Increasing the efficiency and quality of follow up clinic visits for patients with inflammatory arthritis.

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Increasing the efficiency and quality of follow up clinic visits for patients with inflammatory arthritis.

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Abstract

The overarching principal goal of the change project described in this dissertation is to make the clinic visit for a rheumatology patient with inflammatory arthritis more efficient, more effective and of better quality, when compared to their current experience. Changes to both structure and process of how return patients are assessed will be introduced to facilitate these changes. This entailed pre-recording and ordering relevant clinical tests (blood tests and radiographs), and having patients return to clinic having completed a pro-forma that will include a list of current medications, as well as medications that have previously been tried for their arthritis.

As treatments for inflammatory arthritis have become more successful, it has become clear that clinical outcomes are much improved when appropriate treatments are commenced early. Changes to how arthritis referral centres work are required in order to approach the problem of meeting the target of reviewing patients referred by primary care physicians who suspect inflammatory arthritis within six weeks.

The change occurs in the context of ongoing planned and emergent change both in the macro- and the micro- context. The case for the importance of physicians leading and managing change is made herein.

The change was a qualified success. At the time of writing it had been shown to be possible to see an extra new patient in clinic, as a result of the efficiency gained. 131 patients were included in the analysis. The average time for a physician to review a patient was reduced from 23 to 15 minutes, but in the present form it must be noted that a physician spends 14.8 minutes preparing for the patient visit. 91.6% of patients had a validated disease activity score calculated; this was only very rarely done beforehand. 92.37% had radiographs taken within two years which compared with 51.9% who had these taken previously. All patients had their data entered into a registry database.
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Chapter 1: Introduction

Despite our complex medical environment, physicians rely primarily on paper tools, memory, and hard work to improve the care given to patients (Varkey, Reller, & Resar, 2007)

1.1 Introduction

The overarching principal goal of the change project described in this dissertation is to make the clinic visit for a rheumatology patient with inflammatory arthritis more efficient, more effective and of better quality, when compared to their current experience. It was hoped to achieve this by adopting a change both in structure and process (Donabedian, 1988) for reviewing patients after their first clinic visit, or, put differently, after the diagnosis becomes apparent. By providing a vision to improve the efficiency of clinic visits for patients, and by extension their overall care, it is hoped that medical and allied healthcare staff will become involved and engaged, and increase the chances of the project becoming successful and embedded (Kouzes & Posner, 2009).

Leaders in healthcare worldwide are working in challenging environments (Block & Manning, 2007). Most healthcare systems are exceedingly complex organisations with identifiable attitudes and cultures that characterise the organisation tasked with overseeing the delivery of healthcare (Gershon, Stone, Bakken, & Larson, 2004). While Ireland is not unique in this regard, in the recent past the country has experienced changes to how healthcare is delivered and an unprecedented reduction in resources with which to do this. Resilience has been identified as important in leaders from studies (Allison, 2012), and has
arguably never been more relevant, to the leader or manager than in the Irish health care system today.

One way of meeting some of these challenges is to improve the efficiency of delivering care in a disease that is nearly entirely managed in the outpatient specialty clinic. There is great potential to develop this type of service because, for the most part, it is not dependant on the usual structures and resources required for managing clinical problems that require in-patient facilities.

1.2 The change agent

The author and change agent is a medical doctor at registrar level, also (more widely) known as a non-consultant hospital doctor (NCHD). The importance of doctors participating actively and engaging with management and leadership has been underlined by the new focus placed by the National Health Service (NHS) on developing the leadership skills of NCHD’s (Roebuck, 2011), based in part, on the work by Baker. He demonstrated that high performing health care systems that where structurally and culturally very different, had a common focus on quality and in the development of leaders at all levels. Baker stresses that leadership is inseparable and integral to high performance, quality and safety (Baker, 2011).

The report he prepared recognises the importance of leadership:

*The business case for leadership and engagement is compelling: organisations with engaged staff deliver better patient experience, fewer errors, lower infection and mortality rates, stronger financial management, higher staff morale and motivation and less absenteeism and stress.* (TheKingsFund, 2012)
A study of 2,000 Dutch doctors, found that those who were more engaged were significantly less likely to make mistakes (Prins et al., 2010).

.........the contribution of staff at an early stage of their careers to leadership and service improvement needs to be valued and recognised. (TheKingsFund, 2012)

And so the case for doctors facilitating change is clear. However, the track record for this is generally held to be poor.

1.3 The macro- context

The Irish healthcare system is witnessing significant changes at a national level currently;

- The development of hospital networks (not dissimilar to the trust structure characteristic of the NHS in the United Kingdom (UK));

- The ongoing dissolution of the Health Service Executive (HSE);

- The implementation of the Health Information and Quality Authority (HIQA) standards for institutions involved in the delivery of healthcare in Ireland (HIQA, 2012):

- The effects of the implementation of the Haddington Road agreement (LabourRelationsCommision, 2013):

- The plans of the Minister for Health for introducing Universal Healthcare Insurance (which at time of writing is in still in an early development stage) and other changes detailed in the national service plan (HealthServiceExectutive).
While it was anticipated that most of this change will not directly affect the implementation of this change project, this nevertheless forms the backdrop against which the project is being implemented.

The documents’ Future Health (DepartmentOfHealth, 2012), and Better, Safer Care (HIQA, 2012) are very prescriptive in what they expect in healthcare delivery. They have meaningful consequence on the delivery of care for outpatients, and this has relevance to rheumatology clinics.

Healthcare organisations are being compelled to promise the public what many feel is an impossible standard. This makes the environment for frontline healthcare providers extraordinarily difficult and frustrating, and leads to very low staff engagement and morale (Downey-Ennis, Harrington, & Williams, 2004). This forms the backdrop against which the change project is implemented.

1.4 The micro- (organisational) context

The rheumatology out-patient service at the hospital is struggling to meet the needs of the service user. The hospital serves a community of 350,000 people, but because of the distribution of consultant rheumatologists, the department provides care for an area with a population of approximately 500,000. Patients are waiting too long in the waiting room. Results are not to hand when doctors call patients into their room, and doctor’s waste a great deal of time collecting these during clinic, when they could be seeing patients. The rheumatology clinics are finishing approximately an hour later than they are scheduled to. It
is anticipated that the number of hours worked by NCHDs will be reduced soon, and that this will inevitably affect the out-patient service.

The department already provides a ‘demand-led’ service with an understaffed medical team. It is now facing the task of providing a high quality service, rooted in evidence-based medicine, while safeguarding the training of their medical and nursing staff.

In addition to their out-patient commitment, the rheumatology team participate fully in the hospitals general internal medicine service. This essentially means that the team is responsible for all patients requiring medical admission over a 24 hour period on an approximately one in nine rota.

A great deal of the workload for the medical team is on the wards, looking after patients with general medical conditions, who are often very ill. These patients usually found their way to care under the rheumatology teams as they were admitted during one of the on-call days. Treating these patients is a priority for the doctors working in the rheumatology service as:

1. They are often very sick;
2. Relatives often need to meet the medical team to discuss issues;
3. The problems of overcrowding (seen most clearly in the emergency department), required that much attention be paid to securing discharges as soon as possible;
4. Patients must be seen by the medical team early in the morning so that plans that will require the input of other medical and paramedical services can be booked as soon as possible. This is to avoid situations where decisions are being taken at the end of a day and that day is now lost.
Furthermore, there are difficulties in complying with the European Working Times Directive (EWTD) for NCHDs without reducing service provision. Much focus had been placed on decreasing the number of hours worked by doctors, and at the time of writing, attempts are being made to reduce doctors working hours following an industrial relations dispute. This means that the service is lacking a doctor every one week in four, and although clinics are being reduced to take account of this, they are not being reduced in a proportional manner, and are invariably running later than usual on these days.

As outlined below, treatments for inflammatory arthritis are more effective than ever, and there is increasing evidence that early intervention with these treatments results in less long term morbidity, disability and mortality (Nell et al., 2004). There is a new urgency to see patients referred to clinics by primary care physicians. Anecdotally, the consultants have noticed a significant increase in referrals to clinic, but have also witnessed the reduction in both frontline and support staff, with which they are expected to run their clinics.

**1.5 Medical need for change**

Inflammatory arthritis (IA), of which the most common is rheumatoid arthritis (RA), is a common disease caused by the immune system inappropriately attacking the cells lining joints called ‘synovial cells’. This results in significant inflammation at these sites. It is associated with progressive disability as well as systemic complications. Both longevity and quality of life are reduced and it is associated with high socioeconomic cost (Firestein, 2003; McInnes & Schett, 2011).
The hallmark of the natural history of this highly destructive disease is represented by the development of articular (joint) deformities, making normal everyday tasks extremely difficult and often impossible. During the many years while these changes are taking place, the patient suffers a great deal of pain. There is mounting evidence that early treatment of rheumatoid arthritis results in better overall control of the disease, higher success rates in achieving remission, and a significant reduction and occasionally halting, of the development of deformities (Nell et al., 2004).

In clinical practice, this has translated into the concept that there is a ‘window of opportunity’ of debatable length from disease onset, during which remission is achievable. If treatment with disease modifying therapy is delayed beyond this ‘window’, it seems the treatment will be somewhat less successful. There is also a great deal of data indicating that the effective treatment of all inflammatory arthropathies results in significant decrease in out-of-work time, and therefore confers a significant economic advantage on a macro-level (Barnabe et al., 2012).

1.6 Aims and Objectives

**Specific Aim 1**: The primary aim is to decrease the time physicians spend with inflammatory arthropathy return patients.

**Specific Aim 2**: To see more new patients in clinic suspected to have an inflammatory arthropathy by their General Practitioners (GPs).
Currently, the target recommended by the Irish Society of Rheumatology is to have patients who are suspected to have an inflammatory arthropathy initiated on appropriate treatment within six weeks of symptoms onset (Kane, 2011). This inherently requires the patient to be seen by a rheumatology specialist well within this timeframe. There are many barriers to achieving this goal. At our institution, like many other hospitals in Ireland, we are not meeting this target most of the time.

