NHSScotland Shared Services

Radiology Programme

National Radiology Model Strategic Document
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Programme Director | Brian Montgomery  

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**Revision History**

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Table of Contents

A. Executive Summary ................................................................................................................. 5
   Figure 1: National Radiology Model ............................................................................................. 5
   Table 1: Underpinning Requirements ........................................................................................... 6
   Table 2: Radiology Workshop: interventions to support a National Radiology Model .............. 8

B. Existing Arrangements .......................................................................................................... 11

C. Strategic Case for Change .................................................................................................... 13
   Table 3: Patients waiting for all key diagnostic tests, NHSScotland........................................... 13
   Table 4: NHSScotland Workforce Statistics - Consultant vacancies – WTE.............................. 14

D. Stakeholder Engagement ...................................................................................................... 15

E. Economic Case ....................................................................................................................... 16
   Table 5: Five year trend in radiology service costs and activity ................................................. 16
   Table 6: Five year trend in radiology examinations .................................................................... 16
   Figure 2: Five year trends in radiology service costs and activity, Scotland ............................... 17

1. Overview of Shared Services ............................................................................................... 17
   1.1. Introduction ....................................................................................................................... 17
   1.2. Process ............................................................................................................................. 18
   1.3. Engagement ..................................................................................................................... 18
   1.4. Further Information ........................................................................................................... 18

2. Introduction to Diagnostic Radiology .................................................................................. 19
   2.1 The Strategic Case ........................................................................................................... 19
   2.2 The Case for Change ......................................................................................................... 19
      2.2.1 Organisational Fit: National Requirements ............................................................... 19
      Table 7: National Requirements the Strategic Document Supports ........................................... 20
   2.3 Baseline Data .................................................................................................................. 22
   2.4 Existing Arrangements ................................................................................................... 23
      Figure 3: Radiology Services in Scotland ................................................................................ 24
      Table 8: SWOT ...................................................................................................................... 25
   2.5 The Do Nothing Option .................................................................................................. 26
      Table 9: The Do Nothing Option .......................................................................................... 26
   2.6 Development of a Short List ............................................................................................ 27
   2.7 Scope ............................................................................................................................... 27
   2.8 Main Benefits Criteria ...................................................................................................... 28
Table 10: Benefits ...................................................................................................................... 28
2.9 Risks .................................................................................................................................. 28
Table 11: Risks .................................................................................................................................... 29
2.10 Constraints and Underpinning Requirements ..................................................................... 29
3. Commercial Case ................................................................................................................... 30
Table 12: Initiatives – Existing Activity ........................................................................................ 30
4. Financial Case ........................................................................................................................ 30
5. Management Case .................................................................................................................. 31
6. Readiness to Proceed ............................................................................................................ 31
Appendix 1 – National Radiology Model ..................................................................................... 33
Appendix 2 – Workshop Attendees ............................................................................................. 37
Appendix 3 – radiology programme visioning workshop report ..................................................... 38
Appendix 4 – PESTLE ................................................................................................................... 51
A. Executive Summary

This Strategic Document uses the principles of the Scottish Capital Investment Manual, but has been tailored to the needs of this particular work stream. Focusing on the process and outcomes to date it will identify a proposed way forward which embraces the “Best for Scotland” philosophy for the provision of a National Radiology Model. Figure 1 and Appendix 1, across NHSScotland. It will present the factors impacting radiology in Scotland and will describe a future service model which will support patient focused health and enable diagnostic imaging to be delivered consistently and with long term sustainability. The scope of the Radiology Programme is contained to diagnostic radiology and does not capture interventional radiology, although this may change as there are interdependencies between both.

Figure 1: National Radiology Model

<table>
<thead>
<tr>
<th>Rationale</th>
<th>National Model for Diagnostic Radiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current service is unsustainable</td>
<td>Benefits</td>
</tr>
<tr>
<td>The Vision</td>
<td>Constraints/Dependencies/Risks</td>
</tr>
<tr>
<td>A collegiate solution</td>
<td>Costs</td>
</tr>
<tr>
<td>Ability for radiology staff to work across Scotland</td>
<td>Cross boundary reporting</td>
</tr>
<tr>
<td>Maximising role utilisation, and flexibility to work across traditional Health Board boundaries</td>
<td>Improved waiting time performance</td>
</tr>
<tr>
<td>Agreed nationally accepted:</td>
<td>Co-ordinated approach to out of hours</td>
</tr>
<tr>
<td>- Clinical governance</td>
<td>Support for remote and rural boards in hours reporting</td>
</tr>
<tr>
<td>- QA</td>
<td>National approach to radiology reporting</td>
</tr>
<tr>
<td>Integrated, compatible IT Systems supporting:</td>
<td>More effective use of the workforce</td>
</tr>
<tr>
<td>- data sets and definitions</td>
<td>Ability to identify demand, capacity and equipment</td>
</tr>
<tr>
<td>- patient pathways and protocols - reduced variation and demand management</td>
<td>Reduced shortfall in reporting capacity</td>
</tr>
<tr>
<td>- workforce optimisation, e.g. radiography reporting, radiography assistant</td>
<td>Achieving the recognised standard for radiology reporting</td>
</tr>
<tr>
<td>- transfer of reporting</td>
<td>Improved quality of service planning by availability of comparable data</td>
</tr>
<tr>
<td>- de-coupling of image capture and reporting</td>
<td>Flexibility to adapt to emerging clinical service change</td>
</tr>
<tr>
<td>- separation of scheduled and unscheduled activity for both image acquisition and reporting</td>
<td>Increased throughput and quality due to de-coupling of scheduled/unscheduled reporting of images</td>
</tr>
<tr>
<td>- Cross boundary image requesting</td>
<td>Sustain image acquisition close to patient</td>
</tr>
<tr>
<td>- Image acquisition and sharing delivered by re-procurement of national PACS</td>
<td>Sustain expert radiology opinion for local clinician</td>
</tr>
<tr>
<td>- Cross boundary image reporting</td>
<td>Provide specialist radiology opinion to local services</td>
</tr>
<tr>
<td>- Reducing adverse/unnecessary variation</td>
<td>Cost avoidance</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
</tr>
<tr>
<td></td>
<td>Re-procurement of PACS</td>
</tr>
<tr>
<td></td>
<td>- circa £20m</td>
</tr>
<tr>
<td></td>
<td>- capital and revenue without SS changes</td>
</tr>
<tr>
<td></td>
<td>Additional PACS functionality to support RIS reporting only</td>
</tr>
<tr>
<td></td>
<td>- circa £2.5m</td>
</tr>
<tr>
<td></td>
<td>Datamart to enable service planning</td>
</tr>
<tr>
<td></td>
<td>- Circa £250,000</td>
</tr>
<tr>
<td></td>
<td>NSS Support Costs</td>
</tr>
<tr>
<td></td>
<td>- Programme Team</td>
</tr>
<tr>
<td></td>
<td>- SME</td>
</tr>
<tr>
<td></td>
<td>Design of QA, HR &amp; clinical governance models (costs to be established)</td>
</tr>
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Desired Outcomes

Ensure continuing good outcomes for patients
Sustainable, equitable, access to robust, timely services

Diagnostic radiology has evolved over the last century from the plain X-ray to the modern suite of imaging services and differing diagnostic procedures that are integral to the provision of healthcare across Scotland. Available in a wide range of healthcare settings, diagnostic radiology services provide a key diagnostic function in the support and delivery of a number of patient pathways which facilitate timely diagnosis for patients and improve patient outcomes. Equitable access to a robust quality and timely imaging service is vital for clinicians involved in both emergency and elective care to ensure optimal outcomes for their patients.

The total net costs for diagnostic radiology is circa £262m\(^1\) per annum. In addition to this are the associated NHS staff costs for unplanned activity and outsourcing to the private sector. The associated costs are unplanned, unbudgeted, undefined and anxiously escalating. The workforce challenges have exacerbated during the period from the initiation of the Programme to

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\(^1\) Scottish Health Service Costs (Costs Book) years ending 31st March 2015, 2014, 2013, 2012 & 2011
date and as a result each of the three NHS Regions is responding to local crises within radiology services.

As a result of this, the Health Portfolio team has been engaged in various discussions with a number of stakeholders from the South East and Tayside Regional Planning Group (SEAT) as well as external IT and programme management providers. SEAT has expressed a willingness to address the crisis on a collegiate basis and has shown a willingness to work with NHS Lothian, NHS Tayside, NHS Fife and possibly NHS Forth Valley. This regional approach may provide an opportunity to test the national radiology model in a regional setting. However, that can only be achieved after the data requirements, the IT connectivity and the HR requirements, as stated in Table 1, below, are established. The role of the radiology programme in support of this work has yet to be defined and agreed.

Whilst the aforementioned discussions have been ongoing, the radiology programme was approached by the North of Scotland Planning Group (NoSPG) to participate with them in a regional radiology workshop activity. The radiology programme will seek to engage with the West of Scotland (WoSPG) to achieve a consistent and equitable approach.

The need to establish a formal Operating Model in support of three Regions is recognised, but this cannot be achieved in the short term, or at least until the three underpinning requirements are met.

It must be stressed that, should each of the regions attempt to approach a solution independently, the implementation of a National Radiology Model is at risk.

As clearly outlined, the radiology services in their current form are unsustainable. This is due to a number of factors including workforce challenges and an exponential increase in demand for services which outstrips capacity.

It is anticipated that these issues will be further exacerbated over the next five years due to demographic changes and a projected 2.4% national population increase. It is therefore critical that diagnostic radiology delivers a consistent, efficient and resilient future service.

At the turn of 2016 a Positioning Paper was presented to the Chief Executives (CEs) and, following discussion, three underpinning requirements for radiology in Scotland were identified: Table 1 refers. They are dependencies without which the radiology initiatives cannot be achieved.

This document focuses on the requirements associated with the development of a National Radiology Model.

The opportunity exists for NHSScotland to deliver a high quality, sustainable radiology service capable of supporting emergent clinical models. Delivery of this service will require planning and delivery that is not constrained by the current Territorial Board structure and is set in a revised financial and performance framework. It is anticipated that the underpinning requirements detailed in Table 1, below, may facilitate a virtual national service with a flexible workforce enabled by technology to report remotely from anywhere in Scotland. It is also considered that this would allow demand and capacity to be better matched and economies achieved by rationalising out-of-hours rotas. By adopting a ‘Once for Scotland’ approach, it will also be possible to more effectively and efficiently make use of outsourcing and achieve further benefit from national procurement.

### Table 1: Underpinning Requirements

<table>
<thead>
<tr>
<th>Underpinning Requirement</th>
<th>Delivery Achieved By</th>
</tr>
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<tbody>
<tr>
<td>1 National radiology data requirements</td>
<td>In order to support the national Picture Archiving and Communications System (PACS) re-procurement (in the next three years) the radiology programme has</td>
</tr>
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</table>
begun work with key stakeholders to identify the national radiology data requirements (summary below). It is anticipated that the initial stages will be passed over to the PACS Governance Board at the end of 2016.

The next stages will be to consider how the data requirements will be managed and assembled ready for analysis. It is envisaged that this may incur a capital cost.

### 2 Integrated, compatible IT systems

The like for like requirements for national Radiology Information Systems (RIS) are within scope of the national PACS re-procurement programme which is being managed by the PACS Governance Board.

Work to identify the IT architecture, infrastructure and connectivity needed to support the future model for radiology has yet to be finalised. It is envisaged that this may incur a capital cost.

### 3 Maximising role utilisation, and flexibility to work across traditional Health Board boundaries

Working within the agreed national policy framework, it is necessary to review the current ways of working of individuals and teams, to enable staff to deliver a more flexible national service across current traditional geographical boundaries, in ways which maximise the utilisation of skills and competencies of each role within the team. This work will require clear linkages to professional and technical quality assurance arrangements and clinical governance.

It is envisaged that access to Health Board personnel data will be required to support that work.

## A1 National radiology data requirements

The ability to achieve a connected IT system, through the national re-procurement of PACS, requires agreement of a national data set and definitions. The mechanism by which this will be delivered is through a project established by the Shared Services Radiology Programme to Identify National Radiology Data Requirements. The project aims to be completed by the end of December 2016 and its objectives are as follows:

- Identify national radiology data definitions, data sets and data fields for clinical, managerial and financial data;
- Identify and document the data that is currently held in the national PACS system including the raw data fields and their format;
- Identify and document the data that is currently held in local Radiology Information Systems (RIS), of which there are many; including identifying and documenting what data is structured and non structured;
- Investigate which data items in the RIS applications are shareable. Assess how that data could be sourced and assembled ready for analysis;
- To assess how that data will be analysed to achieve desired results and how the results will be distributed;
- To investigate NHSScotland Cost Book data to determine how it could be harmonised through national PACS and RIS to ensure greater efficiency by allowing benchmarking comparisons to be made between health care providers;
- To identify other supporting radiology data sources from within NHS National Services Scotland (NSS);
- To obtain the necessary approvals in relation to Information Governance including Caldicott Guardian approval, completion of a Privacy Impact Assessment (PIA) and submission to the Public Benefit and Privacy Panel (PBPP); and
- To feed National Radiology Data Requirements into the re-procurement of PACS (mechanism to be established).

