Health Service Strategy and Planning Unit

Metro North Medical Imaging and Nuclear Medicine Clinical Services Plan 2025–2030

Metro North Health

Queensland Government

Metro North Health acknowledges the Traditional Custodians of the Land upon which we live, work and walk, and pay our respects to Elders both past and present.

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Introduction

Medical imaging[1] is a clinical knowledge service that is pivotal to modern medical practice. Medical imaging including its fusion of nuclear medicine and therapeutic techniques has reshaped the way care is delivered through timely accurate diagnosis, treatment, monitoring and outcome prediction of many diseases and injuries. The shift towards personalised medicine is propelling its application in areas such as oncology and surgery:

- 3D printing produced from accurate Computed Tomography (CT) imaging in cardiothoracic patients amidst other specialties including orthopaedics and vascular, to manufacture personalised prostheses for treatment, with follow up achieved via CT and Magnetic Resonance Imaging (MRI)
- Positron Emission Tomography (PET) SPECT (Single-Photon Emission Computed Tomography) and radiopharmaceuticals for theranostic services, which integrates diagnostic imaging and targeted therapy to personalise patient care in oncology.

Metro North Health is witnessing increased demand for medical imaging services that can be attributed to many factors notably, changing models of care; inability to access recent imaging acquired elsewhere leading to repeat imaging; variation in scanning indications and subsequent over ordering; complexity of examinations requested[2]; advances in medical treatment; increasing patient, referrer and facility expectations; and changes to revenue from private practice billing. This increase in demand can be detrimental to report turnaround timeframes and lead to delays in patient care.

Further increased demands places pressures on workforce which is then exacerbated by gaps in the projected pipeline of the profession, ongoing professional recruitment challenges for radiologists, radiographers, sonographers, nuclear medicine scientists, nuclear medicine specialists, radiopharmaceutical scientists, radiation safety officers and the added complexity and competition from the more flexible and lucrative private sector.

Despite these challenges, the future of medical imaging is exciting. The acceleration of scientific and technological discoveries offers greater ability to deliver care on an individual level. With such advances, Metro North Health and the broader health system must give due consideration to the role of new technology and how it is systematically evaluated to meet the diverse needs of patients that enter our care.

The advancement of medical imaging and application to diagnose, treat, and manage complex patient conditions, and the potential cost savings to other Departments realised by the use of medical imaging diagnostics and interventions should be acknowledged in funding arrangements. It is vital Metro North Health grow imaging capabilities and capacity, alongside supportive digital, workforce and infrastructure solutions supported by sustainable funding models to provide accessible, value-based health care to our patients.

The Metro North Health Medical Imaging and Nuclear Medicine Clinical Services Plan 2025-2030 (the Plan) provides an opportunity to articulate the strategic direction for medical imaging including nuclear medicine services in Metro North Health over a five-year timeframe.

1 In this document medical imaging is an umbrella term that includes radiology and nuclear medicine. Medical imaging specialists includes both radiologists and nuclear medicine specialists.

2 Including multiphase imaging, production of multiple reconstructions and volume rendered images, production of specific series for third party applications – stereotactic surgery, bronchoscopy guidance, additive manufacturing, surgical planning

How to read this plan

The Plan aims to provide direction and guidance to the development of high-quality medical imaging and nuclear medicine services across the health service over the next five years. It is anticipated the Plan will deliver improved outcomes across seven domains including access, person centred care, safe and effective care, efficient care, integrated care, research and innovation and education and training.

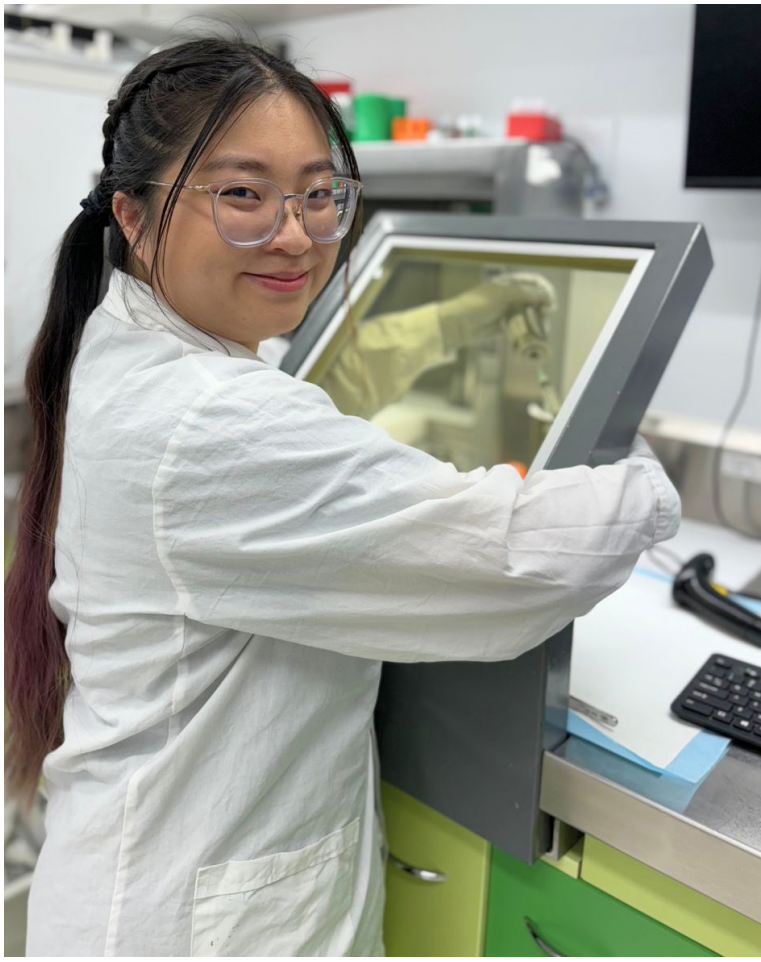
The Plan has been prepared in two parts:

Part A: the clinical service plan

– presents a summary of issues and opportunities, service principles, future directions, objectives, actions and supporting measures that will guide service delivery and enhancement for medical imaging services over the next five years. The actions will be categorised over three horizons: year 1, year 2 to 3 and 4 and beyond in implementation planning.

Part B: background information

– presents summary information on the background papers developed including service profile, service activity and trends and the population paper and acronyms.



How we got here

In developing the Plan, we consulted with key clinicians and executive working in Metro North Health. The project was governed by a steering committee with strategic guidance sought at key stages. The Plan provides actions to be implemented to improve the service delivery arrangements for medical imaging and nuclear medicine services in Metro North Health. The Plan aligns to multiple Metro North Health and statewide planning priorities.

Many actions in the Plan will be delivered by doing things differently within existing resources. Some actions will require resources to progress. It is important to recognise that medical imaging services operate within a health service system with competing needs and finite resources and that allocation of new resources required to progress the actions will be subject to normal budgetary processes.

Consumer co-design will be a key focus as actions are implemented. Recognising Metro North Health priority to improve health equity for Aboriginal and Torres Strait Islander peoples, the Metro North Health Equity Strategy should be implemented alongside this Plan.

The scope of this Plan includes the geographic catchment of Metro North Health and referring Hospital and Health Services in Queensland and northern New South Wales; all ages; all facilities including hospitals, satellite hospitals, community and oral health centres and Herston Imaging Research Facility (HIRF) and across settings of inpatient, ambulatory and home and community care. The targeted focus areas in scope include choosing wisely; approach to service arrangements across Metro North Health (e.g. networked model); approach to reporting across Metro North Health; review of current service delivery models (e.g. outsourced) for Caboolture and Redcliffe hospitals and a coordinated approach to investment decisions across Metro North Health.

