1-1-2015

Improving routine outpatient access to Magnetic Resonance Imaging (MRI) in an acute Dublin teaching Hospital

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Citation
Carswell A. Improving routine outpatient access to Magnetic Resonance Imaging (MRI) in an acute Dublin teaching Hospital [Masters dissertation], Dublin: Royal College of Surgeons in Ireland; 2015.
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Improving routine outpatient access to Magnetic Resonance Imaging (MRI) in an acute Dublin teaching Hospital

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A Dissertation submitted in part fulfilment of the degree
Of MSc Leadership, Institute of Leadership, Royal College of Surgeons in Ireland

2015
Improving routine outpatient access to Magnetic Resonance Imaging (MRI) in an acute Dublin teaching Hospital

MSc in Leadership, 2015

Student ID: 13129619

Submission Date: 13th May, 2015

Word Count: 16,292

Facilitator: Jennifer Hogan
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Acknowledgements

I wish to thank my colleagues in the Radiology department who worked collectively on this initiative to improve patient access. Attending third level education while in full time employment is a considerable undertaking, one that would have been impossible without the support of my family. Therefore I would like to thank my husband Andrew, my children Elouise and James, my parents and sisters, without whom I would have been lost. I would also like to acknowledge the amazing insight and support provided by my supervisor Jenny Hogan and our action learning team - Sinead, Kerry, Declan, Denise and Francis. Finally, I wish to thank the Foundation and Hospital for providing me with this opportunity.
Abstract

**Aims** - The aim of this quality improvement is to improve routine outpatient access to magnetic resonance imaging in an acute Dublin teaching hospital.

**Rationale** - The Hospital had recently commissioned a second Magnetic Resonance Imaging (MRI) scanner and although it had significantly improved inpatient access, outpatient access remained a serious concern. When data was collected, it was identified that for certain scan types (including spines and brain), the next routine appointment would be scheduled in excess of two years. A review of relevant literature identified that improving access was contingent on analysing capacity, activity and demand. This analysis would indicate the actions required to either decrease demand, increase capacity or improve activity. The restrictions of a limited budget and reduced staffing required that the department look at alternative ways of improving access. Therefore the focus was on increasing the activity through process improvement.

**Change Process** - The Senior and Swailes Organisational Development model for change was used as the framework for implementing the objectives set.

**Evaluation and Results** – The outcome of the evaluation indicated that the review of scheduling, the review of protocols and the validation of the waiting list all positively impacted in decreasing access times. The development of Key Performance Indicators against which to provide on-going evaluation and support for informed decision making was delayed by external factors

**Recommendations and Conclusion** – As a result of the initiative it has become evident that in order to improve access to not only MRI, but to all diagnostic imaging, that the publication of national access targets is required.
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<th>Description</th>
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<tbody>
<tr>
<td>DNA</td>
<td>Did Not Attend</td>
</tr>
<tr>
<td>HIQA</td>
<td>Health Information Quality Authority</td>
</tr>
<tr>
<td>HSE</td>
<td>Health Service Executive</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
</tr>
<tr>
<td>NIMIS</td>
<td>National Integrated Medical Imaging System</td>
</tr>
<tr>
<td>NTPF</td>
<td>National Treatment Purchase Fund</td>
</tr>
<tr>
<td>OD</td>
<td>Organisational Development</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PACS</td>
<td>Picture Archiving Communications System</td>
</tr>
<tr>
<td>RIS</td>
<td>Radiology Information System</td>
</tr>
<tr>
<td>SDU</td>
<td>Special Delivery Unit</td>
</tr>
<tr>
<td>SMART</td>
<td>Strategic, Measureable, Achievable, Realistic &amp; Time bound</td>
</tr>
<tr>
<td>TAT</td>
<td>Turn Around Time</td>
</tr>
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</table>
1 Introduction

1.1 Introduction

The focus of this quality change initiative is to improve routine outpatient access to Magnetic Resonance Imaging (MRI) in an acute hospital. It will be achieved primarily through the review and revision of practices around scheduling, vetting and waiting list management and secondly, through the introduction of revised key performance indicators. This will enable management to audit quality and activity in the department and ensure that service decisions around capacity, activity and demand are evidence based. This chapter will identify the rationale for this change project, its aims and objectives and the organizational context in which it was undertaken. It will also describe the role of the student which includes: i) the carrying out of a literature review; ii) the implementation of the initiative, using the Senior and Swailes Organizational Development Change Model (Senior & Swailes 2010a); and iii) the project’s evaluation as a tool to enable prioritization and allocation of resources, while identifying future quality improvements (Smith et al. 2012).

1.2 Rationale

In December 2012, the Radiology Department developed a business case for the Executive Management Team of the Hospital, identifying the requirement for a second MRI scanner. The case outlined the potential risks to patient care including delayed access to inpatient and outpatient MRI diagnostics, the increased length of stay for inpatients due to the excessive inpatient access time and the continued risk
of the existing scanner breaking down due to its age. Funding was confirmed from the Health Service Executive (HSE) in 2013 to purchase a new scanner and a project team was put in place to manage the tendering and installation. In early 2014, an additional business case was submitted identifying staffing requirements for the new scanner. As part of this case, targets were identified for reducing both inpatient and outpatient access times to MRI and to clear the existing waiting list. The new scanner was commissioned in August, 2014.

The intention of this project is to improve outpatient access to MRI through: 1) the review of vetting & scheduling including an analysis of capacity; 2) identifying process improvements in the management of the MRI waiting list; 3) and the introduction of Key Performance Indicators (KPIs). In Ireland, the introduction of reporting and monitoring of outpatient waiting lists in 2012 resulted in target access times being set and reports / toolkits being issued on the methods in which waiting lists were to be managed (Special Delivery Unit 2014; Special Delivery Unit 2013; Plunkett et al. 2012). For the first time, the monitoring and reporting of diagnostic imaging waiting lists will be introduced for Acute Hospitals in 2015 (Health Service Executive 2015). With this notification by the HSE it is possible to hypothesise that waiting list targets and regulations on the management of waiting lists will follow. Therefore, any changes made to the process managing waiting lists, will need to be resilient to potential waiting list management policy developments, for diagnostic imaging.
The demand for access to complex imaging such as MRI has increased as clinicians see the benefits of early diagnosis (Nuti & Vainieri 2012). The recent installation of the second MRI scanner offers an opportunity to review the scheduling based on the increased capacity and to introduce KPIs, against which management and staff can evaluate the effectiveness of the scheduling and the service.

1.3 Aim & Objectives

1.3.1 Aim

The aim of this project is to improve routine access for outpatients referred for MRI imaging in the Hospital. This aim supports the Hospital’s mission to service the healthcare needs of the community and ultimately benefit the patient. According to Donald Berwick, the improvement of healthcare requires three aims: “…improving the experience of care, improving the health of populations, and reducing per capita costs of health care.” (Berwick, Nolan, & Whittington, 2008, P.759). In order to improve the health of the population it is vital that patients have timely access to diagnostics. According to Berwick et al. (2008), one method of achieving improved healthcare is by providing innovative access to services by reviewing how they are scheduled.
1.3.2 Objectives

It is anticipated that the following specific, measurable, achievable, realistic and time-bound (SMART) objectives will support the achievement of the overall aim:

1. MRI outpatient access management group will have met by 14th November, 2014.

2. A review of the scheduling process will take place and process improvements will be agreed that are in line with current Special Delivery Unit (SDU) criteria for managing outpatient waiting lists by 12th January, 2015.

3. A set of KPIs for demand utilisation in MRI are agreed which are based on best practice by 31st March, 2015.

4. That 90% of all out patients will wait no more than 9 months for an outpatient MRI by 31st March, 2015.

In order to achieve this it will require agreeing the implementation of KPIs, constant monitoring of capacity, activity & demand management and the scheduling of MRIs, including the slots allocated to different specialties for outpatient access. It will also require a review of waiting list management activities such as validation, managing “Did Not Attend” (DNAs), and monitoring of longest waiters. The focus of both the HSE and the National Clinical Programme for Radiology on data has been partially led due to the findings of the Hayes Report (2010), which addressed the importance of diagnostic imaging in the quality of patient treatment and the need to ensure the appropriate gathering of data to allow management monitor access. The intention is
by implementing the project and ensuring the outputs are achieved, that the following outcomes will result:

- Improved outpatient access to MRI, resulting in improved patient experience and clinical outcomes.
- Improved access for MRI referrals, resulting in an improved service for the referring clinician.
- A vetting and scheduling system that is resilient to policy developments around waiting list management.
- A set of agreed Key Performance Indicators which will aid in the management of the service.

1.4 Organisational Context

The healthcare system in Ireland is constantly having to adapt to external factors which impact on it, such as changes in Government, the fluctuating economic environment, technological advances and global mobile workforces (Hay Group 2011) (appendix 1). These factors are impacting on the acute hospitals within this system as they are required to provide a service, where demand is increasing, while resources are reduced. Consequently, quality improvements must be identified that improve access, increase quality and either reduce costs or are cost neutral. The National Clinical Programme for Radiology is working with acute Hospitals to develop methods of gathering data, in order to provide a more equitable and efficient service and identify potential areas for improvement (National Clinical Programme...
for Radiology 2014). Hospitals must use their own data to review how they provide access to MRI for patients.

There are potential threats within the organisation to the successful outcome of the project. These include:

<table>
<thead>
<tr>
<th>Risk #</th>
<th>Risk to project success</th>
<th>Rationale</th>
<th>Impact to project</th>
<th>Likelihood it will occur</th>
<th>Action to proactively control risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lack of engagement from key personnel</td>
<td>Caused by increase in inpatient demand as a result of improved access, increase in demand due to access to scans not available on previous scanner, increase in demand as patients move from private to public care (McLoughlin 2013)</td>
<td>x</td>
<td>x</td>
<td>Identify what the perceived barriers are and provide evidence to show how the change will benefit the patient &amp; the service, combined with creating a sense of urgency around move towards national reporting and monitoring of diagnostic imaging</td>
</tr>
<tr>
<td>2</td>
<td>Unforeseen increases in demand</td>
<td>x</td>
<td>x</td>
<td>Monitor inpatient and outpatient demand. Review allocation of slots between inpatient &amp; outpatient demand to ensure that one does not encroach on the other</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Reduction in capacity</td>
<td>Due to: existing scanner breaking down because of its age, old scanner being upgraded or replaced, or lack of staff</td>
<td>x</td>
<td>x</td>
<td>Actions required to mitigate against this are outside the scope of the initiative, however, improving scheduling should mitigate against future reductions in capacity</td>
</tr>
<tr>
<td>4</td>
<td>The inability to access the data required from the RIS/PACS system</td>
<td>x</td>
<td>x</td>
<td>Review existing access and identify options to gain access to all data required</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Staff shortages</td>
<td>Staff being unavailable to work on the initiative due to shortages requiring them to prioritise other activities</td>
<td>x</td>
<td>x</td>
<td>Constant review of staffing levels and liaising with project team to review their commitments</td>
</tr>
</tbody>
</table>

Table 1 Risk Assessment (Nov, 2014)

Where possible steps to eliminate or reduce potential threats have been identified and risks will be reviewed as the project progresses. In the case of resistance from key personnel, the development of the Stakeholder Analysis (appendix 2) will help to identify the groups who will be impacted by the project and their potential levels of resistance to it. This will aid in the development of communication plans.
1.5 Role of the Student in the Organisation and Project

As business manager of the Diagnostic Directorate, which includes the Radiology department, the Author’s responsibilities include the ensuring of a quality service provision to service users within the organisation and the wider community. To ensure this is achieved the author has responsibility to identify risks, develop and monitor key performance indicators and instigate quality improvements (Srinivasan & Holsinger 2011; Davies et al. 2000). The author will lead the implementation of the project by identifying key stakeholders, project champions and areas of potential resistance. To achieve this, the author must complete a literature review that can facilitate identifying best practice for rolling out the change initiative and also to present evidence for the benefits of instigating the change to help address resistance if it arises. The author has chosen to lead the organisational development change process based on the change model developed by Senior and Swailes (2010).

![Organisational Change Model - Senior & Swailes (2010)](image)

*Figure 1 Organisational Change Model - Senior & Swailes (2010)*
The student also has responsibility to develop the tools for evaluation, not only the outcomes of the project, but the effectiveness of the process used in the project. Evaluation has shown to help management in the prioritisation and management of scarce resources within health management. Finally, the student is responsible for providing a written study and poster presentation on the implementation of same.

1.6 Summary and Conclusion

The aim of this project is to improve routine outpatient access to MRI scans. The Hospital has been provided with the means to increase capacity, therefore, the key is to ensure that this additional capacity is used as effectively and efficiently as possible, with the intended outcome being improved patient experience and quality of care. The role of the student in this quality improvement is to ensure the result is achieved by providing leadership through vision, planning and implementation of the project.
2 Literature Review

2.1 Introduction

Patient waiting times are regularly used as an indicator of quality within health systems (Olisemeke et al. 2013; Lodge & Bamford 2007). The Irish government regularly report on waiting times for accessing outpatient clinics and time to elective procedures, however, to date there has been no national publication of waiting times for diagnostic imaging. In comparison, in 2010-2012, the Italian National Government set targets of thirty days for access to MRI and the United Kingdom (UK) set performance targets of no patient waiting longer than thirteen weeks for access to any diagnostic imaging. In November 2014, Irish patients in certain regions were waiting over two years to access MRI (Mitchell 2014). The HSE have advised in their Acute Hospital Operational Plan (2015), that they intend to commence the reporting and monitoring of diagnostic waiting lists. The inclusion of MRI in the diagnostic process has shown to increase the overall treatment time for patients due to delayed access (Molinié et al. 2013). Therefore, it is evident that the responsibility lies with the organisation to expedite access to MRI to support diagnosis; the question arises as to how to facilitate this. Waiting lists result from an inequality between demand and supply (Schneider 2011); in order to reduce waiting lists one must either reduce demand or increase supply. Supply is dependent on both capacity and activity; the former is subject to the resources available to provide the service, however the latter is dependent on how those resources are utilised.
2.2 Search Strategy

For this literature review the following databases were included in the search: Medline Ovid, Emerald, Lenus and Google Scholar. The following strategy was used, allowing for small variances subject to the search engine:

- Medline - Magnetic Resonance Imaging / or MRI.mp AND access time$.mp, waiting lists / or waiting times$.mp and delay.mp / time factors and 2007 – current and English. This resulted in fifty-six articles on Medline of which eleven were relevant further to review of the full text where available and the abstract for five articles.