The project will be to consider how, once identified, the data requirements will be managed and assembled ready for analysis. It is envisaged that there may be a capital cost attributed to facilitate the solution.
A2 Integrated, compatible IT systems

As the current RIS functionality is within scope of the national PACS re-procurement programme, the requirements around the IT architecture, infrastructure and connectivity needed to facilitate a future integrated model for radiology have yet to be established. It is envisaged that this may incur a capital cost.

In July 2016, the radiology programme began engagement with key stakeholders to identify the current IT landscape within NHS Health Boards in order to determine the infrastructure and connectivity needed to enable full compatibility in support of the national radiology model. A full picture of the current IT landscape will require baseline data to be submitted to the programme by the NHS Health Boards. The baseline data will then require to be analysed. The outcome of this data collection and analysis exercise will inform the design of an IT solution.

Health Board Directors of Finance support of that data initiative is critical to achieve the objectives. The programme will request this through the Design Authority Financial Sub Group.

A3 Maximising role utilisation and flexibility to work across traditional Health Board boundaries

NHSScotland has an agreed national policy framework to support effective service change and transition for staff. It is necessary for the implementation group, working with HR and staff side colleagues, to review the current ways of working of individuals and teams, to enable staff to deliver a more flexible national service across current traditional geographical boundaries. The group will also review how best to maximise the utilisation of the skills and competencies held within each role within the team. This will include contractual, quality assurance and clinical governance issues.

In support of that comprehensive work, it is anticipated the programme will be required to identify baseline NHS Board workforce data. The current information available is historical, but to adequately address pressing local issues, accurate, up to date data will be essential.

Health Board Directors of Finance support of that data initiative is critical to achieve the objectives. The programme will request this through the Design Authority Financial Sub Group.

The radiology programme team within the NHS NSS Shared Services Health Portfolio held a Radiology Visioning Workshop which included key stakeholders from across Scotland. Workshop attendees were informed that the national radiology data requirements, integrated, compatible IT systems and nationally accepted HR contracts were ‘givens/delivered assumptions’; therefore, participants were asked to identify other future radiology service priorities. The prioritised service interventions and means by which they might be delivered are outlined in Table 2, below.

Table 2: Radiology Workshop: interventions to support a National Radiology Model

<table>
<thead>
<tr>
<th>Intervention / Requirement</th>
<th>Actions</th>
<th>Potential Opportunities</th>
<th>Key Barriers, Risks and Dependencies</th>
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<tr>
<td>Specify the IT requirements necessary to support a National Model for Radiology</td>
<td>Programme project in progress to review data requirements. Anticipated completion end 2016 Submission</td>
<td>Consistent approach to recording and analysing data Remote reporting of images pan-Scotland Reduce the gap between demand and capacity across Board boundaries Reduce/optimise use of outsourcing &amp; locums Rationalise Out-of-Hours and specialist</td>
<td>Integrated, compatible IT and RIS functionality dependent upon PACS re-procurement Mitigating action: Include connectivity of Information Systems as part of the re-procurement of PACS There is no comparable data available Mitigating action: Agree pan-Scotland</td>
</tr>
</tbody>
</table>
| To the PACS Governance Board end 2016 | Cover and rotas  
- Improve waiting time performance  
- Reduce adverse variation | Clinical and managerial data definitions and data sets  
If there is no national or collaborative approach, services will become unsustainable |
| Nationally agreed imaging pathways | Board / Regional engagement and agreement. Anticipated completion end 2016 | Reduce unwarranted variation  
- Optimise referrals and quality of care  
- Manage demand through better utilisation of existing workforce | Ongoing mismatch between demand and capacity data  
- Continued inappropriate referrals to the service  
**Mitigating action:** Development of pathways and decision support tools  
Integrated, compatible IT functionality  
Clinical engagement (National Clinical Strategy) |
| A co-ordinated approach to Out of Hours (OOH) Services | Board / Regional engagement with HRDs. Anticipated completion end 2016 | Rationalisation of a number of OOH rotas for generalist and specialist services across Scotland  
- Reduction in level of expenditure on outsourcing & locums  
- Optimisation of workforce  
- Improved recruitment and retention  
- Support to remote and rural Boards | HRDs to create National job descriptions, contracts and workforce planning for Reporting Radiographers  
Untapped resource to meet increasing demand  
Differing HR contracts’ impact on ability of some Boards to recruit  
Integrated, compatible IT and RIS functionality dependent upon PACS re-procurement  
Clinical and Board engagement  
Ongoing mismatch between demand and capacity  
Continued inappropriate referrals to the service |
| Support for Remote and Rural Boards for in-hours reporting | Board / Regional engagement with HRDs. Anticipated completion end 2016 | Utilise existing SLAs for in-house reporting  
Collaboration between Boards will improve sustainability, performance, equity of access, recruitment and retention | HRDs to create National job descriptions, contracts and workforce planning for Reporting Radiographers  
Integrated, compatible IT and RIS functionality dependent upon PACS re-procurement  
No comparable data available to support demand and capacity planning  
If there is no national or collaborative approach, services will become unsustainable |
| National approach to radiography reporting | Board / Regional engagement with HRDs. Anticipated completion end 2016 | Optimise workforce  
- Increase image reporting capacity  
- Improve recruitment and retention | Variation between Boards in the use of reporting radiographers  
HRDs to create National job descriptions, contracts and workforce planning for Reporting Radiographers  
Integrated, compatible IT and RIS functionality dependent upon PACS re-procurement |
| Mapping Activity to Identify Demand, Capacity | Board / Regional engagement with HRDs. Anticipated | Ability to model a resilient, sustainable national Radiology Model  
Flexible national networked service with a virtual workforce that can be deployed | HRDs to create National job descriptions, contracts and workforce planning for Reporting Radiographers  
Untapped resource to meet increasing demand |
The current regional landscape within radiology has provided an impetus for work to commence to address the regions’ individual radiology challenges. The Regional Planning Groups have already taken steps towards engagement in a collegiate approach.

To support the need to prioritise the activities required within each of the regions, baseline data, including workforce and financial data, is a critical, immediate requirement. NHS Board Directors of Finance support of that data initiative is crucial to achieve the objectives. The programme will request help through the Design Authority Financial Sub Group.

The underpinning requirements of the national radiology model and each of the interventions identified by stakeholders at the Visioning Workshop will need to be contextualised in a regional setting. Notwithstanding the need to understand the existing IT infrastructure, the workforce and cross boundary working arrangements, this undertaking will also aim to provide clarity around demand and capacity, out of hours (as well as in hours) activity and baseline financial data to name but a few of the key needs.

The scale of the projects required to understand these arrangements, to enable suitable prioritisation and likely implementation of the National Radiology Model cannot be underestimated. Until the full picture has been determined, the timescales are also unknown.

In summary, the current radiology service is unsustainable. A National Radiology Model which has the potential to be sustainable, affordable, resilient and fit for the future has been identified by stakeholders. The underpinning requirements and service interventions necessary to support that National Radiology Model have been outlined along with the possible means of delivery. It is not possible at this early stage to identify any costs associated with the development of a National Radiology Model.

| Staffing and Equipment completion end 2016 | across Scotland by using available technology Ability to plan and procure additional reporting capacity via outsourcing on a national basis Procurement of capital equipment on a national basis | demand Differing HR contracts’ impact on ability of some Boards to recruit Integrated, compatible IT and RIS functionality dependent upon PACS re-procurement |

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B. Existing Arrangements

The key drivers for change will be discussed further within this Strategic Document, and are summarised as follows:

- Increasing patient expectation around access to and delivery of services
- Growing complexity of disease and increasing options in relation to diagnosis, treatment and ongoing monitoring
- Patient expectation of access to investigations within a growing litigious landscape in Scotland
- The requirement to report on images across Health Board boundaries
- To meet the expectations of Realistic Medicine\(^3\) and reduce the need for defensive medical practice
- Without radiology for diagnostic capability, other clinical services including primary care cannot make a timely diagnosis, which impacts on the ability of clinical services to deliver a treatment plan and meet waiting time targets for patients
- Radiology is a key component of acute services and without radiology, hospitals are unable to deal with emergency and other unscheduled referrals
- Inability to meet current waiting time targets
- The forecast population and demographic increase
- The need to demonstrate value for money within an ever decreasing resource for public services
- The requirement to have access to nationally comparable data
  - to address variation in practice
  - to monitor and plan services to create capacity to meet demand including the requirement for seven day working
- The need to standardise contractual arrangements
- To consider a ‘Best for Scotland’ approach
- To alleviate the growing spend attributed with outsourcing to the private sector
- To address issues around staff retention and recruitment

The aforementioned existing arrangements mean that demand is not being met and therefore there is a variance in the ability to meet national waiting time targets across NHS Health Boards. There are also a number of issues affecting patient access which are not captured within waiting time targets such as unscheduled care demands. In some cases this is resulting in significant expenditure in outsourcing to the private sector, additional in-house activity payments at enhanced rates and the utilisation of locums.

There is no nationally agreed data set for radiology and therefore an inability to meaningfully collate data for planning purposes or to measure and identify best practice. There is variation in the delivery of radiology services across Boards ranging from service user access to reporting of images with no national imaging pathway.

There are a number of challenges around growing demand, increasing complexity and sophistication of investigations, changing clinical practice, increased access to investigations for primary care clinicians, workforce, capacity, inconsistent data definitions and collection, information systems which are not integrated, an inability to share patient information between Boards, remote

\(^3\) The Chief Medical Officer’s Annual Report 2014-15 “Realistic Medicine”
reporting of images and variation in standards and costs of service provision. Some cases are already being outsourced to the private sector to support the current demand. It is anticipated that these challenges will be further exacerbated over the next five years due to population increases and demographic changes.
C. Strategic Case for Change

The strategic case for change has been highlighted by the challenges faced by existing arrangements, which highlight inconsistency in process, inefficient service delivery and significant service risk around the future of the diagnostic radiology service across Scotland.

Historically, radiology services have evolved on a hospital by hospital basis and in response to increasing local demand including that originating from primary care. Challenges around workforce are impacting on the ability to meet increasing demand resulting in delays to diagnosis and treatment: Table 3, below, breaks down the number of patients waiting for diagnostic tests as of 31 December 2016. This is further compounded by disparate Information Technology (IT) systems which do not enable service planning on a national basis. An opportunity exists to design services on a national basis optimising the use of current resources and mobilising the existing workforce more effectively.

Table 3: Patients waiting for all key diagnostic tests, NHSScotland

<table>
<thead>
<tr>
<th>Diagnostic Test &amp; Investigations</th>
<th>Total waiting</th>
<th>&gt; 6 Weeks</th>
<th>&gt; 4 Weeks</th>
<th>31 Dec 15 (current)</th>
<th>30 Sep 15</th>
<th>30 Dec 14</th>
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<tbody>
<tr>
<td>8 Key Diagnostic Tests</td>
<td>9297</td>
<td>3043</td>
<td>9036</td>
<td>93.2</td>
<td>90.3</td>
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<td>Upper Endoscopy</td>
<td>5774</td>
<td>1145</td>
<td>1792</td>
<td>80.2</td>
<td>76.8</td>
<td>80.7</td>
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<td>Lower Endoscopy</td>
<td>1701</td>
<td>346</td>
<td>543</td>
<td>75.7</td>
<td>65.1</td>
<td>71.1</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>6169</td>
<td>1260</td>
<td>1879</td>
<td>79.6</td>
<td>77.5</td>
<td>81.4</td>
</tr>
<tr>
<td>Cystoscopy</td>
<td>1791</td>
<td>165</td>
<td>369</td>
<td>90.8</td>
<td>75.5</td>
<td>71.5</td>
</tr>
<tr>
<td>All Endoscopy</td>
<td>15435</td>
<td>2916</td>
<td>4563</td>
<td>81.1</td>
<td>75.2</td>
<td>78.5</td>
</tr>
<tr>
<td>Computer Tomography (CT Scan)</td>
<td>8273</td>
<td>100</td>
<td>768</td>
<td>98.8</td>
<td>98.3</td>
<td>97.5</td>
</tr>
<tr>
<td>Magnetic Resonance Imaging (MRI Scan)</td>
<td>9944</td>
<td>423</td>
<td>1556</td>
<td>95.7</td>
<td>93.7</td>
<td>93.9</td>
</tr>
<tr>
<td>Barium Studies</td>
<td>198</td>
<td>0</td>
<td>7</td>
<td>99.9</td>
<td>98.3</td>
<td>96.7</td>
</tr>
<tr>
<td>Non-Obstetric Ultrasound</td>
<td>18307</td>
<td>104</td>
<td>2122</td>
<td>99.4</td>
<td>98.3</td>
<td>97.1</td>
</tr>
<tr>
<td>All Radiology</td>
<td>36922</td>
<td>627</td>
<td>4403</td>
<td>98.3</td>
<td>97.1</td>
<td>95.9</td>
</tr>
</tbody>
</table>

Note: ISD receives aggregate diagnostic data from each NHS Board and so patient-level information is not systematically validated by ISD. However ISD does carry out quality assurance checks on the data submitted. The derivation of the figures and data accuracy is the responsibility of the Board.