Part A: The clinical service plan

Current challenges and opportunities

Metro North medical imaging services face a range of challenges and opportunities including:

Increasing demand

- Increased integration of medical imaging in patient care, which has demanded increased preparation time and involvement at multidisciplinary team meetings, alongside other functions, leading to reduced reporting capacity to deliver diagnostic imaging.
- Patients are living longer, the population is growing and there are increasing numbers of patients living with chronic conditions requiring medical imaging services for monitoring and surveillance.
- The demands on medical imaging and preparatory work of support services e.g. Biomedical Technology Services with national and state health screening programmes:
  - breast cancer using mammography and ultrasound for assessment workup of screen detected lesions
  - the anticipated National Lung Cancer Screening Program using primarily Computed Tomography (CT) in high-risk people
  - monitoring for decreased foetal movements as part of the safer baby bundle.
- Transition with conversion from more traditional scanning to complex imaging such as CT, PET and MRI, as reflected in historical growth trends. MRI alone has grown 9.6 per cent per annum between 2019-20 and 2022-23 (from 16,849 to 22,160 encounters).
- Planned expansions in Metro North Health and other Hospital and Health Services for PET will increase demand for cyclotron capacity and radiopharmaceutical scientist capacity.
- Increase demand in public imaging services due to increased Federal government data matching for G20 Medicare billing rules means that the private sector is contributing less to the imaging of publicly referred patients.
- The number of Medicare payable scans is rapidly increasing allowing substantial increases to existing and new applications in particular areas like MRI, nurse practitioner referred examinations and PET imaging for cancer treatment. In Queensland, across public and private hospitals, there were 819 PET whole body fluorodeoxyglucose (FDG) studies for initial staging of eligible cancer types performed in 2022-23 compared to 1,467 performed in 2023-24 [3] (Medicare item number 61612).
- The increase in demand is reflected in the activity data for Metro North. Between 2019-20 and 2023-24, medical imaging activity grew by 54,073 or 4.4 per cent per annum across Metro North Health with the highest growth occurring at Caboolture and Redcliffe Hospitals (7.8 per cent; 6.4 per cent respectively).

Despite increased demand, there is **untapped capacity** across facilities such as Surgical, Treatment and Rehabilitation Service (STARS), Redcliffe and Caboolture Hospitals that could be utilised with additional funding for staffing. There are service **networking opportunities**[4] that could support demand management, continuity of care, upskilling and efficient healthcare.

Despite all facilities feeding into one Radiology Information system (RIS) and Picture Archiving and Communication System (PACS), there are limitations in the consistency between facilities in the **administrative data and enabling Information Communication and Technology (ICT) infrastructure** that challenges recording and analysis of medical imaging service activity. There is significant reliance on manual methods of data collection across medical imaging. Additionally, there is no consistent method to record waitlist data, no visibility of referrals to private providers and no established **performance targets** in Queensland Health or Metro North Health to support peer benchmarking activities across

3 Note: doesn't differentiate between public and private providers.

4 A networked service uses a coordinated approach between all Metro North Health medical imaging services to deliver medical imaging services that should not be delivered at a single site. The networked services will be delivered at two or more sites for the total Metro North Health population through a formal arrangement ensuring equity of access resulting in better patient outcomes.

medical imaging (e.g. waitlist). Metro North medical imaging services would benefit from establishing performance targets to standardise measures to support safe and quality care, and administrative measures including access, safe scheduling and decreased waiting times.

Appropriate ordering of tests is important for good patient outcomes. Clinician over reliance on diagnostic imaging generates considerable waste in the system. These practices are attributed to limited decision support tools, medico legal risks, patient expectations and performance targets. An increasingly important but overlooked area includes doctor-patient communication skills. The risk aversion of referrers and the relative inexperience of junior clinicians can lead to increased, unnecessary utilisation of medical imaging to avoid challenging clinician and patient interaction. This is coupled with varying levels of cost awareness amongst clinicians on providing cost conscious care that leads to unnecessary resource use with minimum clinical utility to the patient. There is scope to introducing and strengthening **value-based health** care initiatives.

Metro North Health has multiple contracts with private providers to **outsource medical imaging.** Caboolture Hospital operates a fully outsourced medical imaging service model, various hybrid outsourcing arrangements exist at Redcliffe and The Prince Charles Hospital (TPCH) for the radiology workforce, after hours and on-call reporting. Whilst there are benefits to outsourcing including timely imaging and reporting turnaround timeframes, this comes at the expense of unnecessary recalls for after-hours services, complicated workflows for staff, complicated radiation safety governance and equipment support arrangements with concerns over lower standards of radiation safety, impacting culture and concerns over continuity of care. This model provides an interim solution to meet demand, however, it inevitably drives private sector growth and inhibits sustainable growth of public sector medical imaging services. There is opportunity to grow public sector services by redirecting investment in our own trainees and providing agile approaches to service delivery.

Australia's health system is operating under a substantial medical imaging **workforce shortage** with deficits in the pipeline for radiologists, sonographers, radiographers and Nuclear Medicine Scientists, Nuclear Medicine specialists and radiopharmaceutical scientists. There are increased demands on medical imaging with the commencement of Satellite Hospitals and this is expected to continue with a strong capital pipeline without an accompanying overarching medical imaging workforce strategy.

There is a paucity of detailed and accurate workforce data for Metro North Health medical imaging. Health Roundtable data related to Allied Health Wellbeing suggests that MI professionals have the highest levels of distress within the Allied Health professions with over fifty percent distressed. The future imaging workforce will evidently require greater numbers of staff but will also need to embrace change including utilising the current workforce such as Nurse Practitioners to support demand management strategies. There must also be a focus on support of workplace culture and wellbeing.

The number of trainee registrars has not kept pace with the unprecedented growth and bottlenecks to essential training and development for paediatric and women's imaging. Workforce strategies to harness include introduction of new roles such as medical imaging assistants, radiology Principal House Officers and Resident Medical Officers, Artificial Intelligence (AI) supporting workflows and future models of care with strong clinician oversight and buy-in. The mismatch between growth in workload and registrar numbers, limited innovation in flexible workforce arrangements to account for the remuneration differences between public and private sectors are hindering the attraction of talented individuals.

Research and its potential to modernise medicine requires a commitment at all levels of the organisation. Presently, clinical workload takes precedence over research and innovation. This could be better balanced with improvements in administrative tasks underpinning research such as centralised support, streamlining cumbersome processes, strengthening/creating partnerships with research partners e.g. HIRF, Biomedical Technology Services (BTS) and availability of equipment for research purposes. Creating a culture of research and innovation requires creating capacity for clinicians to undertake research, supported by Executive, to build the ecosystem which recognises research excellence, provides appropriate incentives, builds a sustainable funding environment and the enabling platforms/ infrastructure (storage of large datasets) for research to translate into clinical practice.

Advances in **science, medicine and technology** in medical imaging is evolving at a rapid pace. Precision medicine has been made possible by innovations in medical imaging and pathology leading to accurate diagnosis and precision treatment therapies. Increased demand for nuclear medicine services is predicted with advances in cancer treatment and it is imperative Metro North Health provides equitable access to new and emerging technologies and tracers e.g. LuPSMA (Lutetium-177 prostate-specific membrane antigen) theranostic services for prostate cancer. Reported lags in adoption of new technology are due to lengthy procurement cycles which need streamlining and local training resources and pathways to implement. Similarly changes in catheter technology and increasing radiology skills, has led to model of care changes where traditional surgery is being replaced by less invasive procedures

in interventional radiology or neurointerventional radiology e.g. middle meningeal artery embolisation or pulmonary thrombectomy.

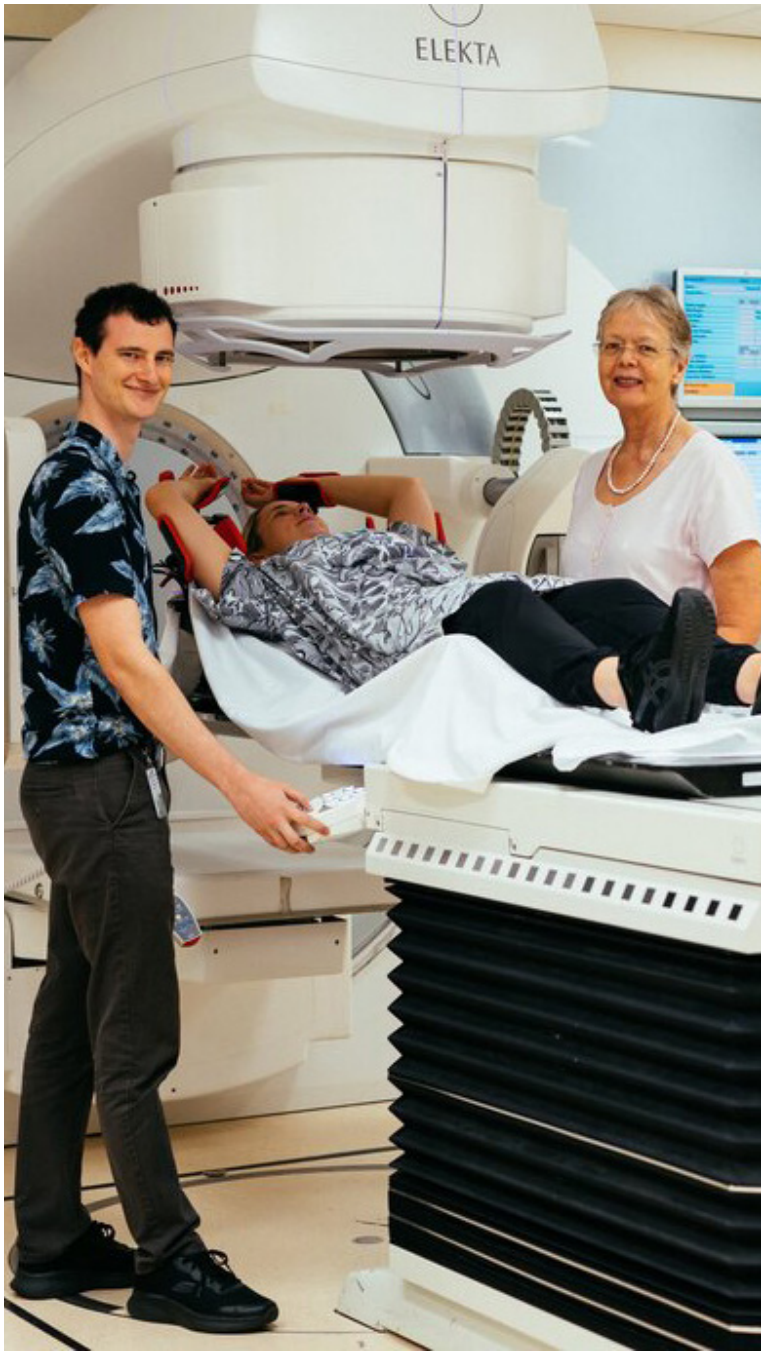
Patients and clinicians increasingly expect **digital capabilities** to support direct patient care and health and wellbeing journeys. Patients anticipate greater access to health information throughout their health journey and clinicians expect seamless integration of workflows to enhance care delivery and better collaboration with other health care professionals.

