EXECUTIVE SUMMARY
Prerequisite reading – Medical Imaging – the need for change January 2013

“Imaging tests are an increasingly important diagnostic tool in healthcare. By facilitating timely, accurate diagnosis, imaging can help ensure that a patient’s condition is appropriately treated at an early stage. Thus, it can prevent or reduce the length of hospital stays, and improve patient outcomes. However, some imaging tests are costly, so unnecessary or inappropriate tests waste resources”1

Public hospital Medical Imaging (MI) departments are under increasing pressure due to a number of issues:

- increase in the number and complexity of procedures requested – no longer only diagnostic procedures but also interventional and therapeutic
- acuity of patients – in-patients, paediatric, elderly and very sick patients in an acute setting where medical emergencies are becoming more frequent 2
- need for appropriate resourcing – workforce shortages, old equipment
- training – the Royal Australian and New Zealand College of Radiologists (RANZCR) curriculum includes more demanding supervision and experiential requirements over 5 years
- increased demand for clinical consultation with referrers – multidisciplinary team meetings, consultation, etc.
- timely reporting – unreported images and backlogs are an issue in some NSW public hospitals. MI Departments in all hospitals will find this more difficult as National Emergency Access Targets (NEAT) are rolled out
- research – often no time or resources to undertake but still expected and essential for future health improvements
- demand to become more efficient and cost effective

Therefore the goal of Medical Imaging departments is:
Timely access to quality care; building a workforce that can manage appropriate referrals with appropriate equipment across multiple aspects of patient care; sustainability into the future of public imaging services.

With increasing demands from patients, referrers, hospitals and LHDs it is necessary to review MI models of service delivery to achieve the necessary balance and sustainability.

Two possible solutions can be considered:
1. Insourcing – Medical Imaging District Services (MIDS) – public medical imaging business units
2. Outsourcing – private practice radiology contracted by public hospitals

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1 NSW Health cost and outcomes study by IPART for selected NSW hospitals (2010) Independent Pricing and Regulatory Tribunal.
1. Medical Imaging District Services

There is an opportunity to emulate the successful Hunter New England business model for MI to:

- provide a safe quality service to the community (public and private) health
- provide a stable, sustainable MI model with few recurrent problems for the LHD
- optimise staffing levels
- maximise private revenues (MBS rebates) to:
  - provide and cascade appropriate MI equipment
  - offer incentives for medical officers to remain in the public health system
- achieve balance between enhanced service provision and cost efficiencies
- improve reporting to referrers – clinical and administrative, timely

Flexibility based on sound clinical and business principles will allow for local conditions and circumstances.

Introduction and Background

In July 2003, the NSW Department of Health mandated the introduction of Medical Imaging (MI) business units in correspondence from the General Manager, Finance and Commercial Services to Area CEOs which had been previously flagged in the NSW Health Accounting Manual for Public Health Organisations (1997). For a range of reasons including shortfalls in skill and staffing resources, there was poor compliance. One LHD established a business unit which comes close to the principles intended in their establishment and endures today. The Hunter New England Business Model was established much earlier in 1996-98, originally for John Hunter Hospital, progressively adding all other hospitals (37) in the LHD in the ensuing years.

After discussions between Ministry of Health representatives and ACI Radiology and Nuclear Medicine clinicians and managers in 2010-2011, it was agreed that it would be beneficial to revisit the business unit model – Medical Imaging District Services (MIDS) for MI departments and Local Health Districts (LHDs). Due to the Governance Review of the Ministry of Health, this work was largely suspended in May 2011.

There is a growing need however to focus on the structure and operations of MI services across NSW.