Source: NSS ISD (National Services Scotland Information Services Division)

According to the NHSScotland Workforce Statistics, Table 4, across Scotland the number of consultant radiologist vacancies is 33.7 Whole Time Equivalent (WTE); 16.7 WTE posts have been vacant for six months or more. This situation is exacerbated by the increasing need for specialisation. There are also a number of undeclared vacancies where Boards consider there is no prospect of recruiting. This number is not included in Table 4, below. Vacancies are not spread evenly across Boards and in recent years there has been significant migration of established consultants from smaller and more remote Boards to the larger teaching centres. This is creating significant challenges to service sustainability for some Boards. Similar challenges exist in other radiology workforce groups. In order to combat this escalating problem, Health Boards have developed localised solutions around cross boundary requesting and reporting of images. In many cases, this takes the form of bespoke individual Service Level Agreements (SLA); however, challenges remain around Human Resources (HR) Quality Assurance (QA) and Clinical Governance (CG). Other solutions include additional unplanned activity and outsourcing to the private sector. Associated costs are unplanned, unbudgeted, undefined and anecdotally are escalating.
Table 4: NHSScotland Workforce Statistics - Consultant vacancies – WTE

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Establishment*</th>
<th>Staff in Post</th>
<th>Total Vacancies</th>
<th>Vacant for 6 months or more</th>
<th>Vacancies as a percentage of establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical radiology</td>
<td>357.7</td>
<td>324</td>
<td>33.7</td>
<td>16.7</td>
<td>9.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Establishment is calculated as number of staff in post plus total vacancies

Source: Scottish Workforce Information Standard System (SWISS)

The localised solutions have highlighted the inability to consistently request and report on images across NHS Board boundaries, identify demand and capacity to enable adequate service planning, facilitate timely diagnosis for patients and improve patient outcomes. Furthermore, disparate and disjoined approaches towards data collection, analysis and storage do not lend themselves to support strategic planning.

There is evidence to suggest variability and in some cases inequity across Health Boards in their ability to provide equitable access to imaging and achieve the associated access targets for diagnostic services. Evidence also demonstrates that demand has outstripped capacity and that the situation is likely to deteriorate due to forecasted increases in populations and shifts in demographics.

It should be emphasised that population and demographic projections for Scotland and the future requirement for seven day working will mean that demand for radiological services, in particular Computerised Tomography (CT) and Magnetic Resonance Imaging (MRI) will increase and the current challenges will exacerbate.

As a result of the compelling case for change, this Strategic Document will describe a model which is underpinned by a number of requirements and initiatives. In order to achieve a service which is sustainable, resilient and fit for the future, these initiative will have to be enabled. However, it must be stressed that this model will improve the current mis-match between demand and capacity, but a gap will remain and so a re-evaluation of the status will be required at a later stage.

In principle, a collegiate approach is required to underpin the model for future radiological services pan Scotland. A key driver will be the need to provide safe and comprehensive services to two user groups: patients upon whom tests are performed as well as clinicians who receive reports and clinical advice from radiology departments. The ethos will be to deliver these services equitably and as close to the user as possible and appropriate to the clinical need. It will require making the best use of resources, to enable radiology staff to work across traditional boundaries, founded upon nationally accepted HR contracts, QA and CG protocols.

These dependencies will facilitate the development of national patient pathways and clinical decision support addressing the need to review variation and demand for the service. The vision and delivery of the service will be reliant upon integrated compatible IT systems with nationally agreed data sets and definitions to support service planning and in turn identify demand and capacity.
D. Stakeholder Engagement

The Radiology Programme team within the NHS NSS Shared Services Health Portfolio worked closely with all Health Boards to identify those individuals they believed had the appropriate expertise within the service to help inform the journey towards a “Best for Scotland” diagnostic imaging service. The workshop attendees are captured in Appendix 2. These stakeholders were crucial to the progress which has been made with this work stream.

Through initial engagement, information about the current landscape of diagnostic imaging in Scotland and a macro environmental analysis of radiology in Scotland were collated. This information was used to provide a snapshot of the current state and was used as a foundation for a Visioning Workshop. The Public Health Intelligence (PHI) team within NSS played a pivotal role in supporting the Radiology Programme to collate data in a visual and interactive manner utilising Tableau. Collation and analysis of the data using this format was a powerful tool in visually representing not only the current state of radiology services, but also providing a basis for future modelling of services nationally.

Over the course of the day, key stakeholders were taken on a journey from the acknowledged current state to identification of the challenges and future service requirements needed for a sustainable future diagnostic radiology service in Scotland. It was unanimously recognised that the status quo is unsustainable.

The workshop was designed to identify the interventions, and through an options appraisal process, achieve the desired future state which would inform this Strategic Document.

A report, which has been published on the Health Portfolio website, providing an overview of the activities and the outcomes of the Radiology Programme Visioning Workshop, is captured within Appendix 3. This report, in addition to output communications have been regular features over the course of the Radiology Programme to inform stakeholders of progress and to ensure that those who had been unable to attend would be able to remain engaged and offered an opportunity to provide feedback.

The outcome of that workshop identified a strategic direction for Radiology in Scotland and the activities required to support that plan. It was agreed that the scope of the Radiology Programme is contained to diagnostic radiology. Interventional radiology is not included.

As a result of the information captured through stakeholder engagement, a new National Radiology Model was designed. (Figure 1 and Appendix 1 refer.)

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4 Source: Scottish Health Service Costs, year ended 31st March 2015.
6 National Records of Scotland 2012-based Population Projections by Council Area and NHS Board (single years 2012-2037); No age or gender breakdown.
11 http://www.sharedservices.scot.nhs.uk/health-portfolio/
E. Economic Case

The outcomes of the Radiology Visioning Workshop followed an options appraisal process which identified a number of requirements or interventions needed to underpin a National Radiology Model. The anticipated timescales to deliver the interventions in support of the proposed National Radiology model are outlined in Table 2, Executive Summary. There is now a need to endorse these interventions as priorities for NHSScotland and agree the routes by which each of the interventions will be delivered. Following approval to proceed from the Chief Executives, each intervention will undergo further analysis, costing and evaluation when developing the OBC.

A five year trend in Radiology service costs and activity undertaken by NSS Public Health Intelligence (PHI) of the radiology information available within the NHSScotland Cost Book, demonstrated continuous growth in the total net cost of a number of examinations for a range of radiology services; from £244m in 2010/11 to £262m in 2014/15, a 7.4% increase. Table 5 refers.

<table>
<thead>
<tr>
<th>Service</th>
<th>Net Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT (computed tomography) Scanner</td>
<td>£36,632,566</td>
</tr>
<tr>
<td>Gamma Camera</td>
<td>£9,706,971</td>
</tr>
<tr>
<td>Magnetic Resonance Imaging</td>
<td>£33,452,041</td>
</tr>
<tr>
<td>Ultrasonics / Ultrasonics (excluding Obstetrics)</td>
<td>£24,283,892</td>
</tr>
<tr>
<td>Other (includes conventional X-ray)</td>
<td>£140,015,929</td>
</tr>
<tr>
<td>Total</td>
<td>£244,091,400</td>
</tr>
</tbody>
</table>

In addition, Table 6 demonstrates that there has been a significant rise in the number of examinations over the same five year period rising from circa 3.4m to 3.9m, a 14.7% increase.

<table>
<thead>
<tr>
<th>Service</th>
<th>Number of Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT Scanner</td>
<td>372,160</td>
</tr>
<tr>
<td>Gamma Camera</td>
<td>52,076</td>
</tr>
<tr>
<td>Magnetic Resonance Imaging</td>
<td>156,409</td>
</tr>
<tr>
<td>Ultrasonics / Ultrasonics (excluding Obstetrics)</td>
<td>473,650</td>
</tr>
<tr>
<td>Other (includes conventional X-ray)</td>
<td>2,314,068</td>
</tr>
<tr>
<td>Total</td>
<td>3,368,363</td>
</tr>
</tbody>
</table>

The Economic, Commercial, Financial and Management cases will be developed in detail as part of the Outline Business Case (OBC).

Approval will be sought from the Chief Executives in August 2016 to proceed to the development of an OBC to progress the interventions required to support the National Radiology Model.
1. Overview of Shared Services

1.1. Introduction

In January 2015, the National Health Service (NHS) National Services Scotland (NSS) Programme Management Services (PgMS) was commissioned by the Guiding Coalition (now Senior Leaders Forum), made up of Board Chairs and Chief Executives, to take forward the NHSScotland Shared Services: to deliver sustainable, efficient services which will ultimately improve service user experience. One such work stream is the Health Portfolio, set up to consider a “Best for Scotland” approach for a number of clinical services including diagnostic Radiology.

Initially this included a review of existing Shared Services programmes and work streams, scoping emerging programmes and the development of a vision and roadmap. The key messages that emerged included the need for further input from the leadership of NHSScotland and from the Scottish Government. Shared Services must be driven from the top by Chief Executives and any changes must be future-proofed to make the most of the hard work involved in driving improvements.
1.2. Process

The Shared Services Portfolio is following best practice guidelines from existing and pilot Scottish Capital Investment Manual (SCIM)\textsuperscript{12} Guidance where appropriate, to support the development of Business Cases.

This involves three documents, namely an Initial Agreement (IA) (now called “Strategic Document”), Outline Business Case (OBC) and Full Business Case (FBC). These documents together make five cases for change, detailed as follows:

- The **strategic case** section. This sets out the strategic context and the case for change, together with the supporting investment objectives for the scheme.
- The **economic case** section. This demonstrates that the organisation has selected a preferred way forward, which best meets the existing and future needs of the service and is likely to optimise value for money (VFM).
- The **commercial case** section. This outlines what any potential deal might look like.
- The **financial case** section. This highlights likely funding and affordability issues and the potential balance sheet treatment of the scheme.
- The **management case** section. This demonstrates that the scheme is achievable and can be delivered successfully in accordance with accepted best practice.

Business Case development is an iterative process and at each key stage further detail is added to each of the five dimensions. The level of detail and the completeness of each of the five dimensions of the case are built up at different rates during the process.

The Strategic Document’s primary purpose is to establish the strategic case for change and fit with other programmes. It must also identify a preferred way forward, detailing a full appraisal of a ‘long list’ of options to achieve this, in what is categorised as part 1 of the economic case. What it does not do is outline every detail of the proposed change – rather, it takes a strategic overview of the status quo and proposes a way forward to meet the business needs of NHSScotland.

The project’s structure is shown in Section 5.

1.3. Engagement

In execution of the process for delivery of a composite business case, NSS Project teams have undertaken engagement with NHSScotland professionals working in the relevant environment. This has been achieved through workshops and open discussions, leading to documented outcomes which inform the business case elements. As and when required, prior to appointment of a Subject Matter Expert (SME), expert guidance was sought from other sources from within NHSScotland. The IA (now “Strategic Document”), OBC and FBC will ultimately comprise outputs from the workshops and other engagement. Therefore, a wide range of professional views have been taken into account in the process of identifying a preferred way forward.

1.4. Further Information

For further information about this Strategic Document please contact the business case owner, Brian Montgomery, Health Portfolio Director on brian.montgomery@nhs.net, or the Health Portfolio Programme Manager, Linda Kerr, lindawkerr@nhs.net.

\textsuperscript{12} http://www.scim.scot.nhs.uk/
2. Introduction to Diagnostic Radiology

Diagnostic imaging refers to a variety of non-invasive practices for diagnosing and monitoring diseases or injuries via the generation of images representative of internal anatomic structures and organs. These detailed images are used to further inform patients and clinicians about the anatomic organisation, functional working of the inner organs and structure of the patient's body.