By decreasing the time it takes to see return patients, it is hoped that it can be demonstrated that more patients can be seen in each clinic session. This will mean increasing the number of new patients seen at each clinic, and, in time reviewing patients with potential new arthropathies within the targeted timeframe. An essential principal to achieving a reduction in the time it takes to review a return patient, is that there will be no diminution in the quality of the clinic visit.

**Specific Aim 3:** To perform a standardised and validated measurement of disease activity for all IA patients, to assist with treat-to-target recommendations.

There are a variety of measurable outcomes to describe the success or otherwise of treatment of IA. A validated score for disease activity exists for RA and psoriatic arthropathy (PsA), the latter being second most common inflammatory arthropathy. This is known as the Disease Activity Score 28-CRP (see below) (DAS28-CRP) (Balsa et al., 2004). The score exists to assist clinicians in their decision about changing treatments. Very specific guidance is available to clinicians that instruct them to treat the patient to a defined target, because there has been a tendency towards undertreating patients, (Smolen et al., 2010).
The score comprises a count of the number of swollen joints and tender joints (of 28 named joints)- assessed clinically, a patient global assessment manifest as a visual analogue scale ranging from 0mm to 100mm, and a laboratory measure of a protein known a C-reactive protein (CRP), which is a non-specific measure of systemic acute inflammation. These are entered into a mathematical equation and a score is produced (Balsa et al., 2004). Although essential for clinical trials, the new impetus to treat to target mandates calculating this score for all IA patients returning to clinic.

We know that this score is only being calculated routinely for the very small minority of patients who are enrolled in a clinical trial at our hospital. The score is cumbersome to use because it requires a complex calculation, and often there are missing information making it impossible to calculate the DAS28-CRP at clinic visit. The information most commonly missing is a value for a recent CRP, which requires a blood test, and in practice is being done after the patient leaves clinic, and the patient global assessment.

The potential benefits of using an empirical method to treat patients and compare disease activity between visits and after commencing new therapies are therefore readily apparent. Changing the practice of the department to calculating DAS28-CRP scores for IA patients will result in a demonstrable increase in quality of care.

**Specific Aim 4: To increase the quality and standardisation of the patient’s clinic visits by focusing physician attention to addressing common concomitant illnesses with inflammatory arthropathies, namely osteoporosis and cardiovascular disease.**

While it has been known for some time that patients with any inflammatory disorder, including inflammatory arthropathies, are at increased risk of cardiovascular complications
including heart attacks and strokes, some authorities now believe that this is the most important potentially measurable outcome for patients with these diseases. Osteoporosis, a disease defined by increased risk of bone fractures due to decreased bone mineral density commonly occurs alongside inflammatory arthritis in the same patient (Gough, Emery, Holder, Lilley, & Eyre, 1994). However, most people with these diseases do not have these issues addressed at their clinic visit with a rheumatologist. Addressing both of these at clinic visits is expected to raise awareness in the patient about these other potential problems, and allow the initiation of lifestyle changes or other interventions as part of a primary prevention strategy.

Specific Aim 5: To increase the proportion of patients acquiring staging hands and feet plain film radiographs every two years in compliance with the defined consensus of consultant rheumatologists at the hospital.

A hallmark of IA is the development of joint deformities over time. The earliest and most subtle changes in the joint will be missed by clinical examination alone. Plain film radiographs (commonly, but incorrectly referred to as X-rays) of hands and feet have been shown to be the most sensitive way of detecting the earliest changes associated with IA (Hoving et al., 2004). These changes are characterised by bone erosions around the joint line, and narrowing of the joint space. At worst the joints become fused (ankylosed) or the bones fall out of alignment completely (subluxed), but usually this is detectable clinically and occurs late in the disease, when recognition of the destructive underlying process is less useful, because the changes are now irreversible.
Therefore, progression of erosive disease is widely held to be most empirically measurable using radiographic scores of plain films (Van der Heijde, 2000). Despite much debate, there is no currently accepted national or international consensus as to how frequently this should be performed, once the diagnosis is established. It is known that most erosive changes occur within the first two years of disease onset, and this important timeframe coincides with and intuitively supports the widely accepted concept of the ‘window of opportunity’ that is discussed above. It therefore follows, that it is most important to ensure radiographs are taken at diagnosis and two years thereafter, but the consensus amongst leading clinician rheumatologists at this hospital is to have these taken every two years, as a method of establishing if the disease is progressing, especially in those with no, or minimal symptoms.

**Specific Aim 6: To develop a research registry database of patients with inflammatory arthropathies.**

The value of registry data in furthering our knowledge of diseases is well established. In the UK the British Society of Rheumatology (BSR) biologics registry database has served as an excellent resource for post marketing surveillance of widely used, new agents (Griffiths, Silman, Symmons, & Scott, 2004). Databases such as this one have the potential to follow patients and report results for a longer term to see if results are sustained, as well as to identify problems with the agent following long term use; information that is not available from randomised clinical trials (RCTs).

Registry databases also reflect the population that the drugs are being used to treat in the real world, as distinct to the highly controlled populations used in RCTs. The Nordic
countries have excellent examples of registry databases, and they lead the world in publishing in the medical literature information retrieved from these databases.

Our hospital is a world leading institution in the field of medical research, and an opportunity to record the demographics, diagnosis, drug treatments and disease activity at clinic visits of these patients in a database should not be missed.

**Specific Aim 7: To improve the level of patient responsibility for their own health.**

Patients attending out-patient clinics very often do not have a list of the medications they are currently taking, or any understanding why certain medications were commenced or discontinued. In this author’s experience which anecdotally is shared by other clinicians, patients very often completely abdicate their own responsibility for managing their illness. There is a prevailing attitude amongst such patients that the information should be known by their doctor, and is available in their chart; this despite the fact that changes to their regular medications have been made by their GP or other doctors, making the last recorded medication list available in clinic inaccurate. This makes it more difficult for the clinician to make decisions about patient management.

Promoting a sense of patient responsibility for their own health is important on a number of fronts. Patients who are better educated about their disease are more adherent to their medications, seek help earlier in the event of relapse of disease symptoms, and better manage their overall lifestyle (Becker & Maiman, 1980).
1.7 Summary

I am aware at the outset that I am already immersed in the organisation. I am an integral participant in the process being studied. I can therefore be considered to be ‘enquiring from the inside’ (Evered & Louis, 1981). However, I have had no hand in developing how the service evolved or was planned to be delivered. This certainly means that I have knowledge of the organisation and the system. Essentially, this is an action research endeavour, and it will build on experience by others in Irish hospitals (Coghlan & Casey, 2001).

The importance of doctors actively engaging and developing leadership skills has been discussed above, and this project will undoubtedly demonstrate this and encourage other doctors to do the same.

This change management project fits with the overall mission and strategy of our hospital to ‘achieve...and maintain excellence in healthcare delivery’ as well as the HSE’s expressed vision;

Everybody will have easy access to high quality care and services that they have confidence in and staff are proud to provide.
Chapter 2: Literature Review

2.1 Introduction and Search strategy

This literature review is necessarily targeted at specific aspects of the change project. There is a strong emphasis on looking at how others have approached the task of improving efficiency in out-patient tertiary referral centres, since therein lies the main focus of this project. Most of these endeavours fit neatly into the Donabedian’s description of the three measurable components of healthcare delivery that are measurable, and set about making changes to one or more of these parameters (structure, process and outcome) (Donabedian, 1988).

An integrative exploration methodology was used to establish current knowledge, and to identify, and critically appraise relevant research, as well as to collect research findings on similar subjects. Six electronic databases were searched: PubMed, Medline, Cochrane, the Kings Fund, National Quality Forum and OMERACT.

Key search term used was “out patient clinic efficiency” across all databases which returned 283 results (243 in PubMed). All abstracts were reviewed and those found to be relevant were accessed.

It became clear early that this subject has been widely studied, but the emphasis of the current research is on strategies that differ from the focus of this project.
2.2 Patient experience

Much of the literature from the United States (US) focuses on decreasing patient waiting time, whereas the focus of this project is on reducing physician time spent with the patient. Furthermore, the US model of healthcare delivery emphasises patient choice and competition between service providers. A marketing expert in healthcare explains;

*Health care is never going to be the same. Clinical expertise is expected. It’s not a brand differentiator. The differentiator is creating an experience that you can own.* (Stempniak, 2013)

Therefore, competing hospitals in the US feel compelled to differentiate themselves favourably, but are mostly run as businesses, seeking efficient and profitable healthcare delivery. There is clear evidence to demonstrate that as patient waiting times go up, patient satisfaction goes down (Stempniak, 2013). Certainly it seems experience in the US suggests that patients are shopping around to see what wait times they should expect. It is likely for these reasons that the focus of US research has been on patient experience.

It should be self-evident that patient satisfaction matters when it comes to implementing a change designed to increase the efficiency of an outpatient department?

The picture might be considerably different in other healthcare delivery models. In the UK, a survey of patients attending 3 different clinics involved in managing chronic diseases that included rheumatology (the other two were a HIV clinic, and a diabetes clinic) was undertaken. The researchers used a set of three simple, open questions and reported the views expressed by 147 patients. They found that shorter waiting times and cheaper car parking came up most frequently as sources of dissatisfaction (Land, Jobanputra, Webber, &
Ross, 2012). Although healthcare delivery in Ireland is based on a hybrid of that of the UK and the US, it is likely that rheumatology patients in our clinics would express the same views. However, shorter waiting times are a recurring theme when patients either side of the Atlantic are asked about what is important to them.

The thrust of this project will be reduce the time the patient spends with the doctor, in order ultimately to see more new patients, but it will likely have a positive effect on patient waiting time.

The issue of patient satisfaction at out patient clinics is included in this literature review, because the subject is so well represented in literature searches that its omission would be to ignore an important aspect of the work already done.

2.3 Diagnosing the problems

Efforts at improving efficiency in medical clinics universally begin with identifying problems causing inefficiency. Technology has been used in varying forms to assist in establishing the problems. The example of a clinician having to wait for the availability of an X-ray machine is cited (Stempniak, 2013), and was uncovered by a process of tagging clinicians and patients in an emergency department with electronic devices designed to record their positions.