- Emerald: diagnostic radiology, waiting, access, time and scheduling resulted in 172 articles of which eight articles were relevant to the review

- Lenus: “MRI waiting access time” resulting in a review of 200 articles. This resulted in seven papers which were relevant to the review

- Google Scholar search was based on the search terms Radiology Waiting list management, this resulted in six papers relevant to the search. In addition to this to support a review of the capacity of MRI in Europe a search was carried out on Google with the terms MRI per head of population resulting in literature from the OECD with comparison data on same.

Articles were excluded that were published pre 2000; that were focused on diagnostic performance and accuracy; that were focused on clinical interventions or treatments which did not include reference to waiting times on outcome. There were a total of thirty-three articles and reports reviewed for this literature review.
2.3 Scope of Literature Review

The intention of this literature review is to 1) identify what role timely access to outpatient MRI scans, has on patient care and why it needs to be improved; 2) why do we have waiting lists for diagnostic imaging and what elements impact on them; and finally 3) what are the most effective actions we can take to improve waiting list management and access to MRI scanning.

2.4. Theme 1 - Why do we need to improve outpatient access to MRI?

The quality of patient care is predicated on the ability to diagnose and commence treatment as quickly as possible (O’Riordan et al. 2013). Focus is now on the development of integrated care programmes that provide patient pathways to ensure quality healthcare provision in a timely manner (Ouwens et al. 2009). An integral part of these pathways is the use of diagnostic imaging to aid clinicians. Patients with diseases, such as cancers, require urgent access to diagnostics in order to expedite commencement of treatment. In this case the organisation has responsibility to ensure that the appropriate access to diagnostics is given to patients within those pathways and therefore avoids blocking the system resulting in poor quality of patient care (van Sambeek et al. 2011; Tokur, Lederle, Terris, Jarczok, Bender, Schoenberg, et al. 2012; Ouwens et al. 2009).
2.5 Theme 2 – What causes waiting lists for outpatient access to MRI?

Waiting lists exist in radiology departments due to the problem of matching increased demand against constrained ability to supply. In radiology, demand is outside the direct control of the providers and lies with the referring clinicians (Schneider 2011). Supply is determined by the capacity in the system versus the actual activity. Therefore, waiting lists are impacted by unconstrained demand, the potential to increase capacity and the actual activity levels subject to variances in resources (Tokur, Lederle, Terris, Jarczok, Bender, Schoenberg, et al. 2012). The organisation holds responsibility to review demand and either increase capacity with additional resources or if no additional resources are available to ensure that activity is maximised so that all capacity is utilised as efficiently and effectively as possible.

2.5.1 Demand

In recent decades the technological advances in diagnostic imaging have resulted in increased demand to access the services provided (Lau 2007; Nuti & Vainieri 2012; Van Schouwenburg et al. 2014). Clinicians can improve both the quality and speed of diagnosis through accessing a range of diagnostic imaging specialties. This results in patients experiencing less invasive treatment practices and decreases in morbidity & mortality. However, increased demand may result in excessive use of diagnostic imaging. This may be caused by examinations which are repeatedly carried out, examinations which do not aid in diagnosis or examinations that are carried out too early or incorrectly (You et al. 2009; Emery et al. 2009; Nuti & Vainieri 2012).
2.5.2 Capacity

Capacity is based on the range of resources available to provide a service (Schneider 2011). In the case of MRI this is contingent on the number of scanners, the availability of staffing and their skill mix. The capacity required is often dictated by the demand for the service, but is also dependent on the capital investment required to provide the equipment and the revenue required to staff it. Capacity can be increased by either purchasing additional MRI scanners or by increasing staffing to run the service over a longer period of time. There is limited information on the capacity required to provide an appropriate level of service. According to the OECD “Health at a Glance” (2014), in 2012 Ireland was above the EU average, with an average of 12.4 MRI per one million population. This was significantly above the UK (6.8 MRI) (appendix 3a). The UK are achieving access targets of all diagnostic imaging being carried out within 13 weeks with that level of equipping. This implies that there is already sufficient capital equipment capacity in the system (OECD Publishing 2014). However, there is no literature that indicated the optimum number or scanners per head of population and therefore this conclusion must be inferred.

2.5.3 Activity

There is a danger in confusing capacity with activity. Activity is dependent on how resources within a service are utilised. It includes how patients are scheduled, the skill mix of available staff, staff attendance, unscheduled downtime and the policies around managing patients. Activity can be increased or improved by calculating capacity against actual activity and identifying if there are gaps. Gaps between
capacity and activity imply an ineffective use of resources and therefore this should result in quality improvement initiatives to improve it.

Scheduling of staff, scheduling of patients (balance between inpatient and outpatient), opening hours, reliability of equipment and skill mix will all impact on actual activity. Although the OECD (2012) identified, that Ireland was above the EU average with 12.4 MRI scanners, it was significantly below the EU average with only 17.7 examinations per 1000 population (appendix 3a &3b). From this it is possible to infer that although we have sufficient capacity based on capital equipment, in the system, we are underutilising it compared to other countries such as the Netherlands (OECD Publishing 2014). The activity does not seem to match the capacity within the system and higher volumes of demand do not equate to more efficient use of resources (Nuti & Vainieri 2012).

<table>
<thead>
<tr>
<th>Examinations</th>
<th>Capacity</th>
<th>Activity</th>
<th>Demand</th>
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<td></td>
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**Figure 2 - Capacity/Activity/Demand**
2.6 Theme 3 – How can we improve access outpatients to routine MRI?

Is the existence of long waiting lists for MRI scans, in Ireland, an indication of overuse of diagnostics and therefore a need to reduce demand, an indication of a requirement to increase capacity, or does it imply an inefficient use of capacity resulting in lower than expected activity? Without having national standards around waiting times, productivity levels by machine, patient type and staffing levels, it is difficult in know which area to focus on.

2.6.1 Reduce Demand

Demand may be determined by volume of patients, mix of disease, preference of referring clinician or substitution of one diagnostic imaging examination over another (Nuti & Vainieri 2012). In Italy, France and the UK, access times have been linked to the region in which the client resides, inferring different regions have different access times (Nuti & Vainieri 2012; Molinié et al. 2013; Brealey et al. 2012). However, it has also been shown that larger volume of patients accessing the service does not always equate to greater waiting times (Nuti & Vainieri 2012). The key may be to reduce the overuse of digital imaging as a limited resource (Tokur, Lederle, Terris, Jarczok, Bender, Schoenberg, et al. 2012). There is limited literature on the overuse of MRI scanning; where an audit was carried out in South Africa of actual imaging against the referral guidelines of the American College of Radiology (2012) the results have shown that the requests were in line with guidelines (Van Schouwenburg et al. 2014). However it is apparent that there has been a significant increase in demand in recent years and this may be attributed to clinician’s fear of
litigation due to misdiagnoses resulting in excessive use of diagnostic imaging (You et al. 2009). There is also a theory that, as patients educate themselves about health services this increases their expectations that they will be referred for diagnostic imaging (You et al. 2009; Tolga Taner et al. 2012). To avoid overuse of MRI, organisations must have clear guidelines for appropriate referrals and quality assurance practices in place (i.e. auditing of referrals against guidelines) to ensure that guidelines are followed (Emery et al. 2009). Alternative options are to develop clear patient pathways that identify when the use of diagnostic imaging is appropriate and equally when it is not required (Ouwens et al. 2009).

2.6.2 Increase Capacity

If the opportunity to decrease demand is limited, then the alternative is to increase capacity. This may be achieved through either the purchasing of additional scanners or through increasing working hours. The findings of the OECD imply that, in 2012, the number of scanners in Ireland should be sufficient to provide appropriate levels of capacity in the system. This infers that the limitation on capacity is not through insufficient scanners but through the underuse of those scanners. The majority of scanners in the Irish system are in public Hospitals. In Greece, which has the 2nd highest number of MRI scanners per 1 million population at 23.4, almost all the MRI scanners are in the private sector. What is interesting to note is that they also have the fifth highest level of scans per 1000 population at 67.6 scans. This implies that the private sector are prepared to “sweat their assets” ensuring that maximum capacity is available on the equipment. If this is the case then the logic extends to questioning whether the majority of MRI scanners in Ireland, which are in public
hospitals, are underutilised due to limited scanning times. To increase scanning times it would be necessary to increase staffing, which requires appropriately trained staff that are available to be recruited and sufficient revenue in the system to fund them. The difficulty is in knowing what the optimum operating hours are for cost effective staffing, given that there is no income generated from scanning in the public sector. To measure this there needs to be national productivity guidelines on the use of diagnostic imaging equipment in the public sector against which to benchmark (Tavakol et al. 2011). If capacity is limited in one organisation in the public sector, however, there is potentially sufficient capacity within the country (OECD Publishing 2014) then the option is to spread the demand to other organisations by outsourcing to other public sector hospitals in the region (Nuti & Vainieri 2012). This can only be achieved with the monitoring and reporting of waiting list numbers and activity at national level in order to identify where there is excess demand and where there is available capacity (Health Service Executive 2015). Another option is to increase capacity by outsourcing to private institutions (Emery et al. 2009; Macleod et al. 2009). The logic should be held that outsourcing to the private sector only takes place when all capacity in the public hospital has been fully utilised. Evidence has been shown that outsourcing occurred where utilisation was lowest, resulting in poor cost effectiveness (Nuti & Vainieri 2012). If resources are underutilised then how do we ensure that we are using capacity, not only efficiently, but also effectively and are we managing our waiting lists with the patients best interest at heart (Ni Shiothcháin & Byrne 2009)?
2.6.3 Maximise activity

If the ability to impact on both demand management and increasing capacity is limited by external factors such as economic constraints, or capacity exists but there is implied underutilisation; then the solution is to look at maximising existing capacity through cost neutral quality improvement initiatives that address system redesign. To achieve this, it is necessary to look at potential capacity against actual activity and identify any variances (Carpenter et al. 2011). System redesign for MRI must look at the processes involved that result in scanning a patient. These include the prioritisation / vetting of referrals, scheduling of patients & staff, the management of patients who DNA, validation of waiting lists, patient focused bookings and overall resources management (Das et al. 2011; Ní Shiothcháin & Byrne 2009). The benefits of effectively managing waiting lists by addressing these issues have been shown to be effective (Lodge & Bamford 2007; Schneider 2011; Ouwens et al. 2009; Kielar et al. 2010).

Although scheduled care in Diagnostic imaging has not been addressed at a national level, the HSE have published a series of detailed reports and toolkits on how to manage scheduled care and outpatient waiting lists in Irish Hospitals starting with the Protocol for the Management of Outpatient Services in 2012 (Special Delivery Unit 2013; Special Delivery Unit 2014). These toolkits and reports identified the following areas that needed to be addressed: prioritisation (vetting), centralised management of referrals, maximum waiting time guarantees, capacity analysis, protection of existing capacity and the appointment / booking system. They gave clear guidelines
on how to manage vetting, booking of new, urgent and routine appointments, managing DNAs, validation of waiting lists and transfer to other services.

**Prioritisation / Vetting of MRI referrals** - Evidence suggests that first come first serve is not the most effective method of managing waiting lists. In fact the nature of healthcare results in more complex structures being placed around referral systems (Bowers 2010). The literature indicates that a prioritisation system is required to identify clinical need and subsequent placement on the waiting lists is decided on this basis (Ní Shiothcháin & Byrne 2009). In Irish Hospitals, using the National Integrated Medical Imaging System (NIMIS), Radiologists vet the clinical referrals and prioritise them with a numbering system that indicates the urgency with which they need to access the service. However, the problem with this system is that if the capacity does not allow for the patient to be scheduled within this period of time, then the numbering system becomes redundant. The system does not automatically allow for a revision of patient status (i.e. if the patient’s health deteriorates) unless this is communicated by the referring clinician. If the prioritisation criteria are not the same nationally, then patient access to the service will vary, not only from region to region, but also potentially from hospital to hospital, independent of waiting list numbers (Macleod et al. 2009). This requires there to be a national referral guideline such as iRefer which ensures appropriate referral to the service (National Clinical Programme for Radiology 2014). Prioritisation based vetting protocols create the risk that patients who are coded with a higher priority will utilise available capacity, while the lowest priority are at risk of having their waiting time increased, resulting in poorer outcomes (Ní Shiothcháin & Byrne 2009). Therefore, the organisation must either review their vetting system by monitoring it against how prioritisation levels are
scheduled to ensure that non-urgent cases are not disenfranchised; and also as a means to identify when additional capacity is required, or improve overall access so that the vetting system is working appropriately.

**Guaranteed Access Times** - In the UK and Canada the introduction of guaranteed waiting / access times resulted in services reconfiguring to meet the national targets which had been set. If reconfiguration did not result in reduced access times, patients were provided access to other services where access times were lower (Ní Shiothcháín & Byrne 2009; Sanmartin & The Steering Committee of the Western Canada Waiting List Project 2000; Emery et al. 2009). The evidence suggests that the Irish system needs not only to introduce monitoring and reporting of radiology access, but also to set target access times.

**Capacity Analysis** – The literature identifies that the scheduling of equipment and booking of patient appointments in Radiology is framed by criteria such as priority of access, length of appointment time, access to rostering of both Radiographers and Radiologists. It is complex and requires analysis to ensure the best utilisation of capacity is ensured, but also the equitable scheduling of patient access (Guglielmino et al. 2009; Carpenter et al. 2011; Ní Shiothchán & Byrne 2009). The integration of engineering techniques to model services and provide process analysis will aid the optimisation of capacity in a Radiology service. Capacity analysis is not a once off initiative, but an on-going process that service providers must engage in. To facilitate this the service must insure that they have a comprehensive set of KPIs, that allow them to analyse the activity against demand and capacity, and as a result make
informed service decisions (Hayes 2010; Plunkett et al. 2012). This will allow for a review in how the scanners are scheduled in regards to inpatient / outpatient mix, allocation per scan type and allocation per vetting type (Das et al. 2011). The Protocol on Managing Outpatient Clinics (Plunkett et al. 2012), instructed that patients were to be placed on a waiting list and given appointments no more than eight weeks in advance which allows for the flexibility to react to demand and capacity.