Digital health underpins a modern learning health system but our digital capabilities are not meeting expectations. Clinicians are challenged by inferior end to end workflows in oral health, inferior voice recognition software to streamline workflows, PACS functionality and integration challenges across medical imaging. Workforce support for software is essential to ensure timely and appropriate patient data access which underpins all models of clinical care in radiology. Clinicians are cautiously optimistic about the use of AI. In the era of AI and personalised medicine, systems must enable consistent recording, use and reuse of data and adequate storage to manage the complexity of incoming data e.g. genetic, molecular, imaging and clinical data. Robust governance and expertise surrounding its implementation and use is needed to ensure high levels of safety are maintained.

Changes to the interpretation of the **National Health Reform Agreement Rule G20** and the subsequent introduction of data matching rules from 1 July 2021 now prevent public hospital outpatient departments from being given the choice to receive their non-admitted diagnostic services as a private patient of a private provider. This is impacting the earning potential of private practice income for Senior Medical Officers practicing in medical imaging and nuclear medicine and is increasing workload for public imaging resources. This presents a recruitment and retention risk for Metro North Health and ability to provide services to the community. Planning for the five years must anticipate the impact of public demand due to patients unable to receive Medicare Benefits Schedule (MBS) reimbursable scans at private facilities.

There is consensus the current **funding model** does not accurately represent the contribution of medical imaging to a patient's hospital stay and outpatient journey. There is a need to develop accurate and transparent costing for medical imaging to inform the options for service planning of referral services and design of Activity Based Funding (ABF) arrangements or introduce mechanisms where there is greater financial accountability for referrers ordering tests e.g. fee for service/test model in line with value-based health care initiatives. There must be recognition of the hours required for medical imaging specialists to prepare and present cases at MDTs. For example, an exponential increase in PET utilisation across Queensland over the last five years has lead to an exponential increase in number and complexity of PET studies for review at MDTs without any increase in staffing.

With advances in technology, **equipment** purchases are becoming more expensive and outdated much sooner. There is a significant lag time (up to two years) for some equipment to be installed and become operational. There are opportunities to negotiate better value in service maintenance contracts with vendors and streamline procurement processes given the rate of technology advances. Investments in supporting services such as Q-TRaCE for PET radiopharmaceutical supply need to match current and future demands to deliver full benefits from high-cost medical imaging capital.



Drivers for change

The advancing nature of medical imaging in the prevention, diagnosis, treatment and monitoring of disease requires strong and sustainable public medical imaging services. Population growth and ageing, the growing complexity of disease and patient expectations requires Metro North Health to resource and implement creative strategies to attain equity of access for all residents, value for patients and the health system. Drivers for change include:

The demand for medical imaging is strong 4.4 per cent per annum growth from 2019-20 including 450,660 medical imaging services delivered across Metro North Health facilities in 2022-23 and increased reliance on costly contracted services.

The role of evolving imaging technology rapid technological advancement can detect disease earlier and improve patient outcomes but requires effective system enablers such as ICT that are currently lagging.

Global workforce shortages in radiologists, radiographers, sonographers, NM scientists, NM specialists and radiopharmaceutical scientists will place significant demand on the current workforce and their ability to contribute to critical diagnoses without significant workforce planning and reform.

Capital pipeline and the projected medical imaging workforce requirements e.g. Queensland Cancer Centre, Redcliffe and Caboolture Hospitals.

A principles led approach

Service principles outlined are designed to support the delivery of safe, effective and person-centred care and have been used to reorient focus ensuring health services are organised and delivered based on community needs and preferences in a sustainable manner. Embedded within these principles is the expectation that the medical imaging and nuclear medicine service lines will prioritise implementation of the Metro North Health Equity Strategy to improve Aboriginal and Torres Strait Islander peoples access to these services. Additionally, consumers and their families will be central to all aspects of service development.

Patient centred care

- Care that focuses on an individual's health care needs and empowering patients to become active participants in their care journey

Sustainability

- A resilient health system that makes efficient use of resources

Innovation enabling

- Adopters and diffusers of innovations in medical imaging

Value-based healthcare

- The shared goal of improving the outcomes that matter to patients in a cost effective and equitable way

Safety and Quality/ Accountability

- Responsibility to deliver quality care, ensure patient safety and manage resources effectively

Right care, right place, right time

- Patients receive appropriate care through optimal resource use

Safe and positive work culture

- Positive patient safety and healthy organisational culture

Equity of access

- Everyone has fair and just opportunity to achieve and maintain optimal health and wellbeing

Future service directions

Future service directions have been developed to address the issues and opportunities raised during the planning process. The service directions provide clarity about the future intent and correlate with the objectives and actions. The future service directions based on a principles led approach will aim for Metro North Health medical imaging services to be recognised as offering world class diagnostic imaging services that enhances value to patient care through effectively managed imaging resources. Patients will be provided with the best possible clinical care in a caring and timely manner through modernisation of the service. Key attributes for the future service direction include:

- Medical imaging services delivered through a **networked approach** that will support improvements in patient access, efficiency and patient outcomes. A balanced and collaborative approach to how this is achieved will be guided by effective consultation with each facility regarding implementation, processes and governance.
- Patients have increasing access to a core set of medical imaging services, supported by streamlined access to complex and subspecialised medical imaging techniques.
- **Value-based health care** decision making increasingly will be embraced with a mindset that promotes providing value for patients and the health system to ensure resources achieve maximum benefit.
- **Research and innovation** will advance patient care through activities that continue to generate innovative solutions and new knowledge that improve patient care and the future of health care. Research and innovation translates to improved patient care in collaboration with industry and universities.
- **A skilled and sustainable workforce** that commits to accessible and high value patient care. The skills of the workforce will be optimised through agile and flexible approaches to working, service transformation and addressing supply side factors aided by technology innovations including AI.
- **Medical Imaging equipment** purchases to maximise the value and benefits to patients with best value procurement arrangements with suppliers.
- **Digital health to play** a key role in supporting a health system that responds to the evolving needs of patients, providers, clinicians' researchers and innovators.
- Metro North Health medical imaging services will grow **sustainably** and adapt to changes in conditions (economic, social, cultural demands) to effectively meet current and future health needs, with efficient use of limited resources (financial, infrastructure, people, environmental).
- Patients, their carers and referring clinicians have a **positive imaging service experience** and are partners in imaging health care.

The service directions, strategies and actions will span three horizons covering five years.

- An implementation plan along with critical success factors will be developed to guide change.
- High level costing implications are presented at a summary level with further detailed costing to occur in implementation phase.

Objectives and actions

The service objectives and actions are the basis for operationalising the future service directions. The service objectives provide a statement of achievement and what services need to work towards to achieve the future state. The actions provide a statement of how the service may work towards meeting the desired objectives and the future state. The objectives and actions are a culmination of triangulation of background papers and consultation.

