Reducing the Waiting List for Elective Laparoscopic Cholecystectomy

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Citation

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Reducing the waiting list for elective laparoscopic cholecystectomy

MSc Physician Associate Studies 2018

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Declaration Form

I declare that this dissertation, which I submit to RCSI for examination in consideration of the award of a higher degree MSc Physician Associate Studies, is my own personal effort. Where any of the content presented is the result of input or data from a related collaborative research programme this is duly acknowledged in the text such that it is possible to ascertain how much of the work is my own. I have not already obtained a degree in RCSI or elsewhere on the basis of this work. Furthermore, I took reasonable care to ensure that the work is original, and, to the best of my knowledge, does not breach copyright law, and has not been taken from other sources except where such work has been cited and acknowledged within the text.

Signed:

Laura McCaffrey

Date: 19TH SEPTEMBER 2018
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Abstract

Gallbladder disease is one of the most prevalent gastrointestinal presentations in the adult population across the developed world. The gold standard procedure for cholecystitis in Ireland is an elective laparoscopic cholecystectomy (LC), which primarily is carried out as an inpatient procedure, with minimal day surgeries being performed. Using the DMAIC (Define, Measure, Analyse, Improve and Control) model for Quality Improvement (QI), this dissertation investigates the waiting times for patients undergoing LC by a single general consultant in a hospital in North Dublin. A variety of tools were utilised including, process flow maps, stakeholder analysis, fishbone diagrams and driver diagrams to identify the root causes of the long waiting lists. The results indicate that the average waiting time for patients is 14.7 months and 100% of these surgeries are carried out as an inpatient procedure. Studies have shown that day surgery LC is a safe and effective alternative when adequate organisation and measures are in place. However, there remains uncertainty in this area with regard to which patients meet the eligibility criteria. Multiple factors influence this eligibility criteria including ASA grade, BMI, co-morbidities and age, but there is no set checklist established and implemented in practice in the Irish Healthcare System. This QI project plan proposes the introduction of an eligibility criteria checklist to identify a patient’s suitability for day surgery, for implementation by a general surgical team. The expected outcome is an increase in the number of day surgeries, with an ultimate long-term goal of decreasing waiting times for patients.
# Table of Contents

1.0 Introduction ......................................................................................................................... 8
  1.1 Introduction .......................................................................................................................... 9
  1.2 Organisational Context ....................................................................................................... 9
  1.3 Rationale for Quality Improvement .................................................................................... 10
  1.4 Aim & Objectives ............................................................................................................... 12
    1.4.1 Aim .................................................................................................................................. 12
    1.4.2 The objectives of the project plan are to........................................................................ 13
  1.5 Role of the student in the organisation and project .............................................................. 13
  1.6 Summary ............................................................................................................................. 14

2.0 Literature Review ..................................................................................................................... 15
  2.1 Introduction ........................................................................................................................ 16
    2.2 Search Strategy ................................................................................................................ 16
    2.3 Review of Literature ........................................................................................................ 17
      2.3.1 Gallbladder disease and the cost on the healthcare system........................................ 17
      2.3.2 Prolonged waiting times in the healthcare system ...................................................... 19
      2.3.3 Day surgery for Laparoscopic Cholecystectomy ......................................................... 21
  2.4 Implications of the Literature review for the Project ............................................................ 27
  2.5 Summary ............................................................................................................................. 28

3.0 Methodology ............................................................................................................................ 29
  3.1 Introduction ........................................................................................................................ 30
  3.2 Approaches to Quality Improvement .................................................................................. 30
      3.2.1 PDSA Cycle and the IHI Model for Improvement ....................................................... 31
      3.2.2 Lean Six Sigma .......................................................................................................... 32
      3.2.3 DMAIC model ............................................................................................................. 33
  3.3 Rationale for model selected ............................................................................................... 34
  3.4 DMAIC Model .................................................................................................................... 34
      3.4.1 Define .......................................................................................................................... 34
      3.4.2 Measure ....................................................................................................................... 40
      3.4.3 Analyse ......................................................................................................................... 44
      3.4.4 Improve ......................................................................................................................... 47
      3.4.5 Control ......................................................................................................................... 49
  3.5 Summary ............................................................................................................................. 50