**Validation of Waiting Lists & Managing of Did Not Attends (DNAs)** - The value of validating a waiting list is to identify those who no longer require access to the service provided, it also ensures that the waiting list data is correct (National Treatment Purchase Fund 2013; Special Delivery Unit 2013). There is an argument that longer waiting times facilitate a natural wastage as over time those who no longer require access to the service will drop off (Ní Shíothcháin & Byrne 2009). Validating waiting lists helps to identify what percentage no longer requires access and their reason why. There is evidence to suggest that longer waiting lists and waiting times increase the chance of a patient not attending. The validation also ensures that communication is kept open with the patient thus reducing potential anxiety as a result of being on the waiting list (Ní Shíothcháin & Byrne 2009). If the patient informs their intention to not attend then this capacity can be utilised, however, if patients DNA, then this results in lost capacity. The managing of DNAs through the introduction of policies and protocols result in reduced numbers of DNAs thus increasing activity (Macleod et al. 2009).
2.7 Implications for the Project

There is a wide availability of literature on waiting list management, capacity analysis and scheduling in healthcare, nonetheless, literature is limited on how to address these issues in radiology and specifically MRI. The management of demand reduction through programmes such as clinical pathways require organisational wide involvement and longer periods of time to initiate. The organisation is limited in terms of investing more capital into equipment or revenue into additional workforce. The clear focus of the project must be on optimising activity rather than investing in additional capacity. Although the literature is rich in terms of initiatives that reduce waiting lists through process redesign in outpatients scheduled care and elective care, it does not automatically translate that the same practices will work in a radiology setting. Therefore, based on the literature available the focus of the project must be on a multi-faceted approach including elements of the following: I) capacity analysis including introducing revised KPI’s; II) vetting review; III) scheduling of the equipment; IV) scheduling of patients; V) introducing protocols for the management of DNAs; VI) the validation of waiting lists.

2.8 Summary and Conclusion

Longer waiting times for accessing diagnostic imaging have been shown to impact negatively on patient care due to a risk of delayed diagnosis, the stress resulting from long waiting periods to access diagnostics and the increased risk of patients not
attending. Therefore the responsibility lies with Hospital Management to ensure that waiting lists are managed appropriately. In an economic environment where hospital budgets are reduced, there is an embargo on recruitment, and large numbers of qualified staff are leaving the jurisdiction; it becomes increasingly important to look at alternative quality improvement options that will reduce delays in access to diagnostics. The literature available suggests that to achieve this, standardised processes must be put in place, not only at individual hospitals, but at a national level. This will ensure that capacity is properly utilised and that patients have equitable access to diagnostics through waiting lists. In the longer run it may be necessary to review cost incurring options such as increased hours and outsourcing to either public or private diagnostic centres. However, the organisation has a duty to initially review activity and ensure that activity matches capacity as much as possible. If not, this implies underuse of resources and cost inefficiencies, which ultimately result in poor patient care. Although it was possible to find a limited amount of literature on potential service redesign to improve access to MRI specifically and more generally to radiology, there was little in the literature that identified the most cost effective methods that resulted in the greatest increase in capacity (Olisemek et al. 2013). In addition to this there was little literature that provided benchmarking on the optimal capacity for MRI, the optimal waiting times and the optimal productivity. Some articles addressed the potential for a public / private partnership; however, with the introduction of Hospital groups, the longer term solution needs to look at the potential for routine outpatient appointments to be carried out in other locations.
3 Methodology & Methods

3.1 Introduction

Problems can be defined as being either hard or soft. Hard (difficult) complexity problems are classified as those which are quantifiable and therefore allow for identification of the optimal solution (Senior & Swailes 2010a). Soft (messy) complexity problems are framed by the ambiguity of defining them and often result in multiple potential solutions. Healthcare is a complex system, the individual parts of healthcare do not work in a linear fashion and when change is made in one part of the system, it is not always possible to predict the outcome on other parts of the system (Reason et al. 2001; Lipitz 2012). It is reasonable to surmise that problems that arise in health care tend to be messy due to the complexity of the organisations (Senior & Swailes 2010a). The Organisational Development (OD) approach was developed to facilitate change and renewal at all levels of the organisation (Senior & Swailes 2010a) by focusing on the people that make it up. OD change management is an on-going process that incorporates long term planned change with the messy nature of organisational problems. Improving access to MRI for routine outpatients can be defined as a messy problem for all stakeholders. It is bound by factors such as competing needs for access which are dependent on external referrals and subject to variations in demand based on hospital activity. Therefore, the key is choosing a model of change which will address the need to progress through the process, while allowing flexibility to review the process and make changes as the impact of each stage becomes evident.
3.2 Critical Review of Approaches to Organisational Development

Kurt Lewin (cite in Burnes 2004) developed the 3-Steps Model in 1947 (figure 3), which was one of the first planned change models. Lewin did not develop this model in isolation; it evolved from his three seminal theories on Group Dynamics, Field Theory & Action Research (Three Step Model) (1947a).

<table>
<thead>
<tr>
<th>Unfreezing</th>
<th>Move</th>
<th>Refreeze</th>
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<tbody>
<tr>
<td>Disturb the equilibrium to lessen resistance to change and create the need for change</td>
<td>From old behaviours to new behaviours</td>
<td>Establish the new patterns of behaviour as the norm</td>
</tr>
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Figure 3- adapted from Three Step Model of Change (Lewin, 1951)

Group dynamics theory states that change comes about through groups of individuals and that to understand how and why change occurs it is vital to understand the forces that impact on the group and also the behaviours within the group. Therefore understanding the individual will help gain an understanding of the group. Field Theory addressed the impact of different forces on the group and how they change behaviour, which either promotes change (drivers) or impedes change (resistors). When these forces have equal strength then the organisation is in equilibrium, but if the driving forces become greater, then change occurs (McAuliffe & Van Vaerenbergh 2006)). Lewin recognised that the constant shifting of forces on the group environment or field meant that “group life was never without change” (Burnes, 2004, p.981, Lewin, 1974a) and therefore he developed the idea that groups existed in a state of “quasi-stationary equilibrium”. John Kotter (1995)
expanded on the original work of Lewin and applied it specifically to organisational
change. He developed his own change model – *Eight Steps to Transforming your
Organisation* - based on his own experience of change initiatives in over 100
organisations. Kotter recognised that change initiatives failed for specific reasons
and therefore by understanding these reasons, steps could be undertaken to ensure
that the change initiative was successful.

Later scholars critiqued Lewin’s 3-Steps model as being too static, too rigid and too
slow to react to change (Burnes 2004). The problem identified with Lewin and later
planned changed models, was that while they worked well in a mechanical system
such as engineering, this hard systems model approach is perceived to be too linear
for complex systems such as health. Changing any aspect of the system (task,
technology, structure or people) will affect the other parts of the system, (Leavitt et
al., 1973). It is important to remember that Lewin’s change model, while clearly a
planned step model, was underpinned by his theories of Field Theory, Group
Dynamics and Action Research which were based on the assumption of constant
change and its impact on individual and group behaviour. Organisational
Development recognises that organisations are complex systems, therefore, change
introduced into any part of the organisation will impact the whole; planned change
must be managed at an organisational level. The natural status of an organisation is
constant change, (Lewin, 1947); the key is in identifying how to bring about planned
changes within this status. Organisational development helps to balance the need to
follow a process for initiating change, while allowing for revisions to be made to the
process as the initiative progresses. However, in order to progress change in an
organisation, it recognises that there must be an understanding of the culture within the organisation, the role of the change agent, their leadership style and how both may impact on the potential for resistance to change.

3.2.1 Culture and change

One definition of an organisation’s culture by Leigh & Maynard (2000) is “…a heady mixture of vision, values, tradition, ethos and self-image.”(cite in Gill 2011, 9.184). Charles Handy (1993) believed that culture was a defined set of norms, values and beliefs resulting in explicit and defined structures and systems. He proposed four types of culture which were each represented by a Greek god. They included Power Culture (Zeus): where control and resources are held centrally and decisions made for political rather than rational reasons; in this case change is dependent on those in the positions of power being willing to change and their follower’s willingness to follow them. Role Culture (Apollo): which is based on logic and reason, supporting the activity of the organisation rather than controlling it; this is seen as the least adaptable to change. Task Culture (Athena): is focused on the project at hand, connections are made via networks, and flourishes in time of creativity and innovation decision making is at group level. Person Culture (Dionysus): no overarching objective, it exists only to service the needs of the participating members.

An alternative view of organisation culture is that it cannot be defined as it is ever changing and subject to external and internal forces, which create competing values
(cited in Senior & Swailes 2010a)

Figure 4 Competing Values Model (Quinn et al., 1983, Kalliath et al., 1999)

The intention with the model is not to map the organisation onto the matrix, but to recognise which forces are impacting at any given time. The competing values model identifies that the more controlling and internally focused the organisation, the less likely it will be susceptible to change.

Both models imply that the type of culture will dictate the success of the change. This raises the question of whether it is possible to establish an organisational culture that will support change (Gill 2011). Trerise (2010) identified that through changing structures it was possible to develop a culture that was amenable to change in Healthcare. Organisational development according to French & Bell (1999) is a long term process which improves an organisation, through the collaborative management of the organisations culture. Therefore, understanding the culture in which the change is to be based is vital to identifying its potential success and areas
of resistance. If the culture is not commensurate with change, the leadership will need to play a key role in developing the culture. It is important to note that there is a field of theory that states that culture is integral to the organisation not separate, and therefore, it is not possible to manage cultural change; on this basis organisational development would not be sustainable (Ogbonna & Harris, 1998, cited in Senior & Swailes 2010a).

3.2.2 The role of leader in change

Organisational change is integral to an organisation’s culture, leadership and management (Kotter, 2008). Quinn (1988) further developed the vision of a competing values model of culture, by identifying the types of leadership roles associates with them. Hersey and Blanchard’s (1993) theory of situation leadership is based on the ability of a leader to change and adapt their style contingent on the situation that occurs (cited in Gill 2011). Therefore, if the organisation’s culture changes, as a result of either organisational development external forces, then the leader’s style must be adaptable to the environment. This adaptability is contingent on their ability to be emotionally intelligent, to read the environment they work in, and to be aware of the group mentality (Allport, 1948). Kurt Lewin (1947a) wrote that “…the group to which an individual belongs is the ground for his perceptions, his feelings and his actions.” (cited in Burnes, 2004, p.981). It is the leader’s responsibility to lead by example, create a culture of change and to influence the followers, in making the changes required. In order to be successful, a leader must have built up networks with key stakeholders and have strong relationships with the
groups and individuals who have influence over the success of the change initiative (McGuire & Hutchings 2006). The leadership style, is also contingent on the type of initiative being undertaken, a hard system problem which is task led, requires a transactional leadership approach to managing change. It places emphasis on role responsibility (organising & staffing) and goal attainment (planning & budgeting) (Kotter, 1990, cited in Senior, 2002). The leadership style for relationship based or organisational development change puts greater focus on creating a shared vision, empowering people to act, and motivating & inspiring change, this calls for transformational leadership (Avolio & Bass 2002), (Burns 1978). Building and managing relationships is vital in persuading followers, resolving conflict and encouraging collaboration (Goleman et al., 2002). The risk with this style of leadership is that it requires the leader to have “charismatic” qualities, which provide followers with a vision to follow, creating a “Hero” Leader (Reich 1991 cited in Senior & Swailes 2010a). Therefore the future of organisational development is based around a culture of distributive or team leadership, where decisions are made at group level and individuals take on aspects of leadership as appropriate to the task (Harris 2008).

3.2.3 Resistance to change

When reviewing the theory of change management, resistance to change is inherent in most change processes (Appelbaum et al., 2012; Kotter & Schlesinger, 2008; Senior & Swailes, 2010). Resistance to change can be broken down into four main groupings including: (a) parochial self-interest (b) misunderstanding and lack of trust,
(c) differing assessment also leads to resistance (d) low tolerance to change (Kotter & Schlesinger, 2008). The key is to identify where resistance may occur and develop a communication strategy around reducing it. The National Institute of Health & Clinical Excellence (2007) published a report on how to understand, identify and overcome barriers to change.

3.3 Rationale for Organisational Development Model Selected

Improving patient access is one of the key tenants of quality improvement in healthcare (Berwick et al. 2008). The requirement to increase capacity, to improve access to MRI, was evident as waiting lists grew and the existing scanner was overburdened. The obvious solution was to provide additional capacity through commissioning and staffing a second scanner. The commissioning of a second MRI scanner in the Radiology department should have led to a sufficient increase in capacity that would have resulted in clearance of waiting lists and a reasonable access for routine appointments. However, although the additional capacity immediately positively impacted on inpatient access, it became evident that the access for outpatients had improved for some scan types, but worsened for others. Paton and McCalman (2000) developed the TROPICS tool to help organisations identify what type of problem they were dealing with. The tool functions as a continuum, which requires answering a set of questions which help to identify whether a problem is hard or soft. An analysis of the two changes initiated to improve patient access to MRI clearly identify that the commissioning of the second
MRI scanner was a hard problem, requiring a step model approach to change management, which was what was successfully utilised.

Table 2 adapted from The TROPICS Factors (Paton & McCalman, 2000)

However, the on-going improvement of outpatient access to MRI was a messy problem (table 2). The solutions to address the problem were evident from international best practice (e.g. validation of waiting lists): however, the messiness of the problem arose from the fact that each change introduced as part of the initiative, could have unpredicted outcomes on other aspects of the service and would need to be constantly reviewed and adjusted. The key to ensuring that the outcome of improving patient access was by ensuring that there was engagement from all
parties, that they recognised not only the need for the change, but also how their input, knowledge and action was needed to ensure that the change would happen.

The Senior and Swailes (2010) model of change management incorporates the best aspects of the step models and action research. The model allows for continuous refinement of the process by recognising that each stage impacts on the system, which requires an adjustment to be made before moving to the next stage. According to Lewin’s (1947) theory of Action Research, change “...proceeds in a spiral of steps each of which is composed of a circle of planning, action and fact finding about the results of the action.” Lewin (1946) wrote that the process is cyclical “It is an iterative process whereby research leads to action and action leads to evaluation and further research.” (Burnes, 2004, p.984). It allows for unplanned change and recognises that change is “…a continuous process in which all stages and steps are interrelated and influence each other.” (Heslin & Ryan, 2008, p.16).