Other roles for novel technology find their roots in process mapping (Damelio, 2011), but advance this to levels of data complexity suitable only for computer interpretation. Parks discusses the role that discrete-event simulation may have in testing the impact of decisions to change a process or structure on a computer model before executing the change (Parks, Engblom, Hamrock, Satjapot, & Levin, 2011). They diagnose inefficiency, then create and
test potential strategies for improvement in a cost-effective manner, exclusively using a computer model. The study they report occurred in an adult medicine clinic within a large, tertiary care, academic medical centre, which is very similar to the environment this project occurs in.

The use of simulation predicted that matching resources to excessive demand at appropriate times for the administration of medication and check-out steps would reduce patients' mean visit time from 124.3 minutes (Standard Deviation (SD) +/- 65.7) to 87.0 minutes (SD. +/- 36.4), though why a simulation was required to see and calculate this is not at all clear (Parks et al., 2011).

An approach such as this is likely of more utility in a more complex and larger clinic system to the one in which the project that is the subject of this dissertation takes place. Nevertheless, it demonstrates the effectiveness of this strategy in integrating the various processes of information gathering, process mapping, data collection, model creation, and the generation of results without the need to hire external (and presumably expensive) consultants, although the cost of the software is not discussed.

One significant flaw of this piece is that it does not relate the predictions to implementation in reality, though its merits may lie in its ability to predict problems that the imaginations of the leaders and managers had failed to conjure.

Another novel attempt has been made at utilizing computer simulated models of clinics, this time focused on the development of an algorithm that would provide for time for the patient to have the necessary and appropriate pre-clinic activities, without contributing to their waiting time (Huang, 2013).
This is attractive and may be somewhat relevant to the project at hand, since the timing of testing, and the gathering and displaying of results, are all issues the project seeks to address. Although with extremely small numbers, they show that reductions of between 5 and 10% in patient waiting time is possible, though once again, the focus of the project herein is to reduce physician time per patient, not the time taken for a patient to finish their clinic visit.

2.4 Identifying problems allows potential interventions to be discovered

With the primary goals of publishing a methodology that can be used to analyse an outpatient endoscopy unit’s efficiency, implement targeted interventions to operational protocols, and assess the effectiveness of these changes, Kaushal’s group studied 2,248 patients who underwent of 2,713 procedures (Kaushal, Chang, Lee, & Muthusamy, 2014). The group identified the rate-limiting step as being the shared 10 bed pre-procedure recovery room.

They targeted this problem by diverting patients from this bottleneck before procedure by implementing ‘a dynamic room-allocation strategy’, changing nursing allocation duties, and patient arrival times. Their main metric was the total completion time (TCT)- the time from beginning of procedure to end.

On-time procedure starts increased by 51% (p < 0.001), and TCT was reduced by 12.2% (p< 0.001) across all cases studied. Overtime and nursing costs reduced by 30% (Kaushal et al., 2014).
This was a very well conducted biphasic prospective study, conducted in an endoscopy suite in California. The data was collected thoroughly and has relevance to the project described in this dissertation because it demonstrates the merit of identifying the rate-limiting step in a clinical process, and the results of interventions designed to circumvent this difficulty. We have identified the rate-limiting step to be the acquisition of appropriate results to inform management decisions in clinic.

2.5 Managing new referrals

Schoch describes the experience of an orthopaedic clinic at Barwon Health where the service was experiencing an increase in new referrals (often without appropriate conservative measures before referral), inefficient triage of these referrals, long waiting times for appointments, and high 'Did Not Attend' (DNA) rates (Schoch & Adair, 2012).

They adopted several strategies including the introduction of triage guidelines, a DNA policy, and role for an orthopaedic nurse. This multi-faceted approach resulted in a 66% reduction in the number of patients waiting for their first appointment, an 87% reduction in the waiting time from referral to first appointment and a 10% reduction in new patient DNAs.

The focus in this report was on first visit and the referral process. The discipline of orthopaedics is considerably different to that of rheumatology and the nature of the chronicity of the illnesses seen in rheumatology clinic makes efficiency of follow-up patient visits much more important that the efficiency of first visit to the speciality. This is in contrast with the workload of the orthopaedic surgeon, were patients only attend once or twice to clinic.
It is also difficult to determine precisely which interventions were responsible for the positive outcomes reported, and to what extent these could be transferable to a project designed to make the follow-up visit of patients more efficient in a rheumatology setting.

A Spanish study set about identifying the characteristics of an early arthritis unit (EAU) that were associated with ‘a better referral efficiency’ (Villaverde, Descalzo, Carmona, Bascones, & Carbonell, 2011). EAU had delivered education to the largest referral source (GPs), in varying ways. The group conducted structured personal interviews with the heads of the 36 EAU included, and thus collected information about the characteristics of a ‘good’ referral pathway (taken to be a measure of agreement between what the GP believed to be inflammatory arthritis, and the opinion of the centre).

Some interesting results were identified in this study. The number of inappropriate referrals varied widely between centres (0-80% SD 38+/21%). Only 39.4% of centres made contact with primary care physicians who were referring inappropriate patients, and this intervention was the only one identified as statistically significantly associated with a ‘good’ referral pathway.

Interestingly, no variations of how the GP education sessions were delivered (number of sessions, grade of instructor, site of education), reached statistical significance in achieving the primary outcome.

This study analyses the effects of attempts to ensure more appropriate referrals are being made to rheumatologists, and therefore reduce the time these patients then spend on a waiting list before seeing a the appropriate specialist. It targets referral pathways, and in this sense is not directly relevant to the project proposed herein. However, it illustrates
some of the strategies already explored in increasing the effectiveness and efficiency of the rheumatology IA clinic.

It is useful to know that they were unable to show that educating GPs made any difference (although whether this is transferable to an Irish setting, and whether the numbers were too small to demonstrate this remain unanswered questions). It would seem clear that, on the basis of this data, attempts to increase the efficiency of clinics should not include investing time in educating the referral source. They might well focus on attempts to fast-track the visit of returning, diagnosed, patients (as this project proposes). Although there may be a role for communicating with GPs following receipt of inappropriate referrals, this will be beyond the scope of the project herein.

Other routes to shortening the waiting time to see a rheumatologist specialist have been explored. Immediate Access Clinics (IAC) represent a variation of the theme of EAC. Here patients are seen within a few days of first referral by a primary care physician, but only for a brief session.

An Austrian group assessed 1,036 patients both at presentation to this clinic 660 were available to be reassessed after 6-12 months (Gartner et al., 2012). Initial tentative diagnoses were confirmed in over 75% of patients suspected of having rheumatoid arthritis (RA). The positive predictive correctness of the assessing rheumatologists regarding the presence of inflammatory rheumatic conditions was over 75%. Those with RA cared for in this clinic setting had substantially lower pain levels after 6-12 months' follow-up than patients treated elsewhere.
Therefore, varying approached at making the referral process itself more efficient, result in efficiencies and better quality of care across many parameters.

2.6 Reducing the DNAs

Attempts have been made to determine the financial cost of DNAs. One group used a discrete-event simulation model to examine the effect of DNAs on the use of an endoscopy suite (Berg et al., 2013). They presented their results based on a complex revenue/cost analysis applicable mainly to the healthcare system in the United States, but nevertheless it is reasonable to cautiously translate the overall effect to clinics in Ireland.

They understood the level of DNA to be around 18%. They show that the expected net gain with perfect attendance should be $4,433, but losses due to DNA is currently $725 (16.4% of net gain). Overbooking by 9 additional patients per day resulted in no loss in expected net gain when compared with the reference scenario. They conclude that overbooking can help mitigate the impact of no-shows on a suite's expected net gain and has a lower expected cost of implementation to the provider than intervention strategies.

A key weakness in this work is the lack of confirmation of this intervention on clinical practice. Nevertheless, it provides an estimate of the cost of DNAs expressed in terms of expected loss of revenue to an endoscopy unit. Is the loss of productivity in Irish public clinics close to 16.4% due simply to DNAs?

Furthermore, it is understood that the rheumatology service clinics are already very heavily overbooked, and the rather simple strategy of scheduling extra patients will not work in this setting.
In the context of a urology referral centre, an Irish group identified 148 patients (20%) who did not attend their scheduled appointment over a two month period (Hennessy, Connolly, Lennon, Quinlan, & Mulvin, 2010). 47 of these were new patients (never before seen in this clinic). 78% had a benign condition, and the authors argue that a strategy to discharge these patients after one unexplained non-attendance may help reduce the burden of wasted appointments.

But is there anything to be done to mitigate against non-attendance? Reti conducted a randomised controlled trial to determine whether DNAs could be reduced by telephone reminders, and whether there was a difference in attendance if the call was from a hospital or a general practice (Reti, 2003). They showed that the rate was 3% for those who received a call from a GP, 8% (hospital call), and 27% (no call). There was a difference between those who received a call and those who did not, but the source of the call did not yield a significant result.

A recent Cochrane review on the use of mobile phone text messaging reminders for attendance at healthcare appointments has been published (Gurol-Urganci, de Jongh, Vodopivec-Jamsek, Atun, & Car, 2013). They included 8 RCTs assessing mobile phone messaging as reminders for healthcare appointments, only including studies in which it was possible to assess effects of mobile phone messaging independent of other technologies or interventions. They found moderate quality evidence from seven studies (5841 participants) that mobile text message reminders improved the rate of attendance at healthcare appointments compared to no reminders (risk ratio (RR) 1.14 (95% confidence interval (CI) 1.03 to 1.26)) and that mobile text message reminders had a similar impact to phone call reminders (RR 0.99 (95% CI 0.95 to 1.02).
But why worry at all about those who don’t attend? Conventional wisdom would dictate that wasted appointments result in inefficiency, but this assumes that another patient could have been accommodated in this slot, and that, by extension, the physician is left idle during this time. This bears no relation to the facts of the matter in relation to this project. Clinics are routinely overbooked, the DNA rate is approaching 20%, but the clinics are still finishing consistently over one hour late. Therefore, interventions to improve clinic efficiency that target no-shows would likely have a negative effect on clinic efficiency in the context of this project. Indeed, many physicians (rightly or wrongly) believe that those who DNA are usually doing well, and are therefore a self-selecting cohort, that ultimately make the clinic more efficient by not showing up.