It has been long accepted that the medical specialty, diagnostic radiology, which uses imaging to diagnose diseases seen within the body is fundamental in providing a key diagnostic function in the support and delivery of a number of patient pathways. These services are available in a wide range of healthcare settings across Scotland where equitable access to a robust quality and timely imaging service is vital for clinicians involved in both emergency and elective care to ensure good outcomes for their patients.

Radiology also has as yet unrealised opportunities to make use of available technology and workforce skill mix to deliver novel service models. These could provide services which uncouple the requesting and capturing of images from the associated reporting and mobilise the available workforce to greater effect. The potential benefits could improve local access for patients who are impacted by geographic proximity to diagnostic radiology service locations, reducing patient travel and waiting times around diagnosis. However, it is important to recognise the added value of access, whether locally or virtually, to the radiologist's clinical opinion beyond that of interpretation of images. The quality of patient outcome can also be improved due to the access to a second opinion from a radiologist. Separation of acquisition of images from the reporting of images is integral to the new National Radiology Model. Separation of acquisition of images from reporting already happens in terms of the timing: that is, images are captured at one point in time and reported upon at a later time. However, separation of acquisition of images in terms of geography does not generally happen. This is what is innovative about the proposed national Radiology Model. To illustrate, the patient's images are captured in one location such as the NHS Western Isles and reported on in another location such as the NHS Borders.

The underpinning requirements which have already been prioritised by the CEs include the identification of national radiology data requirements, to explore integrated, compatible IT systems and the development of nationally accepted HR contracts.

2.1 The Strategic Case

This section of the Strategic Document sets out the strategic context, within which the proposed changes will take place, covering:

- The national context for radiology in Scotland, and:
- The local context for proposed changes relating to radiology.

It provides a compelling case for change, in terms of the existing and future operational needs of the service.

2.2 The Case for Change

2.2.1 Organisational Fit: National Requirements

There are a number of national requirements in terms of policies, strategies, reports and national context which the proposed plans support. These are outlined in Table 7 but in summary include:
a. **2020 Vision “Achieving sustainable quality in Scotland’s healthcare”**: focus on achieving the highest standards of quality and safety, with the person at the centre of all decisions.

b. **Current Economic Landscape**


d. **Healthcare Quality Strategy for NHSScotland**: alignment with the three quality ambitions (person centred, safe, and effective).

e. **Integration of Health and Social Care — The Public Bodies (Joint Working) (Scotland) Act 2014**.

f. **National Clinical Strategy for Scotland**: “Where clinically appropriate we will continue to plan and deliver services at a local level. Where there is evidence that better outcomes could only be reliably and sustainably produced by planning services on a regional or national level, we will respond to this evidence to secure the best possible outcomes.”

h. **NHSScotland e-Health Strategy 2011-2017**
i. **NHSScotland Shared Services**: Will be managed using a “Best for Scotland” approach and delivered in a consistent way where it is appropriate to do so.

j. **Realistic Medicine**

k. **Scottish Capital Investment Manual (SCIM) / Capital Investment Group (CIG)**

l. **Seven day service provision**

m. **The Christie Commission Report**: “we must prioritise expenditure on public services which prevent negative outcomes from arising”.

### Table 7: National Requirements the Strategic Document Supports

<table>
<thead>
<tr>
<th>Policy / Driver</th>
<th>Key themes</th>
<th>How national drivers are supported</th>
</tr>
</thead>
</table>
| **2020 Vision “Achieving sustainable quality in Scotland’s healthcare”, September 2011.** | • Everyone is able to live a longer healthier life at home, or in a homely setting  
• Achieved through integrated health and social care focussing on prevention, anticipation and supported self-management  
• Highest standards of quality and safety, with the person at the centre of all decisions | • The quality of the radiology services is consistently improved and, where appropriate, standardised through adopting best practices  
• Workforce sustainability is improved through investing in education and staff development opportunities at a local, regional and national level.  
• Radiology models need to be able to support the strategic direction of moving care to a homely setting |
| **Current Economic Landscape** | There is a constant requirement to utilise capital and revenue funds more efficiently. These resources are becoming scarcer as the accounting treatment changes and budget constraints become more evident. | • The more efficient delivery of Radiology across NHSScotland will deliver more cost effective services, providing a better understanding of capital and revenue expenditure. |

| Efficiency and Productivity Framework SR10, 2011-2015 | The Framework focus has been on identifying and quantifying potential productive opportunities and supporting NHS Boards by improving benchmarking and encouraging service redesign in using improvement tools and techniques. | • Optimising performance  
• Enhancing performance  
• Increasing capacity  
• Implementation of cost avoidance strategies |
| --- | --- | --- |
| Healthcare Quality Strategy for NHSScotland, May 2010 | Aim to deliver the highest quality healthcare services to people in Scotland, and through this to ensure that NHSScotland is recognised by the people of Scotland as a world leader in healthcare. Key features:  
• Putting people at the heart of our NHS  
• Building on the values of the people working in and with NHSScotland  
• Making measurable improvements in the aspects of quality of care  
Improvement initiatives include:  
• Person centred  
• Safe  
• Effective  | • People at the heart of our NHS: Quality health services are dependent on the delivery of goods and materials to support clinical colleagues with the provision of clinical and social care services.  
• Safe: timely deliveries allow frontline services to safely support patient health.  
• Effective: Providing capacity by removing unwarranted variation in the Radiology services. |
| Integration of Health and Social Care  
The Public Bodies (Joint Working) (Scotland) Act 2014 | Allows NHS Boards and Local Authorities to integrate health and social care services in two ways. It is up to NHS Boards and Local Authorities to agree which approach/model is best for local needs. The overall aim is better and seamless health and care, more efficient use of resources and enabling of change. | • There is a need to ensure that NHSScotland Radiology is managed in an efficient and effective way. These skills could be available to manage any logistics service in the public sector. |
| Realistic Medicine | Realistic Medicine builds a personalised approach to care and empowers shared decision making. It reduces the unnecessary variation in practice and outcomes. It reduces harmful and wasteful interventions. | The following components are required to place collaborative, relational, decision making and planning.  
• Organisational processes and arrangements  
• Engaged, informed, empowered patients and carers  
• Care and support planning conversation |
| National Clinical Strategy for Scotland | “Where clinically appropriate we will continue to plan and deliver services at a local level. Where there is evidence that better outcomes could only be reliably and sustainably produced by planning services on a regional or national level, we will respond to this evidence to secure the best possible outcomes.” | • Radiology models need to be able to support the strategic direction of moving care to required localities |
| National Waiting Time Targets, specifically diagnostic targets | “The Scottish Government has set out the vision for a stronger NHS which will make better use of NHS capacity to deliver a better deal for patients. A major element in achieving this vision is the national waiting time guarantee.” | • Responding to demand for services  
• Measuring and regular reporting highlights delays in the system  
• Enables service improvements  
• Diagnostic waiting times are important in the delivery of the 18 weeks referral to treatment standard |
| NHSScotland e-Health Strategy 2011-2017 | A national direction focusing on healthcare and the needs of NHSScotland and the requirements for electronic information and digital services. | • Uses data to significantly improve the effectiveness of services and treatment |
### Shared Services Vision

NHSScotland’s Shared Services will:

- Transform the way support services are delivered by integrating services and working across boundaries
- Support Scotland’s health with a sustainable, consistent and effective service which meets our customers’ requirements
- Exploit economies of scale to increase efficiency, reduce costs and maximise returns from continuous improvement
- Embed governance at multiple levels to set strategic direction, prioritise service improvements and resolve day to day issues

There is an opportunity to reduce revenue and capital costs to Boards and to improve the effective delivery of radiology services by maximising the use of skilled staff within the health service, removing unwarranted variation, simplifying and standardising radiology business services
- Efficient and effective radiology will be key to the delivery of a national shared service agenda
- Support ongoing Shared Services projects (such as Laundry, Sterile and Catering) and programmes to ensure services are delivered that appropriately meet the future requirement.

### Seven day service provision

NHSScotland faces a challenge with regard to sustaining a suitably trained workforce over the next five to ten years. The Scottish Government Seven Day Working Taskforce has been asked to identify the optimal service models and consider what is needed to deliver them.

- Scottish Clinical Imaging Network (SCIN) commissioned to consider the requirements to enable Seven Day Working Task Force
- SCIN has recommended the level of service required to deliver on a seven day basis

### The Christie Commission Report

The Christie Commission on the future delivery of Public Services was firm in its view that ‘irrespective of the current economic challenges, a radical change in the design and delivery of public services is necessary to tackle the deep rooted social problems that persist in communities across the country’ and stated that ‘public services are built around people and communities, their needs, aspirations, capacities and skills, and work to build up their autonomy and resilience’.

- Identifying the need to improve service delivery and redesign to obtain better value for money.
- Services must be redesigned as demographic change in the workforce will mean there will not be enough people with sufficient skills and experience to deliver radiology services.

### 2.3 Baseline Data

The current repository within NHSScotland is the Cost Book which incorporates staff and operational costs related to the provision and operation of radiology services pan Scotland. The methodology undertaken is open to territorial Board interpretation and therefore, according to key radiology stakeholders, data which is disparate and unreliable. Nevertheless, this is the only data available. Trends demonstrate:

- A consistent increase in service demand over a five year period
- Workforce is reducing; demand is increasing

Limited Demand and Capacity performance data are available and reported in patient waiting time targets referred to in Section C, Table 3. Achievement of these targets is challenging and does not reflect the whole scope of services: only specific examinations are measured. There are also Demand and Capacity data within RIS; however, the information is inconsistent and incomparable across Scotland.

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The current arrangements mean that demand is not being met and therefore there is a variance in the ability to meet national waiting time targets across Boards. In some cases this has resulted in significant expenditure for outsourcing to the private sector, in-house additional activity payments, ad hoc arrangements between Boards and the utilisation of locums.

Informal reports indicate there are escalating costs surrounding the provision of unplanned activity and outsourcing to the private sector: anecdotally, circa £3.1m per annum.

It is evident that a data gaps still remain concerning the following:

- unplanned activity costs;
- outsourcing costs;
- out of hours activity, and associated costs.

There is no nationally agreed data set for radiology and therefore an inability to measure and identify best practice. There is a large variation in the delivery of radiology services across Boards.

Therefore, there is a need for robust, reliable operational and clinical data to enable service planning. A number of important pieces of work around data have been undertaken; however, these have been disparate and often with slightly differing objectives. In order to align the existing work, the Radiology Programme is project managing the identification of the national radiology data needs to support a National Radiology Model.

Key stakeholders had indicated that another national data collection exercise would not add value at this stage.

2.4 Existing Arrangements

As outlined, it has proven difficult to understand and estimate cost as well as some of the out of hours activities of diagnostic radiology services within Health Boards. This is compounded by the fact that the management of services is devolved to individual departments within Health Boards resulting in a complex model.

Using the Cost Book data, NHS NSS PHI (Public Health and Intelligence) produced a visual representation of the radiology service across Scotland capturing the location, staff levels and associated costs, and net cost per examination by Health Board: Figure 3 refers. This demonstrates the historical development of services which has occurred on a reactive basis with little evidence of strategic planning.
There are a number of challenges in terms of access to services within remote and rural environments, growing demand, increasing complexity and sophistication of investigations,
changing clinical practice, workforce, capacity, inconsistent data definitions and collection, information systems which are not integrated, an inability to share patient information between Boards, remote reporting of images and variation in standards and costs of service provision.

It is therefore important to understand the impact of external factors on Radiology in Scotland to consider a future service model which will ensure diagnostic imaging can be delivered consistently and with long term sustainability. A macro environmental framework has been used to consider six important factors: The Political, Economic, Social, Technological, Legal and Environmental (PESTLE) landscape of diagnostic imaging in Scotland. Appendix 4 refers.

There are also factors within the internal environment which may affect the development of the proposal. These were captured during the Radiology Visioning Workshop.