Networked service arrangements

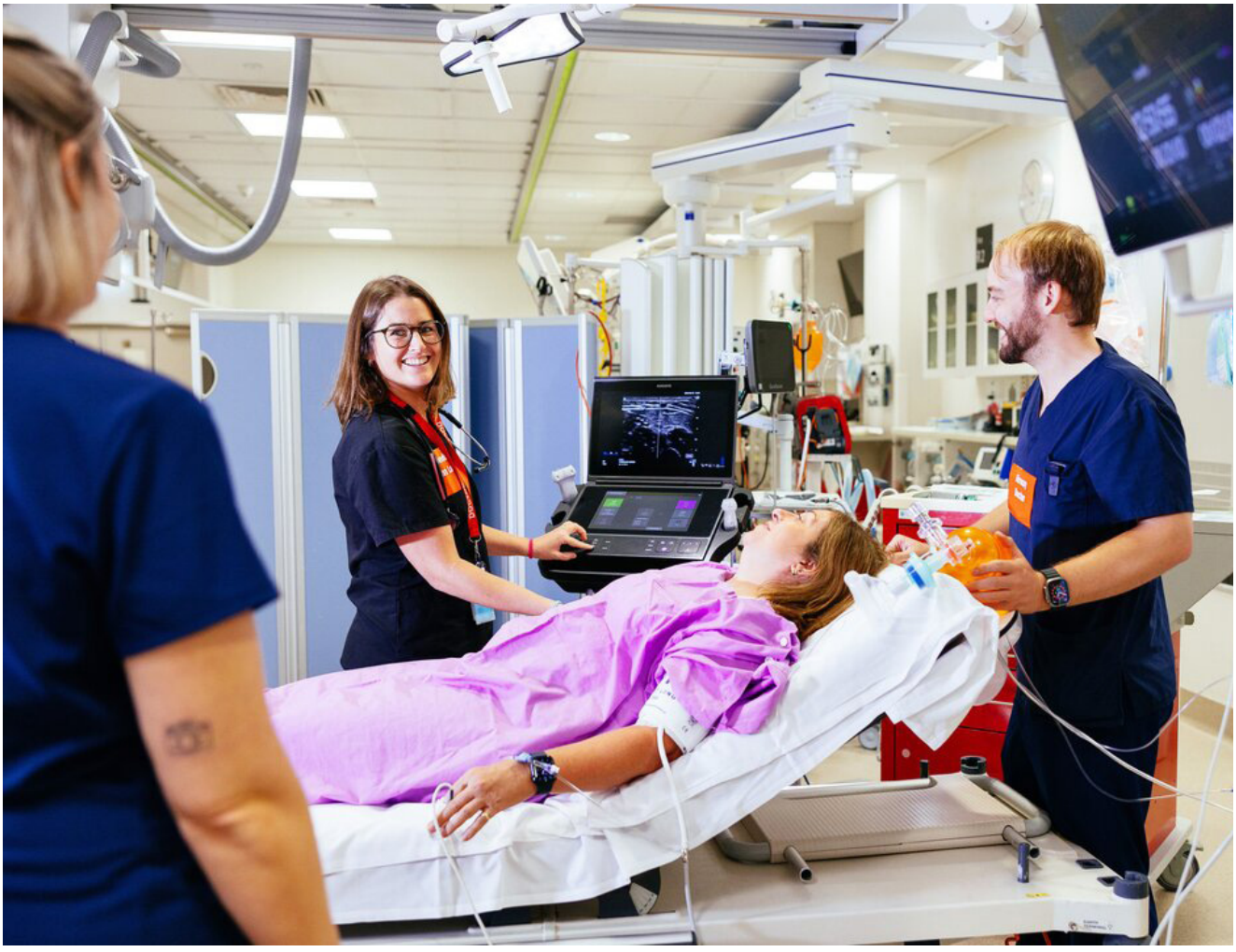
Objectives

1. Service networks will be created where the collective capability of imaging services is enhanced and continuity of care and integrated care is strengthened. Infrastructure, equipment and digital capability will support this networked approach to care.
2. Service network viability will be considered against agreed criteria including volume of activity, equity of access, efficiency, feasibility, workforce, equipment and infrastructure assessment.

Actions		Lead and partners
1.1	Leverage existing services and workforce to enable infrastructure and workforce expansion to meet demand for non-established services or new modalities e.g. nuclear medicine services.	MN COO Directorates
1.2	Develop criteria/framework to support assessment, viability and evaluation of potential service networks.	Directorates and TBD
1.3	**Access to core services** • Develop service capacity at all sites to achieve five days a week service for Interventional Radiology Tier A. – Develop service capacity for five days a week service for limited Interventional Radiology Tier B (within the approved scope of the department) for Redcliffe Hospital over the next two years and at Caboolture Hospital over the next five years and after hours at TPCH	Directorates
1.4	**Access to complex and sub-specialised services** Investigate the creation/expansion of service networks[5] in the following: a. breast imaging services for symptomatic women and men as part of a broader cancer service offering: – increase breast imaging service capacity at the Herston campus – a service at the BreastScreen site at Chermside alongside acquiring the lost screening capacity close to current Chermside site (requiring a minimum of two mammography machines) – Redcliffe –onsite breast imaging service to support existing breast surgery including mammography and localisations – Caboolture – better utilisation of mammogram for outpatient access b. MRI Pacemaker scanning at every site and networked service for access to cardiac scientists, equipment and MRI monitor	BreastScreen Queensland Brisbane Northside Service MN Cancer Stream Directorates

5. Use criteria/framework for viability

	c. Nuclear medicine services: – develop a PET service at TPCH and subsequent sites (Caboolture and Redcliffe Hospitals) – core service offering (e.g. SPECT-CT, BMD and eventually PET) available at all Metro North hospitals to support local access. d. Metro North patient access to specialised theranostic services at the RBWH (e.g. radioactive Iodine-133 and Lutetium-177 therapies when funding available)	Directorates Directorates RBWH Directorate
Actions		**Lead and partners**
1.5	**Facilitation of timely reporting** a. Develop a Metro North reporting hub to manage the backlog of reporting through various options e.g. on-site, on-call, remote reporting (teleradiology) that lead to a reduced requirement to outsource for certain modalities where required.	Directorates and TBD
	b. Introduce a Metro North Business Continuity Plan to ensure sustainable access to reporting 24/7.	Directorates



Value based healthcare

Objectives

1. Clinical Directors of Medical Imaging/Nuclear Medicine and Clinical Directorate Executive Directors will foster a culture of value-based healthcare to drive continuous quality and efficiency improvement.
2. Decision support/criteria will support referrers to select appropriate tests for the condition being investigated/managed/treated.
3. Pathways of care for select conditions will be standardised to support evidence-based medical imaging in appropriate settings.
4. Continuous quality improvement will be used to guide quality, safety and efficiency of health care provision including cost reflective pricing models (refer to service direction sustainable health services).

Actions		Lead and partners
2.1	Clinical Directorate Executive/Clinical Directors will support value-based health care initiatives through resource allocation (financial, technological, human) performance management, change management (Objective 1).	Directorates
2.2	Develop educational resources for clinicians to improve appropriate ordering of scans, accurate written request forms and efficient value-based MDTs. This can be achieved through a variety of modalities including regular talks, mandatory training modules, face-to-face interactions as a formalised plan with established resources (Objective 1).	Directorates
2.3	Implement referral criteria / decision support tools for common conditions to support appropriate test selection, reduction of unnecessary test ordering for referring clinicians (Objective 2).	Directorates
2.4	Develop pathways of care for common conditions which identifies the imaging needs and reduces unnecessary radiation exposure for safe imaging (Objective 3).	Directorates and TBD
2.5	Investigate clinical conditions appropriate for follow up surveillance in alternative settings (Objective 3).	Directorates and TBD
2.6	Implement a key performance indicator process including performance targets that aim to reduce delays in access to care e.g. monitor median wait times for examinations, time of exam to time of report etc (Objective 4).	Directorates
2.7	Improve visibility and accountability for referrer spend on imaging referrals (Objective 4).	Directorates and MN CFCO

Sustainable services

Objectives

1. Metro North patients will have timely access to high quality medical imaging services across settings of care e.g. ED, inpatient and outpatient.
2. Medical Imaging Services will be enhanced in alignment to growth in clinical services with increased medical imaging demand.
3. Private sector providers engaged in public sector service delivery will deliver increased value to the public health system and patients through strengthened contract management.
4. A strengthened funding model for medical imaging services will reflect the growing and important contribution of the medical imaging profession to patient care.