The Senior & Swailes (2010) model allows for the fact that change is not linear and therefore the change process itself can impact on the initiative and require revision at various stages. The change initiative of improving outpatient access to MRI is a planned change. However, although the aim is clearly defined, the objectives are subject to multiple external forces and ultimately, it is a change initiative that primarily impacts on the people who manage the process. The Radiology Department of the Hospital is open to considerable external forces as it is a department responsible for service delivery and does not have authority over activity
levels which are dictated by referring clinicians. Therefore, a linear model such as Kotter’s does not reflect the constant need to review and re-evaluate. It also does not take into account the specific impact that the change agent or leader has on the project.

However, the Senior and Swailes (2010) model adds the benefit of placing the change agent at the centre of the process, recognising that the leadership style chosen to facilitate the change, can determine the success or failure of the change. If the leadership style does not fit with the culture of the organisation than the change is unlikely to be successful. In fact, Ford et al. (2008) take this a step further by developing the theory that the change agent can be the instigators of resistance, or even create a phantom of resistance where there is none. Therefore, the responsibility lies with the change agent of ensuring that they are aware of the power they hold and choose a model of leadership that is most suitable to both the culture of the organisation and the change initiative that they are leading. Accordingly, they must also ensure that they do not intentionally cause harm or damage to their colleagues through the change process.

3.4 Organisational Development (OD) Model for Change - Senior & Swailes

The Senior & Swailes (2010) OD model starts with diagnosing the current state and then visioning the future state, gaining commitment, planning, implementing, assessing and reinforcing the change. Each stage can be linked back to the other as the action impacts on the learning process.
3.4.1 Diagnose Current Situation

Senior and Swailes (2010b) allow autonomy in the use of their OD change model in how to commence the process of change. They recognise that the “diagnosing of the current situation (1a)” and the “developing of a vision for change (1b)” are interchangeable as starting points subject to the situation. The catalyst for this change resulted from additional capacity created with the commissioning of a second MRI to the Radiology Department. In addition to this the implementation of a new Picture Archiving Communication Systems (PACs) in conjunction with Radiology
Information Systems (RIS) in July, 2014, resulted in the need to develop new ways of capturing activity and access. It was already evident that the waiting times for accessing routine outpatient MRI were excessive, at well over two years. However, as there were no agreed local or national access targets for diagnostic imaging, this meant there was no standard to benchmark against. Further to the implementation of the new RIS/PACs, it took a further four months to enter all outstanding appointments from the old system and reschedule appointments to the new scanner, therefore the new access data was not made available until December, 2014. The need for improving access was obvious, however, further to the literature review, it was evident that the actions needed to facilitate the change would require multidisciplinary participation across the department. Without the support of the Lead Consultant Radiologist and the Radiography Services Manager the initiative would not gain the momentum to proceed or potential to be embedded.

A method of diagnosing the current situation was to take the Scheduled Care Toolkit developed by the National Treatment Purchase Fund and the Special Delivery Unit and use it as a basis against which to audit the MRI service. The initial audit carried out in December, 2014 and reviewed with the Clinical Director and Chief Operations Officer in April, 2015. It identified a number of areas where actions were required to ensure the service was meeting best practice. These included the need to clearly identify those at executive level who owned the responsibility of managing the waiting list, developing local action groups to work on improving access, developing accessible data sources that facilitate decision making, work to access targets and validate the waiting lists. The development of National Access targets, while having the potential for the greatest impact on waiting lists, were clearly outside the remit of
the organisation and therefore outside the scope of the project. One element of the Scheduled Care Toolkit for outpatient access, that needed scrutiny, was both the practicality and the clinical appropriateness of following the scheduling model of longest waiters first. While it was evident that any scheduling process requires triaging on clinical need, there were other factors to consider including the Radiologists input in creating the outpatient access schedule and their rationale for grouping certain types of scans together. The revised audit tool identified multiple areas that required change; the key was deciding which of those areas were within the scope of the project and which could be addressed within the organisation, but were outside the scope of this change initiative (appendix 5).

A review was carried out on the department, organisation and healthcare system to assess its openness to change. This review was subjective and based on the experience of the change agent. It looked at the areas of strategy, culture leadership, recruitment & retention and relationship management (appendix 6). It identified that although the department culture had been closed and decision making based on hierarchical structures, the development of the Clinical Directorates was moving towards localised decision making. The introduction of departmental meetings was creating an environment where multidisciplinary approaches to problem solving were taking place. Therefore, the opportunity was available to use the change initiative not only to address the explicit aim of reducing outpatient access times, but also to further develop the multidisciplinary approach in the department and further embed it in the culture. However, there was a clear risk that, due to staffing shortages, reduced activity could impact on both the ability for staff to commit to the initiative and also of reduced activity if unscheduled downtime resulted from insufficient staff.
to cover the service. It was vital for the change agent to create a sufficient sense of urgency around the initiative that the work would proceed in spite of limited resources (Table 1 – Project Risk Assessment).

3.4.2 Develop a Vision for Change

The vision was to improve overall routine outpatient access to MRI. This was to be evaluated by ensuring that 90% of all outpatients were waiting no more than 9 months. At the start of the project it was not possible at that time to ascertain if it would be achievable as the actual access times were unknown. It is a benefit of the model that it recognises this element of change processes, where diagnosis and developing goals are not always sequential. The potential for the HSE to develop scheduling and access policies for diagnostic imaging, meant that it was logical for the initiative to be commensurate, where appropriate, with the guidelines set for managing scheduled care (Health Service Executive 2015). This in turn led to ideas around what areas of access could be addressed and what required additional resources. The limitations set by budget, headcount and also the issues identified in the recruiting of suitably trained Radiographers, made it evident that increases in capacity through longer opening hours or through an additional scanner were not feasible, therefore the change initiative needed to centre on the how the equipment was scheduled and other internal processes.
3.4.3 Gain Commitment to the Vision

The initial discussions with senior management made it evident that before any future investment into MRI scanning would be considered, a review of existing capacity and activity was required within the department. Therefore, the focus of gaining commitment to the change needed to be on the Radiology Management team. Initial discussions made it evident that although they recognised that the access times were a serious problem, they felt that the answer was in investing additional resources into staffing and equipment. This response is reflective of the work of Schneider (2011) and Tokur et al. (2012). The benefits of process analysis and review were not immediately evident to the team. In addition to this the use of the SDU guidelines as a framework also caused some resistance, as it was felt that the difference outweighed the similarities in the management of outpatient clinics and outpatient diagnostic imaging and therefore, would not work within the dynamic of radiology. To address this, evidence was given of the intention by the HSE to commence the monitoring and reporting of diagnostic imaging. Any process improvements implemented now, that were commensurate with the SDU guidelines, would ensure that the department were prepared.

3.4.4 Develop an Action Plan

As a result of the delay in gathering the data on the access for routine outpatients to MRI, the development of the action plan was deferred. The original Gantt chart was created in November, 2014 (appendix 4); however, the first meeting of the local action group was not held until January, 2015. It included the Lead Consultant
Radiologist, the Radiography Services Manager, and the Clinical Specialist Radiographer for MRI and the Radiology Clerical Manager. Details of the number of slots and the waiting times for routine outpatients were provided at the meeting. It became evident that the number of outpatients being scanned were lower than expected and that the access for certain types of MRI like prostate and musculoskeletal, were better than for spines or brains (table 6). Therefore, a discussion was held around what actions could be taken to improve access, focussing on MRI spines and brains.

As a result of discussion, the project plan was developed and tasks were allocated to each person as follows:

- Developing a standard operating procedure and piloting of validation of the MRI waiting list with the aim of reducing DNAs and providing additional slots for scheduling patients—Clerical Radiology Manager / Business Manager
- Developing new KPIs to help management in decision making around patient access to MRI—Business Manager / Radiography Services Manager.
- Review of the existing protocols and sequencing used on the scanner with the aim of ensuring that Clinicians were provided with appropriate images while, reducing the time allocated to each patient slot—Lead Consultant Radiologist
- Review of the scheduling of both outpatients and inpatients, with the aim of identifying additional outpatient slots without negatively impacting on inpatient access times—Clinical Specialist Radiographer for MRI/ MRI Secretary

It was agreed to review this work after a period of eight weeks to see if there had been any impact on the access times for outpatient MRI. A revised Gantt chart was
created to allow for the new timelines (appendix. 7). Although the management of DNAs and review of vetting had been identified from the literature as impacting on waiting list management, due to limited resources and timeframe they were excluded from the scope of this initiative. However, their review is on-going within the department.

3.4.5 Implement the Change

Validating the Waiting Lists

The validation of the waiting lists commenced at the end of January, 2014 with a clerical officer assigned to identify how to draw down the information from the RIS, to draft template patient letters and the discussion of what the appropriate steps were to validate a list. The process was action research based; as the clerical officer progressed to each step a discussion was held to review how the process had worked, its implications for the department and for patients, this resulted in changes being made to the next step in the process. An example of this was that the original intention had been to make a maximum of three attempts to contact patient’s via phone and then to write a letter advising patients that their appointment would be cancelled if they did not respond within two weeks. However, of the patients contacted with appointments in March, 40% were non-contactable via phone. It was unfeasible to risk the potential that if those 40% did not respond to the letter we could potentially have to cancel 40% of outpatient appointments in one month. It was agreed that after the initial attempt by phone a letter would be sent requesting patients to respond confirming their wish to attend the appointment. If this letter
resulted in no response, then a final letter would be sent, informing the patient that their appointment would be cancelled, if they did not respond. Once an entire run through of the process was complete, the draft standard operating procedure (SOP) was written.

**Developing KPIs**

A draft set of KPIs were submitted in December, 2014 to the Executive, having been reviewed by the Lead Consultant Radiologist, the RSM and the Clinical Director. They were then discussed with the CEO at a meeting in January, 2015. It was evident from the discussion that the newly developed KPIs, while being accessible and repeatable, did not facilitate decision making about the provision of service in the department. Therefore, the Business Manager was tasked with developing a new set of KPIs that would enable management to make those decisions as necessary. These were developed and each one was broken down by data source. A traffic light system used to identify if the data was available and if not what actions were required to access it (appendix 8). It quickly became evident that the majority of the actions required input from either the HSE or the RIS/PACs supplier and therefore would fall outside of the scope of the project.

**Reviewing the Schedule (Inpatient & Outpatient)**

The review of the scheduling required a balance of maintaining the improved level of inpatient access, while improving the access to outpatients. This was carried out by
the Clinical Specialist Radiographer in conjunction with the MRI secretary, both of whom held an in-depth knowledge of the service provided. An initial commitment to provide an additional outpatient slot per day would have resulted in a 10% increase in outpatient activity in the department. However, after a two week period the process was reviewed and it was evident that in addition to two new daily scheduled slots, it was possible to create ad-hoc slots on a daily basis, subject to inpatient activity. This resulted in a significant increase in work for the MRI secretary, who was tasked with the identification of patients to fill the slots and to assure their availability to attend. It was agreed that the new slots both scheduled and unscheduled “ad-hoc” would be filled with patients who were the longest waiters (patients already scheduled for 2016), as opposed to those patients whose request had just been received and were due to be scheduled in 2017. This also increased the work load of the secretary, however, it was agreed that this was the most equitable process for the patients.

Review the MRI Protocols

A protocol in radiology consists of a designated set of imaging sequences for any given type of examination (Johnson et al. 2001). The length of a protocol will determine the length of time a patient spends on the table. MRI’s do not produce radiation and so although the longer period spent on the scanner does not negatively impact on the patient’s health, it is recognised that patients often become anxious in the confined space (Grey et al. 2000). Reducing the scan time should therefore reduce patient anxiety. The quandary exists on how to balance a protocol that
provides the appropriate amount of clinical information without resulting in excessive time for the patient on the table and reducing the number of slots which can be schedules. The Lead Consultant Radiologist appointed another Radiology Consultants to the task of reviewing the protocols.

3.4.6 Assess and reinforce the Change

After the first four weeks it was evident that the scheduling of additional regularised slots was resulting in significant improvements in access times for routine MRI spines and brain. However, the unscheduled ad-hoc slots, while creating additional capacity in the system, were at risk of impinging on the inpatient access turn-around-times (TATs). The difficulty was in identifying whether the impact on inpatient TATs was directly attributable to these extra slots for outpatients and therefore the scheduling of ad-hoc slots was ceased. Another considerable impact of the initiative was the effectiveness of the project group while working as a multidisciplinary team. The recognition of a need for more defined governance and leadership around Radiology access, has led to discussions around establishing a multidisciplinary committee with responsibility for access. Although outside the scope and timeframe of this initiative, it naturally leads on from it and the quick wins identified in the implementation stage are providing the information to reduce any resistance.
3.5 Summary and Conclusion

The use of diagnostic tools, such as the TROPICs tool helped to identify the problem type and was the rationale for the choice of OD model. The Senior and Swailes OD model (2010) provided the change agent with a template around which to structure the change initiative. The most important aspect of that template was the recognition of how central the individuals and groups involved in the initiative were to its effectiveness. Although Senior and Swailes (2010) provide detailed tools for allocating responsibilities, action planning and team building; the change agent chose to focus on their own style of communication, which is face to face. This style was suitable given the relationships and networks that they had already built up and would not work where a change agent was parachuted into another organisation.

The next step in the process is to evaluate not only the outcomes, but also the processes and the model, with the intention of identifying future change initiatives to continue the cycle.
4 Evaluation

4.1 Introduction

In recent years, the focus in Healthcare has been in improving quality of patient care (Berwick et al. 2008). To address this many national health organisations, regional groups and individual organisations are implementing quality improvement initiatives. While this may seem to be a move in the right direction, it is questionable how effective or sustainable these initiatives are with evidence based evaluation (Ovretveit & Gustafson 2003). Although evaluation has its roots in Healthcare (Rossi & Freeman, 1989 cited in McCoy & Hargie, 2001), it is evident that there are problems around how the evaluation of quality improvement programmes has been developed and implemented (Ovretveit 2002; Eccles et al. 2003). Therefore, the responsibility lies with identifying the most appropriate evaluation, not only of the objectives but also of the process (Stufflebeam 2001; Smith et al. 2012). First this chapter will address the need to evaluate quality improvement initiatives in complex healthcare systems. Second, it will then evaluate the processes and outcomes identified through the SMART objectives, based on evidence gathered through the literature review. Finally, it will identify how these results can be disseminated both within and external to the organisation.