4.0 Evaluation .................................................................................................................................. 51
  4.1 Introduction ........................................................................................................................ 52
  4.2 Overview of QI Plan and Expected Outcomes .................................................................. 52
  4.3 Evaluation ........................................................................................................................... 54
      4.3.1 Aim of Control Phase of DMAIC .............................................................................. 54
      4.3.2 Monitoring & Review .................................................................................................. 54
      4.3.3 Expected Results ....................................................................................................... 56
  4.4 Dissemination Plan .............................................................................................................. 56
  4.5 Summary ............................................................................................................................. 57

5.0 Discussion & Conclusions ........................................................................................................ 59
5.1 Introduction ................................................................................................................................. 60
5.2 Project Impact .............................................................................................................................. 60
  5.2.1 Stakeholders and Practice ....................................................................................................... 61
5.3 Strengths of the project .............................................................................................................. 62
5.4 Limitations of the project .......................................................................................................... 63
5.5 Recommendations ..................................................................................................................... 64
5.6 Learning about Quality Improvement ....................................................................................... 65
5.7 Summary and Conclusion ......................................................................................................... 66

6.0 References ................................................................................................................................... 67
List of Figures:

Figure 1: PDSA model.................................................................32
Figure 2: Process flow map.........................................................36
Figure 3: Stakeholder Analysis....................................................38
Figure 4: Driver Diagram..............................................................40
Figure 5: Proportion of patients admitted through ED vs GP or other hospitals...43
Figure 6: Procedures starting before or after 12pm...............................43
Figure 7: Percentage of patients discharged on day 1 or 2 post op..............43
Figure 8: Proportion of patients in ASA grades 1-3..............................44
Figure 9: Fishbone Diagram..........................................................45
Figure 10: Updated Process Flow Map...........................................49
1.0 Introduction
1.1 Introduction

This dissertation outlines a Quality Improvement project plan (QIPP), which was carried out across a general surgery specialty in a chosen hospital. One general surgeon’s theatre list for elective laparoscopic cholecystectomy (LC) from April 2016-April 2018 was taken under review. The project explored if and why there are prolonged waiting lists for LC and identified solutions with a QIPP once all data was collected and analysed. This chapter briefly outlines the organisational setting in which the project plan took place and explains the rationale for carrying out the study. The role of the student is highlighted and the project’s aim and objectives are outlined to provide an understanding of the project plan that will be discussed throughout this dissertation.

1.2 Organisational Context

This QIPP will be investigated and carried out in a large teaching hospital located in Dublin that serves to the North Dublin catchment area with over 820 beds. The hospital provides emergency and acute services across 54 medical specialties and is the main teaching hospital for the Royal College of Surgeons Ireland and Dublin City University (Beaumont Hospital, 2016). The proposed project could have major impact within this hospital, as only a slight increase in resources and greater efficiency in scheduling times can greatly reduce costs and waste. Several studies have been carried out evaluating the cost comparison in first admission cholecystectomy compared to an elective LC with possible multiple re-admissions. Subsequent re-admissions potentially have a greater cost to the hospital more in the long term, as further investigations including blood tests, radiological scans,
medications including analgesia and antibiotics and hospital stay, resulting in much higher expenses. Performing a LC at the first presentation of symptomatic gallstones has been shown to be a more cost-effective approach, therefore more beneficial to have shorter waiting times for these patients (Smigielski et al., 2015). According to HIQA (2014), the most recent report on gallstones stated that 34.7% of patients on the outpatient waiting list for both medical and surgical specialties were waiting longer than six months and 10.5% were waiting longer than 12 months, which clearly indicates the strong need for the project to be carried out to further analyse the data and for improvements to be devised. This project aims to evaluate if the patients currently waiting for their elective cholecystectomy are above or below these figures. According to Beaumont Hospital (2016) annual report there has been major improvements in many areas within the surgical specialty, but by optimising the efficiency of performing LC would decrease the average length of stay time for general surgery of 6.2 days and in turn increase the patient turnover within the hospital. Reducing the wait times to within the national guidelines will not only benefit the hospital but also the Irish Healthcare System and most importantly, greatly improve patient’s experience and standard of care.