Table 8: SWOT

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A National PACS</td>
<td>• Age profile of workforce</td>
</tr>
<tr>
<td>• CHI (Community Health Index) number has facilitated broad/national overview</td>
<td>• Following of NICE/SIGN (National Institute for Health and Care Excellence/Scottish Intercollegiate Guidelines Network) Guidelines</td>
</tr>
<tr>
<td>• Desire for change</td>
<td>• High number of unfilled radiology vacancies (approx. 45 WTE)</td>
</tr>
<tr>
<td>• Excellent developing technology</td>
<td>• Inconsistent HR contractual arrangements</td>
</tr>
<tr>
<td>• Good communications with a relatively small radiology community</td>
<td>• Lack of bespoke training for post-graduate Radiographers</td>
</tr>
<tr>
<td>• Good inter-professional working</td>
<td>• Not enough trainees in system</td>
</tr>
<tr>
<td>• Good Networks established</td>
<td>• Radiology services often forgotten in service plans</td>
</tr>
<tr>
<td>• Good partnerships with private healthcare providers</td>
<td>• Recruitment and retention problems (especially outwith the central belt)</td>
</tr>
<tr>
<td>• National imaging equipment group</td>
<td>• Scottish Government access targets</td>
</tr>
<tr>
<td>• Reporting Radiographers</td>
<td>• Strategic planning is at NHS Board level</td>
</tr>
<tr>
<td>• Scottish Education System including excellent centres for core Radiographer training</td>
<td>• Variation in level of operational support for IT systems in Boards 24/7</td>
</tr>
<tr>
<td>• Track record of flexible workforce</td>
<td>• Variation in standards across Scotland</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Create sub-specialty communities – National or cross boundary working on sub-specialties</td>
<td>• Aging and increasing population</td>
</tr>
<tr>
<td>• Development of post-graduate courses for reporting radiographers</td>
<td>• Decreasing resources (IT and HR)</td>
</tr>
<tr>
<td>• Maximise the workforce including better use of support staff</td>
<td>• Financial impact of IT choices</td>
</tr>
<tr>
<td>• National data quality assurance – enable audit</td>
<td>• Flat-lined or decreased availability of radiologists and radiographers</td>
</tr>
<tr>
<td>• National or regional arrangements for Out of Hours radiology cover</td>
<td>• Impact of clinical decision support tools</td>
</tr>
<tr>
<td>• National strategic vision for local radiology Service provision opportunity to plan to meet demand – Demand Optimisation</td>
<td>• Increased reliance on radiology for disease diagnosis and management</td>
</tr>
<tr>
<td>• National training programmes for assistant practitioners</td>
<td>• Length of time to implement changes</td>
</tr>
<tr>
<td>• New elective centres</td>
<td>• Radiology perceived as a ‘support’ service and therefore a Cinderella service</td>
</tr>
<tr>
<td>• Reporting of images across boundaries through IT System</td>
<td>• Rise in demand</td>
</tr>
<tr>
<td>• Review of HR contractual issues – workload/time allocation/pay enhancement</td>
<td>• Rise in patient expectation</td>
</tr>
<tr>
<td>• Sharing best practice</td>
<td>• Rising cost of outsourcing/in sourcing</td>
</tr>
<tr>
<td></td>
<td>• Sub-specialisation is a threat to local service provision</td>
</tr>
</tbody>
</table>
2.5 The Do Nothing Option

The consensus view of stakeholders was that the current Radiology service model is unsustainable. Although there are local solutions currently in place which are transferrable and could constitute a ‘do minimum’ option, they are inconsistent, of variable standard and contain elements of risk. There is a need for significant “environmental” preparation which addresses variation in clinical practice, variation in employment practices, data inconsistencies and IT systems which are not integrated. Therefore, articulating a clear strategic direction for radiology is crucial to the ongoing viability of the Radiology service. Table 9, below, describes the impact of ‘doing nothing’.

Table 9: The Do Nothing Option

<table>
<thead>
<tr>
<th>Strategic Scope of Option</th>
<th>Do Nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Provision</td>
<td>Radiology Services are provided within NHS Board boundaries arranged according to local need. There is variation in practice, quality and delivery across Scotland. There is a mismatch between demand and capacity. If the status quo remains there is a risk to service viability.</td>
</tr>
<tr>
<td>Service Arrangements</td>
<td>Services have evolved historically and are arranged within local NHS geographical boundaries. The impact therefore is an inability to equalise demand and capacity across NHS Boards.</td>
</tr>
<tr>
<td>Service Provider and Workforce Arrangements</td>
<td>Radiology workforce is employed by NHS Boards with localised contracts. Some use of cross boundary outsourcing for image reporting. Use of private sector for reporting. Lack of a national approach to the workforce will compound and exacerbate the current recruitment, retention and cost pressures experienced through outsourcing. Various risks are inherent in maintaining current inconsistent localised arrangements around cross boundary reporting.</td>
</tr>
<tr>
<td>Supporting Assets</td>
<td>Each NHS Board has its own equipment captured within an Asset Register. There are a number of IT and imaging equipment contracts imminently due for renewal. If a national approach is not adopted there is a missed opportunity to standardise and interface equipment which would enable comparability of data, cross boundary reporting of images and service planning.</td>
</tr>
<tr>
<td>Public and Service User Expectations</td>
<td>Patients expect timely access to appropriate investigations. The current service provision is unable to meet the above patient expectations and predicted population and demographic increases will further compound this.</td>
</tr>
</tbody>
</table>
2.6 Development of a Short List

At the Radiology Visioning Workshop stakeholders engaged in a facilitated discussion during which a long list of interventions were considered and those which were deemed to be unrealistic or unachievable were discounted. The remaining interventions were refined and prioritised. The process highlighted the absence of an overarching National Radiology Strategy as defined above. The details of the process to achieve a shortlist of proposed interventions can be seen in Appendix 3.

The proposed long list of interventions consisted of:

- Create sub-specialty communities – national or cross boundary working on sub-specialties
- Develop post-graduate courses and job descriptions for Reporting Radiographers
- Enable clinical decision support and clinical pathways
- Change Human Resources (HR) contractual legislation for a successful Radiology service
- Maximise the workforce including better use of support staff
- Implement a national approach to demand optimisation
- Implement national or regional arrangements for out of hours Radiology cover
- Develop a national strategic vision for local Radiology service provision
- Implement national training programmes for Assistant Practitioners
- Provide National data quality assurance – enable audit
- Support New Elective Centres
- Provide support for remote and rural Boards
- Reporting of images across boundaries through IT system
- Utilise retired Consultants to address demand
- Review of HR contractual issues – workload/time allocation/pay enhancement/increased activity from existing radiologists
- Share best practice

From the long list of interventions, stakeholders were asked to score these using a scoring system addressing each individually, whether advancement would make the situation worse, have no impact or would make an improvement, and score using Red, Amber, and Green (RAG) indicators.

The above process resulted in the development of a short list of interventions required to underpin a National Radiology Model. The short list is:

- Specify the IT requirements necessary to support a radiology service for Scotland
- Nationally agreed imaging pathways
- A co-ordinated approach to Out of Hours services
- Support for remote and rural Boards in-house reporting
- A national approach to Radiography reporting, and
- A mapping exercise to identify demand, capacity, staffing and equipment

In order to achieve a National Radiology Model the underpinning requirements described in Figure 1 are essential. However, although these requirements will require investment, some of those costs are accounted for through other national programmes of work.

It is evident that the current radiology service provision is unsustainable. Therefore there is no ‘Do Nothing’ option. The proposed National Radiology Model is the desired solution.

2.7 Scope

The scope of the Radiology Programme is contained to diagnostic radiology and does not capture interventional radiology or neuro-interventional radiology.
2.8 Main Benefits Criteria

If the diagnostic radiology service was redesigned on a national basis and the above challenges were addressed, the foundation to reach the objectives of the Shared Services agenda would be achieved. NHSScotland would therefore be able to achieve a more sustainable service for Radiology that meets required quality standards and represents the most effective and efficient use of resources.

The benefits of the requirements underpinning a National Radiology Model are outlined in Table 10 below.

### Table 10: Benefits

<table>
<thead>
<tr>
<th>Initiatives</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| Specify the IT requirements necessary to support a Radiology service for Scotland | Enable interfacing of IT systems across Scotland  
Enable data comparability  
Form viable groups to allow peer support using networks (virtual groups) supported by IT |
| Nationally agreed imaging pathways | To standardise access  
Potentially reduce demand for imaging services |
| A Co-ordinated approach to out of hours services | Improve patient access  
Ensure timely reporting on images  
Maximise use of the skills of the existing workforce  
Improve recruitment and retention of workforce |
| Support for remote and rural Boards for in-hours reporting | Improve patient access  
Ensure timely reporting on images  
Maximise use of the existing workforce  
Improve recruitment and retention of workforce |
| National approach to Radiographer Reporting | Improve patient access  
Maximise use of the skills of the existing workforce  
Make best use of the most expensive/limited human resource (the radiologists)  
Streamline patient pathways  
Standardise decision making  
Standardise Job Descriptions and Banding  
Enable post-graduate course development |
| Mapping exercise to identify demand, capacity, staffing and equipment | Use demand and activity data to calculate the total required capacity  
Enable redesign of services to meet current and future demand  
Enable planning for procurement on a national basis  
Maximise use of the existing workforce  
Maximise the total capacity of the workforce by optimising use of the workforce skill sets using radiographic assistants and reporting radiographers where appropriate  
Identify the gap between optimised workforce capacity and current demand  
Use data to address and manage clinically unjustified variation (demand optimisation)  
Maximise use of the estate (capital investment) |

2.9 Risks

In addition to the identified risks captured within Table 11, below, a National Radiology Model and the supporting requirements are dependent upon all of the underpinning requirements being achieved. Failure to address variation in radiology services and the standardisation in referrals to the service is a further risk, due to the impact on demand and resultant costs.
Territorial Health Boards may not engage in the need to produce a National Radiology Model resulting in the ongoing disparity concerning performance and finance frameworks, clinical behaviour and quality assurance.

### Table 11: Risks

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Risk</th>
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<tbody>
<tr>
<td><strong>Capacity and demand</strong></td>
<td>Preferred option does not offer adequate capacity</td>
</tr>
<tr>
<td></td>
<td>Facilities are not flexible enough to respond to changes in service and demand</td>
</tr>
<tr>
<td></td>
<td>Projected population increases and demographic changes</td>
</tr>
<tr>
<td></td>
<td>Changes to clinical practices may impact on activity demand/standards</td>
</tr>
<tr>
<td></td>
<td>Failure to agree on a national data set</td>
</tr>
<tr>
<td></td>
<td>Inability to develop measurable statistics without compatible and comparable IT</td>
</tr>
<tr>
<td><strong>Staffing</strong></td>
<td>National acceptable HR contracts to achieve:</td>
</tr>
<tr>
<td></td>
<td>• Workforce issues related to cross-Board/regional working</td>
</tr>
<tr>
<td></td>
<td>• Ability to train staff to adapt to required new ways of working</td>
</tr>
<tr>
<td></td>
<td>• Standardisation of Job Descriptions for Reporting Radiographers</td>
</tr>
<tr>
<td></td>
<td>• Impact on workforce of job losses and loss of skills</td>
</tr>
<tr>
<td></td>
<td>• Resistance to change</td>
</tr>
<tr>
<td></td>
<td>• Impact on succession planning and resulting loss of skills</td>
</tr>
<tr>
<td></td>
<td>• Ability to redeploy staff appropriately, recognising current NHSScotland Organisational Change policies</td>
</tr>
<tr>
<td><strong>Operational</strong></td>
<td>Failure to ensure service continuity and related impact on frontline services</td>
</tr>
<tr>
<td></td>
<td>Inadequate/insufficient data available for assessment of costs</td>
</tr>
<tr>
<td></td>
<td>Inability to put adequate contingency arrangements in place</td>
</tr>
<tr>
<td></td>
<td>Inability to provide equity of service</td>
</tr>
<tr>
<td><strong>Reputational and policy</strong></td>
<td>Failure to secure Scotland-wide approval and buy-in of all Boards</td>
</tr>
</tbody>
</table>

### 2.10 Constraints and Underpinning Requirements

The National Radiology Model is dependent upon the underpinning requirements referred to in Figure 1 of the Executive Summary: National Radiology Data Requirements; Integrated, Compatible IT systems and Nationally Accepted HR Contracts.

Implementation of National Radiology Data Requirements is dependent upon these being encompassed in the PACS re-procurement. The Shared Services Programme is influencing the specification for PACS re-procurement.

There is a disparity of views between the Royal College of Radiologists and the Society of Radiographers around the role of reporting radiographers.

NHS Boards have to sign up to and support the Shared Service agenda.
3. Commercial Case

This section of the Strategic Document will discuss readiness to proceed with implementing a National Radiology Model.

There are other organisational initiatives which are strategically placed to take forward the six initiatives within the National Radiology Model. In some instances work has already commenced and others fall within the objectives of existing groups. Table 12, below, summarises.

