maturity Assessment table for QH*

**Appendix 3: New Data Policy generated through AI.**

**3.1 Master and Reference Data Management Policy**

- **Policy Title**: Master and Reference Data Management Policy
- **Purpose**: To establish a structured approach for managing master and reference data within Queensland Health (QH), ensuring consistency, accuracy, and availability of critical data across the organisation.
- **Scope**: This policy applies to all departments, units, and personnel handling master and reference data within QH.
- **Policy Sections:**
    1. Definition and Classification: Identify and classify master and reference data critical to organisational operations.
    2. Data Stewardship: Assign data stewards to manage master and reference data, ensuring accuracy and consistency.
    3. Data Governance: Establish mechanisms to oversee master and reference data management, including data quality, sharing, and usage policies.
    4. Data Architecture: Design and implement data architectures that support efficient management and utilisation of master and reference data.
    5. Data Quality: Implement measures to ensure the accuracy, consistency, and completeness of master and reference data.
    6. Data Sharing and Accessibility: Ensure secure and controlled access to master and reference data, adhering to legal and organisational data privacy and security policies.
    7. Data Lifecycle Management: Establish processes for managing master and reference data, including creation, maintenance, and retirement.

8. Training and Awareness: Conduct training and awareness programs to educate staff on the importance of master and reference data management and their roles in ensuring data quality and consistency.

- **Implementation**: This policy shall be implemented immediately upon approval, and all departments and units shall align their data management practices with the stipulations of this policy.
- **Monitoring and Review**: Conduct regular audits and reviews to ensure compliance with this policy and improve master and reference data management practices within QH.
- **Related Documents**: QH Data Governance Policy, QH Data Quality Framework, QH Data Security Policy.
- **Approval and Revision**: The Data Governance Committee shall review and approve this policy. Revisions shall be made as necessary to keep the policy current and effective.

**3.2 Data Warehousing Management Policy**

- **Policy Title**: Data Warehousing Management Policy
- **Purpose**: To manage, organise, and ensure the accessibility and security of data within Queensland Health's (QH) data warehousing systems.
- **Scope:** All data warehousing systems and related operations within QH.
- **Policy Sections**:
  1. Architecture Design: Establish a standardised architecture for data warehousing to ensure data consistency and reliability.
  2. Data Integration: Ensure seamless data integration from various sources into the data warehouse while maintaining data integrity.
  3. Access Control: Implement strict access control measures to ensure only authorised personnel can access the data warehouse.
  4. Data Security: Ensure the security and privacy of data within the warehouse, complying with legal and organisational policies.
  5. Data Quality: Maintain high data quality standards within the data warehouse to support accurate analytics and decision-making.
  6. Maintenance and Monitoring: Regularly maintain and monitor the data warehouse systems to ensure optimal performance.

7. Compliance Audits: Conduct periodic audits to ensure compliance with this policy and other regulatory requirements.

- **Implementation**: Immediate implementation upon approval, aligning all data warehousing practices with this policy.
- **Monitoring and Review**: Regular reviews and updates to this policy as necessary to align with evolving organisational needs and regulatory changes.
- **Related Documents**: QH Data Governance Policy, QH Data Security Policy, QH Data Quality Framework.
- **Approval and Revision**: The Data Governance Committee reviewed and approved it, with revisions made as necessary to address emerging challenges and opportunities.

**3.3 Data Management Optimization Policy**

- **Policy Title**: Data Management Optimization Policy
- **Purpose**: Elevate existing data management practices to an optimised level across all data management knowledge areas within the organisation.
- **Scope**: All data management policies and procedures are currently in place.
- **Policy Sections**:
  1. Continuous Improvement: Establish a framework to evaluate and enhance data management practices routinely.
  2. Training and Awareness: Enhance staff training programs on data management best practices and emerging technologies.
  3. Technology Adoption: Adopt advanced data management technologies to streamline and optimise data processes.
  4. Performance Metrics: Develop and track performance metrics to monitor the effectiveness of data management practices.
- **Implementation**: Coordinate with all departments to implement optimisation strategies.
- **Monitoring and Review**: Regularly review this policy and its implementation to ensure alignment with the organisational goals and regulatory compliance.
- **Related Documents**: All existing data management policies and procedural documents.
- **Approval and Revision**: Approval by the Data Governance Committee, with periodic revisions, to stay updated with evolving data management standards and organisational needs.

### 3.4 Queensland Health Data Storage Policy

- **Policy Title**: Queensland Health Data Storage Policy
- **Objective**: Ensure secure, efficient, and compliant data storage within Queensland Health.
- **Scope**: All data generated, collected, processed, or managed by Queensland Health.
- **Policy Sections**:
    1. Data Classification: All data must be classified based on sensitivity and business criticality following Queensland Health's Data Classification guidelines.
    2. Storage Allocation: Allocate storage resources based on data classification, legal, and business requirements.
    3. Data Encryption: Encrypt sensitive data at rest using industry-standard encryption methods.
    4. Data Retention and Deletion: Retain data per legal and business requirements and securely delete no longer needed data.
    5. Access Control: Implement strict access controls to ensure only authorised personnel can access data.
    6. Audit and Monitoring: Monitor and audit data storage systems to ensure compliance with this policy and detect unauthorised access or data loss.
    7. Backup and Recovery: Implement robust backup and recovery procedures to ensure data availability and integrity.
- **Review**: This policy should be reviewed annually or as required by changes in legal or business practices.
- **Enforcement**: Any violations of this policy may result in disciplinary action by Queensland Health's disciplinary procedures.
- **References**: Relevant laws, regulations, and Queensland Health's guidelines.
- **Document Management**: Version control to ensure up-to-date policies are accessible to all employees within Queensland Health.

I acknowledge using generative AI tools to generate or enhance materials included within this assessment task in modified form.