1.3 Rationale for Quality Improvement
Gallstone disease is a common problem that affects between 5-25% of the adult population in the Western World, and a large proportion of patients who present to the ED with biliary problems are admitted, treated and then discharged and put on a waiting list which could be anywhere of up to two years (Gurusamy and Davidson, 2014). A large portion of patients are readmitted with recurrent symptoms on more
than one occasion, with many of these patients being at a high risk of developing further complications, including acute pancreatitis and obstructive jaundice (Rance and Jones, 2015).

The patient records analysed in the study will comprise of any patient who underwent an elective LC by a single consultant from April 2016-April 2018. There are a number of possible reasons for their scheduled procedure including cholelithiasis, biliary colic, acute cholecystitis, gallstone pancreatitis and gallstone related jaundice and cholangitis. The further cost implications for each patient's subsequent readmissions significantly rises which in the long-term, results in higher costs in comparison to first admission cholecystectomies (Somasekar et al., 2002). A large number of patients are currently awaiting this surgery within the hospital for a significant period of time and are at high risk of possible re-admissions while they are on the list. According to the NICE guidelines, patients should be scheduled for an elective cholecystectomy within 6 weeks of their admission to the Emergency Department (NICE, 2017). However, there have been several studies carried out internationally which recommend that a cholecystectomy should be performed within 72 hours of presentation or as soon as possible if certain factors cannot be met within the allocated time, such as patient co-morbidities (Ohta et al., 2012). A brief snapshot in time was analysed on 1st of May 2018 under the chosen consultant for the project. It was found that there were 15 patients awaiting a LC, with the longest patient waiting 65 weeks for their procedure. The average wait time for the patients on the selected date was 35 weeks, with none of the patients being scheduled for day surgery. Instead all patients were scheduled on the inpatient waiting list. This
data supports the need to investigate further.

The Sláinte care report by the Oireachtas (2017) also stated that a patient should not wait for longer than 12 weeks for an inpatient procedure or 10 weeks for an outpatient appointment which also strongly emphasises the need for improvement within this area as many patients are waiting considerably longer than the national average for an in-patient procedure. A number of studies have been carried out evaluating both the cost implications involved in the delay of LC and examining the impact of health related quality of life and psychosocial consequences on the patients who are on these waiting lists for a prolonged length of time (Oudhoff et al., 2007).

1.4 Aim & Objectives

1.4.1 Aim

In order to devise a project plan in any Quality Improvement project in healthcare, it is necessary to generate a SMART aim. A SMART aim is a specific, measurable, achievable, realistic and timely objective that must be generated in order to succeed in the desired goal (Haughey, 2014). It is vital that the aim for the project fits all of the criteria of the SMART aim in order for the project to be successful.

The aim of the proposed QIPP is to improve patient wait times for elective LC by increasing the number of day surgeries by 40% by September 2019. Increasing the
number of day surgery procedures means patients will be seen quicker, due to shorter day surgery waiting lists. This will result in a greater saving in hospital resources by decreasing inpatient bed days and result in better utilisation of available beds for other inpatient procedures and emergency admissions. By devising a solution as to how these patients can be added to the day case waiting lists will allow a greater proportion of eligible patients to undergo day case surgery.

1.4.2 The objectives of the project plan are to

1. Establish key stakeholders of the project by January 2018.
2. Investigate the average timeframe for patients awaiting elective LC from April 2016-April 2018 under the selected consultant by 31st July 2018.
3. Explore what is causing the main delays for patients on waiting lists for LC by 31st July 2018.
4. Devise a Quality Improvement project plan in order to improve these waiting times by 30th of August 2018.
5. Recommend a plan that is resourceful and cost effective to the consultant that could be piloted by the hospital to improve patient’s quality of life by 30th August 2018.