**Table 12: Initiatives –Existing Activity**

<table>
<thead>
<tr>
<th>Radiology Strategy</th>
<th>Existing Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify the IT Requirements Necessary to Support a National Radiology Service</td>
<td>Captured within the delivered assumption PACS Governance Board/Re-procurement</td>
</tr>
<tr>
<td>Nationally agreed imaging pathways</td>
<td>Captured under the remit of the Demand Optimisation Group (DOG)</td>
</tr>
<tr>
<td>A co-ordinated approach to Out of Hours Services</td>
<td>Scottish Government Seven Day Working Task Force</td>
</tr>
<tr>
<td>Support for Remote and Rural Boards with regard to In Hours Reporting</td>
<td>SCIN Sub-group reporting to Seven Day Working Task Force</td>
</tr>
<tr>
<td>National Approach to Radiography Reporting</td>
<td>SCIN has made a recommendation to create a national workforce planning group to consider remote and rural issues</td>
</tr>
<tr>
<td>Mapping Activity to Identify Demand, Capacity, Staffing and Equipment</td>
<td>Captured within the delivered assumptions</td>
</tr>
</tbody>
</table>

4. Financial Case

A financial case for developing a National Radiology Model has not yet been established.

The cost of the underpinning requirements for the integrated, compatible IT systems may be accounted for within the national PACS re-procurement activity.

There are existing local HR agreements between Boards which allow cross boundary reporting and these could be explored for transferability on a regional or national basis. Any costs attributed will be explored in an Outline Business Case (OBC), the next stage in the development of a Full Business Case.

Costs of developing and implementing a single data set and definitions are contained within internal NSS departmental Service Level Agreements. However, how the data requirements will be managed and assembled ready for analysis may contain a cost element and, if so, this will form part of an OBC.

Any potential financial gains in reducing expenditure on outsourcing, locums and payments for additional activity will be explored in the OBC.
5. Management Case

The arrangements required to successfully manage and deliver the project will be defined as part of the OBC. The areas covered will include:

- Project management strategy and methodology
- The project framework
- Project roles and responsibilities
- The project plan, including the high level timeline for the project
- Project communication and reporting arrangements

The Shared Services governance structure supporting the development of the Strategic Document is shown in the diagram, below:

6. Readiness to Proceed

The current regional landscape within radiology has provided an impetus for work to commence to address the regions’ individual radiology challenges. The Regional Planning Groups have already taken steps towards engagement in a collegiate approach.

To support the need to prioritise the activities required within each of the regions, baseline data, including workforce and financial data, is a critical, immediate requirement. NHS Board Directors of Finance support of that data initiative is crucial to achieve the objectives. The programme will request help through the Design Authority Financial Sub Group.

The underpinning requirements of the national radiology model and each of the interventions identified by stakeholders at the Visioning Workshop will need to be contextualised in a regional setting. Notwithstanding the need to understand the existing IT infrastructure, the workforce and
cross boundary working arrangements, this undertaking will also aim to provide clarity around demand and capacity, out of hours (as well as in hours) activity and baseline financial data to name but a few of the key needs.

The scale of the projects required to understand these arrangements, to enable suitable prioritisation and likely implementation of the National Radiology Model cannot be underestimated. Until the full picture has been determined, the timescales are also unknown.

It must be stressed that, should each of the regions attempt to approach a solution independently, the implementation of a National Radiology Model is at risk.
# Appendix 1 – National Radiology Model

## Rationale

Current service is unsustainable

## The Vision

**A collegiate solution**

- Ability for radiology staff to work across Scotland
- Maximising role utilisation, and flexibility to work across traditional Health Board boundaries
- Agreed nationally accepted:
  - Clinical governance
  - QA

**Integrated, compatible IT Systems supporting:**

- Agreed data sets and definitions
- Production of nationally agreed:
  - HR policy
  - Clinical governance model
  - QA model
  - Integrated, compatible IT systems
  - Patient pathways/protocols

## Objectives

- **Maintain local image acquisition**
- **Local accessibility to expert radiology opinion**
- **Equity of access**
- **Local Sustainability of service**
- **Increased resilience of Service**

## Desired Outcomes

Ensure continuing good outcomes for patients
Sustainable, equitable, access to robust, timely services

## National Model for Diagnostic Radiology

### Benefits

- Cross boundary reporting
- Improved waiting time performance
- Co-ordinated approach to out of hours
- Support for remote and rural boards in hours reporting
- National approach to radiology reporting
- More effective use of the workforce
- Ability to identify demand, capacity and equipment
- Reduced shortfall in reporting capacity
- Achieving the recognised standard for radiology reporting
- Improved quality of service planning by availability of comparable data
- Flexibility to adapt to emerging clinical service change
- Increased throughput and quality due to de-coupling of scheduled/unscheduled reporting of images
- Sustain image acquisition close to patient
- Sustain expert radiology opinion for local clinicians
- Provide specialised radiology opinion to local services
- Cost avoidance
- Cost savings
- Virtual rationalisation with minimal impact to patients and staff

### Constraints/Dependencies

- Agreed data sets
- Agreed data definitions
- National RIS functionality (requesting and reporting)
- Ability to report cross boundary
- Production of nationally agreed:
  - HR policy
  - Clinical governance model
  - QA model
  - Integrated, compatible IT systems
  - Patient pathways/protocols

### Risks

- Unsustainable radiology services
- Mismatch between demand and capacity
- Inability to meet waiting times
- Increased costs of private sector for reporting
- Recruitment, retention issues
- Delayed diagnosis leading to poor patient outcomes

### Costs

- Re-procurement of PACS
  - circa £20m
  - Capital and revenue without SS changes
- Additional PACS functionality to support RIS reporting only
  - circa £2.5m
- Datamart to enable service planning
  - Circa £250,000
- NSS Support Costs
  - Programme Team
  - SME
- Design of QA, HR & clinical governance models (costs to be established)
The National Radiology Model – An Explanation

The Strategic Document seeks to describe a service model for radiology in Scotland that makes the best use of resources and also retains the service at as local a level as remains achievable whilst still remaining cost effective. Separating the different components of the service into the domains described above allows them to be matched individually with the most local level at which they can be delivered. This approach is dependent on prior implementation of the delivered assumptions:

- National PACS with a national reporting and requesting capability;
- National compatible IT systems that support national demand, capacity, activity and queue data and workforce data;
- Agreed HR arrangements that allow staff to deliver services at locations distant from their normal place of work;
- Clinical governance arrangements that can operate across the geographical reach of an individual’s work; and
- Standardised professional quality assurance arrangements that are recognised and accepted throughout Scotland.

The National Radiology Model maximises use of the skills of the workforce. In so doing, the model maximises the total capacity of the workforce by optimising use of the workforce skill sets using radiographic assistants and reporting radiographers where appropriate. In turn this will make best use of the radiologists who are the most limited and expensive human resource. These groups should be underpinned by the use of peer support using virtual networks supported by IT.

The identification of national radiology data requirements will allow demand and activity data to calculate the total capacity. As a result, this will identify the gap between optimised workforce capacity and current demand. The analysis of data on a national basis will also enable clinically unjustified variation to be addressed, thereby optimising demand. National data analysis will also facilitate the maximisation of capital investment.

Sub-specialisms such as paediatric radiology and neuroradiology are some of the key drivers as they are diluting the already scarce resource of consultant radiologists. The key is that the National Radiology Model could provide diagnostic sub-specialisation but not therapeutic sub-specialisation.

The breakdown of the radiology work streams are detailed in the diagrams below, along with options offering national to community service model solutions.
Radiology workload is described by a number of related but distinct domains:

**Table 1**

<table>
<thead>
<tr>
<th>Observation management</th>
<th>Description</th>
<th>Pathology</th>
<th>Recognition of significance</th>
<th>Giving advice on further investigation</th>
<th>Advice on clinical management of the patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text based (report only) interpretation/advice</td>
<td>Recognition (triage)</td>
<td>within the clinical context</td>
<td></td>
<td>investigation in the clinical context</td>
<td></td>
</tr>
</tbody>
</table>

Design different models as components of the overall solution

The provision of radiology services can be described in terms of functional units. A functional unit is the resource required to support a specific part of the service. To illustrate, there will be varying levels of functional units required to support the differing levels of care within the Clinical Strategy (e.g. Multiple Trauma Centres, or a Collegiate Board Model).
The Pyramid Model

Figure 1 – The Pyramid Model
The tiers of the pyramid would reflect the population base that maps to each level of service provision, e.g. Rural/community hospital 30,000 (that number is a guess), secondary service acute unit 150-250,000, tertiary service >250,000, regional service >500,000 and national 6,000,000.
### Appendix 2 – Workshop Attendees

<table>
<thead>
<tr>
<th>Name</th>
<th>Job title</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiona Agnew</td>
<td>Project Manager</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Mike Beach</td>
<td>Radiology Services Manager</td>
<td>NHS Orkney</td>
</tr>
<tr>
<td>Kenny Birney</td>
<td>Head of PACS and RIS</td>
<td>NHS Greater Glasgow &amp; Clyde</td>
</tr>
<tr>
<td>Richard Cannon</td>
<td>Lead Radiographer &amp; Service Manager</td>
<td>NHS Dumfries &amp; Galloway</td>
</tr>
<tr>
<td>Jim Cannon</td>
<td>Director of Regional Planning</td>
<td>North of Scotland Planning Group</td>
</tr>
<tr>
<td>George Cuthill</td>
<td>Local Officer, Scottish Health Council</td>
<td>Scottish Health Council</td>
</tr>
<tr>
<td>Margaret Diamond</td>
<td>Consultant Reporting Radiographer</td>
<td>NHS Fife</td>
</tr>
<tr>
<td>Stephen Docherty</td>
<td>Consultant Radiologist</td>
<td>NHS Tayside</td>
</tr>
<tr>
<td>Fiona Gardner</td>
<td>Consultant Radiologist</td>
<td>NHS Lanarkshire</td>
</tr>
<tr>
<td>Clinton Heseltine</td>
<td>Chief Radiographer/ Radiology Service Manager</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>Rob Jones</td>
<td>Project Support Officer</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Linda W Kerr</td>
<td>Programme Manager</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Jane Macdonald</td>
<td>Interim Radiology Manager</td>
<td>NHS Western Isles</td>
</tr>
<tr>
<td>Aileen MacLennan</td>
<td>Director of Diagnostics</td>
<td>NHS Greater Glasgow and Clyde</td>
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<tr>
<td>Jonathan McConnell</td>
<td>Consultant Reporting Radiographer</td>
<td>NHS Greater Glasgow and Clyde</td>
</tr>
<tr>
<td>Maureen McGurk</td>
<td>IT Consultant PACS/RIS Team</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Graham McKillop</td>
<td>Clinical Director</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>Hamish McRitchie</td>
<td>Radiology Programme Subject Matter Expert,</td>
<td>NHS Borders</td>
</tr>
<tr>
<td></td>
<td>Consultant Radiologist and Associate Medical Director</td>
<td></td>
</tr>
<tr>
<td>Winnie Miller</td>
<td>Planning Manager, Imaging and Diagnostics</td>
<td>NHS Greater Glasgow &amp; Clyde</td>
</tr>
<tr>
<td>Brian Montgomery</td>
<td>Health Portfolio Director</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Judith Park</td>
<td>Director of Access</td>
<td>NHS Lanarkshire</td>
</tr>
<tr>
<td>Shahid Rasul</td>
<td>Clinical Lead Radiology / Consultant Radiologist</td>
<td>NHS Ayrshire</td>
</tr>
<tr>
<td>June Rogers</td>
<td>Director of Operations</td>
<td>National Waiting Times Centre</td>
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<tr>
<td>Anne Marie Sinclair</td>
<td>Lead Clinician SCIN</td>
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<tr>
<td>Alley Speirs</td>
<td>Programme Manager</td>
<td>SCIN</td>
</tr>
<tr>
<td>Shonagh Walker</td>
<td>Clinical Director</td>
<td>NHS Grampian (Shetland)</td>
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<tr>
<td>Kim Walker</td>
<td>Project Manager</td>
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<tr>
<td>Jane Williams-Butt</td>
<td>Lead Radiographer / Imaging Manager</td>
<td>NHS Tayside</td>
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NHSScotland Shared Services

Health Portfolio
Radiology Programme

Visioning Workshop, Feb 2016
## Document History

### Revision History

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<th>Original Author</th>
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<td>Fiona Agnew</td>
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<td>Linda W Kerr</td>
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<td>BACKGROUND</td>
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<td>RADIOLOGY – THE NATIONAL CONTEXT</td>
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<td>2.3</td>
<td>SCOTTISH CLINICAL IMAGING NETWORK (SCIN) VIEW</td>
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<tr>
<td>3</td>
<td>THE WORKSHOP</td>
<td>7</td>
</tr>
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<td>OBJECTIVES</td>
<td>7</td>
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<tr>
<td>3.2</td>
<td>STRENGTHS, WEAKNESSES, INTERVENTIONS AND THREATS (SWOT) ANALYSIS</td>
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<tr>
<td>3.3</td>
<td>CAPTURING THE VISION</td>
<td>8</td>
</tr>
<tr>
<td>3.4</td>
<td>THE ART OF THE POSSIBLE – WHAT IF?</td>
<td>9</td>
</tr>
<tr>
<td>3.5</td>
<td>ACHIEVING THE VISION</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>NEXT STEPS</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>WORKSHOP ATTENDEES</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>SETTING THE SCENE</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>RADIOLOGY: THE NATIONAL CONTEXT. CURRENT AND ANTICIPATED CHALLENGES</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>THE SCOTTISH CLINICAL IMAGING NETWORK VIEW</td>
<td>14</td>
</tr>
</tbody>
</table>
1. Background

In January 2015, the National Health Service (NHS) National Services Scotland (NSS) Programme Management Services (PgMS) was commissioned by the Guiding Coalition (now Senior Leaders’ Forum), made up of Board Chairs and Chief Executives, to take forward the NHSScotland Shared Services: to deliver sustainable, efficient services which will ultimately improve service user experience. One such work stream is the Health Portfolio, set up to consider a “Best for Scotland” approach for some of the functions within Diagnostics (Laboratories and Radiology), Medical Physics, Pharmacy Aseptic Dispensing and Public Health.