Following on from this but sticking with the theme of patient behaviour, a group of researchers found that patients who presented on-time had a longer wait time once in the exam room for the physician than those that were late (14.8 +/- 9.2 minutes versus 11.0 +/- 8.4 minutes, p<0.005) (Okotie, Patel, & Gonzalez, 2008). However, those patients spent a significantly longer time with the physician (10.7 +/- 6.0 minutes versus 8.9 +/- 5.8 minutes, p<0.05). Patients learn quickly.

2.7 Lean Six Sigma

Other interventions have focused on eliminating non-value added processes and reducing variation to improve patient flow through tertiary clinics. Lin et al used Lean Six Sigma
principles in an otolaryngology clinic, conducting a prospective observational study and reported their findings (Lin, Gavney, Ishman, & Cady-Reh, 2013). They identified the key performance indicators to be; overall lead time from patient arrival to start of interaction with care provider; proportion of patient visits starting on time; and the ability to minimise the movement of both staff and patients (which was seen as a rate limiting step).

They began by mapping patient flow through the clinic, including pre-registration processes. They observed times of 188 patient visits over 5 days, from registration to the next steps in patient flow. Observing Lean Sigma principles, they analysed this data to identify patient flow constraints and areas for potential interventions.

Interventions were targeted at the main tenet of Lean Six Sigma following consultation with key stakeholders. They eliminated non-value added registration tasks, and changed staff hours to better fit with times of high and low patient turnover. They then conducted a post-intervention observation study of 141 patients 5 months later.

They managed to demonstrate that by adapting and applying Lean Six Sigma principals to tertiary out-patient clinics, that clinic arrival to physician start time decreased by 12.2%, on-time starts for patient exams improved by 34%, and, curiously, ‘excess patient motion was reduced by 74 feet per patient’ (Lin et al., 2013).

In a different but still clinical context, researchers applied Lean Six Sigma principals to a patient flow in a busy phlebotomy department (Melanson et al., 2009). The result was a reduction of average patient wait time from 21 to 5 minutes, with the goal of drawing blood samples within 10 minutes of arrival at the phlebotomy station met for 90% of patients. The results were sustained for at least 10 months of follow up.
In a urology out-patient setting, other researchers arrived at some interesting findings, using Lean Six Sigma. The average length of the physician assessment increased from 7.5 minutes at baseline to 10.6 minutes at 90 days following implementation of Lean Six Sigma principals (Skeldon et al., 2014).

This result is at odds with the objectives of the project outlined here, where a reduction in physician-patient face-to-face time is sought. However, the authors describe that by reducing the non-value added processes, the average proportion of value-added time compared with the entire clinic visit increased from 30.6% at baseline to 66.3% at 90 days.

In relation to the project in this dissertation, this work has demonstrated the importance of process mapping, engagement of leadership and staff, and elimination of non-value added steps or processes were key to improvement. It also highlights the value of innovation, and recognised the portability of models used in manufacturing to a very different setting.

2.8 Training as Intervention

Interventions aimed at increasing quality and safety often also have consequential positive effects on efficiency. In the oncology out-patient environment, a group sought to address four key risk areas identified initially by staff interviews and analysis of incident reports, by implementing a specific team training initiative (Bunnell et al., 2013).

Not only did this have the expected effect on the safety and quality parameters analysed, but it also improved efficiency by between 75 and 90%. Some of this may be accounted for a fundamental change in culture at the organisation as a direct result of the intervention.
(more respectful behaviour and improved relationships among team members were nearly
universally reported).

Culture is very important in an organisation, and has a dynamic role, both in setting the
backdrop against which change is to be introduced, as well as effecting the path of the
change itself (House, Hanges, Javidan, Dorfman, & Gupta, 2004).

2.9 Delivery-centric

Many measurements in health management suffer an element of outcome-bias (Bell et al.,
2006). The nature of interventions by leaders and managers is heterogeneous. Cady et al
argue that a paradigm shift is necessary when analysing what they call ‘delivery-centric’
outcomes (Cady & Finkelstein, 2012), where the focus is on physician workflow, which has
become increasingly important (Lapointe, Mignerat, & Vedel, 2011).

Here, the outcome is not a clear result expressed in terms of Quality Adjusted Life Years
(QALYs) or on clinically defined endpoints, but focuses on an improvement in how
physicians work. They have devised a mixed methods protocol which they argue can usefully
be applied to evaluating such interventions. In their article, they give an excellent example
of the applicability of this model.

The methodology is very thorough and necessarily cumbersome, but using it to measure
interventions such as the one in this study would require resources beyond those available.
Furthermore, the model is not formally validated and its widespread applicability is not
known. However, their work highlights the belief amongst some authorities that selecting
outcome measurement to evaluate the success or otherwise of interventions designed to improve how physicians work are often inappropriate.

### 2.10 Process Improvement

Another study evaluated all aspects of workflow in a large academic Magnetic Resonance Imaging (MRI) department to determine whether process improvement (PI) efforts could improve key performance indicators (KPIs) (Recht et al., 2013).

Key performance indicators relevant to an MRI department were established, and over a 3-week period in April 2011, all aspects of patient flow through the department were tracked. They implemented several process improvements designed to impact on patient flow, and measured the KPIs before process improvement and after. Universally they found statistically significant improvement in all KPIs.

The authors also interestingly mention ‘......in addition [to the changes in KPIs] a new sense of teamwork and empowerment was established within the MR staff’. Again we witness the importance of culture in an organisation (House et al., 2004), and in this study we recognise the positive change to culture brought about by process improvements. It is also interesting to note that the group measured the improvements a full three months after implementation of the interventions, which may have relevance to the project outlined here.
2.11 Medication Reconciliation

Little is to be found in the literature on delays caused to physicians during follow up appointments due to the necessity of reconciling medications. Perhaps this is because most research in clinic efficiency emanates from the US where physicians are likely uninvolved in this process. There is a paucity of data in this area, but an interesting study looked at how nurses involved in admissions to an emergency department considered the effect of this challenge on their workload, and their opinions on potential process improvement intervention to deal with this difficulty were sought (Candlish, Young, & Warholak, 2012).

Nurses reported times to complete the medication reconciliation to range from zero to more than 20 minutes, and they indicated that this depended on patient's medication knowledge and the complexity of the regimens. A number of potential solutions to this problem were identified but they are only relevant to the context of the emergency department. It is likely that this problem is even greater in the emergency department where patients are making unplanned attendances and may not have time to take medications or a list of them with them to the hospital. This is not true for scheduled outpatient appointments, and process improvements in this context should be easier to introduce.

2.12 Electronic Health Care Records

Another group tracked the actual implementation of a new Electronic Medical Record (EMR) within the outpatient clinics of a large US research hospital, reporting on physician satisfaction, but not specifically on efficiency outcomes (Vishwanath, Singh, & Winkelstein,
2010). They did however include physician’s perceptions on efficiency in patient processing, among many other variables, via survey. They found that the perceptions of physicians before implementing EMRs was highly predictive of their perceptions reported after they were introduced.

Five year follow up data is available for the implementation of electronic healthcare records, used to record patient details, but also to prescribe medication (Brockstein et al., 2011). This data is very impressive in improving efficiency, patient safety, and research productivity. It also allows evaluation of adherence to established quality measures.

The potential benefits of a single electronic medical record for each patient in Ireland is limited only by one’s imagination, and certainly would address more than just medicine reconciliation problems, as patients attend different hospitals separated only by a few kilometres. This would also likely decrease repeat testing as results from any given institution are available to any other institution at any given time. Efforts at introducing this have been frustrated by concerns about data-protection in Ireland, but this solution to increasing out-patient efficiency is far beyond the scope of this project.

2.13 Contact Avoidance

Other innovative solutions have been developed and tried where basis for intervention is found in attempting to circumvent the need for a face-to-face meeting with the patient in delivering tertiary care. Certain disciplines lend themselves easily to such an innovation. An example of this is a teledermoscopy service in dermatology. The efficiency of remote dermoscopy (where defined high resolution images of skin lesions are obtained out of
hospital and reviewed by a dermatologist afterwards) and an assessment of patient acceptance of this was assessed by a New Zealand group.

They reviewed 300 consecutive cases, where 200 patients attended remotely (run by nursing staff) and 100 attended conventional face-to-face clinics. Of those attending remotely, only 12% required subsequent face-to-face clinic contact to establish a diagnosis. Mean waiting times for first assessment were reduced by two thirds, cost savings of 14% were achieved and patients were on the whole ‘highly satisfied and confident’ in the remote service (Lim, Oakley, & Rademaker, 2012).

A group in Bradford, UK, utilized electronic consultation to reduce the burden of face-to-face clinic visits for patients with chronic kidney conditions, and reported the comparison with conventional consultation across a number of parameters (Stoves et al., 2010). They found that GPs reported that the service was convenient, provided timely and helpful advice, and avoided outpatient referrals. Specialist recommendations were well followed, and GPs felt more confident about managing chronic kidney disease in the community. This strategy helped address the problem of inappropriate referrals from GPs which can account for 8% of clinic workload (Bromage, Napier-Hemy, Payne, & Pearce, 2006).

Although the discipline of neurology less readily lends itself to this model, attempts have been made to reduce face-to-face first contact with patients by triaging potentially appropriate referrals into a category that might be first assessed remotely (Cariga, Huang, & Ranta, 2011). The group were able to channel 20% of over 1,100 referrals to this type of assessment. This methodology resulted in delayed diagnosis in only 1.35% of patients, and the rate of re-referrals were high (11.26%).
Since rheumatology share some features with neurology with respect to the importance of clinical examination of the patient, it is likely that a similar project in rheumatology would experience the same difficulties seen in neurology. It may be that remote clinics are better suited to dermatology, pathology and radiology were patient contact is less crucial.

So, avoiding face-to-face clinics may have a role in certain settings, however an attempt was made to systematically analyse the appropriateness of telephone follow up for patients discharged from hospital following surgery (Thompson-Coon et al., 2013). Five papers met the inclusion criteria but unfortunately the authors of the review determined that the studies were of low methodological quality, and reported dissimilar outcomes. They therefore did not conduct a formal synthesis.