Actions		Lead and partners
3.1	Utilise untapped capacity across MI sites (Objective 1).	STARS, Caboolture, Redcliffe
3.2	Grow Metro North Health medical imaging services in line with: • projected growth and planned capital commitments (TPCH, Redcliffe, QCC) • National Lung Cancer Screening Program – increased CT requirements for high-risk individuals and FDG PET/CT evaluation • Surveillance professional guidelines (e.g. Hepatocellular Carcinoma Guidelines) • nuclear medicine (PET services, access to new and emerging tracers/technology and Theranostics treatments) • cyclotron and radiopharmaceutical laboratory manufacturing/ production infrastructure capacity in line with Metro North and statewide planning • increased medical imaging requirements for screening (and associated increase in assessments), detection and monitoring of pathologies • decreased Foetal Movements and Better baby bundle initiatives on RBWH, Caboolture and Redcliffe. **Data projections and capital commitments by 2031-32**[6] • 1 CT, 1 MRI and 2 x-ray angiography additional for RBWH Medical Imaging Department, 1 additional CT scanner in RBWH ED and 3 additional standard PET/CT or 2 whole body PET/CT in RBWH Nuclear Medicine Department is required before QCC commitments. • QCC committed 2 CT, 1 MRI, 1 X-Ray, 1 X-Ray OPG, 1 fluoroscopy suite, 1 interventional suite, 4 ultrasounds, 2 nuclear medicine (SPECT/CT) and 2 whole body PET/CT and dedicated theranostics treatment spaces (discussions ongoing – subject to change). • TPCH redevelopment committed to Children's ED – 1 CT, 2 X-Ray, 2 ultrasound and Adult ED – 1 additional warm shell for a second CT. • 1 additional CT for the TPCH Medical Imaging Department and 1 CT for the warm shell in the Adult ED is outstanding • Redcliffe redevelopment committed a satellite with 2 CT, 2 ultrasound and 3 X-ray. As well as an additional 1 MRI, 1 X-ray angiography, 1 X-ray, 1 ultrasound, and 1 mammography for the main Medical Imaging Department. (Objective 1	Directorates MN SAI MN Chief Nursing & Midwifery Officer

6. Note: LNPs 100-day plan could influence the network of medical imaging services.

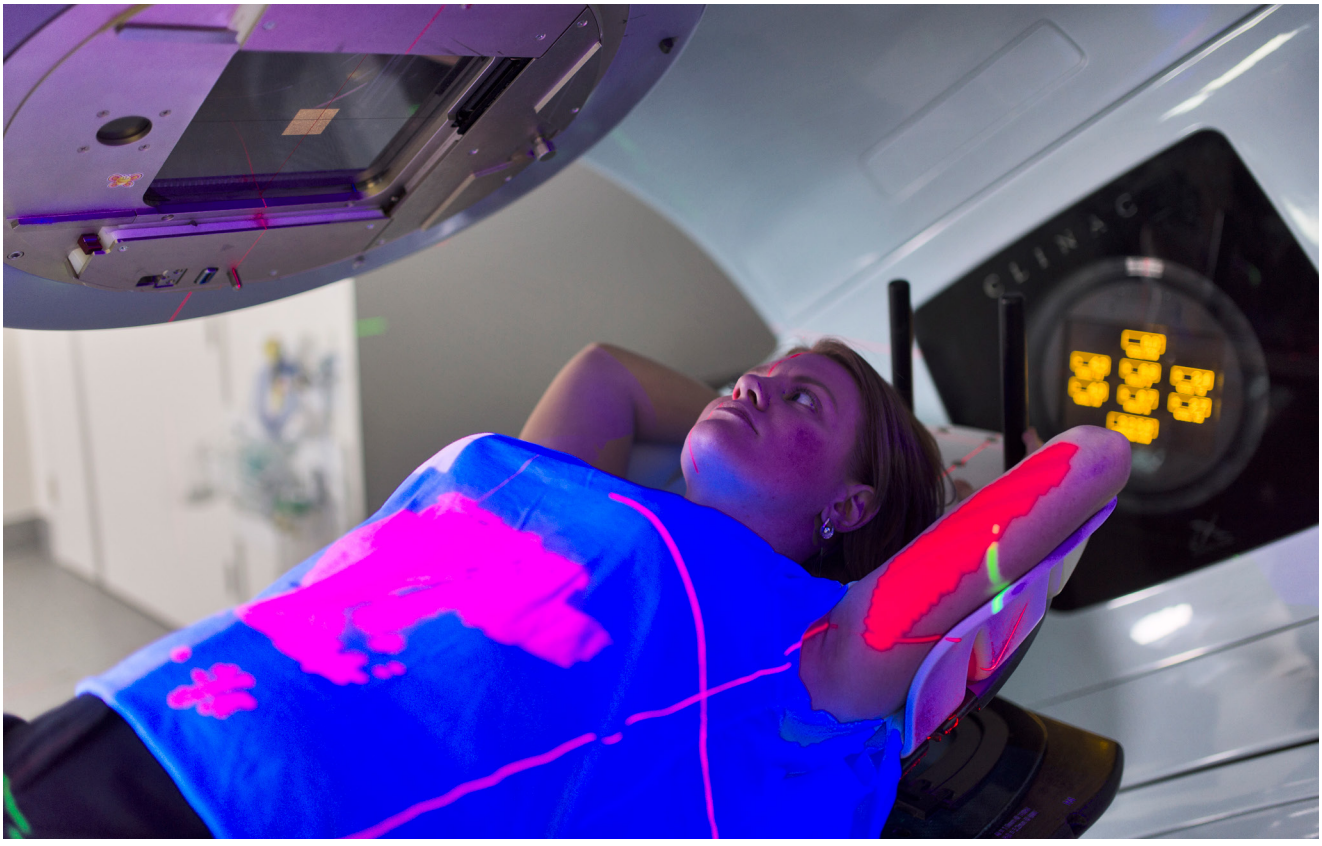
Actions		Lead and partners
3.3	Monitor and plan for increased public sector medical imaging activity with the impact of the G20 ruling (Objective 1).	Directorates
3.4	Medical Imaging departments will be consulted (as a mandatory process/checklist) and a consistent future funding model developed when creating new services and/or enhancements to identify 'service uplift' and the resources required (e.g. workforce, equipment, infrastructure) to deliver safe, sustainable medical imaging services (Objective 2).	Directorates
3.5	Improve private contracts to achieve improved balance between low complexity/simple versus complex outsourced imaging, inclusion of training opportunities for radiographers, sonographers and radiologists and identification of escalation points for improved continuity of care (Objective 3).	Redcliffe and Caboolture Directorates MN Chief Nursing & Midwifery Officer
3.6	Develop an appropriate funding model in alignment with value-based care initiatives actions/strategies to recognise medical imaging's involvement in patient care including MDT contribution, (e.g. fee for service model or other costing models) that identifies: • fee for test/s ordered to promote greater accountability of requesting specialities (Objective 4). • the quaternary and tertiary role of our services (e.g. RBWH and TPCH) in Queensland for patients requiring complex scans/ procedures by surrounding HHSs through enhanced Service Level Agreement negotiations with the Department of Health.	MN CFCO Directorates
3.7	Develop a methodology for allocating agreed proportion of WAU funding to medical imaging services at all Metro North Health facilities. (Objective 4).	MN CFCO Directorates
3.8	Advocate reform through existing state/federal pathways to include new technology e.g. PET/CT, theranostic services.	MN COO

Research and Innovation

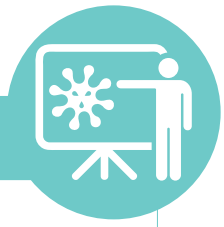
Objectives

1. Research will be recognised for its contribution to advancing knowledge, improving patient outcomes and attracting staff.

Actions		Lead and partners
4.1	Advance research through creation of a Metro North Health research coordinator position to support progression of research in medical imaging and aligned/linked with existing research services (e.g. HIRF, DNM and DMI research positions). This position could support grant/ethics applications, projects and strengthening partnerships with universities (Objective 1).	MN Research
4.2	Embed research project/s as a key deliverable in specialist trainee positions (Objective 1).	Directorates and MN CMO
4.3	Invest or partner (e.g. Biomedical Technology Services – Medical Physics) to advance computing capability and programs to support big data/analytics. Commence with trials for AI in current workflows (Objective 1).	Directorates Digital Metro North BTS
4.4	Strengthen research through enhanced partnerships with: • Biomedical Technology Services –support clinical research • HIRF –further embed research and resources into DMI and DNM Departments to provide efficient and better utilisation of equipment, staff resources and support the flow of research through all professions including Health Practitioners, administration, nursing and medical (Objective 1).	Directorates HIRF BTS MN Research
4.5	Create permanent research and support positions (e.g. research assistant, clinical trial coordinators) in Medical Imaging to attract and retain talented individuals (Objective 1).	Directorates



Workforce, Training and Education



Objectives

1. Strategic partnerships with stakeholders throughout the health system will be developed to enhance the capacity and capability of the medical imaging workforce (e.g. education providers including TAFE and universities, state and federal governments, private health sector).
2. The workforce will be agile, characterised by flexibility, resilience and a proactive approach to change.
3. There will be a sustainable pipeline of medical imaging workforce to support sustainable services.
4. There will be a network of shared education across Metro North Health to support professional development.
5. Education and development will be integrated into practice safely for new and emerging technologies.