4.2 The Significance of Healthcare Evaluation

OD change models require adaptability and a constant reassessment of the original diagnosis and vision, resulting from the learning as the initiative progresses (Senior
Healthcare generally requires soft models of change to address the organisational impact that managing messy complex problems require. To address these messy problems, organisations have developed quality improvement programmes, which aim to improve patient experience and outcomes such as the HIQA National Standards (Health Information & Quality Authority 2012). These quality improvement programmes result in actions being identified which require change to improve the system. However, these change initiatives can result in a lack of agreement in defining the problem, diagnosing its cause and identifying the most appropriate actions to address it. They tend to have ambiguous objectives, which make it difficult to define the resources required to action them and create reasonable timelines within which to address them. This makes the evaluation of these change initiatives difficult (Paton & McCalman 2000). Although soft models of change, such as the OD Model, are difficult to evaluate, there is an obligation in healthcare management to review the most appropriate methods of evaluation, as these interventions have the potential to have the greatest impact on patient care (Ovretveit 2002; Ovretveit & Gustafson 2003). Donabedian (1966), in his seminal paper on evaluating medical care, identified the need not only to evaluate health care on the grounds of outcome, but also on the process between physician and patient care and the structure or “…the settings in which it takes place and the instrumentalities of which it is the product… [and the] …administrative and related processes that support and direct the provision of care” (Donabedian, 2005, p.694-695). Ovretveit (Ovretveit & Gustafson 2003) identified that the failures in assessing quality improvement programmes in Healthcare centred on the failure to assess: implementation, pre-study theory, outcomes, outcome attribution, explanation and measurement variability. Therefore evaluating healthcare cannot solely rely on the
outcomes, but must be stringent enough to ensure that the outcomes can be unambiguously attributed directly to the initiative. It must also result in identifying which aspects of the initiative were critical in ensuring these outcomes. Finally, Ovretveit (2003) identified that the lack of agreed national or universal structures/data, for measuring quality improvements in health, result in the difficulty of being unable to compare change initiatives. To ensure quality improvement initiatives are properly evaluated it is key not only to measure the outcomes, but to review the process too (Hulscher 2003).

4.3 Evaluation

The objective of this change initiative is to improve access for patients to MRI. This can be clearly evaluated by the outcome of monitoring access times. However, to only review the outcomes would ignore the evaluation of what aspects of the change initiative were most effective in achieving the outcome; whether the outcome was sustainable within MRI or potentially transferrable to other modalities in Diagnostics Imaging; and whether the initiative was fair and equitable to the patients on the waiting list. The imminent introduction of waiting list management policy to the area of Radiology requires that any changes made to improve access will meet the guidelines on managing waiting lists. Therefore in order to evaluate the project it will be necessary:

✓ to see if outcomes have been met in regards to achieving improved access times
✓ to evaluate the process of scheduling patients, to ensure that the method is resilient to potential policy developments around waiting list management, such as ensuring that the longest waiter is scheduled first for the next routine appointment.

Evaluation is often outcome based in healthcare and although KPIs are vital in monitoring those outcomes, they do not provide a qualitative understanding of a service. According to Øvretveit (2002) this type of evaluation does not provide the evidence decision makers require to manage a service. Developing smart objectives at the outset of the initiative will help to address issues around defining and measuring outcomes, however, the OD model also requires some flexibility in the context and development of these SMART objectives allowing for development during the initiative.

4.3.1 Aims & Objectives

As noted in Chapter 1, the aim of this initiative was to improve access for outpatients referred for MRI imaging in the Hospital, through the reviewing of the scheduling process. Further to carrying out the literature review and auditing the current utilisation management of the MRI service (based on the NTPF Toolkit for managing scheduled care), it became evident that the scope of work to be carried out within the initiative included the following: a review of protocols and sequencing times for each type of scan; the scheduling breakdown by vetting status, scan type and outpatient v’s inpatient access; the validation of the waiting list; and a review of available
business intelligence data required to provide management with the information needed to make informed decisions on the development of the service.

4.3.2 Methods, Measures and Results

The SMART objectives identified to frame the scope of the project also provided the structure for the evaluation of the project:

**Objective 1** - MRI outpatient access management group will have met by 14th November, 2014 – Achieved by 31st January, 2015

Resulting from the delay in gathering base-line data, the group met on the 31st January, 2015. Originally there was resistance to committing to a more formal structure for demand management utilisation from a number of stakeholders within the department. However, as the initiative moved forward, and the “Quick Wins” became evident, the resistance reduced. Although it will not be achieved within the timeframe of the project, working in conjunction with the HSE and an external consultancy firm, the department are now drafting terms of reference for a Demand Management Utilisation committee. This will take learning’s from the MRI initiative, including the need to have subgroups for each modality that are radiology consultant led.

**Objective 2** - A review of the scheduling process will take place and process improvements will be agreed that are in line with current Special Delivery Unit (SDU)
An audit tool was developed, based on the NTPF Performance Improvement in Scheduled Care - Waiting List Management Tool Kit. The initial audit helped to identify where the process for waiting list management in outpatient and elective scheduled care, differed from the practice in the Radiology Department (appendix 5). Although the audit was carried out after the first set of objectives were developed, it became evident that the actions required as a result of the audit mirrored the initiative’s objectives. Three of the actions identified at the first meeting of the project team were: 1) validation of the waiting lists; 2) reviewing current scheduling practices with a view to adding additional outpatient slots; and 3) reviewing MRI protocols to reduce the time patient’s spent on the scanners. All three actions fell within the process improvements identified as part of the audit.

**Waiting List Validation** - Within the timeframe of the initiative a total of 635 patient appointments were validated over a four month period from April – July, 2015. The initial communication effort, by phone, resulted in response rate of approximately 60% (appendix 10). Of this group approximately 7% advised that they no longer required their appointment. This resulted in a total of 26 slots being made available for rescheduling. It is possible then to presume that if a full patient response rate were achieved, then 6.8% of 635 patients would result in 43 slots over four months or 130 slots over a one year period. Based on the new schedule for outpatients, this equates to an additional 2.5 weeks of outpatient activity per year. The difficulty is in evaluating whether 6.8% reduction in waiting lists as a result if validation is on target as there is no published national data against which
to benchmark. An SOP was developed which can now be disseminated across the department, but is dependent on adequate clerical staff resources.

**Review of MRI Protocols** – This review was carried out by the Consultant Radiologists. Approximately 45 MRI protocols had been reviewed by the end of March, 2015. Of these 45 protocols, on average, at least one sequence was deemed clinically no longer required and was removed. This resulted in an average of 3 minutes reduction in scanning time per protocol. With an average of 29 examinations being carried out per day, this equates to a saving of 87 minutes. This is evident in the increased activity from 29 examinations per day in January, 2015 to 31 examinations per day in March, 2015 (table 3). An example of a protocol review can be seen in appendix 11. As the review was on-going at the time of submission of this paper, further evaluation of the actual impact of revision, based on an audit of activity and a validation of the process and outcomes, are outstanding.

<table>
<thead>
<tr>
<th></th>
<th>Jan-15</th>
<th>Feb-15</th>
<th>Mar-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI</td>
<td>614</td>
<td>588</td>
<td>667</td>
</tr>
<tr>
<td>Avg Daily Exams</td>
<td>29.24</td>
<td>29.40</td>
<td>31.76</td>
</tr>
</tbody>
</table>

** Avg is based on total examinations/working days per month

*Table 3 MRI activity per month by examination*

**Review of Scheduling** – The baseline identified in January, 2015 (appendix 9) was noted for how many patients’ slots were allocated per scan type and what the
next routine available appointment. When the initial measurements were taken it was evident that the utilisation of the capacity for outpatients was significantly below what would have been expected, with the average outpatient activity at 43 per week or 8.6 patients per day. It is important to note that this did not include Paediatric outpatient which accounted for ½ day scanning per week. As a result of reviewing how the two machines were being scheduled, it was evident that the primary focus of improving inpatient turn-around-times had been achieved; however, there was scope to increase outpatient access. Due to the process of teams reviewing inpatients on Monday mornings, and also the time required for Consultant Radiologists to vet weekend requests for MRI, the time allocated for inpatient scanning on a Monday morning was underutilised and therefore additional outpatient slots were scheduled at this time. A similar review of the whole week, identified periods of lower activity for inpatients, allowing for additional outpatient slots to be created. As a result of this an additional 10 outpatient slots per week were created, an increase of 23% to 53 slots. The impact of this was a 30% reduction in examinations waiting over 12 months for routine access from 425 in January to 297 in March, 2015 (table 4)
The Clinical specialist and the secretary also created additional ad-hoc slots on a daily basis, when inpatient activity abated. It was difficult to evaluate the sustainability of this as overall Hospital inpatient activity increased in February & March due to a national flu epidemic. This resulted in inpatient TATs dis-improving and a cessation of the additional ad-hoc slots. This will be revisited in the summer months when overall Hospital activity reduces, as the outcomes evaluated will not be impacted on by patient flow issues.

**Objective 3** - A set of KPIs for demand utilisation in MRI are agreed which are based on best practice by 31st March, 2015 - Outstanding

An initial set of KPIs were developed in December, 2014, based on information available in the RIS/PACs system. These KPIs were reviewed with the executive management team in January, 2015. It quickly became evident that the KPIs developed did not meet the brief of providing the management team with data capable of helping them to make informed decisions. As a result of this meeting, a new approach was taken to developing the KPIs. Rather than focusing on the data available, the new KPIs were developed based on what would facilitate decision making (table 5). This resulted in the identification of a new set of actions that will be required in order to develop these KPIs. These actions are based around two specific actions. 1) Allowing Hospital’s local access to data in the NIMIS database, to develop their own reporting functionality; and 2). A set of National Access
Targets for MRI outpatients being developed and implemented against which KPIs can be set.

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Indicator</th>
<th>Available</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI - 1</td>
<td>Difference between Activity &amp; Capacity - DNAs, staff attendance, equipment servicing, equipment breakdown (KPI)</td>
<td>Requires review of internal process &amp; design - DNAs, validation, scheduling, equipment downtime, attendance management, staffing</td>
<td>Pending</td>
<td>Pending capacity review by RSM</td>
</tr>
<tr>
<td>KPI - 2</td>
<td>Difference between Capacity &amp; Demand - Business case for increased resources (human +/- capital) (KPI)</td>
<td>Requires business case for additional capacity to be added to the system - Human Resources +/- capital equipment / Review of demand</td>
<td>No</td>
<td>Pending capacity review by RSM &amp; Access to NIMIS Database</td>
</tr>
<tr>
<td>KPI - 3</td>
<td>Difference between actual inpatient TAT and target TAT (KPI)</td>
<td>Requires review of scheduling, demand, activity &amp; capacity</td>
<td>No</td>
<td>Requires access to NIMIS database</td>
</tr>
<tr>
<td>KPI - 5</td>
<td>Difference between Local inpatient target against inpatient access (KPI)</td>
<td>Data can be supported from KPI 1 &amp; 2 &amp; 3 - may need review of scheduling based on vetting allocation</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>KPI - 6</td>
<td>Difference between National outpatient target against outpatient access (KPI)</td>
<td>Enables department to benchmark against other organisations</td>
<td>No</td>
<td>Requires national development</td>
</tr>
<tr>
<td>KPI - 7</td>
<td>Difference between Local outpatient target against outpatient access (KPI)</td>
<td>Data can be supported from KPI 1 &amp; 2 &amp; 3 - may need review of scheduling based on vetting allocation</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>KPI - 8</td>
<td>Difference of unreported plain film against target (in days)</td>
<td>Requires review of targeted agreed TATs on reporting and may result in case for additional reporting resources</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
</tbody>
</table>

Table 5 Proposed Key Performance Indicators for Radiology (2015)

**Objective 4** - That 90% of all out patients will wait no more than 9 months for an outpatient MRI by 31st March, 2015 – Average access time reduced from 12 to 9 months

An initial set of data was collected at the end of January, 2015 to give a base line against which to evaluation the impact of the various process improvements (appendix 9). This indicated that the average wait for a routine outpatient MRI was 12 months. At that time the longest outliers were for MRI Spine at 33 months and MRI brain at 18 months. The focus for the period of the intervention from 1st
February – 31st March, 2015 was to increase slots for those scan types in order to improve access times. As a result of the review an additional six slots per week were added for Spine and four slots for Brain. It is important to note that included in the six spine slots were one triple and one double. Prior to the introduction of these slots, the secretary was using three slots to book one triple spine. Therefore in true terms the spine slots were increase to nine. The outcome was to reduce next routine access for spine by twenty months with new appointments being booked in March/April of 2016. Similarly one of the four new slots allocated to Brains included a double, thus increasing the slots to five in real terms. This resulted in the next routine appointment for brains being scheduled for February/March, 2016. The overall outcome was that the average routine access time for MRI reduced to nine months, which was in line with the objective. However, the required outcome is to have no patient waiting greater than 9 months for a routine MRI, which will require further work.

<table>
<thead>
<tr>
<th>Date</th>
<th>January, 2015</th>
<th>March, 2015</th>
<th>Variance</th>
<th>Increase in slots per week</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spine</td>
<td>33</td>
<td>13</td>
<td>20</td>
<td>6</td>
<td>Measured improvement due to initiative</td>
</tr>
<tr>
<td>Brain</td>
<td>18</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>Measured improvement due to initiative</td>
</tr>
<tr>
<td>Pelvis/Fist/Rect/Gyn</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td>Prostate</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td>Liver</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td>MRCP/Pancreas</td>
<td>6</td>
<td>8</td>
<td>-2</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td>Abdo/Other</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td>Soft Bowel Follow Through</td>
<td>14</td>
<td>17</td>
<td>-3</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>Potential change due to demand fluctuation</td>
</tr>
<tr>
<td><strong>Average routine access</strong></td>
<td><strong>12</strong></td>
<td><strong>9</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 6 Next routine MRI outpatient appointment in months*
4.3.3 Dissemination Plan

It is proposed to further develop the KPIs based on progressing the actions identified in the KPI development plan. The KPIs will then be evaluated using test data to assess their effectiveness in supporting management with the data to make fair and informed decisions. Subject to the success of this trial data, they will be rolled out across the department. The intention is to write up a paper on the KPI development and implementation for publication in a healthcare management journal with the support of the clinical director.

The final thesis, subject to approval, will be published on ePublications, allowing access at an international level. The author intends to present the evaluation of the process and the findings at a symposium to be held in the Hospital in December, 2015.