Rationale

The rationale for an improved service delivery model for Medical Imaging has not changed since 1996 when John Hunter began the implementation of their business model. Quality service to community (public and private) health, increase in complexity of procedures and acuity of patients, need for appropriate resourcing, research, training, and increased demand for clinical consultation with referrers and timely reporting are expanded as follows:

- Service improvements:
  - Increase in demand - turnaround times to achieve National Emergency Access Targets (NEAT), extended operating hours and increasing volume of procedures, higher demand from referrers for face-to-face clinical discussion with Radiologists due to increase in acuity of patients and increased complexity in imaging
  - Interventional Radiology (IR) & Interventional Neuroradiology (INR) – minimally invasive procedures undertaken by Interventional Radiologists and Interventional Neuroradiologists are less expensive than those surgeries they replace and can shorten patient stays in hospital thereby contributing to real cost savings in the health system
Timely reporting – some hospitals have a backlog of unreported images. The CEC is leading a Taskforce to ensure all unreported images are read by Radiologists, and already significant pathology has been found. For patient safety, this problem cannot reoccur. A MIDS model offers the opportunity for flexible working arrangements viz. secondary employment after hours for public Radiologists (provided that in hours quotas have been met). An additional benefit of this arrangements is that public Radiologists are less inclined to work in private practices one or more days / week to supplement their income. National Emergency Access Targets add more pressure to Radiology departments to report early

- Best clinical practice – patient focus, education and research remain a priority and can only be maintained with sustained viability of MIDS

- Governance – transparent boundaries and roles, advocation, collaboration, facilitation and lines of communication for service delivery, compliance with MoH policies

- Accreditation – mandatory for MI departments and private practices from July 2012 and linked to the payment of Medicare benefits for imaging services

- Resourcing:
  - Equipment – changes to the Commonwealth’s Capital Sensitivity Rules introduced July 2011 (where MI equipment older than 10 or 15 years will attract only half the Medicare rebate - see Table 1 in Appendix A), have highlighted the impediments to capital planning, upgrading or replacement of MI equipment over the last few decades. There is a need to replace old equipment to provide patients with the best care and optimise private revenues
  - Workforce – understaffing in almost all professions in MI has increased the stress on health employees, decreased the motivation of employees to remain in public health and has the potential to place patients at risk

    Many staff members have large amounts of accrued leave which makes backfilling difficult but will also have a financial impact in the future

    Flexible funding and staffing models for workforce with Staff Specialist and VMO consultants, trainees, nurses, medical radiation technologists and scientists, orderlies and other support staff – taking into account site-specific requirements for service, teaching, training, administration and research – need to be developed

    Such models for workforce requirements must ensure adequate professional development and training for MI professionals ensuring future workforce supply and succession planning

- Revenue – explore opportunities for revenue optimisation to incentivise stakeholders. All revenue is retained in the MIDS to contribute toward operating costs

- Financial sustainability – significant efficiencies have already been gained in MI departments. Consideration of standardising accounting and pricing practices. MIDS become self-sustaining wherever possible. Collaboration between management of the LHD and the MIDS is essential. Business plans, KPI reporting and annual review to be implemented and agreed between LHD and MIDS management
• New Technologies – consideration of new technologies, new procedures, new interventions viz. MRI, IR, INR, PET-CT, radionuclide therapies, etc. is appropriate and often saves money elsewhere in the health system. With increasing hybrid systems in NM, radiation licensing, training and education in the use of these systems will need to increase within imaging.

Medical Imaging District Services Guiding Principles
Medical Imaging District Services (MIDS), whilst aiming to be self-supporting, must nevertheless be considered as any other public hospital department – servicing the community’s health needs.

MIDS will contain and manage costs but not at the expense of quality service, patient safety, training, research and clinical consultation which remain paramount. Like other public hospital departments, such non-billable activities separate public hospital imaging services from private practice.

Efficiency gains include working with referrers - Emergency Departments, wards, etc. - to ensure the appropriateness of imaging requests to avoid over-use of imaging as a diagnostic solution where use of patient history, clinical examination and collaborative diagnostic skill and experience could yield an appropriate patient management decision.

For the full list of MIDS Principles see Appendix B.

THE MIDS MODEL
Operating Costs
All expenses are paid from the Imaging General Fund with the revenue generated from public and private patients (see Revenue in this section).

Operating budget begins with previous year’s costs as a base. Known increases or decreases are then factored in, ie. additional staff due to additional equipment, cost savings, etc. to determine the next financial year’s operating budget.