Actions		Lead and partners
5.1	Develop a Strategic Workforce Plan for medical imaging services (Objective 1).	MN People and Culture
5.2	Prioritise optimising current and future workforce through investment in: a. upskilling/re-skilling staff including supernumerary positions in NM to facilitate training of students and staff and remedy current workforce structural deficits b. trial of proven alternate workforce models such as expanding Reporting Radiographers, Clinical Assistants and Radiology Nursing roles (at all levels) and staff working to full/top scope of practice c. flexible staffing models - cross training, variable shift patterns, flexible adhoc reporting opportunities from home to support overtime for backlog, remote working, working across facilities/ Hospital and Health Service/private sector d. expanding administrative/clerical roles and scopes of practice at every step on the patient imaging journey to free up Radiologist, Radiographer and Sonographer clinical time and return time to care e. better leveraging of existing technology to enhance workforce management e.g. AI, automation, enhanced virtual care service delivery f. increase in radiology, radiographer, sonographers, nuclear medicine and radiopharmaceutical scientist trainee positions and increase in university medical imaging workforce placements (Objective 2).	Directorates MN People and Culture MN CMO MN Chief Midwifery Officer MN Chief Allied Heath Practitioner Digital Metro North

Equipment

Objectives

1. The acquisition of equipment will be supported by modernised procurement processes that streamline operations (e.g. from purchase to commissioning).
2. There will be agile approaches to current funding models that are responsive to needs.

Actions		Lead and partners
6.1	Establish a network/system of governance that oversees the assessment of new technology, acquisition and replacement of equipment that delivers value to patients and the health system. Example: the collective procurement of equipment / software purchases at a HHS/network level versus individual facilities (Objective 1).	MN CFCO
6.2	Explore different purchasing methodologies that deliver value for money e.g. subscription based models for equipment versus buying capital outright, opt in models (Objective 2).	MN CFCO

Information Communication Technology

Objectives

1. Medical imaging services will adopt key features of a learning health system enabled by modernised ICT infrastructure. Integrated digital solutions will inform real-time analytics and facilitate models of care to safer predict-prevent models, research, improved patient care and innovation.
2. Medical imaging request forms will be streamlined for accurate and timely flow of information between the referring clinician and medical imaging which enables gatekeeping and accountability.

Actions		Lead and partners
7.1	Implementation of Digital Metro North Strategy – Horizon 1 (2025) – Machine learning is part of clinical models, including use of AI in training for clinicians Horizon 3 (2030) – adoption of a learning health system (Objective 1).	Digital Metro North
7.2	Increase health informatics capability of Medical Imaging and Nuclear Medicine e.g. workforce, service clinical and administrative data (Objective 1).	Digital Metro North Directorates
7.3	Implement the Statewide electronic medical imaging request form to streamline imaging requests and support accurate flow of information for triaging and test selection (Objective 2).	Digital Metro North Directorates MN CNMO eHealth Queensland BTS

Part B: Background information

This summary information should be read alongside the suite of background papers developed to inform this Plan. These include:

Attachment 1:
Background paper: service profile

Attachment 2:
Background paper: service activity and trends

Attachment 3:
Background paper: population paper

Attachment 4:
Background paper: issues and opportunities[7].

Current service arrangements

Metro North Health provides the full spectrum of medical imaging and nuclear medicine services to residents within and external to Metro North Health.

Medical imaging services spans conventional imaging such as x-ray, to the most sophisticated diagnostic and therapeutic practices including interventional and neuro interventional procedures. Metro North also provides breast screening and assessment service through the BreastScreen Queensland Brisbane Northside Service and hosts the BreastScreen Family Clinic at Chermside for residents of Queensland.

Metro North Health provides a mixed model service arrangement from services that are completely insourced, partially outsourced to fully privatised services. The RBWH is the only facility which provides a fully in-sourced model with workforce and governance provided to STARS.

Other Metro North Health facilities are supported by a mixed model of service delivery with in-reach workforce (e.g. Satellite Hospitals workforce supplied by the major Metro North hospitals), outsourced reporting arrangements (e.g. TPCH) with the Caboolture Hospital being a fully-privatised model of service delivery. Redcliffe Hospital provides medical imaging services to the Community and Oral Health Directorate for inpatient services.

Metro North HHS has an alliance with the Herston Imaging Research Facility through the RBWH. The RBWH has established links which provides researchers with access to imaging scanners to revolutionise our understanding and treatment of diseases and conditions. Research areas include developing and testing PET tracers to improve early detection and diagnosis, and to identify more accurate image guided therapy for patients. This research hopes to uncover new information about cancer biology and improve care for patients with breast, brain, head, neck, ovarian and prostate cancers.

The tables below provide a summary of the imaging modalities offered at each facility, differentiating between the full and partial spectrum of services for medical imaging and nuclear medicine and the governance, workforce and reporting arrangements.

7. Summary of issues and opportunities obtained from Phase 1 stakeholder consultation activities only.

Medical Imaging and Nuclear Medicine service offering

Service	RBWH	STARS	TPCH	Redcliffe Medical Imaging	Caboolture*	Kilcoy	Satellite Hospital	HIRF
X-ray	●	●	●	●	●	○	●	
CT	●	●	●	●	●			●
CT Sub-Speciality	●	●	●					
MRI	●	●	○	●	●			●
MRI Sub-Speciality	●	●	●					
Ultrasound	●	●	●	●	●		○	●
Ultrasound Sub Speciality	●	●			●			
Mammography	●				●			
Intervention / Procedures	●	●	●	○				
Intervention Sub-Speciality	●		●					
Theatre II	●	●	●	●	●			
Theatre Sub-Specialty	●		●					
Paediatric Imaging			○	○	○	○		

	Nuclear Medicine							
Service	RBWH	STARS	TPCH	Redcliffe	Caboolture*	Kilcoy	Satellite Hospital	HIRF
SPECT/CT	●		○					
NM Cardiac stress testing	●		●					
PET/CT	●							●
Diagnostic CT	○							
Bone Mineral Densitometry	●		●					
Theranostics infusion	●							
Dosimetry	●							
Radiopharmacy SPECT manufacture	●		●					
Radiopharmacy in vitro	●							
Cyclotron and radioisotope manufacture	●							
PET radiopharmaceutical manufacture	●							
Therapy radiopharmaceutical manufacture	●							
SPECT radioharmaceutical distribution	●							
PET radiopharmaceutical distribution	●							
Therapy radiopharmaceutical distribution	●							

Breastscreen Queensland Brisbane Northside Service offering

	Screening Assessment	X-Ray (2D mammogram)	Digital Tomosynthesis	Ultrasound	Image Guided Needle Biopsy	MRI
Chermside Clinic	Screening	Yes	No	No	No	No
Chermside Clinic	Assessment	Yes	Yes	Yes	Yes	Referral to RBWH if needed
Breast Cancer Family Clinic (Chermside)	Screening + Assessment	Yes	Yes	Yes	Yes	Referral to Medicare rebated private provider
Redcliffe	Screening	Yes	No	No	No	No
North Lakes	Screening	Yes	No	No	No	No
Keperra	Screening	Yes	No	No	No	No
David Jones Rose Clinic	Screening	Yes	No	No	No	No
Indooroopilly	Screening	Yes	No	No	No	No

Notes:
- ● Full Scope of Service.
- ○ Provided with some scope limitations.

Caboolture medical imaging services provided by iMED.

Subspecialty services are defined as requiring specialised training or equipment that is additional to primary service delivery.

BTS Estimated Oral Health Imaging Devices

	Total	Modality	Make	Model
Image Plate Readers	16	Intra-Oral	Instrumentarium	KaVo Scan eXam
	50	Intra-Oral	Instrumentarium	Express Origo
	1	Intra-Oral	Air Techniques	Scan X Duo
	3	Intra-Oral	Vista Scan	Mini View
Digital Plate Readers	2	Intra-Oral	Sirona	XIOS XG
	8	Intra-Oral	Sirona	Schick elite
	2	Intra-Oral	Planmeca	Planmeca Prosensor
OPG Machines	6	Extra-Oral	Planmeca	Planmeca Promax
Cone Beam CT Machines	1	Cone Beam CT	Morita	X800
	1	Cone Beam CT	iCAT	iCAT
Handheld X-ray	1	Intra-Oral	Instrumentarium	Nomad 2
Total	91			

The Metro North population

Metro North Service is the second largest Hospital and Health Service in Queensland, representing 20.5 per cent of the Queensland population in 2023. Historical population growth trends indicate Metro North catchment is growing at the same rate as the Queensland average at 1.8 per cent per annum.