1.5 Role of the student in the organisation and project

As a final year physician associate (PA) student rotating across various clinical specialities within the hospital, I can evaluate the data with a non-bias opinion. My primary job will involve examining data via medical charts and evaluating all the patients admitted for their elective LC over a two-year period. Once the data
collection has been completed, I will then begin to focus on possible areas for improving patient wait times and experience with the use of QI tools. Although I have very little power in the stakeholder analysis and have little influence, by collecting all of the data required and proving that wait times can be improved I can prepare a detailed QIPP to be implemented in the future.

1.6 Summary
This chapter outlines the project, the rationale for carrying it out and the role in which I, as the student will play in conducting the project in order to collect the data required. A QIPP will be generated which can be piloted by the consultant involved in the speciality investigated. The aims and objectives provide a clear focus for the project and the brief introduction into Quality Improvement methods will be further expanded in later chapters. Chapter 2 reviews the relevant literature appropriate to the project and focuses on Quality Improvement and day surgery. Chapter 3 will describe the methodology and different kinds of Quality Improvement tools that will be used in the study while also reviewing the results and identify the average timeframe for patients waiting on elective LC in this hospital. Chapter 4 will discuss how the proposed project plan will be implemented and evaluated in the future to verify its success and aid in sustainability. Finally, Chapter 5 will comprise of the discussion where the results of the study will be evaluated and conclusions will be drawn and the details of the QIPP will be discussed.
2.0 Literature Review
2.1 Introduction

The following chapter reviews the literature relevant to the proposed project plan of improving wait times for patients for elective LC. The search strategy will outline how the literature was searched, including the tools and search engines utilised, while also discussing the relevant searches that were found. The literature review will focus on three main themes that have been published to support the chosen topic and will explore the reasons as to why the student came up with the project idea. There has been significant research carried out internationally on gallbladder surgery however, the student narrowed the search to focus on how wait times surrounding gallbladder surgery can be improved and recent studies that support this.

2.2 Search Strategy

A broad and narrow literature search is vital for any project in order to gather relevant evidence to support the project. The student used a variety of search engines including Google Scholar, Pubmed, MEDLINE, CINAHL and Scopus. Pubmed and Google Scholar yielded the majority of the literature provided for the project. The search parameters for this project involved papers published from 2013-2018 with an exception of seminal pieces of literature that were selected to assist the evidence basis required for this project plan.

The student began with searching the literature with a variety of MeSH terms including ‘elective day surgery’ ‘laparoscopic cholecystectomy’ ‘improving wait times in healthcare’ and ‘criteria for day surgery’. A broad literature search on Google Scholar using the terms ‘day surgery AND cholecystectomy’ yielded a number of
papers which were published in the last five years. A variety of papers were utilised from this search and a further focused search was completed to provide a narrower search. The student aimed to only search the data published within the last five years, but to obtain a higher yield the student searched back a further five years and some of these papers are included in the literature review. Additional important documents also analysed for the study included the Beaumont Hospital 2016 Annual Report, the Sláintecare report and various HSE documents.

2.3 Review of Literature

After critically analysing the relevant literature, the following themes were selected; Gallbladder disease and the cost on the health care system, prolonged waiting times in the healthcare system and day surgery for LC. Each theme is discussed separately and plays an influential role on the Quality Improvement project plan chosen.

2.3.1 Gallbladder disease and the cost on the healthcare system

Gallbladder disease is one of the most common diseases affecting the middle age population in developed countries affecting up to 5-25% of the population (Gurusamy and Davidson, 2014). It is a significant health problem in the developed world and provides a substantial burden on the HSE in terms of costs and patient numbers (HIQA, 2014). Gallbladder disease occurs when hard fatty or mineral deposits known as gallstones accumulate within the gallbladder (NICE, 2014). Gallstone disease can be asymptomatic in a number of patients and cause no significant problems in a
patient’s lifetime, but in others it can cause considerable health problems in terms of pain and decreased quality of life (Stinton and Shaffer, 2012).