Operating budget includes:
• Salaries and on-costs
• Consumables
• Minor building works
• Equipment * (including PACS and other radiology specific IT systems)
• Equipment service agreements
• Hospital Charges **

* On a monthly basis a percentage of revenue from the Imaging General Fund can be allocated to an Equipment Replacement Reserve (ERR) to meet future capital needs or operating leases can be included in the operating budget. (See Appendix A – Equipment Replacement Options)

** Costs from hospital / LHD
Hospitals may choose to charge the MIDS such costs as a facility fee or individual costs viz. air conditioning, canteen, management services, rent, etc. however it is suggested that no costs are internally charged to a MIDS for two reasons:
1. Minimal staff available to calculate percentage of all hospital’s costs used by MI and other departments - also time consuming
2. Hospital's costs increase the operating budget of the MIDS which increases transfer prices (see Revenue)

There may be an opportunity for hospitals to cover general hospital overheads by retaining a percentage of Activity Based Funding.

Cost containment / Efficiencies
Dedicated MIDS staff members actively investigate cost savings to offset increases in service delivery requirements.

Revenue
MIDS revenue comes from two main sources:
1. **Private patients / MBS**
   Two options:
   a) **Staff specialists within the hospital employed by NSW Health**
   100% of MBS revenue from private patients is directed to No.1 Trust Fund Account. Based on the MoH infrastructure fees, funds are transferred to the Imaging General Fund on a monthly basis as follows:
   - General / Ultrasound / Angiography / Fluoroscopy – 40%
   - MRI – 70%
   - CT – 84%
   - Nuclear Medicine – 40%

   b) **Private contract with public hospital – appropriate rural / regional sites**
   100% of the private revenue is retained by the Imaging General Fund because the contract with the external reporting entity charges the General Fund a monthly contracted fee for reporting regardless of revenue generated. There is a review period as the year progresses regarding the targets set by the contract with any increase to be distributed based on an agreed percentage as per the contract.

2. **Transfer pricing**
The starting point for the calculation of transfer pricing for public patients is that the estimated activity for the financial year is costed out at the 100% of the MBS rate based on previous year’s procedures by modality by referrer. That is compared to the remaining operating budget that needs to be recovered once private revenues are deducted and the appropriate percentage of MBS is calculated.  

The MIDS must be transparent about how the final percentage of MBS to be charged to referrers / hospital is calculated, for example:
- Are there any tests that sit outside the general pricing? – rationale to be given, eg. MRI of the prostate uses expensive consumables
- The fee for any exam without an MBS item number is determined on an exam that is of a similar nature
- Is there a surcharge on transfer price charged after hours, for call backs or mobiles?
- Does it include an equipment replacement component?
- Does it include PACS cost (LHD wide service)?

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3 NSW Health cost and outcomes study by IPART for selected NSW hospitals (2010) Independent Pricing and Regulatory Tribunal: recommendation 22
The MIDS must calculate surplus / deficit at the end of each financial year as it is against MoH policy to make a profit. Any variance can be treated as follows:

<table>
<thead>
<tr>
<th>Aim: Total Revenue = Total Costs</th>
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<tbody>
<tr>
<td>If at year end the MIDS achieves:</td>
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<tr>
<td><strong>Surplus</strong></td>
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<tr>
<td>Small → retained in Imaging General Fund or ERR (equipment replacement reserve)</td>
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<tr>
<td>Excessive → reduction in transfer price or,</td>
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<tr>
<td>→ dividend to hospital / LHD or,</td>
</tr>
<tr>
<td>→ service enhancements</td>
</tr>
<tr>
<td><strong>Deficit</strong></td>
</tr>
<tr>
<td>Review e.g. efficiency vs. inability to earn private revenue, miscalculation of transfer price, overuse of MI services against referrers’ activity budget, etc. otherwise:</td>
</tr>
<tr>
<td>→ increased transfer price or,</td>
</tr>
<tr>
<td>→ hospital/LHD to subsidise or,</td>
</tr>
<tr>
<td>→ services reduced</td>
</tr>
<tr>
<td>To be negotiated with hospital / LHD</td>
</tr>
</tbody>
</table>

All of the revenue charged to hospital / referrers for public patients is fully retained by the Imaging General Fund.