In 2023, Metro North was home to 768,966 adult persons over the age of 25 and home to 348,712 children, adolescent and young adults (CAYA) under 25 years of age[8], representing a population distribution of 69 percent adults and 31 per cent CAYA.

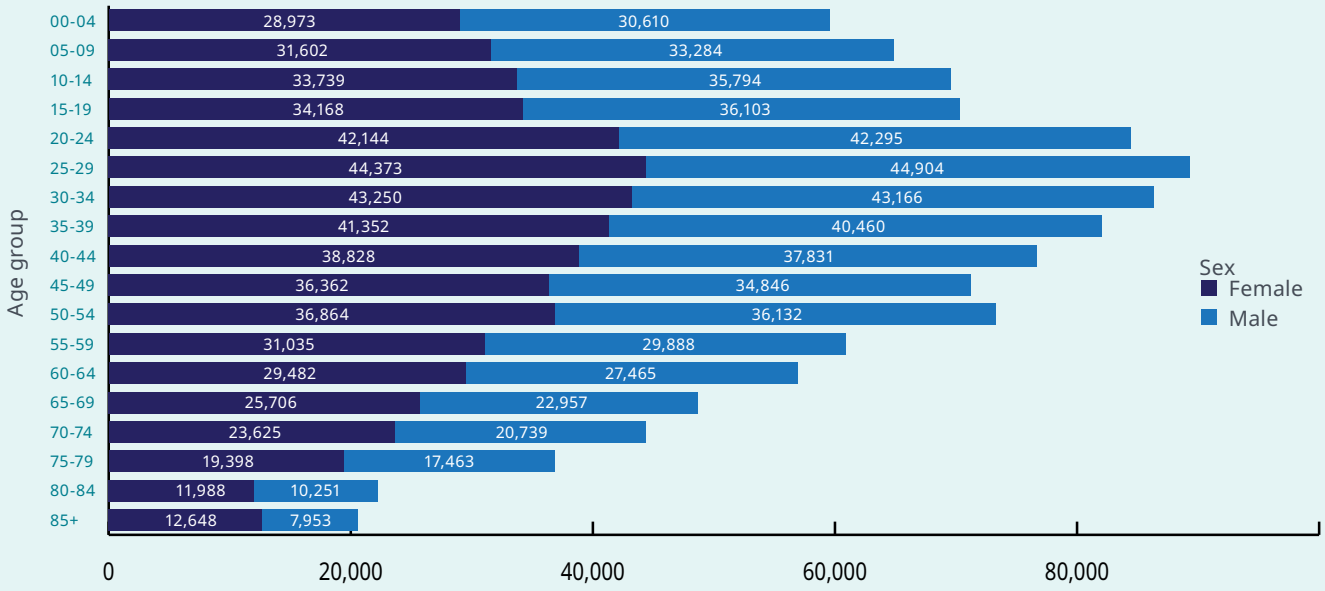
North Lakes and Caboolture catchments, located in the northern corridor of the catchment, had the greatest per annum growth rate of all Metro North areas between 2018 and 2023.

Between 2021 and 2046, the projected population of Metro North is anticipated to grow by 474,330 persons or 1.5 per cent per annum. This is higher than the Queensland rate of 1.4 per cent per annum. Over the same period, children, adolescents and young adults are projected to grow 0.9 per cent per annum, representing a change from 326,468 to 419,739 CAYA.

Metro North has the second largest number of older persons in the State with 53.9 per cent aged between 65 and 74 years of age (93,027 persons).

Within Metro North, Aboriginal and Torres Strait Islander persons represent 2.6 per cent of the Metro North population (1,063,610 persons) in 2020.

Figure 1: Metro North estimated resident population by age group and sex, 2023



Source: ABS 2024. File: estimated-resident-population-sa1-abs-consultancy-single-year-age-sex-sa1-sa2-lga-qld-tweed-2011-2023p-asgs-2021.

8. Children, adolescent and young adults encompassing 0-25

Table 1: Metro North population projections by SA3, 2021-2046

SA3 name	2021	2026	2031	2036	2041	2046	n	CAGR%
Bald Hills - Everton Park	46,714	49,477	51,235	52,732	54,329	55,845	9,131	0.72%
Bribie - Beachmere	37,504	40,113	41,733	42,208	42,630	42,934	5,434	0.54%
Brisbane Inner	43,269	53,598	64,236	72,544	79,596	86,608	43,339	2.81%
Brisbane Inner - North	101,955	112,762	118,839	124,667	131,335	139,238	37,283	1.25%
Brisbane Inner - West	61,443	65,897	68,389	70,921	73,443	76,044	14,601	0.86%
Caboolture	81,224	97,322	113,191	125,971	138,418	152,019	70,795	2.54%
Caboolture Hinterland	15,108	17,109	19,020	20,310	21,385	22,239	7,131	1.56%
Chermside	75,401	77,484	79,408	81,772	84,774	88,505	13,104	0.64%
Kenmore - Brookfield - Moggil	48,340	48,470	48,755	48,933	49,350	49,663	1,323	0.11%
Narangba - Burpengary	70,479	88,090	108,272	127,152	147,881	171,452	100,973	3.62%
North Lakes	89,832	105,280	117,250	126,319	134,280	141,192	51,360	1.83%
Nundah	43,643	49,121	52,754	56,232	59,855	63,686	20,043	1.52%
Redcliffe	64,680	71,104	78,360	85,578	93,058	101,233	36,553	1.81%
Sandgate	62,105	63,358	64,291	65,017	66,098	67,378	5,273	0.33%
Sherwood - Indooroopilly	35,483	37,751	39,210	40,668	45,562	44,962	9,479	0.95%
Strathpine	40,445	44,599	49,144	54,230	59,571	65,022	24,577	1.92%
The Gap - Enoggera	55,036	56,268	57,404	58,519	59,967	61,204	6,168	0.43%
The Hills District	91,334	94,691	98,674	102,042	105,880	109,097	17,763	0.71%
Total	**1,063,995**	**1,172,494**	**1,270,165**	**1,355,815**	**1,444,412**	**1,538,325**	**474,330**	**1.49%**

Source: Queensland Government population projections, 2023 edition; Australian Bureau of Statistics, Regional population by age and sex, 2021.

Current service trends for Metro North

Greatest activity 2022-23

- 50.3 per cent of activity was X-Ray (n=226,563) followed by Computed Tomography (CT) (23.3 per cent, n=104,610) and ultrasound (14.4 per cent, n=64,877).
- The RBWH supplied 159,030 (35.3 percent) diagnostic tests, followed by TPCH (129,866 tests; 28.8 percent).

Greatest per annum growth 2019-20 to 2022-23

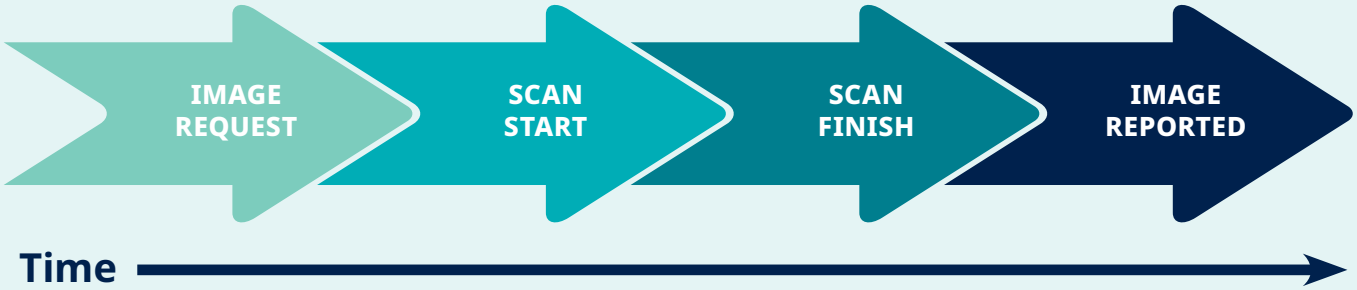
- Magnetic Resonance Imaging (MRI) has grown 9.6 per cent per annum (n=5311) followed by Computed Tomography (8.2 per cent per annum, n=22,121) and Bone Mineral Densitometry (BMD) (5.3 per cent per annum, n=284).
- Caboolture and Redcliffe Hospitals catchment service activity grew by 7.8 per cent and 6.4 percent respectively.
- In Queensland Medicare data indicates a 350 per cent growth in PET scans over the past 10 years. This trend is anticipated to continue for the next 5 years. Note PET/CT growth in MN has been limited due to scanner capacity for 15 years.