4.4 Summary and Conclusion

The aim of the initiative was to improve outpatient access to MRI. This aim was broken into a number of objectives around setting up an action team, identifying process improvements and reducing waiting times. The initial data taken in January, 2015 showed that the next routine appointment for an MRI spine would be scheduled in two years and nine months. The data used for evaluation at the end of March, 2015 showed that the routine access time had dropped to thirteen months. Although it did not reach the objective of all patient’s being scanned within nine months, it was a significant improvement and met with the aim of the project. However, further to
evaluation of the other objectives such as developing KPI’s and implementing process improvements in scheduling and waiting list management; it is evident that the work undertaken to achieve these has the potential to continue creating further improvements to access times. It will be interesting to review the data in a further two months to see if additional improvements have been made.

The OD model of change supported the development of the change initiative based on action research. The model clearly identified the steps to achieve this; however, without the structure of a supporting model of project management, e.g. PRINCE, LEAN or PDSA, it resulted in the ability to evaluate the outcomes of the initiative, but created problems in evaluating the process. The benefit to an organisation of developing a team of individuals trained in one of these processes would be to place them into project teams to ensure the initiative is carried out within that structure. This would enable detailed evaluation of the process used in each initiative, identifying those with potential to work elsewhere and those which did not present value based on the resource input. Further analysis of the OD model and how it impacted on the organisation will be discussed in the next chapter.
5 Discussion & Conclusion

5.1 Introduction

Organisational development is based on the idea of organisational learning; therefore, any change initiative using the OD model must include a review on how the initiative impacted not only on changes to technology, structure and processes (as seen in chapter 4.), but also on how those changes affected the people involved. This includes the impact on the organisation’s culture, leadership and development. As a result of the review, organisations can learn from both the strengths and limitations of the change initiative and then identify future change initiatives that will help the organisation grow. The aim of this initiative focused on reducing outpatient access times to Radiology. Although access times were significantly reduced, the objective of all outpatients being scanned within 9 months was not achieved. Nevertheless, the average access time for routine outpatient MRI was reduced from 12 months to 9 months. This was an achievement that had real impact on patient care and will be developed to further improve access. The change initiative resulted in the added benefit of developing the multidisciplinary approach to process improvement. This outcome needs further discussion to identify what the implications are for further change initiatives and what this means for the culture within the department.
5.2 Organisational Impact

5.2.1 Structure / Processes

As a result of the initiative to improve outpatient access to MRI, the department has developed a number of new processes. The outcome of these process improvements, as evidenced in their evaluation, has been the reduction in waiting time for routine brain and spine MRI. Although the reduction has been significant, it did not result in achieving the intended target of having all outpatients access MRI within nine months. In addition to this, best practice in the UK is for all patients to access diagnostic imaging within 13 weeks (van Sambeek et al. 2011). The key to ensuring that these new structures and processes are embedded and the organisation continue to actively work towards achieving improved access times such as those in the UK, is to develop the governance around the management of waiting lists for diagnostic imaging. Although not within the scope of the original project, as a result of the change initiative, and other quality improvement programmes taking place between the Hospital and the HSE, commitment has been given by radiology management to develop a Demand Management Utilisation Committee. This committee will have governance over all access to diagnostic imaging within the organisation. It will have oversight on decisions regarding process improvements, allocating capacity per speciality, developing business cases for increasing capacity and reviewing options for demand rationalization. The membership will include not only Radiology Management, but also service users, bed management and business intelligence. When the HSE implement their monitoring and reporting of diagnostic imaging access, the responsibility for the collection and dissemination of this information will fall to the committee; it will be
best placed to look at how national standardised processes can be implemented in the department, should the HSE follow the path of managing scheduled care.

5.2.2 Culture / Openness to Change

When Ford et al. (2008) reviewed the impact of the change agent on resistance within a change project, they suggested that the change agent could create resistance as a result of their preconceived ideas around the stakeholders and their expectations of resistance from certain groups or individuals. The initial stakeholder analysis carried out in 2014 identified that the Consultant Radiologists and the Radiographers were likely to be the most resistant to the change initiative. This initial analysis was subjective on the part of the change agent, based on their experience of working with those groups (Carswell 2015).

Further to a review of the department, organisation and healthcare system, it was clear that this change initiative, while having the benefit of identifying opportunities to improve access, would be limited to those process improvements where no additional resources were required. Although this initially presented a risk to the initiative, it also helped develop a new attitude towards addressing access, as it created the environment in which each discipline needed to look at cost neutral options for improving access. What became evident after the first meeting of the action group was the openness and enthusiasm of all disciplines to work collectively to improve patient outcomes. Ford et al. (2008) were perceptive in their analysis of the danger of change agent’s introducing their own preconceptions to the initiative. In this regard, it highlighted the need for greater openness and communication on
behalf of the change agent to the potential engagement of the stakeholders. It is also a timely reminder that the majority of people involved in healthcare value quality patient care. Although the change agent identified the culture as being Power (Zeus) based (Handy, 1993), the change initiative showed that each discipline took on the task that suited their skill and knowledge. This is much more indicative of a Task (Athena) (Handy 1993) based culture. Although they worked independently of each other, when the initiative was complete, the collective result was the improvement of access times. However, the key to ensuring a continuation of this shift in culture will be to take this format and duplicate it across the department, so that all employees are involved in multidisciplinary groups that continue to provide quality improvement. Only then will openness to change and organisational development become embedded in the culture.

5.2.3 Leadership & Development

The change management literature reviewed, focused heavily on the change models and their effectiveness in implementing successful change initiatives (Burnes 2004; McAuliffe & Van Vaerenbergh 2006; Appelbaum et al. 2012). Kotter (1995) addressed the individual elements of what cause change initiatives to fail resulting in his 8-Step Model. However, it is evident that within the Irish Healthcare setting there is little discussion on the importance of the individual chosen to lead the change initiative or the followers who implement the change (Allio 2009). McAuliffe and Van Vaerenbergh (2006) reviewed the importance of having an adequate power base as a case for choosing external or internal change agents, and discussed the relative
benefits and disadvantage of hiring external consultants. In light of the economic environment over the last seven years, which has seen significant cuts in budgets and an emphasis on using internal resources, the choice of a leader of change is ever more important. The ability of a change agent to lead effectively is based on their ability to build relationships, network, their skills at encouraging contribution and dealing with resistance and conflict. However, the appointment of a change agent is often not based on a review of skill sets, but a reactive appointment to an identified need for change and in the case of the Health sector is often a positional appointment. Allio (2009) identified the areas for future research to address the development of leaders – selection, training, followership and metrics for measuring the success of leadership. The focus on organisation development includes performance management, talent management and succession planning (Senior & Swailes 2010a). The scope of this becomes broader as organisational development and leadership theory moves away from individual Hero Leaders, towards distributive leadership across all levels to embed a change culture (Harris 2008). The best model of developing new leaders is learning the evidence based theory and then allowing them to develop their leadership behaviour through experience (Allio 2009). The Hospital has begun to address this through the development of fellowships, funding education in leadership through the Royal College of Surgeons Ireland, combining both theory and practice. The key to organisational development is not only in choosing the right change model, but to have an agreed strategy on the identification of emergent leaders and their development, so that the organisation has a resource of leaders available to manage change, whether planned or unplanned. The Health Service in Ireland has seen an exponential increase in change programmes over recent years, including the work practice reform agendas
such as Public Service Agreement (2010-2014) and the Public Service Stability Agreement (2013-2016) and the move to Hospital Groups (Higgins 2013). These have been achieved with relatively little organised industrial action. The time is now ripe for those who have experienced change to be given training on how to take that experience and develop it.

5.3 Strengths of the project

One of the greatest strengths of the project lay in its greatest limitation, which was that the project was time bound in order to meet the requirements of the academic submission. It had two major influences on the project, the first being that it worked as a driver for the change agent to ensure that objectives were clear and concise and that the time lines associated with those objectives were met. The second impact on the project was that evaluation happened within a relatively short timeframe and therefore the evidence was available to show the “quick wins” that were achieved in respect of reduction in access times for MRI outpatients. In addition, having provided capital and revenue investment in MRI in 2014, the Executive Management Team made it clear that any further investment in MRI could only occur once all cost neutral process improvement options had been addressed. This resulted in a need to review the existing activity against potential capacity and then identify if there were areas for scope in increasing the capacity that did not include funding additional payroll to extend working hours.
5.4 Limitations of the project

According to Lewin (1947) cited in Burnes (2004), the most important aspect of the change is the cyclical process research, action and research. Organisational development does not take change in isolation, but sees each change result in learning, from which the organisation can grow and develop over a period of time (Senior & Swailes 2010a). OD is carried out over the long term and is only effective if each change results in review and further implementation. This change initiative was time bound at the start by the ability to access the appropriate information to diagnose the situation. It was time-bound at the end by the academic requirement to provide outcomes against which to evaluate. This did not allow sufficient time to provide a full cycle of development, implementation and re-enforcement. This limitation on time must be addressed by establishing the governance to ensure that the initiative is developed beyond the scope of the project to ensure that learnings are reviewed, adapted and embedded in all areas of the department.

The project was limited by not having local or national access targets against which to work. The author chose a target of nine months, based on the existing scheduled care targets of 52 weeks for outpatient appointments and nine months for elective surgery. This was based on the rational that, at a minimum, patients should access their diagnostic imaging in advance of attending their appointment. However, best practice in other jurisdictions, such as Canada and the UK, have target access times within three months. Another limitation of the project was the limited access to data resulting from the RIS / PACs. The system did not allow for a detailed review of demand management or a detailed review of demand against activity by referring speciality.
5.5 Recommendations

5.5.1 Setting up a Demand Management Utilisation Committee

Waiting list management and scheduling are only one aspect of demand management utilisation in diagnostic imaging. However, as with all complex systems, process improvements to waiting list management and scheduling directly impact on capacity, activity and demand within the department. Therefore, the key to ensuring on-going management of scheduling and waiting lists is to convene a demand management utilisation committee, who provide governance, leadership and oversight of capacity reviews, activity and demand rationalization. This committee needs to be clinician led, with dedicated radiology consultants with responsibility for each modality, from which subgroups (such as that set up for the MRI initiative) can work both within the department and with colleagues across the service to improve patient access.

5.5.2 Allowing access to the RIS/PACs database

The development of RIS / PACS and electronic requesting, have resulted in large amounts of data being collected around the diagnostic imaging process, which have potential to support decision making (Humphreys 2012). Big data helps organisations make informed decision, by condensing large amounts of data into usable information (H. Davenport 2014). It can deliver information on demand by
speciality and by referring clinician. It could help identify areas of growth and forecast when additional capacity may be required on a short, medium and long term basis. It can help identity processes that are impacting on access, such as DNAs, scheduling and reporting turn-around-times. However, if accessing big data is cumbersome or does not help to answer questions around the service, then it becomes redundant. Until radiology management can access the appropriate data, from which relevant information can be created it will be impossible to develop KPIs which can help with informed decision. Information technology provides multiple packages that allow organisations to take big data and transform it into usable information. However, this is not possible without access to the database.

5.5.3 Development of National Access Targets for Diagnostic Imaging

All of the literature clearly points to the requirement to have national access targets against which patient access can be monitored and reviewed. Perhaps the reason for the limited international literature on this subject is that other jurisdictions do not have the same issues around the significant wait times for routine MRI that Ireland has. Change initiatives carried out in other jurisdictions, such as Italy, on waiting list management for radiology aim to reduce wait times from 45 days to 16 days (Nuti & Vainieri 2012). A recent article in the Sunday Business Post identified that there were 27,000 patients waiting for MRI in Ireland with many patients waiting more than two years (Mitchell 2014). In April, 2014 a newspaper article identified the NHS Wales as having the longest wait for Diagnostic tests in the United Kingdom with 16.6% waiting greater than twelve weeks (The Guardian 2014). The HSE and
individual organisations have a responsibility to question how we can provide the same quality of service to our patients. Until national access targets are created for diagnostic imaging it will be nigh on impossible to improve the access times.

5.6 Summary and Conclusion

It is evident from the literature available that without clear leadership & governance, changes may not be implemented or when they are the implemented it is seen as a finite process, which ends with the outcome being achieved. Organisational development recognises that change is an on-going process in any organisation and that the best way for the organisation to grow and develop is to learn from each change initiative in a constant cycle of action research. This change initiative identified that the key to improving access to MRI was to: have access to data for decision making, standardised processes for managing the waiting lists, the constant monitoring and reporting of waiting lists against national targets and the review of scheduling. Without these actions taking place on a regular basis, waiting lists can become unmanageable and result in increased access times for patients. However, the success of the change initiative cannot only be valued in the achieving of the aims set for the project, but must be evident in the actions undertaken to embed these changes into the department / organisation so that they become the new “how things are done around here.” (Drennan 1992). This can only be achieved through leadership developing the governance to implement change and that the staff are given access to the appropriate training to develop a culture of change.
References


Das, S. et al., 2011. How to reduce waiting times at an MRI department of a university radiology Department. Available at: http://hdl.handle.net/11245/1.366176.


Olisemeke, B. et al., 2013. *The effectiveness of service delivery initiatives at improving patients ’ waiting times in clinical radiology departments: a systematic review*, Available at: http://www.crd.york.ac.uk/PROSPERO/.


Schneider, A.J., 2011. *Capacity planning for waiting list management at the Radiology department of Leiden University Medical Center*. University of Twente.