A Position Paper was endorsed by NHS Board Chief Executives in January 2016 where it was agreed that Radiology would be one of the first Programmes to be taken forward.

The Radiology Programme team within the Health Portfolio worked closely with all Health Boards to identify those individuals they believed had the appropriate expertise within the service to help inform the journey towards a “Best for Scotland” diagnostic imaging service. The workshop attendees are captured in Appendix 2.

Through initial engagement, information about the current landscape of diagnostic imaging in Scotland was collated. This picture was used as a foundation for our Visioning Workshop held on Thursday 25 February 2016.

Over the course of the day, key stakeholders were taken on a journey from the acknowledged current state to identification of the challenges and future service requirements needed for a sustainable future diagnostic Radiology service in Scotland. It was unanimously recognised that the status quo is unsustainable.

Specialist clinical input was provided by the Radiology Programme Subject Matter Expert (SME), Hamish McRitchie, Consultant Radiologist, NHS Borders.

The workshop was designed to identify the interventions required to achieve the desired future state which would inform a first draft of an Initial Agreement (IA) (now called the “Strategic Document”), the first stage in a Business Case. Capturing the business need, the Strategic Document would thereafter be taken through the Shared Service governance process and would be considered and endorsed by the Board Chief Executives.

This report provides an overview of the activities and the outcomes of the Radiology Programme Visioning Workshop.


16 Source: Scottish Health Service Costs, year ended 31 March 2015.


2. The status quo

2.1 Setting the scene

Brian Montgomery, Shared Services Health Portfolio Director, welcomed participants to the workshop. It was explained that NHS Board Chief Executives had set a task to develop a sustainable model for radiology services in Scotland outwith existing Board constraints. The Chief Executives specified a requirement to report on images nationally and for there to be an agreed national data set for radiology. As a consequence, participants were informed that the focal point of the workshop was to be around the identification of the interventions needed to achieve a robust, sustainable future radiology service for Scotland.

There was further scene setting where participants were asked to consider the best model for Scotland, whilst balancing the need to ensure quality, efficiency, effectiveness and value for money. The Senior Leaders’ Form had expressed a political will and mandate for change in terms of Shared Services and a ‘Once for Scotland’ approach. Participants were asked to consider how to transform the historical territorial model and identify the challenges and interventions that would be required. It was stressed that this is not a centralisation agenda: Appendix 3 refers.

2.2 Radiology – the National context

Hamish McRitchie, Radiology Programme SME, provided further context for the benefits of creating a Shared Services state through his presentation which described a clinical case: Appendix 3 refers. A patient’s journey was outlined, describing how Radiology and other geographically dispersed clinical services supported patient diagnosis and management. The landscape of radiology services, the position on reporting images and the need for comparable data were briefly described. He outlined what would be possible should these mechanisms be available nationally.

Hamish presented the current radiology service as being unsustainable due to the high level of unfilled radiologist and radiographer vacancies and an increasing demand for imaging which is unlikely to diminish. The impact of this is the inability to meet waiting time targets and the resultant increase in cost of service provision.

All of these issues were considered drivers for change and he asked participants to consider what they perceived to be barriers and dependencies, taking into account technical, contractual, governance and quality assurance factors.

2.3 Scottish Clinical Imaging Network (SCIN) View

Anne-Marie Sinclair, Consultant Radiologist and Lead Clinician for SCIN, described the challenges for radiology around workforce and data from the perspective of the Diagnostic Network. The SCIN Shared Services Discussion Paper had been distributed to participants prior to the workshop and was referred to. The Audit Scotland Report undertaken in 2008 recommended that NHS Boards and NSS Information and Statistics Division (ISD) should work together to address variation in data collection and quality. Anne-Marie highlighted some work which had been undertaken to explore how the data collection system developed by Raj Burgul, Consultant Radiologist in NHS Forth Valley, could be utilised.

Challenges facing Radiology services were outlined including workforce challenges: an increased requirement for numbers of radiologists and radiographers, but paradoxically a reduction in numbers of trainees. The presentation illustrated a mismatch between demand and capacity, increasing costs on outsourcing for reporting of images and an inequity of spread of reporting across Boards. It was asserted that the recording of ‘waiting’ digitally had influenced behaviour.
Anne-Marie concluded that there is a pressing need for robust data to strengthen the need for change and that it will require leadership and support to develop this. Appendix 4 refers.

3. The Workshop

3.1 Objectives

Brian outlined the objectives for the workshop as follows:

- develop a vision for radiology Services for the future; and
- identify what is needed to ensure a robust, sustainable radiology service for Scotland.

3.2 Strengths, Weaknesses, Interventions and Threats (SWOT) Analysis

Breakout groups were formed and attendees, supported by facilitators from the Radiology Programme, were asked to undertake a SWOT analysis on Radiology in Scotland.

Addressing the Weaknesses and Threats first, participants then focussed on Strengths and concluded with the identification of the service Opportunities. These Opportunities were thereafter referred to as Interventions.

The outcomes of the SWOT are summarised below.

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A National PACS</td>
<td>• Age profile of workforce</td>
</tr>
<tr>
<td>• CHI (Community Health Index) number has facilitated broad/national overview</td>
<td>• Following of NICE/SIGN (National Institute for Health and Care Excellence/Scottish Intercollegiate Guidelines Network) Guidelines</td>
</tr>
<tr>
<td>• Desire for change</td>
<td>• High number of unfilled radiology vacancies (approx. 45 WTE)</td>
</tr>
<tr>
<td>• Excellent developing technology</td>
<td>• Inconsistent HR contractual arrangements</td>
</tr>
<tr>
<td>• Good communications with a relatively small radiology community</td>
<td>• Lack of bespoke training for post-graduate Radiographers</td>
</tr>
<tr>
<td>• Good inter-professional working</td>
<td>• Not enough trainees in system</td>
</tr>
<tr>
<td>• Good Networks established</td>
<td>• Radiology services often forgotten in service plans</td>
</tr>
<tr>
<td>• Good partnerships with private healthcare providers</td>
<td>• Recruitment and retention problems (especially outwith the central belt)</td>
</tr>
<tr>
<td>• National imaging equipment group</td>
<td>• Scottish Government access targets</td>
</tr>
<tr>
<td>• Reporting Radiographers</td>
<td>• Strategic planning is at NHS Board level</td>
</tr>
<tr>
<td>• Scottish Education System including excellent centres for core Radiographer training</td>
<td>• Variation in level of operational support for IT</td>
</tr>
<tr>
<td>• Track record of flexible workforce</td>
<td></td>
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</tbody>
</table>
### OPPORTUNITIES

- Create sub-specialty communities – National or cross boundary working on sub-specialties
- Development of post-graduate courses for reporting radiographers
- Maximise the workforce including better use of support staff
- National data quality assurance – enable audit
- National or regional arrangements for Out of Hours radiology cover
- National strategic vision for local radiology Service provision opportunity to plan to meet demand – Demand Optimisation
- National training programmes for assistant practitioners
- New elective centres
- Reporting of images across boundaries through IT System
- Review of HR contractual issues – workload/time allocation/pay enhancement
- Sharing best practice

### THREATS

- Aging and increasing population
- Decreasing resources (IT and HR)
- Financial impact of IT choices
- Flat-lined or decreased availability of radiologists and radiographers
- Impact of clinical decision support tools
- Increased reliance on radiology for disease diagnosis and management
- Length of time to implement changes
- Radiology perceived as a ‘support’ service and therefore a Cinderella service
- Rise in demand
- Rise in patient expectation
- Rising cost of outsourcing/in sourcing
- Sub-specialisation is a threat to local service provision

### 3.3 Capturing the Vision

Brian explained that by referring to the long list of interventions identified during the SWOT it was possible to begin to capture the Vision for radiology services: The preferred way forward. He then facilitated a lengthy discussion to achieve the identification of the strategic interventions, a short list, and agreement on the priorities for the service.

Participants were then asked to consider the short list of interventions and, addressing each individually, whether advancement would make the situation worse, have no impact or would make an improvement; these were scored using the below RAG indicators:

- **Red** – Makes situation worse
- **Amber** – No impact
- **Green** – Makes improvement

*Picture: Courtesy of Robert Jones (2016)*
The short list of interventions, comprising the preferred way forward for Radiology, was compiled and each scored as follows:

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Makes situation worse</th>
<th>No impact</th>
<th>Makes improvement</th>
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</thead>
<tbody>
<tr>
<td>National Radiology Strategy</td>
<td></td>
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<tr>
<td>Nationally Agreed Imaging Pathways</td>
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<tr>
<td>A Co-ordinated Approach to Out of Hours Services</td>
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<tr>
<td>Support for Remote and Rural Boards for In-Hours Reporting</td>
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<tr>
<td>National Approach to Radiography Reporting</td>
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<tr>
<td>Mapping Exercise to Identify Demand, Capacity, Staffing and Equipment</td>
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<tr>
<td>Specify the IT Requirements Necessary to support a Radiology Service for Scotland</td>
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<th>Total 12</th>
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3.4 The Art of the Possible – What if?

Brian encouraged participants to think "outside the box" and referred them to the next workshop activity. He posited that, "If the following were in place, at what level on the pyramid would Radiology Services be delivered?"

- Ability to report on images nationally (PACS or other system)
- Access to relevant patient medical records
- Accountability for radiology performance (i.e. waiting time, cancer targets)
- Agreed Clinical Governance
- Agreed clinical pathways
- Agreed data set for radiology which is collected and shared
- Contractual arrangements to allow reporting for other Boards (i.e. HR)
- Decision support software
- Planning radiology Services (staffing and equipment provision) to satisfy demand
- Protocol-driven access to investigations
- Radiology reporting quality assurance (QA)
- Radiology support for hub and spoke patient pathways (i.e. cancer pathways)
- Standardised access to radiology
- Standardised job designs for consultant radiographers

The majority of participants fed back that, should the defined mechanisms be in place, the majority of services could be delivered nationally, regionally or at multi-board level.
3.5 Achieving the Vision

In the final activity of the day, participants were asked to describe in no more than three words what they considered to be the most important enterprise for Radiology:

- National reporting system
- Implement unified RIS
- National imaging strategy
- National radiology access
- Nationally planned service
- Resolving out-of-hours
- Seamless cross-site reporting
- Sustainable services

3.6 Next Steps

Bringing the workshop to a conclusion, Brian began by addressing the issues which had been ‘Car Parked’ over the course of the day and confirmed that interventional radiology, neuro-interventional radiology and sub-specialty radiology were outwith the scope of the Radiology Programme.

Questions around whether individual Boards or radiology departments had an option to “opt out” were discussed. Brian responded by indicating that opting out was not an option.

Brian referred to the objectives of the day which had been to develop a future Vision for radiology services and to identify what would be needed to ensure a robust, sustainable radiology service for Scotland. Participants agreed that they believed these objectives had been achieved.

It was explained that the next steps for the Radiology Programme would be to produce a Shared Services Health Portfolio Visioning Workshop report and that members of the Radiology Programme team would be in touch with stakeholders for endorsement of the decisions achieved.