2.14 The Physician Extender

The roles of physician assistants and clinical nurse practitioners in rheumatology have been previously described and their roles are greatly expanding (Hooker, 2008). There is, however, room for further development of assistants to physicians outside of direct patient dealings. Norris et al describes a role for a scribe who shadows physicians and executes clerical tasks on behalf of the physician (Norris, Harris, & Stringer, 2011).

It may be that there is a role for a clerical worker in this project whose job would be to order the appropriate blood tests and radiographs in advance of a patients’ clinic attendance, and to display these results in way such that they are immediately available to the physician when reviewing the patient at their scheduled appointment.
2.15 Conclusion:

Multiple strategies have been employed in seeking the more efficient delivery of outpatient care. Perhaps the most relevant research to the project detailed herein comes from an Irish group of gastroenterologists.

The group performed a retrospective chart review of 329 consecutive patients attending a clinic over a 2-week period, and categorized them into new or follow-up attendees (Donnellan, Harewood, et al., 2010). Follow-up patients were further subcategorized into one of four groups:

A) Attending to receive results of investigations requiring no further treatment;

B) Attending with a chronic gastrointestinal disease requiring no active change in management;

C) Attending to receive results of investigations requiring further treatment;

D) Attending with a chronic gastrointestinal disease requiring active change in management.

They identified 12% and 18% of follow up visits to belong to category A and B respectively. Based on the assumption that group A could be managed by phone follow up, and group B by review with a physician assistant, they argue that there is an opportunity to pre-screen charts before clinic.

To further develop this, they then set about reducing unnecessary outpatient attendances by having senior clinicians actively pre-assessing patient charts (before clinic visits) and pre-specifying management plans (Donnellan, Hussain, Aftab, & McGurk, 2010). A significant reduction in clinic sizes by about 40 per cent can be achieved, by cancelling these
appointments or including a plan to discharge if the patient is well on review. There was a non-significant increase in the ratio of new to review patients and no significant reduction in waiting lists.

This work is not dissimilar to the project outlined here. The setting is nearly identical to that of this project, and the focus is on return patients, where there appears to be a paucity of literature. The rate-limiting step in this incidence would be obtaining access to the patient’s charts two-weeks before they are due in clinic. It is cumbersome to trawl through patients charts, results that inform clinical management decisions may not be to hand two-weeks before the visit, and this strategy would not achieve the aim of encouraging patients to take more responsibility for their care.
Chapter 3: Methodology

3.1 Selecting a change model

What almost everyone would like is a clear and practical change theory which explains what changes organisations need to make and how they should make them. (Burnes, 2004)

Most change is triggered in an unpredictable manner by an organisational crisis, and because of this, the response to the change is often reactive (De Witt & Meyer, 2005; Nelson, 2003). There are models to deal with all types of changes and it is difficult to attempt to account for all change projects in all organisations with a so-called ‘one size fits all’ model (Burnes, 1996). Indeed, it has been proposed that managers, (and presumably leaders), should be prepared to choose or develop models to suit a particular need in a particular situation (By, 2005). Nevertheless, a roadmap to assist the change process should be selected at the outset.

Barbara Senior has usefully advocated examining three categories for change by; of rate of occurrence, by how it comes about, and by scale (Senior & Fleming, 2006). This allows for the application of some methodology in selecting a change model that might be suitable for this project.

The project was designed to be;

1. Planned by defined timelines without major significant deadlines, where missing a deadline of would mean the project has failed,

2. initiated in a very controlled manner, inspired by the triggers for change outlined in chapter 1,
3. and of a scale that is manageable, by an NCHD with such authority as has been delegated.

It therefore follows, that the change model selected should be appropriate for this type of change project. Using these criteria, two models were considered to be appropriate.

The Burke-Litwin model (fig. 1) provides a way of thinking about planned organisational change by reference to an organisational framework that uses systems theory in action (Burke & Litwin, 1992).
It is impossible to deal with the complexity of this model and others in the scope of this submission, but in essence it distinguishes between ‘transformational factors’, which it names ‘leadership’, ‘mission and strategy’ and ‘culture’ (as examples) as well as ‘transactional factors’ which it refers to as ‘management practices’, ‘structure’, ‘systems’, and ‘motivation’ (again as examples only).
The benefit of the Burke-Litwin model, is that it accounts for a great deal of complexity in a way that is reasonably easy to understand, and therefore provides a good starting point for commencing planned change. But using a model as complex as this for a very defined project with few influential stakeholders and protagonists, would likely be too cumbersome.

The author favours a particular hybrid of models developed by, and for, the Health Service Executive (HSE, 2013) and depicted in figure 2. This model has been developed by experts in change management after consideration of a great deal of the literature. It has been devised in the context of an understanding of the specific culture in which the provision of health service takes place in Ireland. As it is not nearly as complex as the Burke-Litwin model, it is easier and more practical to use.

**Figure 2: The HSE Change Model (2013).**
The Burke-Litwin model would likely more thoroughly and accurately account for the complexity of the environment, but this author believes that this would be more suitable for examining the environment and change from an academic point of view (as distinct from an action-learning point of view). It is expected that the loss of some of this accuracy and complexity will result in quicker decisions and implementation of changes.

The HSE’s Change Model is dynamic, and takes the best from both the planned models, and systems models, without allowing the model become too unwieldy.

Furthermore, the support tools provided by the HSE to assist managers and leaders using their model are readily accessible.

3.2 Change and Leadership

But what is meant by change?

The process of continually renewing an organization’s direction, structure, and capabilities to serve the ever-changing needs of external and internal customers. (Moran & Brightman, 2001).

Without constant change, organisations would ultimately fail, and even disappear (L. Johnson & Luecke, 2005; Okumus & Hemmington, 1998). This change allows the organisation to adapt to the environment, which itself is undergoing constant change. It is known that approximately 70% of change projects fail (Balogun, Hailey, & Johnson, 2008). With this in mind, the strategy used to implement the change here, will use much theory, in an effort to ‘learn the easy way’, and hopefully raise the chances of success above 30%.
Raising the chances of the project’s success begins with planning, and learning from others who have studied, researched, and written about change in organisations. Studying change in organisations is such that observations over a long time in many circumstances by authorities, is the closest we have to empiric and scientifically collected evidence (Guimaraes & Armstrong, 1998). The scholar of change in organisations is left in no doubt that change is very challenging (indeed Brendan Drumm entitled his revealing book detailing his time as CEO of the HSE “The Challenge of Change” (Drumm, 2011)).

Change is happening all the time and in every aspect of the way healthcare organisations function. It is happening in parallel to planned change, initiated in a careful, structured and controlled manner. In most organisations, but especially in hospitals, it is not possible simply to pause the evolutionary changes that are occurring in the organisation, so that a significant change can be introduced. There are a number of potential challenges common to the introduction of change projects in all organisations as well as ones that are particular to this project in this setting. It is necessary to identify these challenges and devise strategies to circumvent them.

Kotter, as well as others attribute the lack of success of 70% of change projects to a leadership deficit in the process of steering change (Hammer & Champy, 1993; Kotter, 1990). It is therefore recognised that leadership is important to the successful introduction of change. Some authorities have even attempted defining leadership (a term difficult to secure consensus definition of) in terms of change (Eisenbach, Watson, & Pillai, 1999).

The various leadership theory models have been discussed elsewhere (Gill, 2012). There is a trend towards studying the subject of leadership with complex theories as distinct from the trait approach. An all unifying theory is not yet available, but would almost certainly include
elements of trait theory as more evidence is gathered that heritable characteristics contribute significantly to one’s leaderships style if not potential (A. M. Johnson et al., 1998). That said, there is a heavy focus on the models of transformational and authentic leadership (Luthans, Norman, & Hughes, 2006). One reassuring consequence of the trend toward the transformational and authentic leadership models in our understanding of leadership, is the recognition that a leader does not necessarily need to have all skillsets and qualities mastered (Ancona, Malone, Orlikowski, & Senge, 2007; Bass, 1985).

The complete leader is seen in he who recognises his own shortcomings and utilises all available talent to achieve the shared goal of the organisation. Furthermore, it is appropriate to adapt leadership styles to the given situation, and this apparent ‘inconsistency’ should be valued, as recognised by the trend towards complex leadership theories.

If a single skill could be identified in the leader in an Irish healthcare setting, it might be resilience. The identification of resilience as a key requirement for those wishing to further positively develop the environment they are working in (Allison, 2012), makes it imperative that as the change champion, the author works towards developing this.

The leader of the change project needs to be aware of how the project is anticipated to impact on the duties, workload and feelings of the involved parties, but needs to remain alive to the probability that, as the project is dynamic, in a workplace of flux, these may change several times.

A first principal of this proposal will be promoting engagement through clear and regular communication. Increasing engagement amongst doctors and nurses has been proven to
improve patient safety (Laschinger & Leiter, 2006). The author knows from experience that there is evidence of ‘change fatigue’ amongst the main protagonists, and recognises that giving explicit recognition that this change itself is occurring on a background of a great deal of other changes elsewhere is important.

It is probable that performance is lost by an organisation by departing from routine during periods of change and it was argued that people need routines to be effective (Luecke, 2003). However the pendulum has since swung, and there is a consensus now that change is associated with more innovation and dynamism, as well as being better able to meet the aspirational needs of the people working in the organisation (Burnes, 2004). The recent emphasis in leadership literature on transformational leadership supports the view that assisting employees reach their potential is important.

3.3 Planning: Determining the detail of the change

To assist in setting the objectives, the widely used acronym SMART was used (Doran, 1981). This was used to focus the change project on achieving a manageable goal in a specified timeframe. Seven key, and very specific objectives were distilled, as outlined below;

**Specific Aim 1:** The primary aim is to decrease the time physicians spend with inflammatory arthropathy return patients.

**Specific Aim 2:** To see more new patients in clinic suspected to have an inflammatory arthropathy by their General Practitioners (GPs).
Specific Aim 3: To perform a standardised and validated measurement of disease activity for all IA patients, to assist with treat-to-target recommendations.

Specific Aim 4: To increase the quality and standardisation of the patient’s clinic visits by focusing physician attention to addressing the common concomitant illnesses with inflammatory arthropathies, namely osteoporosis and cardiovascular disease.

Specific Aim 5: To increase the proportion of patients acquiring staging hands and feet plain radiographs every two years in compliance with the defined consensus of consultant rheumatologists at the hospital.