**Workforce**
The Medical Imaging workforce plays a critical role in public and private patient safety, quality, timely service for their referrers and maximum utilisation of MI equipment and newer technologies.

On implementing a new MIDS, it is essential to commence with the employment of a Business Manager and an accountant to plan, implement, report and find the right balance between quality service delivery and funding efficiencies in partnership with the Clinical Lead in Radiology.

Other workforce groups within the MIDS may include:
- Radiologists
  - General Radiologists
  - Paediatric Radiologists
  - Interventional Radiologists
  - Interventional Neuroradiologists
- Nuclear Medicine Physicians
- Physicists
- Radiopharmaceutical Scientists
- Nuclear Medicine Technologists
- Radiographers
- Medical Imaging Nurses
- Orderlies (Porters)
- Administrative staff
- IT / Technical staff

For further detail on these workforce categories see *Medical Imaging – the need for change* January 2013.
Reporting / Governance
Service Level Agreements (SLAs) in place to determine rights, responsibilities and expectations of the LHDs and the MIDS with the MIDS reporting monthly on activity and dollar budgets to stakeholders. 4

A collaborative environment is to be fostered where MIDS clinicians and business managers work closely with hospital and LHD management to determine most appropriate arrangements to ensure optimal patient outcomes and service delivery is essential.

Outcomes / benefits
As the HNE model has proved, there are numerous benefits of setting up a MIDS model. The beneficiaries are:

- **Patients**
  - Skilled medical and nursing care from adequate staff numbers in what is often an acute hospital setting
  - More timely service on site
  - Most appropriate treatment due to improved relationships / consultation among referring and MI clinicians
  - Latest technology minimising radiation received and / or time spent in MI

- **Medical Imaging Departments / Clinicians, Referrers / Hospital, LHD CEO / Board**
  - Medical Imaging becomes self sustaining and may actually improve the bottom line
  - The Hunter New England model has proven to be self sustaining while contributing to the LHD (See Appendix C)
  - Public Radiologists in particular are incentivised to remain in the public health system where:
    - training of future clinicians improves – greater numbers required to keep up with ageing population and increasing demand from referrers for established and newer procedures and therapies and
    - private revenue can be maximised
  - MI equipment is replaced in a timely manner and cascaded to smaller hospital sites for more effective whole of life management
  - Rarely are there ad hoc, unplanned MI equipment replacement emergencies for expensive items breaking down
  - Better planning, control and efficiencies
  - Better relationships among referrers and MI departments as best patient care remains the focus and clinical consultations are more frequently desirable with the complexity of patient conditions
  - Problems / issues from MI rarely arise - MIDS resolve most of their own issues
  - Appropriateness of imaging requests becomes the responsibility of all referrers as the budget previously allocated to MI is re-allocated to referrers or the hospital. An activity budget is a necessary adjunct to the $ budget
  - Standardised, transparent costings and reporting
  - Infrastructure fees are retained by the MIDS and used for the purposes intended, ie. replacement of ageing MI equipment thereby,
  - Maximising private revenues from the MBS
  - Reporting of all images is managed within the MIDS (or in collaboration with other public hospital MIDS intra- and inter- LHD if required)

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4 NSW Health cost and outcomes study by IPART for selected NSW hospitals (2010) Independent Pricing and Regulatory Tribunal: recommendation 21
As the hub of all public hospitals, MI is able to contribute to referrers / hospitals / LHD requirements viz. National Emergency Access Targets (NEAT)

**Risks**
The most significant set of risks revolve around setting up a less than optimal MIDS (e.g. attempting to implement all at once, half heartedly or one size fits all). A critical factor in success of pursuing the MIDS approach lies in each service developing its own road to that destination; taking into account local financial, IT, physical and human resources, and clinical networks, etc. each guided however by an agreed set of principles.

Setting up a MIDS initially requires an investment in additional personnel (at least a MIDS Business Manager and an Accountant) and it takes time for it to 'settle' into an efficient system.