Further engagement will take place involving a wider group of stakeholders. This will include staff working within radiology departments who access the investigations and have expertise available to assist the management of patients. We will continue to engage with the Scottish Health Council, Partnership and others about meaningful engagement with staff, patients and the wider public.

Brian thanked participants for their ongoing engagement during what had been a very intense, but important day. He summarised the activities undertaken to achieve the preferred way forward for Radiology services in Scotland and duly brought the workshop to a close.
## Workshop attendees

<table>
<thead>
<tr>
<th>Name</th>
<th>Job title</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiona Agnew</td>
<td>Project Manager</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Mike Beach</td>
<td>Radiology Services Manager</td>
<td>NHS Orkney</td>
</tr>
<tr>
<td>Kenny Birney</td>
<td>Head of PACS and RIS</td>
<td>NHS Greater Glasgow &amp; Clyde</td>
</tr>
<tr>
<td>Richard Cannon</td>
<td>Lead Radiographer &amp; Service Manager</td>
<td>NHS Dumfries &amp; Galloway</td>
</tr>
<tr>
<td>Jim Cannon</td>
<td>Director of Regional Planning</td>
<td>North of Scotland Planning Group</td>
</tr>
<tr>
<td>George Cuthill</td>
<td>Local Officer, Scottish Health Council</td>
<td>Scottish Health Council</td>
</tr>
<tr>
<td>Margaret Diamond</td>
<td>Consultant Reporting Radiographer</td>
<td>NHS Fife</td>
</tr>
<tr>
<td>Stephen Docherty</td>
<td>Consultant Radiologist</td>
<td>NHS Tayside</td>
</tr>
<tr>
<td>Fiona Gardner</td>
<td>Consultant Radiologist</td>
<td>NHS Lanarkshire</td>
</tr>
<tr>
<td>Clinton Heseltine</td>
<td>Chief Radiographer/ Radiology Service Manager</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>Rob Jones</td>
<td>Project Support Officer</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Linda W Kerr</td>
<td>Programme Manager</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Jane Macdonald</td>
<td>Interim Radiology Manager</td>
<td>NHS Western Isles</td>
</tr>
<tr>
<td>Aileen MacLennan</td>
<td>Director of Diagnostics</td>
<td>NHS Greater Glasgow and Clyde</td>
</tr>
<tr>
<td>Jonathan McConnell</td>
<td>Consultant Reporting Radiographer</td>
<td>NHS Greater Glasgow and Clyde</td>
</tr>
<tr>
<td>Maureen McGurk</td>
<td>IT Consultant PACS/RIS Team</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Graham McKillop</td>
<td>Clinical Director</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>Hamish McRitchie</td>
<td>Radiology Programme Subject Matter Expert,</td>
<td>NHS Borders</td>
</tr>
<tr>
<td></td>
<td>Consultant Radiologist and Associate Medical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Director</td>
<td></td>
</tr>
<tr>
<td>Winnie Miller</td>
<td>Planning Manager, Imaging and Diagnostics</td>
<td>NHS Greater Glasgow &amp; Clyde</td>
</tr>
<tr>
<td>Brian Montgomery</td>
<td>Health Portfolio Director</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Judith Park</td>
<td>Director of Access</td>
<td>NHS Lanarkshire</td>
</tr>
<tr>
<td>Shahid Rasul</td>
<td>Clinical Lead Radiology / Consultant Radiologist</td>
<td>NHS Ayrshire</td>
</tr>
<tr>
<td>June Rogers</td>
<td>Director of Operations</td>
<td>National Waiting Times Centre</td>
</tr>
<tr>
<td>Anne Marie Sinclair</td>
<td>Lead Clinician SCIN</td>
<td>NHS Greater Glasgow &amp; Clyde</td>
</tr>
<tr>
<td>Alley Speirs</td>
<td>Programme Manager</td>
<td>SCIN</td>
</tr>
<tr>
<td>Shonagh Walker</td>
<td>Clinical Director</td>
<td>NHS Grampian (Shetland)</td>
</tr>
<tr>
<td>Kim Walker</td>
<td>Project Manager</td>
<td>NHS NSS</td>
</tr>
<tr>
<td>Jane Williams-Butt</td>
<td>Lead Radiographer / Imaging Manager</td>
<td>NHS Tayside</td>
</tr>
</tbody>
</table>
Setting the Scene

Brian Montgomery
Health Portfolio Director
Radiology – The national context. Current and anticipated challenges

Hamish McRitchie
Radiology Programme
Subject Matter Expert
Appendix 4 – PESTLE

A Macro Environmental Analysis of Radiology in Scotland

INTRODUCTION

The Royal College of Radiologists stated in 2015 that “Team working together across traditional boundaries have the potential to deliver significant gain for the NHS and to deliver the required quality of reporting” (1)

Radiology has evolved over the last century from the humble plain X-ray to the modern suite of imaging services and differing diagnostic procedures that are integral to the provision of healthcare across Scotland. This includes the medical sub-specialty, Interventional Radiology, which involves both the diagnosis of disease and therapy in nearly every organ system.

These services are available in a wide range of healthcare settings across Scotland where equitable access to a robust, quality and timely imaging service is vital for clinicians involved in both emergency and elective care to ensure good outcomes for their patients.

However, Radiology faces a number of challenges around growing demand, increasing complexity and sophistication of investigations, changing clinical practice, workforce, capacity, a lack of comparable information, an inability to share patient information between Boards, remote reporting of images and variation in standards and costs of service provision. Some cases are already being outsourced to the private sector to support the current demand. It is anticipated that these issues will be further exacerbated over the next five years due to population increases and demographic changes.

It is therefore important to understand the impact of external factors on Radiology in Scotland to consider a future service model which will ensure diagnostic imaging can be delivered consistently and with long term sustainability.

This paper therefore sets out a strategic analytical approach using a PESTLE. This macro environmental framework has been used to consider six important factors: The Political, Economic, Social, Technological, Legal and Environmental landscape of diagnostic imaging in Scotland.
PESTLE

POLITICAL

Political factors referring to the stability of the political environment, influences, restrictions, opportunities, attitudes and approaches:

- Health is a devolved power in Scotland with the ultimate responsibility for planning and managing the diagnostic imaging service resting with the Scottish Government through NHSScotland.
- The imaging service is delivered separately within the 14 territorial Health Boards and one Special Health Board, the National Waiting Times Centre.
- There is minimal crossover between the territorial Boards.
- Arrangements are in place regionally to allow radiological input to multi-disciplinary meetings (i.e. Multidisciplinary Teams – MDTs – for cancer) and other specialist areas.
- Bespoke, special arrangements exist between some Boards to enable small amounts of imaging to be performed.
- The Scottish Government implemented the six week maximum waiting time for eight key diagnostic tests and investigations, 4 of which relate to imaging, in 2009.
- Boards report performance against access targets on a regular basis and the figures are published by the NHS NSS Information Statistics Division (ISD).
- A major determinant of the location and nature of radiological services will be the configuration of acute services.
- The Chief Executives’ Group of the NHS in Scotland endorsed the National Quality Framework for four regional Major Trauma Centres (MTCs). The report in November 2013 indicated there would be a further review of the number of MTCs.
- The configuration of clinical services and siting of the MTCs will have an impact on the location and hours of availability of radiological services. This will be influenced by the imminent National Clinical Strategy.
- The Scottish Government in November 2015 announced an investment of £200m to create 6 new elective treatment centres across Scotland requiring additional radiological support.

ECONOMIC

- Economic factors referring to the wider economy affecting radiology: financial constraint of healthcare budget, efficiency savings targets, cash-limited budgets, reduced budgetary flexibility, lack of current capital funding
- Variable local budgets held at Board and Hospital level
- Low national economic growth levels
- Patient and clinician expectations, new clinical guidelines and new indications for imaging are key drivers
- Imaging tests are, in the main, acquired by radiographers and reported either contemporaneously or at a later date by consultant radiologists
- A relatively small amount of imaging activity is acquired by other health care workers and some plain film imaging is reported by specialist reporting radiographers
- Due to insufficient reporting capacity, the majority of Health Boards in Scotland are struggling to deliver the six week access targets for patients and ISD figures show
deteriorating performance for access to CT (computed tomography) and MRI (Magnetic resonance imaging)

- A portion of imaging workload is outsourced to private providers and to in house overtime payments
- Outsourcing of imaging in Scotland is conservatively estimated at £3.5 million per annum
- The cost of in house extra reporting is not known
- In comparison with other European countries, Scotland has one of the lowest numbers of radiologists per 100,000 people
- Recruitment of consultant radiologists is historically difficult
- Several Boards have outsourced out of hours emergency reporting to the private sector to allow consultants time to deliver daytime and weekend services
- Demand for complex, cross-sectional imaging is on the increase; demand is outstripping local service capacity
- The UK has fewer CT machines per head of population than all other Organisation for Economic Co-operation and Development (OECD) countries
- As CT and MRI workload growth is averaging 10% per annum, increased use of equipment alone will not bridge the capacity gap.

**SOCIAL**

Socio-cultural factors representing the culture that Radiology operates within:

- Public expectation/patient choice: tests for every illness, local access, extended day access and weekend access, immediate results
- Public expectation that health IT solutions are in place and work
- Public expectation that primary and secondary care work seamlessly together
- Anticipated strain on Healthcare due to Scotland’s aging population
- According to the National Records of Scotland the population will increase by a projected 126,791 (2.4%) by 2020
- The number of people achieving pensionable age is increasing. This will affect the future radiology service provision as areas with a high deprivation index will be more affected by the demographic shift as lower socio-economic groups have longer periods of ill health at the end of their lives.
- ISD Cancer Incidence Projections for Scotland predict a 33% rise in the number of new cases of cancer in the next 10 to 15 years: an increase from over 30,500 to over 40,000 cases
- There are shorter turnaround times required for cancer imaging to support the 31 and 62 day access targets
- Staff expectation: work life balance, flexible working, weekday working, unpopularity of night time on call work
- Staff mobility: migration/movement of skilled workforce (England/Overseas)
- There are significant difficulties in the recruitment and retention of staff in remote and rural areas
- Professional resistance to changing staff roles
- Significant challenges exist for service users from remote and rural areas to gain equitable access to imaging services
TECHNOLOGICAL

Points referring to new developments and changes in information technology:

- The National Picture Archiving and Communication System (PACS) provides storage and access to images from multiple imaging modalities in and between all NHS hospitals in Scotland.
- The National PACS contract ends soon and re-procurement will begin soon
- Cloud services and cloud storage may change the game
- There is no National RIS
- PACS is now being used by some Boards for cross-Board reporting of images
- There are 3 Radiology Information Systems (RIS) used to book and report scans. The system providers are Carestream, CRIS and Trak
- Reporting within PACS may change NHSScotland’s technical capability for cross boundary reporting
- Radiology systems must interface with other health information/EPR (Electron paramagnetic resonance)
- There is disparity in the reporting of images across Board boundaries
- Issues relating to clinical governance, Caldicott, technological sustainability and contingency management have to be addressed where cross-boundary reporting occurs
- Approaches towards radiological ordering differ from traditional paper based methods to electronic ordering
- There is no cross site electronic requesting
- Standardisation of electronic ordering lends itself to the addition of clinical decision software with embedded referral guidelines which in turn could help address demand optimisation
- Network speeds are critical and not uniform
- There is no national strategy regarding demand optimisation of imaging requests
- A national view of diagnostic activity is not possible due to a lack of consistency in the approach towards data collection and reporting
- It is not possible to measure and compare imaging activity outwith access target data which comprises only a proportion of the total workload
- Service planning is problematic due to inconsistent data collection and management
- Some regional radiology departments undertake retrospective manual data collection activities which are time consuming and resource intensive

LEGAL

Legal factors affecting radiology in Scotland:

- Radiologists and radiographers delivering frontline clinical services are governed by their respective regulatory bodies: the General Medical Council and the Health Professions Council
- The Ionising Radiation (Medical Exposure) Regulations (IRMER) 2000 governs the use of ionising radiation and apply to any facility that carries out medical exposures involving the use of ionising radiation
There are legal constraints within IRMER on requesters/operators and around authorisation/justification

The six principles of the NHS Caldicott Guardians apply when using service user information

Caldicott rules around the security and storage of patient identifiable data applies to cross Board reporting

Current contracts are held at Health Board level

A number of contractual issues for radiologists, such as crown indemnity and job planning, require oversight

ENVIRONMENTAL

Environmental considerations:

- Future developments in science and technology may reduce the levels of radiation required to provide the service and results but with a reduced environmental exposure
- Radiation is used for medical diagnostic purposes when the potential benefit to the individual outweighs the risk of harm from the radiation
- The number of CT scans has risen steadily for the period from 2003 to 2014

References