Appendices

1). PESTLEI Analysis on the Radiology Department of an Acute Dublin Hospital

Political
- Change of Minister of Health, Change of Head of Acute Hospital Division of HSE
- Change from HSE to Directorate structure under review at Ministerial level
- Development of Hospital Groups

Economic
- Reduced budget & resources

Sociological
- Increase in patient’s accessing the Hospital
- Increase in patient advocacy complaints and parliamentary questions regarding access

Technological
- Introduction of National Integrated Medical Imaging System (NIMIS)
- Use of waiting list management in out-patient department
- Development of National Reporting systems through Business Objects

Ecological
- Building of new extension for MRI

Legislative
- National Clinical Programme for Radiology
- SDU targets for waiting list management

Industry Analysis
- Reduction in people with private health insurance resulting in an increase in patients attending public hospitals and accessing diagnostics.
2). Stakeholder Analysis

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Potential Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Consultant Radiologists</td>
<td>High - Red</td>
</tr>
<tr>
<td>2</td>
<td>Radiographers</td>
<td>High - Red</td>
</tr>
<tr>
<td>3</td>
<td>Radiology Clinical Staff</td>
<td>Neutral - Amber</td>
</tr>
<tr>
<td>4</td>
<td>Executive Management Team</td>
<td>Low - Green</td>
</tr>
<tr>
<td>5</td>
<td>Referring Clinicians</td>
<td>Neutral - Amber</td>
</tr>
<tr>
<td>6</td>
<td>Patients</td>
<td>Low - Green</td>
</tr>
</tbody>
</table>
3a). OECD MRI Units per 1,000,000 population

3b). OECD MRI Exams, (2012) per 1,000 Population


4). Project Gantt chart November, 2014
5). Audit of Leadership & Governance for Waiting List Management in Radiology

<table>
<thead>
<tr>
<th>Waiting List Management Audit for Diagnostic Imaging</th>
<th>Reviewed</th>
<th>Comment</th>
<th>Recommended Action</th>
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<tbody>
<tr>
<td><strong>Leadership &amp; Governance</strong></td>
<td>01/04/2015</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Org Structure**

- **Is there a waiting list management policy in place for diagnostic imaging which sets out roles and responsibilities?**
  - Yes

- **Are there national access targets?**
  - No

- **Do you know at any given time how many patients are breaching the national access target?**
  - No

- **Are there local access targets agreed with Exec and Clinicians?**
  - No

- **Do you know at any given time how many patients are breaching the local access target?**
  - No

- **Which executive director does your dedicated executive lead report to?**
  - CEO

<table>
<thead>
<tr>
<th><strong>Roles and Responsibilities</strong></th>
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</thead>
</table>

- **Do you have a dedicated executive lead who has overall responsibility for waiting times?**
  - Yes
  - Chief Operations Officer (COO)

- **Is the waiting list management role clearly defined and separate from other duties, e.g., medical secretary?**
  - No
  - Diagnostics Directorate Business Manager is responsible at local level

- **Do consultants have a proportion of a waiting list reserved for urgent patient vs. routine patient bookings?**
  - Yes

- **Can the dedicated executive lead book patients onto the list without consultant oversight?**
  - No

<table>
<thead>
<tr>
<th><strong>Skills and Training</strong></th>
</tr>
</thead>
</table>

- **Do you have regular training / refreshers available for waiting list teams to learn best practice?**
  - No
  - Waiting list management is unavailable on NIMS

- **Are there tools and templates available to support dedicated executive lead to make decisions?**
  - In development
  - Subject to a) access to NIMS database & b) setting of local/national access targets

- **Does the dedicated executive lead have access to peer support in the organisation? e.g., action learning sets?**
  - No
  - Quality Assurance tool is available to support Radiologists not executives

- **Is there a collaborative relationship between waiting list and bed management teams for capacity and demand planning?**
  - In development
  - Business Manager attends escalation meetings for unscheduled care (escalation policy)

- **Are there tools and templates available to support dedicated executive lead to make decisions?**
  - In development
  - Subject to a) access to NIMS database & b) setting of local/national access targets

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- **Is there a collaborative relationship between waiting list and bed management teams for capacity and demand planning?**
  - In development
  - Business Manager attends escalation meetings for unscheduled care (escalation policy)
## Data and Information Overview

### 1. Understanding Performance

<table>
<thead>
<tr>
<th>Question</th>
<th>Status</th>
<th>Reason</th>
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<tbody>
<tr>
<td>Do you have a good understanding of how the hospital is currently performing?</td>
<td>No</td>
<td>due to lack of access targets Development of national &amp; locan access targets required</td>
</tr>
<tr>
<td>Do you make use of a performance dashboard to identify underperforming areas?</td>
<td>In development</td>
<td>KPIs to be finalised and tested to see if appropriate and supportive to informed decision making</td>
</tr>
<tr>
<td>Do you examine performance by modality?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Do you use data/dashboards to track performance and issues over time to identify specific trends?</td>
<td>Yes</td>
<td>New suite in development Report to be issued to Radiology Management, Clinical Director and Executive on completion of review</td>
</tr>
<tr>
<td>Do you understand which parts of the scheduled care pathway are causing long waiting times?</td>
<td>In development</td>
<td>Review is underway of capacity, activity and demand to identify</td>
</tr>
</tbody>
</table>

### 2. Primary Targeting Lists (PTLs)

<table>
<thead>
<tr>
<th>Question</th>
<th>Status</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you make use of organisation and specialty level PTLs?</td>
<td>No</td>
<td>Not applicable (no targets set) National access targets required to be developed</td>
</tr>
<tr>
<td>Are PTLs produced internally and regularly (ideally weekly) to ensure current performance is understood?</td>
<td>No</td>
<td>Not applicable (no targets set) National access targets required to be developed</td>
</tr>
<tr>
<td>Do your booking teams use PTLs to drive chronological booking for routine patients?</td>
<td>No</td>
<td>No waiting list management functionality in NIMIS, but where possible modality secretaries will Need to develop waiting list management functionality on NIMIS and develop National access targets</td>
</tr>
</tbody>
</table>

### 3. Key Performance Indicators

<table>
<thead>
<tr>
<th>Question</th>
<th>Status</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you collect performance metrics on areas which might influence overall waiting times?</td>
<td>Yes</td>
<td>Activity &amp; waiting lists is currently captures by modality</td>
</tr>
<tr>
<td>Do you take strategic decisions based on performance against key performance indicators?</td>
<td>Where possible</td>
<td>Information, capital investment decisions are based in the HSE, the Hospital will provide a</td>
</tr>
<tr>
<td>Do you regularly share performance against KPIs with staff and other stakeholders to influence change?</td>
<td>No</td>
<td>outsourced has occurred where waiting lists become unmanageable Further development required for communication of KPIs to all staff within Radiology</td>
</tr>
<tr>
<td>Do you complete clearance plan in collaboration with individual specialties?</td>
<td>Yes</td>
<td>Further work required at Hospital Group level to identify capacity</td>
</tr>
</tbody>
</table>
### Process Improvement Overview

#### 1. The Booking Process

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a defined process for how and when patients are booked for scans?</td>
<td>Yes Vetting process dictates access</td>
</tr>
<tr>
<td>Do you book routine patients chronologically when scheduling?</td>
<td>Yes subject to vetting</td>
</tr>
<tr>
<td>Is there an effective communication process in place for decision-to-treat referrals?</td>
<td>Yes based on clinical decision of Radiologist</td>
</tr>
</tbody>
</table>

#### 2. Reviews and Validation

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you review specialty waiting lists on a weekly basis to identify and action impending breaches?</td>
<td>No</td>
</tr>
<tr>
<td>Do you validate the waiting list regularly for accuracy to ensure suspensions and patient requirements are still correct?</td>
<td>In development 1st validation of MRI waiting list for 4 month period completed Rollout of validation to all modalities required, subject to administrative resources being available</td>
</tr>
<tr>
<td>Are patients contacted prior to their scan in order to confirm attendance?</td>
<td>Yes Patient’s are phoned or written to to confirm appointment Development of electronic based communication system under way</td>
</tr>
<tr>
<td>Do you regularly review your backlog and create action plans for imaging those patients who have breached the scheduled care waiting time target?</td>
<td>No No access targets agreed. NIMIS system does not facilitate identification of longest waiters Data extracts required to identify longest waiters and action plans to address this subject to funding</td>
</tr>
</tbody>
</table>

#### 3. Early Warning Signs

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you monitor your DNA rate at a speciality level?</td>
<td>Yes DNAAs to be monitored</td>
</tr>
<tr>
<td>Are cancellations monitored and controlled with a defined policy?</td>
<td>In development due to implementation of NIMIS, cancellations must be advised in writing to Policy to be developed</td>
</tr>
<tr>
<td>Do you have a standby list of long waiters who could attend in place of a cancellation?</td>
<td>Yes This is managed by each modality secretary</td>
</tr>
</tbody>
</table>

Do you do the following:
- Validate the waiting list
  - In progress as above Subject to administrative resources
- Stress test by allocating TCIs
  - Yes
- Liaise with bed and theatre management teams daily
  - Yes
## Risk Assessment and Contingency Planning

### Leadership and Governance

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the individual or team with overall responsibility for waiting times have a weekly plan in place to maintain target performance over time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are all risks to achieving the performance targets identified and a mitigation plan in place?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Are communication channels in place which are going to be effective for communicating to and engaging with staff over time?</td>
<td>Yes</td>
<td>Multidisciplinary departmental meetings</td>
</tr>
<tr>
<td>Will resources be made available for waiting list management as required?</td>
<td>HSE Dependent</td>
<td></td>
</tr>
</tbody>
</table>

### Data and Information

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can the flow of scheduled care patients be tracked over time?</td>
<td></td>
<td>subject to access NIMIS data base</td>
</tr>
<tr>
<td>Are PTLs reducing patient queues in line with the targets for scheduled care?</td>
<td></td>
<td>no PTLs developed nationally</td>
</tr>
<tr>
<td>Are PTLs produced weekly to help staff manage the process over time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is performance being tracked over time to identify issues and risks across the scheduled care pathway?</td>
<td></td>
<td>by Lead Consultant Radiologist, RSM &amp; Business Manager</td>
</tr>
<tr>
<td>Are dashboards being updated on a regular basis to communicate performance levels to staff?</td>
<td>In development</td>
<td></td>
</tr>
<tr>
<td>Are KPIs informing decision-making in the short and long term?</td>
<td>In development</td>
<td></td>
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</tbody>
</table>

### Process Improvement

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are all relevant staff aware of the new process in place for effective waiting list management and how to use it?</td>
<td>In development</td>
<td>new sop for managing validation, DNAs &amp; cancellations in development</td>
</tr>
<tr>
<td>Is changing demand and capacity over time built into the process?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a contingency plan in place in the event of unforeseen equipment downtime?</td>
<td></td>
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</tr>
<tr>
<td>Is a weekly review of the waiting list and any back-log taking place?</td>
<td></td>
<td></td>
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</tbody>
</table>

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### 6). Diagnosing the Current Situation

<table>
<thead>
<tr>
<th>Data</th>
<th>Department</th>
<th>Hospital</th>
<th>HSE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose and Goals</strong></td>
<td>Reduce waiting numbers &amp; access times, but no agreed targets</td>
<td>Development of new Organisational Strategy due to be completed after project, no agreed Organisational diagnostic imaging access targets. Potential review of Group Diagnostic Imaging capacity to take place</td>
<td>Structured HSE Service plans and Divisional operational plans indicating need to monitor and report on diagnostic imaging, but no agreed national diagnostic imaging access targets</td>
</tr>
<tr>
<td><strong>Structure &amp; Culture</strong></td>
<td>Hierarchical &amp; Power based moving towards collective responsibility. Disciplines had previously worked in isolation or in small groups. Moving towards multidisciplinary teamwork</td>
<td>Hierarchical &amp; Power based within Executive Management Team. Decisions on allocation of resources made at executive committee level</td>
<td>Hierarchical &amp; Power based, decisions on allocation of resources made at Executive level, move towards Hospital Groups and Commissioners</td>
</tr>
<tr>
<td><strong>Leadership approaches &amp; Styles</strong></td>
<td>Transactional / Transformational Subject to discipline,</td>
<td>Transactional - Reduction in budget directly impacted on development of staff, reduced training budgets and tighter control on decision making</td>
<td>Transactional - Reduction in budget directly impacted on development of staff, reduced training budgets and tighter control on decision making</td>
</tr>
<tr>
<td><strong>Recruitment</strong></td>
<td>Risk due to shortage of trained staff</td>
<td>Limited by head count &amp; budget</td>
<td>Limited by recruitment embargo</td>
</tr>
<tr>
<td><strong>Rewards</strong></td>
<td>Remuneration</td>
<td>Not evident - budgets are based on prior year expenditure</td>
<td>Not evident - budgets are based on prior year expenditure</td>
</tr>
<tr>
<td><strong>Work Engagement</strong></td>
<td>Strong commitment but limited by malaise</td>
<td>Strong commitment but limited by morale</td>
<td>Poor - see HSE survey 2014</td>
</tr>
<tr>
<td><strong>Training &amp; Development</strong></td>
<td>Required to ensure skill mix, limited by lack of local budget</td>
<td>Centralised control of budget &amp; approval - investment in developing Leaders at MSc Level in 2013 / 2015</td>
<td>minimal spend on training &amp; development - Ref HMI article on difficulty of filling Senior Management Positions due to lack of training and development</td>
</tr>
<tr>
<td><strong>Intra &amp; inter Group relationships</strong></td>
<td>Closed culture, risk averse, significant impact of Hayes Report 2010</td>
<td>Developing more open culture - Hospital Groups</td>
<td>Developing networking relationships with Hospital Groups</td>
</tr>
</tbody>
</table>
### 7). Revised Gantt chart January, 2015

<table>
<thead>
<tr>
<th>Key Project Steps</th>
<th>Responsibility</th>
<th>wk10</th>
<th>wk11</th>
<th>wk13</th>
<th>wk15</th>
<th>wk17</th>
<th>wk19</th>
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<th>wk31</th>
<th>wk33</th>
<th>wk35</th>
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<tr>
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<td>Unilateral Action Group in Radiology</td>
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<td>Evaluate current outpatient access to MRIs</td>
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<tr>
<td>Capture base line data</td>
<td>Project Team</td>
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</tr>
<tr>
<td>Review or existing scanning protocols for MRI</td>
<td>Consultant Radiologist</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Review existing schedule against capacity for out-patient MRIs</td>
<td>Clin Spec MRI</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Set KPIs for Patient Access to MRI</td>
<td>BM &amp; RSM</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Develop SOP and pilot Validation of waiting lists</td>
<td>BM &amp; Clinical Manager</td>
<td></td>
<td></td>
<td>🟡</td>
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<td></td>
</tr>
<tr>
<td>Evaluate any changes to inpatient access to MRIs</td>
<td>Project Team</td>
<td></td>
<td></td>
<td>🟡</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Develop governance for embedding new processes</td>
<td>BM, RSM, Cons Radiologist</td>
<td></td>
<td></td>
<td>🟡</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Write up study</td>
<td>A Carswell</td>
<td></td>
<td></td>
<td>🟡</td>
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<td></td>
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</tr>
<tr>
<td>Submit Thesis</td>
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<td>🟡</td>
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</tr>
</tbody>
</table>