Specific Aim 6: To develop a research registry database of patients with inflammatory arthropathies.

Specific Aim 7: To improve the level of patient responsibility for their own health.

Each were measurable (except the seventh), and thought to be both realistic and achievable within the specified timeline for the project.

3.4 Developing the implementation plan

The SWOT analysis (Andrews, 1997) assessed the current situation, and assisted in determining the change detail, outlining current supporting structures. A four page pro-forma (fig. 3) was developed and approved by the key consultant. This was posted to patients approximately two weeks before their scheduled clinic appointment. Patients were
to return to clinic with this form completed, and to bring the form with them. This was all explained to patients in an accompanying letter (fig. 4).

The pro-forma was ultimately to undergo eight drafts before the final version presented here. It changed frequently during the projects piloting time. This pro-forma included all the required parameters to calculate the DAS28-CRP. It also collected information about the patient’s initial presentation of arthritis, as well as other details such as smoking history, that would be useful to the registry. It was designed such that the patient could understand and complete the first three pages, and the final page was for the doctor to complete in clinic.

Part of the final page included blood results for the patient, some of which may have been available before posting the form, and where this was the case, it was completed before posting.

In order to prepare each pro-forma for posting, the patient’s blood results were accessed through the hospital’s laboratory database. If the patient had an ESR and CRP within the last two weeks (and so within four weeks of their clinic visit), it was accepted that this likely represents an accurate result for the purposes of their clinic visit.

If the results for these blood tests were longer than two weeks ago, new blood ordering forms for these tests were prepared (fig. 5) and sent to the patient with the pro-forma. If the blood results were abnormal, repeat tests were ordered to assess the trend. For rheumatoid factor (RF) and anti-citrullinated antibodies ACPA, these tend not to change, and if they were processed at any time for a given patient, their results were recorded in the
pro-forma before posting it. Where these results were not available, a blood form requesting them was completed.

The last set of hand and feet plain film radiographs were identified for each patient by searching the hospital’s radiology database. If they were performed anytime within the last two years, they were recorded as such, but if not, they were ordered on the required hospital form, and enclosed in the packet posted to the patient (fig. 6).

The final page of the pro-forma also included boxes the doctor was asked to tick during the clinic visit to ensure that the concomitant morbidities of osteoporosis and cardiovascular risk factors were addressed appropriately.

An accompanying generic letter (fig. 4) was written for the patient and again the approval the key consultant was obtained. The sections in this letter relating to blood tests and radiographs were deleted as appropriate for individual patients, before being posted to the patient.

The patient was responsible for completed most of the pro-forma (all but the last page). There were sections for current medications and their doses for arthritis, current medications and doses for other conditions. They were also asked to record previous medications tried for their arthritis, the time they were commenced, the time they were discontinued and the reason for discontinuing. It was expected that this alone would significantly reduce the time required for consultation. Furthermore, it encourages the patient to take more responsibility for their own health. The questions on smoking and the visual analogue scale also provide the patient with thought provoking questions concerning their health and their arthritis.
A discussion was held amongst all the consultants about whether the present project required ethical approval by the hospital’s ethics committee. The consensus was that, since the patients were receiving no treatment or tests above those that are part of current best practice and since the change was very unlikely to cause problems to patients, there was no requirement to seek ethical approval for the project.

The steps involved in this process are presented in the process map in figure 7.

### 3.5 Identifying challenges and building commitment

The type of stakeholder analysis proposed by Mitchell (Mitchell, Agle, & Wood, 1997) was used in the planning stage to assist in identifying the key players. Time was given to addressing known ‘political’ issues that for privacy purposes cannot be discussed further in this submission. There can be no underestimating the complexity of the political environment that this change was to take place in, and clear, authentic, communication was prioritised. As it was necessary to build a broad network of support, this began well in advance of the proposed date for implementation.

Tools such as risk-analysis, force-field analysis assisted in identifying potential problems and solutions at the planning stage. These were aimed at identifying potential barriers to change, and the concerns that stakeholders may have. It was hoped that the scale of the project, and assurances provided to secretaries, nurses and doctors, will mean that the staff will not feel overwhelmed.
As the author and change agent is a medical doctor, there were, at the very outset, problems specific for the author having just recently moved to this new appointment. In the first instance, the culture of the hospital is very different from that were most of the authors clinical experience comes from. The dynamics and relationships within the department of rheumatology were also unknown to the author, and it requires time to become familiar with this. The way clinics are run at our hospital is also different from the authors experience elsewhere. For example, attempts are made in organising clinics such that the patients all have a specific diagnosis category, e.g. inflammatory arthritis, connective tissue disease or vasculitis. In other hospitals, clinics are a mix of all rheumatology diseases.

In the risk analysis, it was also identified that it may be challenging for secretaries, receptionists, nurses, consultant doctors and medical records staff to co-operate fully with the new rheumatology registrar (the author). Other NCHDs presented less of a difficulty in this regard, since they too were in a similar position of rotating through various hospitals for a relatively short period of time.

The author met with each of stakeholders on an individual basis in informal meetings in the lead up to project commencement. It was felt that this would be better than attempting to sequester every stakeholder in one place and at one time (which would likely have been impossible anyway), and present a full plan for the change envisaged. Meeting each individual, was a way of understanding concerns for that individual that would not have been expressed in a larger forum, and because the number of stakeholders was small it was possible to approach the issue in this manner.

It also allowed the author to concentrate on how the project was anticipated to affect that given stakeholder. It was expected that presenting the most important aspect of the project
in terms of how the change would affect their job was a less overwhelming presentation, and was more likely to gather their support. Furthermore, it was expected that meeting individually was more likely to secure the loyalty and goodwill of the stakeholder.

During the stakeholder analysis, it was recognised that the consultants work collaboratively but nevertheless, somewhat separately. This is so for two principal reasons. At any given clinic there is only one consultant, so they only very rarely see the same patients at successive clinic visits. In addition to this, each consultant has a special interest and expertise in a given area within rheumatology, and because there is an attempt to have disease specific clinics, they tend to have responsibility for clinics of their disease interest.

In practical terms, this means that it is very much more important to engage and have the support of the consultant whose interest is in inflammatory arthropathies and early arthritis, than the others with interests in vasculitis, connective tissue disorders, and other rheumatology diagnoses. For the latter consultants, it was clear that they had high influence but little interests (since this specific project was unlikely to directly affect them). It was therefore important to have them satisfied and informed, and to monitor that the project as it progressed would not see these stakeholder move to having more interest if the change began to affect them more than anticipated.

Fortunately, the authors direct line manager is the consultant whose interest is in inflammatory arthropathies. The author and this consultant meet on a very regular basis both formally and informally. It was decided to specifically target the clinic he is responsible for to implement the project, although, since the attempts to have disease specific clinics are not complete, there would be patients returning to other clinics that would be included in the scope of the project.
In effect, full devolved authority was given to the author by this key stakeholder to implement the project. It should be noted, that his main interest undoubtedly concerned specific aim 6 (to develop a research registry database of patients with inflammatory arthropathies), which was not the principal objective of the change project, but was very helpful in securing his continued support for the project.

The NCHDs, principally the other two medical registrars had high interest but little influence, and the author was on very friendly terms with these key players. As these doctors play a key role in reviewing the patients included in this change project at clinic visits, it was anticipated that their co-operation and involvement was critical. Since the consultant leading the principal clinic was able to speak to these doctors, and the author enjoys a good relationship with each of them, securing their support was not difficult.

The secretaries and receptionists were originally identified as low interest and low influence, but later this changed to see them as having high influence. The project required their active participation, both by furnishing a list of clinic attendees two weeks in advance, as well as in posting the packages to patients. It was decided not to make contact with radiographers, but to monitor the situation, and as the project progressed it became apparent that there was no issue here.

A first principal of this proposal was to always promote engagement through clear and regular communication. Increasing engagement amongst doctors and nurses has been proven to improve patient safety (Laschinger & Leiter, 2006).

As always, there were a number of planned changes being introduced at the same time as the change project outlined here. A database known as Excellicare was being created and
intended to become a research registry, and one consultant was advocating that it be updated after every clinic visit (which would effectively mean entering the same data into both the patient’s chart as well as the database).

A new method for giving Hi-tech prescription (a specific type of prescription very commonly used in rheumatology) requiring laboriously registering each patient online with a named pharmacy- a process that takes about 15 minutes-was also being piloted. The attempts to make disease specific clinics a reality were ongoing. While these did not represent a direct threat to the project, they were competing for attention and time, as well as contributing to change fatigue.

3.6 Implementation

The author was responsible for assembling the packages to be posted to patients. In the latter stages of the project assistance in this regard was provided by an employee of UCD whose principal role was in inputting clinical data to a software database. It is necessary that a doctor be responsible for interpreting blood test results, radiographs and ordering same. In practical terms this meant staying late two evenings a week.

The system was piloted initially in approximately 40 patients, whose data do no feature in the results section. The pro-forma was adapted according to feedback from both doctors and patients. Furthermore, many parameters on the original pro-forma were not being completed by patients, and so the pro-forma was changed to better record this information.

The preparatory work for each patient took, on average, 17.1 minutes initially, and when the project was fully operational it took 14.8 minutes.
Recording the data on the registry database software took on average 5.5 minutes per patient.

3.7 Mainstreaming: Making it the way we do our business

The medical case conference occurs weekly and the NCHD’s present an interesting clinical case. It is an opportunity to have audience with all the consultants and nurses, and is probably the only forum that is universally attended. The author used his presentation at this meeting at two timepoints as the project was becoming embedded, to raise awareness once again of the project and to remind the physicians and nurses what to do if a patient arrived to their clinic visit with this pro-forma.

It was not possible to continue this project with the author completing all the preparatory work and posting the packages out indefinitely. As the project advances, the employee of UCD continues to record the dates of the last radiographs, and blood results for each patient as the list is furnished to him. A rota will be drawn up of physicians to complete the radiograph request cards, and blood request forms each week for these patients. The outcome of this cannot be assessed in this dissertation.