In certain patients when the stones irritate the gallbladder or block part of the biliary system a number of complications can arise giving way to gallbladder disease including cholelithiasis, choledocholithiasis, cholecystitis, biliary colic, ascending cholangitis or pancreatitis (Ferreres and Asbun, 2014). All of these conditions lead to complications which can greatly impede a patient’s quality of life causing a great deal of pain and some of the conditions which arise can also be life-threatening (Njeze, 2013). Predisposing factors to gallbladder disease include increasing age, female gender, obesity, multiparity, previous surgery, rapid weight loss and long-term parenteral disorders (Aune et al., 2015). Blood tests, abdominal x-rays, ultrasounds or MRCPs are investigations usually carried out to investigate gallbladder disease. If stones are found on investigation they can proceed to undergo ERCP or percutaneous cholangiography to try and remove the stones but if this is unsuccessful, and the patient remains symptomatic they must then proceed to a cholecystectomy (NICE, 2014). The majority of cholecystectomies are carried out laparoscopically, with few open procedures still being carried out due to decreased hospital stay from smaller wounds, reduced post-operative pain and improved cosmesis (Sugrue et al., 2015). If the patient does not proceed to undergo a LC they may develop complications including gallbladder perforation, empyema of the gallbladder, ascending bacterial cholangitis or pancreatitis, which can be fatal (Ferreres and Asbun, 2014).
Symptomatic gallstones are one of the most common and most costly of the gastrointestinal (GI) diseases with the incidence of occurring increasing with age (Abraham et al., 2014). The most common presentation of symptomatic gallstones is biliary colic and is characterised by intermittent severe pain, which often radiates from the abdomen to the back and right shoulder due to the obstruction of the cystic duct with a stone (Njeze, 2013). Predisposing factors to this condition are diabetes mellitus, obesity and patients who are taking hormone therapy (Pak and Lindseth, 2016). If a patient presents with these symptoms and a fever or raised white blood cell count it could indicate a more serious presentation of acute cholecystitis, gallstone pancreatitis or ascending cholangitis (Abraham et al., 2014). The management of symptomatic gallstones include analgesia, according to the World Health Organisation pain ladder and possible antibiotics depending on the presentation, if required (Abraham et al., 2014). However, this management plan is relatively unsuccessful and therefore LC is the surgical choice of treatment and gold standard due to it’s shorter hospital stay and brief convalescence period with reduced chance of re-admission compared to conservative management or open cholecystectomy (Sugrue et al., 2015).

2.3.2 Prolonged waiting times in the healthcare system

There are a number of factors that influence the prolonged waiting times for elective LC in Ireland, ranging from major influences such as available and trained surgeons and theatres, to time of day at which the procedure is scheduled. A multitude of variables all cause a domino effect on the extensive waiting time for these surgeries (Camelione et al., 2016). Some of the main factors that contribute to these long waiting lists include surgeon volume, demographics and clinical factors. A
retrospective study carried out by Lau et al. (2007) in Canada analysed the demographics and clinical factors contributing to the lengthy waiting lists by looking at two intervals, interval A and interval B. Interval A measured the length of time from time of referral to surgical consult while interval B measured the time from surgical consult to date of procedure (Lau et al., 2007). The study showed an association between greater than 50 years of age and an increase in interval B, which may have been due to increased pre-operative assessment and investigations (Lau et al., 2007). However, the study also showed that the greatest influence on both intervals was the individual surgeons themselves. The most influencing factor causing delay was the particular surgeons themselves and the number of LC procedures they perform. Demographic and clinical factors, excluding age above 50 had no impact on waiting times (Lau et al., 2007).