**Legend:**
- **Green**: On track, in progress and complete to plan, no issues.
- **Blue**: Completed, finished and handed over to another responsibility.
- **Red**: A problem needs serious attention and action now.
- **A**: Amber - Not complete, in progress, a risk but not an issue yet.
- **B**: Black - Completed, finished, scheduled over to another responsibility.
## 8). Developing KPIs for Demand Management Utilisation in Radiology

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Indicator</th>
<th>Data Source</th>
<th>Available</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Radiology Capacity per modality (eg MRI, CT, US)</td>
<td></td>
<td>RSM</td>
<td>Pending</td>
<td>Is currently being calculated by RSM</td>
</tr>
<tr>
<td>b</td>
<td>Radiology Activity per modality</td>
<td></td>
<td>NIMIS</td>
<td>Yes</td>
<td>But limited detail</td>
</tr>
<tr>
<td>KPI - 1</td>
<td>Difference between Activity &amp; Capacity - DNAs, staff attendance, equipment servicing, equipment breakdown (KPI)</td>
<td>Requires review of internal process &amp; design - DNAs, validation, scheduling, equipment downtime, attendance management, staffing</td>
<td>a &amp; b</td>
<td>Pending</td>
<td>Pending capacity review by RSM</td>
</tr>
<tr>
<td>c</td>
<td>Radiology Demand per modality</td>
<td></td>
<td>NIMIS</td>
<td>No</td>
<td>Requires access to NIMIS database</td>
</tr>
<tr>
<td>KPI - 2</td>
<td>Difference between Capacity &amp; Demand - Business case for increased resources (human +/- capital) (KPI)</td>
<td>Requires business case for additional capacity to be added to the system - Human Resources +/- capital equipment / Review of demand</td>
<td>a &amp; c</td>
<td>No</td>
<td>Pending capacity review by RSM Access to NIMIS Database</td>
</tr>
<tr>
<td>d</td>
<td>Inpatient Turn Around Time (TAT) Request to Image to Report</td>
<td></td>
<td>NIMIS</td>
<td>No</td>
<td>Requires access to NIMIS database</td>
</tr>
<tr>
<td>e</td>
<td>Local agreed targets for inpatient TAT</td>
<td></td>
<td>AMNCH</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>KPI - 3</td>
<td>Difference between actual inpatient TAT and target TAT (KPI)</td>
<td>Requires review of scheduling, demand, activity &amp; capacity</td>
<td>d &amp; e</td>
<td>No</td>
<td>Requires access to NIMIS database</td>
</tr>
<tr>
<td>f</td>
<td>National - Inpatient access target per modality by vetting status</td>
<td></td>
<td>HSE</td>
<td>No</td>
<td>Requires national development</td>
</tr>
<tr>
<td>KPI - 4</td>
<td>Difference between National inpatient target against inpatient access (KPI)</td>
<td>Enables department to benchmark against other organisations</td>
<td>d &amp; f</td>
<td>No</td>
<td>Requires national development</td>
</tr>
<tr>
<td>g</td>
<td>Local - Inpatient access target per modality by vetting status</td>
<td></td>
<td>AMNCH</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>KPI - 5</td>
<td>Difference between Local inpatient target against inpatient access (KPI)</td>
<td>Data can be supported from KPI 1 &amp; 2 &amp; 3 - may need review of scheduling based on vetting allocation</td>
<td>d &amp; g</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>h</td>
<td>Outpatient Access to next appointment by vetting category by modality by days (months) (Time)</td>
<td></td>
<td>Modality secretary</td>
<td>Yes</td>
<td>Should be available through NIMIS</td>
</tr>
<tr>
<td>i</td>
<td>National -Outpatient access target per modality by vetting status</td>
<td></td>
<td>HSE</td>
<td>No</td>
<td>Requires national development</td>
</tr>
<tr>
<td>KPI - 6</td>
<td>Difference between National outpatient target against outpatient access (KPI)</td>
<td>Enables department to benchmark against other organisations</td>
<td>h &amp; i</td>
<td>No</td>
<td>Requires national development</td>
</tr>
<tr>
<td>j</td>
<td>Local - Outpatient access target per modality by vetting status</td>
<td></td>
<td>AMNCH</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>KPI - 7</td>
<td>Difference between Local outpatient target against outpatient access (KPI)</td>
<td>Data can be supported from KPI 1 &amp; 2 &amp; 3 - may need review of scheduling based on vetting allocation</td>
<td>h &amp; j</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>k</td>
<td>Patient Waiting list by Numbers</td>
<td></td>
<td>NIMIS</td>
<td>Yes</td>
<td>But limited detail</td>
</tr>
<tr>
<td>l</td>
<td>Agreed target of maximum unreported plain film per month</td>
<td></td>
<td>AMNCH</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
<tr>
<td>m</td>
<td>No of days for unreported plain film</td>
<td></td>
<td>NIMIS</td>
<td>Yes</td>
<td>But time intensive to provide</td>
</tr>
<tr>
<td>KPI - 8</td>
<td>Difference of unreported plain film against target (in days)</td>
<td>Requires review of targeted agreed TATs on reporting and may result in case for additional reporting resources</td>
<td>i &amp; m</td>
<td>No</td>
<td>Needs to be agreed locally</td>
</tr>
</tbody>
</table>
9). Evaluation of changes to scheduling

<table>
<thead>
<tr>
<th>Scan type</th>
<th>Vetting</th>
<th>NEXT ROUTINE</th>
<th>Scan type</th>
<th>Vetting</th>
<th>NEXT ROUTINE</th>
<th>Change in Slots</th>
<th>Comments</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPINE</td>
<td>7</td>
<td>4 2 2 1</td>
<td>SPINE</td>
<td>13</td>
<td>8 3 2 1 13 months</td>
<td>6</td>
<td>1 triple slot, 1 double slot</td>
<td>Reduction of 20 months for next routine appointment</td>
</tr>
<tr>
<td>BRAIN/IAMS/MRA</td>
<td>9</td>
<td>6 2 2 1 1</td>
<td>BRAIN/IAMS/MRA</td>
<td>13</td>
<td>8 1 1 2 11 to 12 months</td>
<td>4</td>
<td>2 double slots</td>
<td>Reduction of 8 months for next routine appointment</td>
</tr>
<tr>
<td>PELVIS/RECT/GYN</td>
<td>5</td>
<td>1 1 1 2 1 YEAR</td>
<td>PELVIS/RECT/GYN</td>
<td>5</td>
<td>1 2 1 10 months</td>
<td>Reduction of 2 months for next routine appointment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROSTATE</td>
<td>2</td>
<td>1 1 1 1 1 1 1 1</td>
<td>PROSTATE</td>
<td>2</td>
<td>1 1 1 1 1</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIVER</td>
<td>3</td>
<td>1 1 1 6 MONTHS</td>
<td>LIVER</td>
<td>3</td>
<td>1 1 1 4 months</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRI/PANCREAS</td>
<td>3</td>
<td>1 1 1 6 MONTHS</td>
<td>MRI/PANCREAS</td>
<td>3</td>
<td>1 1 1 8 months</td>
<td>Increase 2 months for next routine appointment</td>
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<td></td>
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<tr>
<td>ABD/OTHER</td>
<td>2</td>
<td>1 1 1 6 MONTHS</td>
<td>ABD/OTHER</td>
<td>2</td>
<td>1 1 1 6 months</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBFT</td>
<td>1</td>
<td>1 1 1 1 YEAR 2 MONTHS</td>
<td>SBFT</td>
<td>1</td>
<td>1 1 1 YEAR 5 months</td>
<td>Increase 3 months next routine appointment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSK</td>
<td>11</td>
<td>6 2 2 10-11 MONTHS</td>
<td>MSK</td>
<td>11</td>
<td>6 2 2 10 months</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Total</td>
<td>43</td>
<td>18 11 12 7</td>
<td>Adult Total</td>
<td>53</td>
<td>25 15 12</td>
<td>Increase in 10 slots</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10). Evaluation of Validation

<table>
<thead>
<tr>
<th>Scan type</th>
<th>Vetting</th>
<th>NEXT ROUTINE</th>
<th>Scan Type</th>
<th>Vetting</th>
<th>NEXT ROUTINE</th>
<th>Change in Slots</th>
<th>Comments</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROSTATE</td>
<td>2</td>
<td>1 1 1 1 1 1 1 1</td>
<td>PROSTATE</td>
<td>2</td>
<td>1 1 1 1 1</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIVER</td>
<td>3</td>
<td>1 1 1 6 MONTHS</td>
<td>LIVER</td>
<td>3</td>
<td>1 1 1 4 months</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRI/PANCREAS</td>
<td>3</td>
<td>1 1 1 6 MONTHS</td>
<td>MRI/PANCREAS</td>
<td>3</td>
<td>1 1 1 8 months</td>
<td>Increase 2 months for next routine appointment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABD/OTHER</td>
<td>2</td>
<td>1 1 1 6 MONTHS</td>
<td>ABD/OTHER</td>
<td>2</td>
<td>1 1 1 6 months</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBFT</td>
<td>1</td>
<td>1 1 1 1 YEAR 2 MONTHS</td>
<td>SBFT</td>
<td>1</td>
<td>1 1 1 YEAR 5 months</td>
<td>Increase 3 months next routine appointment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSK</td>
<td>11</td>
<td>6 2 2 10-11 MONTHS</td>
<td>MSK</td>
<td>11</td>
<td>6 2 2 10 months</td>
<td>no change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Total</td>
<td>43</td>
<td>18 11 12 7</td>
<td>Adult Total</td>
<td>53</td>
<td>25 15 12</td>
<td>Increase in 10 slots</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The variance in appointments reflects slots left vacant for urgent or semi-urgent requests**

11). Example of review of MRI Prostate Protocol

PROSTATE (aera) scan time= 23:24mins+8p=31:24mins

1. LOC
2. Axial T2 FS: Large Fov (to body) 2:34 - Remove
3. Axial T1: Large Fov (to body) 2:04
4. Sag T2 sFOV (to body) 2:39
5. Cor T2: small Fov (slices parallel to prostate/ urethra) 2:03
6. Axial T2: small Fov (slices perpendicular to COR T2) 3:21
7. Axial T1: small Fov (same as seq. 6)2:28 - Remove
8. DWI Axial: b=0, 400, 800 (same as seq. 6)5:34
9. DWI: b=1800 3:00
Improving routine outpatient access to Magnetic Resonance Imaging (MRI) in a Dublin Academic Teaching Hospital
Amy Carswell
Masters in Leadership
RCSI DEVELOPING HEALTHCARE LEADERS WHO MAKE A DIFFERENCE WORLDWIDE

Abstract

**Aim** - The aim of this quality improvement is to improve routine outpatient access to magnetic resonance imaging in an acute Dublin teaching hospital.

**Rationale** - The hospital had recently commissioned a 2nd MRI scanner and although it had significantly improved inpatient access, outpatient access remained a serious concern. When data was collected, it was identified that for certain scan types (including spines and brain), the next routine appointment would be scheduled in excess of two years. A review of relevant literature identified that improving access was contingent on analysing capacity, activity and demand. This analysis would indicate the actions required to either decrease demand, increase capacity or improve activity. The restrictions of limited budget and reduced staffing required that the department look at alternative ways of improving access. Therefore the focus was on increasing the activity through process improvement.

**Change Process** - The Senior and Swales Organisational Development model for change was used as the framework for implementing the objectives set.

**Evaluation and Results** – The outcome of the evaluation indicated that the review of scheduling, the review of protocols and the validation of the waiting list all positively impacted in decreasing access times. The development of Key Performance Indicators against which to provide on-going evaluation and support for informed decision making was delayed by external factors.

**Recommendations and Conclusion** – As a result of the initiative it has become evident that in order to improve access to not only Magnetic Resonance Imaging, but to all diagnostic imaging, that the publication of national access targets is required.
Improving routine outpatient access to Magnetic Resonance Imaging (MRI) in a Dublin Academic Teaching Hospital

Amy Carswell
Masters in Leadership

Introduction & Background

In 2014 a 2nd MRI scanner was commissioned in an acute Dublin teaching Hospital. Although the additional capacity improved inpatient access, routine outpatient access remained poor (in excess of two years). A literature review identified that improving access was contingent on analysing capacity, activity and demand.

Figure 1: Capacity Analysis

The restrictions of limited budget and reduced staffing required that the department look at alternative ways of improving access. Therefore, the focus was on increasing the activity through process redesign and improvement.

Aim & Objectives

Aim - Improve routine access for outpatients referred for MRI imaging.

Objectives:
1) That 80% of all outpatients will wait no more than 9 months for an outpatient MRI
2) A review of the scheduling process will take place and process improvements will be agreed that are in line with current Special Delivery Unit (SDU) criteria for managing outpatient waiting lists
3) A set of KPIs for demand utilisation in MRI are agreed which are based on best practice

Methodology

The Organisational Development (OD) Change Model\(^1\) was used as the framework for this initiative. The current situation was diagnosed by reviewing, not only the structural waiting list data, but also addressing the departmental culture and leadership, identifying potential resistance and carrying out a risk assessment.

A vision was developed to improve routine outpatient access based on a multidisciplinary approach to process improvement. This resulted in a team being created that included Radiologists, Aestheticians, business management, and the Business Manager.

Figure 2: OD Change Model\(^2\)

The following process improvements were chosen, which would develop the base from which future SDU waiting list criteria could be rolled out:

- Validation of the MRI waiting list
- Review MRI scanning protocols
- Review outpatient scheduling
- Development of key performance indicators (KPIs)

Action Research\(^3\) was used, over a two month period, to refine the process improvements. Standard operating procedures were developed to embed new practices. Recommendations were identified to further improve patient access.

Evaluation

The quality initiative was evaluated on the objectives. These were broken down into the process improvements which were implemented. Improvements were seen in routine access, with access time reduced from 33 months to 13 months for routine MRI spines. This resulted in a reduction from 12 to 9 months for average routine access.

Figure 3: Bar Chart – MRI next routine outpatient appointment in months

Organisational Impact

There was a significant improvement in routine access to MRI and the process redesigns implemented create the ability for further gains. The multidisciplinary team approach has developed a culture of change to improve the quality of patient care.

Conclusion

The future of improving outpatient routine access to MRI is contingent on the Health Service Executive developing a set of national diagnostic imaging access targets. These targets will enable organisations to set performance matrix for monitoring and reporting.

References

\(^1\)Special Delivery Unit. 2014. National Waiting List Management Protocol