3.8 Evaluating and Learning

Specific aims 1 and 2. To assess if the clinic time per return patient was reduced by this change in structure and process, the clinic finish time would be noted. If successful, this would translate very meaningfully into more new patients being seen (and therefore being seen sooner) at clinic; an easily measurable metric.
Doctors were asked to record the time it took on average for a return IA patient who had not been sent the pro-forma, as well as to record the same for those who had been. This was performed near the end of the 5 month period. A determination on whether there would now be room in the clinic to accommodate extra new referrals could then be made.

**Specific aim 3.** DAS-28CRP scores would be available for all the patients involved in this new process were previously almost none had this assessed or recorded. This is very easily measurable.

**Specific aim 4.** The clinic visit will be necessarily standardised as a result of the use of the pro-forma, and it was expected to be easy to see if doctors were now addressing the common defined comorbidities, by analysing how many were indicating on the pro-forma declared so.

**Specific aim 5.** Each patient would act as their own control for the purposes of analysing the radiograph data. In respect of this, if a patient’s last set of radiographs was more than 3 years ago, it can be assumed that they have had at least one clinic appointment, and probably two, where radiographs were due, but were not ordered. This can then be compared with their compliance with the department’s policy.

**Specific aim 6.** The details of all patients would be inputted into what is effectively a registry database.
**Specific aim 7.** It was felt at the outset, that there would be no definitive way of measuring the success of specific aim 7, without either patient questionnaires or interviews. Having already completed the pro-forma, it was considered unreasonable to ask the patient to complete another set of paperwork. The aim was nevertheless an important aspect of the project, and although it was not measured, it was felt important to be represented in the list of specific aims.

**3.9 Summary**

Importantly, as recognised by the HSE Change Model, the steps outlined above were a dynamic process, and the model and plan should not be viewed in a stepwise fashion. This project like many others, evolved, and while there is a definite overarching cycle through the various aspects of the Change Model’s parameters in a reasonably consecutive manner, there has also been much vacillating backwards and forwards between each box.
Chapter 4: Results and Evaluation

Following the initial pilot phase of 40 patients, 131 patients (85 female) were sent pro-formas before their clinic visit, and data is available for these patients in the results that follow. 77 had RA (37 seropositive), 43 PsA, 2 undifferentiated arthritis, 1 connective tissue disease, 1 gout, 1 juvenile idiopathic arthritis, 4 osteoarthritis (erosive), and 2 had no diagnosis recorded.

Specific Aim 1: The primary aim is to decrease the time physicians spend with inflammatory arthropathy return patients.

This outcome proved more difficult to measure than expected. The experience of individual physicians was overwhelmingly positive, and all reported average time at clinic per patient with inflammatory arthropathy, to be decreased from an average of 23 minutes to an average of 15 minutes, as measured by questionnaires completed by involved physicians at three time-points. This however did not readily translate into the clinics finishing on time. There are several possible reasons for this and these are explored in the discussion that follows.

Specific Aim 2: To see more new patients in clinic suspected to have an inflammatory arthropathy by their General Practitioners (GPs).
At the time of writing, an attempt is being made to include an extra one new patient per clinic on the principal that there would be a man-hour saved as a direct result of the project. This should not result in longer clinics.

**Specific Aim 3:** *To perform a standardised and validated measurement of disease activity for all IA patients, to assist with treat-to-target recommendations.*

120 (91.6%), patients had with DAS28-CRP scores calculated, 7 (5.34%) did not have scores calculated because of a piece of missing essential data, and it was thought not appropriate to calculate a score for those 4 (3.05%) who had osteoarthritis.

Although not formally compared to previous practice, it is without question that only a minority of patients had this formally recorded before the project.

**Specific Aim 4:** *To increase the quality and standardisation of the patient’s clinic visits by focusing physician attention to addressing the common concomitant illnesses with inflammatory arthropathies, namely osteoporosis and cardiovascular disease.*

The boxes indicating that the concomitant pathologies osteoporosis and cardiovascular disease were addressed were ticked in all cases. However, as discussed later, this is likely a poor qualitative measurement.

**Specific Aim 5:** *To increase the proportion of patients acquiring staging hands and feet plain radiographs every two years in compliance with the defined consensus of consultant rheumatologists at the hospital.*
68/131 (51.9%) had no radiographs in the three 3 years before their clinic visit. Of the 68 who had no radiographs taken during this time, 49 (72.1%) had radiographs directly as a result of the change project. The overall compliance with the policy of obtaining staging radiographs every two years of is now 92.37%, which compares very favourably with 51.9%.

**Specific Aim 6:** To develop a research registry database of patients with inflammatory arthropathies.

All patients were entered onto a research registry database.
Chapter 5: Discussion

Specific Aim 1: The primary aim is to decrease the time physicians spend with inflammatory arthropathy return patients.

Although the specific weekly clinic that was targeted for this project was the designated inflammatory arthritis (IA) clinic, it became clear that there was some way to go before it could accurately be described as such. On average, each IA clinic for the last six months had scheduled 23 patients per clinic. In fact, of the return patients in this clinic, only 50% had a clearly defined inflammatory arthropathy established as a diagnosis. Furthermore, new referrals, of which there was an average of 5 per clinic, were not included in the project. In effect, this meant that in this clinic, an average of only 9 patients were sent out the pro-forma. The difficulties here were compounded by the non-attendance of scheduled patients without advance notice which was 17%, which often included patients who had been sent a packet.

Therefore, although the doctors involved in the clinic likely accurately reported that the average time for a clinic visit for a return IA patient who had been sent the pro-forma was reduced by some 8 minutes, this only translated into a saving of 72 minutes over the course of a clinic in one doctor’s time. Of course, in practice this was usually split across three doctors, and, due in part to appointment scheduling, it failed ultimately to make a meaningful difference on the clinic finish time. An extension of the project would require the reduced time required to see patients who had been sent a package to be accounted for in scheduling (spacing) appointments appropriately. It is probably reasonable also to
consider that doctors were likely spending more time with other patients, especially new referrals, than they previously had been, as the pressure at clinic was somewhat relieved. This however was not measured.

In addition to the logistical difficulties outlined above, there were other reasons to consider the endeavour in its present form inefficient from the clinician’s point of view. Even at the most efficient point in this project, it still took 14.8 minutes on average to completely compile a package to be posted to the patients. This greatly exceeds the saving of 8 minutes realised at the clinic.

It should also be emphasised that nearly all patients did not have their CRP or ESR recorded on the returning pro-forma (as the patient had been posted the request forms for this with the package, and had the blood test taken therefore since the package was sent). This of course means that the physician in clinic still must open the laboratory software system to retrieve these results. The same is true of the updated radiographs. Rather than meeting the intention of reducing the time taken for each return IA patient, this had the effect of increasing the workload, by the necessity of opening the results platforms twice; once before sending packages to patients, and once during the visit to retrieve results!

There may be scope for using a ‘physician-extender’ to carry out the work involved in assembling the packages, and this would certainly save the physician time in the final analysis. It may, in future, be possible to make a business case for this.

There are a number of reasons explaining why it took 14.8 minutes to compile the packages. Referring to figure 7, the patient address and confirmation of appointment was on a software system known as ‘PAS’ which requires a specific login and password. The next step...
was to determine what the diagnosis might be, and this was achieved most of the time by obtaining the last rheumatology clinic letter via an online portal which allows the letter to be viewed. New patients to clinic had already been labelled as such by the secretaries.

The laboratory results are on a separate program called ‘labs’, requiring a separate login and password. The ‘labs’ system displays all laboratory results (haematology, biochemistry, protein studies, serology) in a chronological order beginning at the most recent results. This is somewhat clumsy because it is necessary to search through potentially hundreds of results to identify that a rheumatoid factor, or ACPA had actually been done as long ago as ten years (which clearly means searching through many years of irrelevant results).

The next task was to look up when the patient last had plain film radiographs of their hands and feet. This in turn requires a separate login and password. Unfortunately the patient’s medical record number for the laboratory results is not shared with the radiology system, making it compulsory to enter the patients name and date of birth manually to retrieve results.

Blood test request forms, of which there are three in relation to this project, were completed and posted out to the patients. Nonetheless this was seen as more efficient than the original intention of the project to obtain and review each chart before clinics, and record results of bloods and radiograph reports in it.

As mentioned above, the system was made somewhat less efficient by patients who had been sent out a package, not attending their scheduled appointment. Coupled with the process outlined above, in the initial pilot study of the project (that included about 40 patients), each patient also received a phone call before the package was sent to them, to
give prior notice of this. This was very cumbersome, and it was sometimes quite difficult to make contact with a patient this way. Although not formally assessed, this part of the process did reduce the number of packages sent to patients who were not going to turn up at their scheduled visit (those who it was not possible to make contact with were not sent the package, and others were able to give notice over the phone that they were not able to attend). Overall, the value of the phone call was judged to be limited, and the time it took unjustified. The letter that was sent was considered to be concise but comprehensive, and very few patients had difficulties understanding what was expected of them.

Patient’s attitudes to the new change would have been interesting to interrogate. Results being available to the physician as patients enter clinic undoubtedly increases the quality of the care the patient receives, but whether this translates into increased patient satisfaction is unclear. The informal feedback given to the author from patients was universally positive.

**Specific Aim 2: To see more new patients in clinic suspected to have an inflammatory arthropathy by their General Practitioners (GPs).**

Despite the difficulties in appreciating that clinic schedules were being better kept, it is possible to see an extra new patient in the early arthritis clinic, in each clinic that the return patients had been sent the package. This will be a relative success, and although it is difficult to directly relate the change project to this outcome in a causal manner, it can be reasonably said that the project encouraged the permission by doctors of the addition of another patient, and the clinic will not demonstrably suffer for this.

**Specific Aim 3: To perform a standardised and validated measurement of disease activity for all patients IA patients, to assist with treat-to-target recommendations.**
Arguably the most rewarding and useful outcome of this change project was the introduction of routine empirical assessment of disease activity. As mentioned in chapter 1, these allow for comparisons of disease between visits to be accurately assessed. In addition to this, if the score is greater than 2.6, this more or less compels the doctor to consider augmenting treatment in accordance to the ‘treat-to-target’ recommendations.