The risk involved in making no changes to MI departments is that they will be increasingly unable to keep up with increasing demand, unable to meet training requirements and unable to maximise private revenues.

If public Radiologists are not incentivised, there is the added risk of disenfranchising them and losing them, and all the attendant training, clinical consultation, etc.

The 'risk' that hospitals will 'lose' the infrastructure fee from private patients to their bottom line may be offset by retaining a portion of Activity Based Funding.
2. Outsourcing Model

Due mainly to the 2012 media coverage of unreported x-rays at several NSW public hospitals, there has been a vigorous marketing campaign by private radiology practices to participate in or take over reporting responsibilities for public hospitals. There have also been discussions around taking over the public department altogether.

Whilst some public hospital radiology departments do utilise the services of private radiology practices, this is generally on an ad hoc basis when short staffed or via a contract arrangement where public Radiologists are unavailable, particularly in rural and regional NSW, particularly since it is difficult to attract public Radiologists to these areas.

The Business and Assets Services Branch of the Ministry of Health is developing an improved contract document for public / private arrangements. From the KPMG survey of MI departments conducted in 2010, recommendations included standard terms and conditions, agreed KPIs and pricing guidelines as several governance and accountability issues were identified. While many public Radiologists have one or more days a week in a private practice, the model here is a contract with private-only providers.

Outcomes / Benefits

- **Hospital, LHD CEO / Board**
  
  Private practices are offering:
  o apparently attractive costings initially
  o seemingly simple solution which shifts responsibility for MI to private practice rather than continue to be managed in the public health system, including for staffing and equipment
  o quicker reporting turnaround times
  o a solution for regional, rural and remote sites where no public Radiologists are available

- **Medical Imaging departments / referrers / patients**
  
  o None have been identified (see Risks section following)

Risks

There is a range of service risks identified by the ACI Radiology Network in extending outsourcing of imaging services in metropolitan hospitals. These include:

- Decreased medical quality control (eg. to achieve financial thresholds, the number of procedures reported by some private Radiologists far exceeds accepted professional standards for safe and accurate reporting)
- Decreased clinical governance (difficult to retain control of an external entity, particularly in fulfilling contractual obligations viz. provision of new equipment, turnaround times, compliance with MoH Policies)
- Fragmentation of the multiple elements of imaging services which is feared will lead to reduced availability of Radiologists in the public system to undertake the many specialist components of the service including:
complex interventional procedures, CT and MRI modalities which supplement the more traditional modalities of x-ray and ultrasound eg. a complex trauma CT in a public hospital may contain >6000 images and take over an hour to analyse and report
- teaching
- research
- consultation
- interpretation and reporting

- Deterioration of capacity to train future radiologists, which includes College mandated supervision. Note that trainees are required to report 10,000 plain films during their five years of training
- Reduction of teaching for all clinicians in clinical skills and appropriate use and utilisation of imaging
- Decreased access to 24/7 services via provision of on-call and/or night shifts
- Radiology reporting occupies close to 100% of a Radiologist's time in private practice versus ~50% in a public hospital. The above-mentioned "non-billable" activities must be taken into consideration as they provide a significant contribution to better patient care and maintaining a sustainable workforce. Private-only practices generally have no experience in this area
- A number of private providers prefer to provide services via remote access rather than providing onsite reporting. This may create potential security issues for information technology systems and does not allow for the full use of the PACS system features including voice recognition technology and electronic referrals
- Reporting off site does not offer opportunities for private providers to build relationships with referrers, particularly important when they need to be notified of unexpected findings or to discuss patient history in a difficult case
- Workforce skill-mix: potential reduction in ability of staff to manage / support increasingly complex patients and procedures
- Potential reduction in nursing staff currently reflected in private practices
- Confusion if both public and private Radiologists in the public hospital which could be detrimental to best patient care
- If widespread outsourcing of radiology services in public hospitals increases, there will be reduced constraint on future increases in fees charged to the public health system due to a lack of alternative service provision

**Recommendations**

1. That insourcing of public hospital Medical Imaging departments be enhanced utilising the Medical Imaging District Services Model.