Referring specialities 2022-23

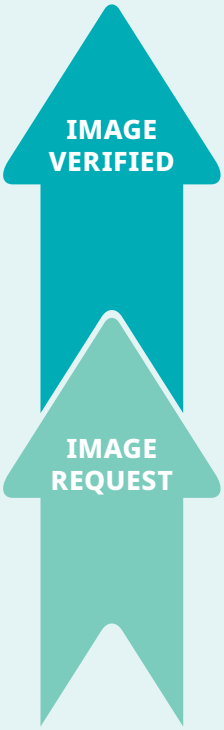
The top referring specialities to medical imaging are outlined below.

- RBWH Main Medical Imaging Department: **neurosurgery** referred 10.6 per cent of all activity (n=4907) followed by gastroenterology (8.4 per cent, n=3891) and orthopaedics (8.1 per cent, n=3676).
- Nuclear Medicine RBWH: **medical oncology** referred 24.5 per cent of all RBWH Nuclear Medicine worksite activity (n=2300) followed by haematology (11.0 per cent, n=1034) and general surgery (10.7 per cent, n=1007).
- TPCH Main Medical Imaging Department - **cardiology** referred 21.1 per cent of all activity (n=10,492) followed by thoracic medicine (16.4 per cent, n=8130) and orthopaedics (14.1 per cent, n=6988).
- Redcliffe: the **emergency department** referred 52.8 per cent of all activity (n=46,525) followed by orthopaedics (17.3 per cent, n=15,276) and obstetrics and gynaecology (5.4 per cent, n=4755).
- Caboolture: the **emergency department** referred 68.3 per cent of all activity (n=40,384) followed by obstetrics and gynaecology (9.1 per cent, n=5384) and general surgery (7.4 per cent, n=4350).

Performance 2022-23



Operational performance is measured across the imaging continuum for the time from image request to scan start and scan finish to the image being reported.

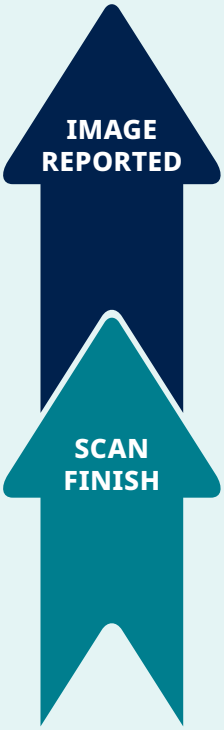


Emergency

- Caboolture Hospital outperformed facilities in being able to verify scanning within one hour of image request across CT and US (60.8 per cent, 46.8 per cent and respectively). More than 90 per cent of X-ray scans at all facilities were completed X-ray scans within two hours.
- TPCH, RBWH and Redcliffe Hospitals scan start from image request for ultrasound in one hour is 13.7 per cent, 24.7 per cent and 34 per cent respectively, compared to Caboolture Hospitals performance at 74.9 per cent.

Inpatient

- Caboolture Hospital inpatients were more likely to complete scanning within one hour of request across all modalities
- For CT and X-ray modalities, over 90 per cent of all patients had scans verified within 48 hours of requests.
- 100 per cent of Kilcoy inpatients commenced X-ray imaging within one hour followed by Caboolture (90.9 per cent) and Redcliffe (83.1 per cent).



Emergency

- 98.9 per cent of reports for CT scans at Redcliffe Hospital emergency patients were completed within four hours followed by Caboolture (77.3 per cent) and TPCH (69.4 per cent).
- 96.3 per cent of reports for US at Redcliffe completed within four hours followed by TPCH (63.4 per cent) and RBWH (58.0 per cent).
- 97.4 per cent X-ray reports for Kilcoy were completed within 72 hours followed by Redcliffe (93.6 per cent) and Caboolture (88.0 per cent).

Inpatient

- 97.4 per cent CT images for inpatients at Caboolture were reported within four hours followed by Redcliffe Hospital (96.5 per cent) and STARS (79.4 per cent).
- 84.4 per cent MRI of Redcliffe inpatient images were reported within four hour followed by Caboolture (84.3 per cent) and TPCH (72.1 per cent).

Outpatients

- 89.6 per cent of outpatient reports for CT images at Caboolture were provided within two days followed by Redcliffe (88.3 per cent) and RBWH (97.6 per cent). M92.8 per cent of outpatient reports for MRI at Redcliffe were provided within five days followed by Caboolture (91.3 per cent) and STARS (52.8 per cent).

Satellite hospitals

- As at 31 August 2024, there have been 12,984 X-rays provided at the Satellite Hospitals (6426 at Caboolture Satellite Hospital, 6052 at Kallangur Satellite Hospital and 506 at Bribie Island Satellite Hospital.
- As at 31 August 2024, Kallangur Satellite Hospital provides an average of 768 X-Rays per month compared to 492 at Caboolture Satellite Hospital and 372 at Bribie Island Satellite Hospital. Annualised, Caboolture Satellite Hospital will provide 5,910 X-rays in Kallangur Satellite Hospital will provide 9218 and Bribie will provide 4464 in 2023-24.

Community and Oral Health (COH)

Redcliffe Hospital is the predominant provider of medical imaging services at COH facilities. The following describes the services provided and impact to MI services:

- rehabilitation ward at Brighton Health campus (BHC) (42 beds) – early acceptance of strokes and requirement for cranial CT scans and X-rays for orthopaedics
- geriatric services including interim care and geriatric evaluation and management at BHC (77 beds) – increasing medical activity and need for MI services for CT and MRI
- Geriatric Evaluation and Management in the Home – to commence in January 2025 (10 beds) will have an impact on MI services
- Residential Transition Care Program (based at Zillmere) (60 beds) – this older cohort (usually over 65 years of age with multi-morbidities) require frequent brain MRIs, CTs and orthopaedics due to their age and morbidities.

HIRF

HIRF is a joint venture between the University of Queensland (UQ), Metro North, and Queensland University of Technology (QUT). The Facility primarily undertakes imaging for research purposes however has capacity to facilitate clinical requests as required. In 2022-23, 1373 total medical imaging activity was undertaken at HIRF. Of this 99.4 per cent were outpatients (n=1365).

In 2022-23, 56.0 per cent of HIRF activity was MRI (n=769) followed by PET (37.7 per cent, n=517) and CT (3.9 per cent, n=54).

Projections to 2031-32

- From 2022-23 to 2031-32, Medical Imaging across all facilities in Metro North is projected to increase 2.9 per cent per annum from (455,148 scans in 2022-23 to 586,829 scans in 2031-32).
- Caboolture Hospital is projected to grow 4.9 per cent per annum (35,870 total scans) followed by Redcliffe (4.0 per cent per annum, 36,142 total scans) and RBWH/STARS (2.3 per cent per annum, 35,607 total scans).
- PET is projected to grow 12.2 per cent per annum (9988 total scans) followed by CT (3.3 per cent per annum, 35,877 total scans) and Nuclear Medicine (SPECT/CT) (2.8 per cent per annum, n=6346 total scans.

Acronyms

CT	Computed Tomography
MRI	Magnetic Resonance Imaging
PET	Positron Emission Tomography
SPECT	Single-Photon Emission Computed Tomography
HIRF	Herston Imaging Research Facility
FDG	Fluorodeoxyglucose
STARS	Surgical, Treatment and Rehabilitation Service
RIS	Radiology Information system
PACS	Picture Archiving and Communication System
ICT	Information Communication and Technology
TPCH	The Prince Charles Hospital
AI	Artificial Intelligence
LuPSMA	Lutetium-177 prostate-specific membrane antigen
MBS	Medicare Benefits Schedule
ABF	Activity Based Funding
MDT	Multidisciplinary Team
Q-TRaCE	The Nuclear Medicine radiopharmaceutical laboratory
NM	Nuclear Medicine
MN COO	Metro North Chief Operating Officer
MN CFCO	Metro North Chief Finance and Corporate Officer
MN SAI	Metro North Strategy Assets and Infrastructure
MN CMO	Metro North Chief Medical Officer
RBWH	Royal Brisbane and Women's Hospital
QCC	Queensland Cancer Centre
ED	Emergency Department
OPG	Orthopantomogram
DNM	Department of Nuclear Medicine
DMI	Department of Medical Imaging
HHS	Hospital and Health Service
TBD	To be determined

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