It is fair to say that the project in this regard has been a near unqualified success. 94.5% of appropriate patients had a full DAS28-CRP calculated. This is likely because there was a formal plan introduced to measure this, as well as a method for capturing data that is often missing, thus making the score impossible to calculate. The parameter that is most frequently missing is the visual analogue scales that the patient marks, and this is never done at routine clinic visits. The most up to date CRP is also missing frequently (usually because the last blood test was several months ago, the results of which are now irrelevant).

**Specific Aim 4:** To increase the quality and standardisation of the patient’s clinic visits by focusing physician attention to addressing the common concomitant illnesses with inflammatory arthropathies, namely osteoporosis and cardiovascular disease.

The final page of the pro-forma, which required completion by the doctor, focused attention on the commonly concomitant conditions mentioned above. Doctors indicated that these issues were addressed in clinic. It is known that this was not happening as a matter of course before the project.

The potentially measurable meaningful outcomes to assess whether this intervention was a success are so heterogeneous that with the numbers involved in this project, it was never
going to be possible to demonstrate anything more substantial, than the doctor’s assertion that they felt that this had been assessed.

For example, in relation to osteoporosis, reasonable outcomes may have included but would certainly not be limited to;

1. Did the doctor take an adequate history of levels in inflammation over time and exposure to corticosteroids?
2. Did the doctor advise weight bearing exercise?
3. Was the patient prescribed calcium and vitamin D supplementation or advised about potential dietary interventions?
4. Did the doctor calculate the fracture risk score (a validated score to predict risk of fractures)?
5. Did the doctor order a bone densitometry (DXA) scan?
6. In women, was an appropriate menstrual history recorded?

All of these (and many more) would be appropriate depending on the individual. For example, a 20 year old man with IA who was in long term remission with minimal corticosteroid exposure would require no intervention, whereas a post-menopausal woman who smokes and has poor disease control and copious corticosteroid exposure, as well as maternal history of major fracture, would not warrant a DXA scan before commencing definitive treatment.

This example is given to illustrate the difficulty with measuring accurately whether other concomitant illnesses were given attention at the clinic visit. The question of addressing cardiovascular risk is fraught with the same challenges. However, at least by placing an item
on the physician part of the pro-forma and requiring physicians to tick it compels the doctor to satisfy themselves that it has been addressed appropriately. It simply serves as a reminder to the clinician.

In retrospect, it may have been more appropriate to limit this part of the study to a specific cohort within the IA return patient population. This may have allowed a more definitively described outcome and would also make the measurement of the outcome clearer. It certainly is important to make sure that the process does not become a ‘tick-box exercise’. Notwithstanding these limitations, it is still considered by the author important enough to warrant inclusion as part of the results of the change project.

**Specific Aim 5:** To increase the proportion of patients acquiring staging hands and feet plain radiographs every two years in compliance with the defined consensus of consultant rheumatologists at the hospital.

The data presented under this heading in the results chapter is very clear. Patients who were part of this project were more likely to have had radiographs taken than before their clinic visit was organised in this way.

The utility of this is unequivocal, as it provides the strongest evidence to the clinician that overall the disease is well controlled between clinic visits. This provides different information to clinical disease activity indices such as the DAS28-CRP which is thought of more as a ‘photograph in time’, that at any given time may be high or low, but does not necessarily give an accurate impression of the disease activity over time.
Where there has been no increase in bone and joint damage over time, the clinician can be reasonably certain that there is no need to augment treatment. Due to its precise measure, this specific aim is one of the strongest positive outcomes of the change project.

However, this aspect of the project suffered from a severe limitation. There is now no doubt that it would have been better to record the findings of the last set of radiographs in the pro-forma, and specifically the comparison with the last set to see if there has been interval progression. This would have allowed the visit to be more efficient, because the doctor very often still had to open the radiograph software database to retrieve this information.

**Specific Aim 6: To develop a research registry database of patients with inflammatory arthropathies.**

All the data collected in this study has been entered into a database. It is expected that this registry will be invaluable in pursuing the research goals of the rheumatology department.

### 6.1 Conclusion

Most of the results of this intervention are positive. Although the change has not been shown to increase the efficiency of a doctor’s time per return patient, this is the case only for so long as the doctor is involved in assembling the package to be posted. However, this role might later be taken up by physician extenders. Many lessons were learned even as the project was in full-swing (some of which are discussed above); this despite the implementation of a pilot project ahead of the main project. Leading this change going forward would include taking decisions to change parts of it that are informed by the experience gained to date.
References


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TheKingsFund. (2012). Leadership and Engagement for Improvement in the NHS; Together we can Retrieved 30/11/12, from [www.kingsfund.org.uk/search/site/engagement](http://www.kingsfund.org.uk/search/site/engagement)


### Abbreviations and Glossary of Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BSR</td>
<td>British Society of Rheumatology</td>
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<td>CI</td>
<td>Confidence Interval</td>
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<td>CRP</td>
<td>C-Reactive Protein (a non-specific marker of acute inflammation)</td>
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<td>DAS-28</td>
<td>Disease Activity Score-28 joints</td>
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<td>DNA</td>
<td>Did Not Attend</td>
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<td>DXA</td>
<td>Bone Densitometry Scan</td>
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<td>EAU</td>
<td>Early Arthritis Clinic</td>
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<td>EMR</td>
<td>Electronic Medical Record</td>
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<tr>
<td>ESR</td>
<td>Erythrocyte Sedimentation Rate (a non-specific marker of chronic inflammation)</td>
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<td>EWTD</td>
<td>European Working Times Directive</td>
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<tr>
<td>GP</td>
<td>General Practitioner (primary care physician)</td>
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<td>HIQA</td>
<td>Health Information and Quality Authority</td>
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<td>HSE</td>
<td>Health Service Executive</td>
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<td>IA</td>
<td>Inflammatory Arthritis</td>
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<td>IAC</td>
<td>Immediate Access Clinic</td>
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<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
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<td>NCHD</td>
<td>Non-Consultant Hospital Doctor</td>
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<td>NHS</td>
<td>National Health Service</td>
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<td>OMERACT</td>
<td>Outcome Measures in Rheumatology</td>
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<td>PI</td>
<td>Process Improvement</td>
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<td>PsA</td>
<td>Psoriatic Arthropathy</td>
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<td>RA</td>
<td>Rheumatoid Arthritis</td>
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<td>QALY</td>
<td>Quality Adjusted Life Year</td>
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<td>Abbreviation</td>
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<tr>
<td>RCT</td>
<td>Randomised Clinical Trial</td>
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<td>RR</td>
<td>Risk Ratio</td>
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<td>SD</td>
<td>Standard Deviation</td>
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<tr>
<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities, Threats</td>
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<tr>
<td>UCD</td>
<td>University College Dublin</td>
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<td>TCT</td>
<td>Total Completion Time</td>
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Figure 3

Pages 79-82
Arthritis Follow-up Clinic

What year did your joint symptoms first start? 

Which joint was the first affected? (tick one from below)

- Wrist(s) □
- Hand(s) □
- Elbow(s) □
- Knee(s) □
- Hip(s) □
- Shoulder(s) □
- Ankle(s) □
- Neck □
- Feet □
- Lower Back □

Which of the above joints has been most affected? 

What type of arthritis have you been diagnosed with? 

Please tick the box beside the medical problems you have been diagnosed with.

- High blood pressure □
- Previous heart attack □
- High Cholesterol □
- Stroke □
- Diabetes □
- Underactive Thyroid □
- Heart Failure □
- Cancer □

Please feel free to clarify any of your answers above or record any other diagnosis you have in the space provided below:

Addressograph Here
Self-Report Questionnaire

a) Considering all of the ways your arthritis has affected you, how do you feel your arthritis is today? (please mark on this line)

Very Well ─────────────────────────────────────────── Very Poorly

b) During the last week, how long does your stiffness in your joints last in the morning?

Duration in Hours OR Duration in Minutes


c) Are you a current smoker?

Yes ☐ No ☐

How much do you smoke (number of cigarettes a day)?

Did you ever smoke in the past?

Yes ☐ No ☐

On average, how much did you smoke in the past?

Number of cigarettes per day:

Number of years smoking:
The doctor will help you with any part of the following section that you cannot complete, or have questions about.

What medications are you currently taking for your arthritis?

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<thead>
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<th>Name</th>
<th>Dose</th>
<th>Since what date (roughly)</th>
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What other medications have you taken in the past for your arthritis?

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What other medications are you currently taking?

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Totals (within 28 joint count):
Swollen Joint Count (SJC) □□
Tender Joint Count (TJC) □□

Note: Any joint that has had a replacement arthroplasty, or small joint synovectomy is to be eliminated from the swollen and tender joint count. Print NA (for "Not Applicable") in the appropriate box.

Total Swollen Joint Count □□
Total Tender Joint Count □□

Most Recent CRP: Date:
Most Recent ESR: Date:
Rheumatoid Factor.........................Titre: Date:
ACPA:.................................Titre: Date:

Free Text:
Figure 4

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Dear

Many thanks for taking the time to complete the enclosed questionnaire and bringing it with you to your rheumatology clinic visit. Please make your best attempt to complete all but the final page, which the doctor will complete during your clinic visit.

We also include blood forms which you are due to have taken. Ideally this should be done any time within a week of your clinic visit, but if this is not possible, please have your blood sample taken on the day of clinic (before or after your clinic visit). The phlebotomy (blood-taking) clinic is a walk-in service (i.e. no appointment necessary), with these forms.

A card for you to have X-Rays of your hands and feet taken is also included. This is also a walk-in service with this card. You are due X-Rays because you have not had them in the last 24 months. X-Rays are the best way of examining whether you arthritis is getting worse, even if you have been feeling well.

Yours Sincerely,

Dr Carl Orr
Professor Douglas Veale
Figure 5: Blood Test order forms
Figure 6: Radiology Order form
Figure 7: Process Map

Obtain clinic list from secretaries about 2 weeks before clinic appointments

↓

Identify returning patients (i.e. not new referrals) from this list

↓

Attempt to identify working diagnosis (by serology and TA system)

↓

Find address of patient on DAS and write envelope

↓

Find and record last CRP, ESR and serology

↓

Complete blood forms for appropriate bloods for that clinic visit

↓

Find out date of last radiographs

↓

If appropriate complete radiograph request form

↓

Label pro-forma

↓

Sign accompanying letter

↓

Send in post