2. That contracts to outsource to private-only radiology providers be standardised and controls tightened - this option to be utilised where public Radiologists are unavailable or their use is agreed between LHD management and MI Clinical Director / Business Manager where appropriate.
Appendix A - Equipment Replacement Options

MI equipment ranges in price from relatively inexpensive to several million dollars. Whilst the NSW Treasury and MoH have preferred purchasing outright until recently, LHDs may be able to determine whether purchasing or operating leases suit their budget and purposes.

Revenue Maximisation
Changes to the Commonwealth’s Capital Sensitivity rules introduced July 2011 (where MI equipment older than 10 or 15 years will attract only half the Medicare rebate - see Table 1 below), have highlighted the impediments to capital planning upgrade or replacement of MI equipment over the past few decades. There is now a critical need to replace old equipment to provide patients with the best care and maintain private revenues.

Table 1: Effective life age and maximum extended life age for full Medicare benefits

<table>
<thead>
<tr>
<th>Modality</th>
<th>ATO depreciation schedule</th>
<th>New effective life age</th>
<th>Maximum extended life age (including 5 year extension for upgrades)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound</td>
<td>5 years</td>
<td>10 years</td>
<td>15 years</td>
</tr>
<tr>
<td>OPG</td>
<td>15 years</td>
<td>15 years</td>
<td>20 years</td>
</tr>
<tr>
<td>Mammography</td>
<td>7 years</td>
<td>10 years</td>
<td>15 years</td>
</tr>
<tr>
<td>Fluoroscopy</td>
<td>15 years</td>
<td>15 years</td>
<td>20 years</td>
</tr>
<tr>
<td>X-ray</td>
<td>15 years</td>
<td>15 years</td>
<td>20 years</td>
</tr>
<tr>
<td>Nuclear Medicine (excl. PET)</td>
<td>10 years</td>
<td>10 years</td>
<td>15 years</td>
</tr>
<tr>
<td>MRI</td>
<td>7 years</td>
<td>10 years</td>
<td>15 years</td>
</tr>
</tbody>
</table>

Capital sensitivity should not however be the only guide as to when to replace MI equipment. Arguments can be made that Ultrasound equipment be replaced every 7 years and for paediatric Radiology Departments (WM Kids, POW and JHH), CTs utilised by children less than 16 years old should be replaced every 5-7 yrs as new equipment has dose limiting technology which is safer for children who are more susceptible to radiation.

More detail on equipment funding options can be found in the MoH discussion paper *Procurement of Medical Imaging Equipment* (November 2012) but briefly, the responsibility to fund MI equipment will remain as the LHD’s responsibility. With purchasing outright and operating leases being considered however, there will be more flexibility. There are three main options for LHDs to fund replacement equipment:

Funding Equipment Options

1. Equipment Replacement Reserve
   A capital component to replace MI equipment can be included in the transfer price to referrers / hospital in a MIDS model. On a monthly basis an amount of revenue from the Imaging General Fund is allocated to an Equipment Replacement Reserve (ERR) to meet future capital needs.

2. **Operating Budget**  
If operating leases are an option, lease payments are included in the overall operating budget for the MIDS.

3. **LHD Option**  
LHDs may choose to replace equipment from any other local source of funds. The risk is that if this is not done in a timely manner, patients may be subjected to longer periods in time in MI utilising older equipment, MBS revenues will be halved, they, services will be disrupted if old equipment breaks down, and emergency ad hoc replacement is much more expensive.

NB: In some rural / regional locations, private practices provide equipment and services so do not fall within the MIDS Model for equipment replacement.

It should be noted that a 10 year rolling strategic plan for all MI equipment to be replaced in NSW will enable greater planning and therefore savings on purchasing, leasing and service agreement options.
Appendix B – Medical Imaging District Services Guiding Principles

1. Medical Imaging will be a clinically led service with a focus on all aspects of clinical service delivery including diagnostic, interventional and therapeutic procedures, interpretation and reporting, teaching, training, research, meetings, quality and safety.