There have been several studies carried out to show the comparison of cost effective approaches for elective LC, as it one of the most commonly awaited GI surgeries nationally (HIQA, 2014). One of the major problems with symptomatic gallstones is the possible multiple readmission rates while patients are awaiting their procedures, which can result in significant morbidity, decreased quality of life for the patient and increased costs for the hospital and health service (Rossi et al., 2014). A retrospective study carried out by Somasekar et al. (2002) in the UK of 156 patients showed the mean waiting time for was twelve months with 37 of these patients being readmitted with symptomatic gallstones requiring a series of investigations and treatment with a mean length of stay of three days. The cost of treatment for these readmission patients alone was £44,462 causing a significant burden on the hospital
and also requires beds for these patients (Somasekar et al., 2002). Even though this study was carried out in 2002, it indicated that performing early LC for patients can help significantly reduce costs and allow a better utilisation of hospital resources by reducing the amount of ED re-admissions (Somasekar et al., 2002).

### 2.3.3 Day surgery for Laparoscopic Cholecystectomy

Day surgery is defined as a patient being admitted to a hospital for a planned procedure and discharged home on the same calendar day (Quemby and Stocker, 2014). In order to be considered for day surgery the procedure must have been planned as day surgery before the patient is admitted to hospital (Quemby and Stocker, 2014). A patient who is booked as an inpatient but leaves on the same day is not classified as a day surgery. Thus, this emphasises the importance of the day surgery pathway from the point of adding the patient to the waiting list and surgical booking. There are several advantages to performing day surgery including shorter inpatient stays, reduced waiting lists, lower infection rates and cheaper surgery than overnight stay and allowing better utilisation of resources for the hospital (Dodaro et al., 2013). Although there can be certain limitations to day surgery as the scheduled surgery may not always be guaranteed due to unforeseen complications arising such as the need for conversion to open or the requirement of a postoperative drain (Radunovic et al., 2016). Therefore the patient may be required to stay as an inpatient for observation (Dodaro et al., 2013). There are also a number of factors which can lead to delayed discharge including perioperative complications such as bleeding, requirement of conversion to open, biliary duct leaks and the need for a postoperative drain (Radunovic et al., 2016). This highlights the requirement for careful patient selection to undergo these day surgeries with the aim to avoid these
complications. In order for a procedure to be considered as a day surgery; there should be minimal blood loss expected and a short operating time, along with no expected intra or post-operative complications and no requirement for specialist aftercare (Quemby and Stocker, 2014).

There are a number of factors that play a role in deciding whether a patient is suitable for day surgery including ASA (American Society of Anaesthesiologists) status, age, BMI and local co-morbidities but these should not be solely used in making this decision (Pujahari, 2016). Several studies have investigated the criteria required for patients eligible for day surgery and although there is no set checklist for the requirements, there are a lot of similar overlaps. LC can be safely and effectively carried out, which provide several benefits to both patients and the hospital (Ramez Antakia and Ravi, 2014).

In Ireland an elective LC is a routine procedure that is publicly funded by the HSE (HIQA, 2014). It is one of the most common GI surgeries with approximately 5,154 patients who underwent the procedure and 76.8% as an elective basis (HIQA, 2014). Of these elective procedures only 24.4% were done as a day surgery basis with the remainder being done as inpatient with a mean length of stay of 3.1 days (HIQA, 2014). Due to elective LC being publicly funded procedures, the current estimated annual national cost is 23.6 million with an average cost of €5,973 per patient. Of this an inpatient case can cost an average of €7,040 with a day surgery costing significantly less at only €2,669 per patient (HIQA, 2014). The NHS guidelines state that they recommend for 75% of all elective procedures to be carried out as day
surgeries but by following the National Clinical Programme in Surgery in Ireland, a
target of 40% of elective LC being carried out as day surgeries could cause a
potential saving compared to current rates of 26% saving up to 1 million per annum
(HIQA, 2014, NHS Institute for Innovation and Improvement, 2008).