2. The Medical Imaging Service will be patient centric with the patient receiving exactly, and only what they require at the optimum level.

3. Medical Imaging Services will display compassionate clinical care and respect to all who access and comprise the service.

4. Medical Imaging Services will provide a timely and efficient service (including 24 hours a day, 7 days a week where appropriate).

5. As a public sector entity, Medical Imaging remains a hospital department serving the community’s needs.

6. An underlying business framework will be developed for Medical Imaging Services.

7. Medical Imaging requires pricing principles to achieve transparency, efficiency and equity.

8. Medical Imaging will be a sustainable service to meet the needs of the public now and into the future.

9. Medical Imaging Services will have appropriate IT support to ensure delivery of a timely and efficient service.

10. Provision of the Medical Imaging Service will be a clinical, operational and management partnership.

11. Through the partnership, appropriate resourcing of staff and equipment will occur to ensure service delivery (including teaching, training, research, meetings, quality and safety) for optimum patient care.

12. Medical Imaging Services will collaborate with and/or partner other departments as relevant to ensure appropriate and optimal service delivery underpinned by appropriate service level agreements.
Appendix C – Hunter New England

Rationale
The original rationale for the John Hunter business unit was the need to attract and retain appropriately skilled and trained radiologists and other professional groups in MI. The existing budget was also unable to meet present demand, replace equipment, and consider service enhancements.

Expressions of Interest were sought for the reporting of some excess images only – all other services were to remain in the public hospital MI department.

Since 1996 John Hunter has increased the number of radiologists from 8 to 20 and Trainees from 4 to 13.

Reporting procedures / KPIs
In hours reporting targets are set on an annual basis with monthly reports (based on published Relative Value Units (RVUs) so that radiologists (as The Bureau) can be offered after hours reporting on a MBS percentage basis and flexible work practices. Time off in lieu or 40 hours in 4 days can be agreed and ‘secondary employment’ in The Bureau is contingent on meeting in hours targets.

Additional overflow is reported by a contracted private radiology group on a regular basis.

Cost calculations
At the start of the HNE model, activity over a number of years was studied. High cost modalities were separated from low cost modalities and work was done to calculate more precise costs per modality. More expensive modalities actually cost more than MBS rebates, while lower cost modalities were under MBS.

Initially only billable hours were calculated on MBS rebates. Non-billable hours were separated out and block funded, however this proved too difficult to maintain.

To keep calculations simple and more flexible, the HNE model now uses 100% MBS rebate as the starting point and calculations indicate that 151% of MBS across the board covers the remaining operating budget (has not changed for several years) after MBS infrastructure fees have been deducted.

A dividend is paid to the LHD and cost savings are found to maintain transfer price if possible.

Equipment Procurement
30% of all CT revenue and $50 per MRI exam is transferred from the Imaging General Fund to the ERR (internally recorded as there is only one bank account on the ledger). MRI is recorded separately from general replacements. Any funds left in the Imaging General Fund Account at the end of the financial year are allocated directly to the ERR. The model still relies on MoH for higher end equipment. Building works are usually bundled up with new equipment costs.

Appropriate Referral
A culture shift occurred whereby ED Trainees contact MI Trainees in the first instance to determine the need and appropriateness for imaging which has facilitated more appropriate referrals. Escalation to consultants is the next option.

Research is conducted at John Hunter Hospital by internationally renowned clinicians sponsored by commercial entities where use of MI equipment is charged out at AMA rates. This realises research potential and an additional revenue stream.
**Control**
Referrers are responsible for managing their activities (referral into MI) and are given monthly reports by MI of actual activity versus budget.

Service Level Agreements (SLAs) are in place with various ‘clusters’ of HNE activity viz. Primary (community) cluster, the Mater, acute networks, etc. to formalise expectations.

**Outcomes**
- Private revenue is maximised
- Radiologists are incentivised to remain in the public system
- The HNE model has strengthened clinical linkages whereby other significant clinical groups leverage off radiology’s expert advice and solutions are sought from radiology on a range of clinical issues