A study carried out by Verma et al. (2011) illustrated that day surgery is a continually
evolving area and over the last few years has significantly improved in efficiency and
numbers due to the increased benefits. It has shown significant advancements and
benefits for the hospital, healthcare systems and most importantly the patients. A
wider range of patients is now being considered for a variety of procedures for day
surgery. However, there is still considerable hesitancy for performing these
procedures as day surgery despite the sufficient evidence to show that it is a safe
and effective method of patient care (Al-Omani et al., 2015). Pre-operative
preparation and protocol driven, nurse-led discharge is vital for safe and effective
day surgery (Malley et al., 2015). Patients can be admitted through the Emergency
Department or via GP referral for a day surgery procedure.

One of the major factors involved in deciding on day surgery is the selection of the
patients who are eligible. The British Association of Day Surgery suggests that full
term infants over one month are usually fit for day surgery procedures and
recommend that a multidisciplinary approach must be taken in determining a patients
suitability (Verma et al., 2011). A variety of considerations come into play including
social, medical and surgical factors (Quemby and Stocker, 2014). In order for a
patient to be considered they must understand the procedure and postoperative care
and should have a responsible adult to escort them home and also to provide support for the first 24hrs post-op (Quemby and Stocker, 2014). For a patient to be classified as fit for a procedure their medical status must be taken into account, which is determined by anaesthetists or by a nurse led pre-operative assessment (Malley et al., 2015). However, there are studies to show that patients should not be limited by their ASA grade, age or BMI, but in fact should be a unique decision for each patient and not limited to certain conditions (Al-Omani et al., 2015). These guidelines suggest that patients with stable chronic disease also benefit from day surgery due to minimal disruption in their treatment schedule. Similarly, obesity is not an absolute contraindication but an increased BMI can have higher incidences of complications but this can be assessed by anaesthetists (Verma et al., 2011). Early mobilisation and shorter anaesthetic durations can prove beneficial to obese patients associated with day surgery compared to inpatient stays (Nightingale et al., 2015). In order for a procedure to qualify as a day surgery, patients should be able to withstand oral intake within a few hours and should be able to mobilise before discharge and post-op symptoms must be controllable with both oral and local anaesthetic medication (Ramez Antakia and Ravi, 2014).

The NHS Modernisation Agency recommends that 75% of all elective procedures should be carried out as day surgeries by following day surgery guidelines (NHS Institute for Innovation and Improvement, 2008). Elective LC are ideal procedures for day surgeries as they can be relatively minimally invasive and short surgeries with an average procedure time of two hours (Ramez Antakia and Ravi, 2014). They are also registered in the list of twenty five procedures which have been audited by the Healthcare commission in the UK for day surgery (Anderson et al., 2017). With
technical improvements, effective pre-operative assessment, nurse led discharge and good analgesia and anti-emetics there is little evidence as to why day surgery cannot be implemented (Anderson et al., 2017).

The National Clinical Programme in Surgery Care Pathway, HSE/RCSI (2014) describes the management for day surgery LC and includes the patient’s selection criteria, the discharge criteria and the care pathway, which should be followed for these patients. According to this care pathway, in order for a patient to be eligible for day surgery, they must be of ASA grade I or II, they must have a responsible adult to take the patient home and be capable of looking after them for 24 hours post procedure, they must have access to a toilet and telephone and also live no more than one hour from the nearest Emergency Department (HSE/RCSI, 2014). An increased BMI is one of the most influential factors for deciding if a patient is suitable for a day surgery procedure but it is not an absolute contraindication, but instead if greater than 35 can be seen in the anaesthetic clinic to check eligibility (Solodkyy et al., 2018).

A retrospective study carried out by Al-Qahtani et al. (2015) in Saudi Arabia and published in 2015 is one of the main studies focused on for motivating the project. This study carried out over a four year period performed day surgery LC on 487 patients with only 22 patients having to stay as inpatients due to complications. The study did not specify the reasons as to why the 22 patients stayed as inpatient, but it is likely this was due to unforeseen complications such as a drain in situ post-operatively, a pain score >7, vomiting or conversion to open (Ozkardes et al., 2014).
A patient satisfaction rate of 97% was documented, which was obtained by telephone call, the patient rated their satisfaction on a scale of 1-10. This study suggests that day surgery LC is in fact safe and feasible with optimal patient selection and education along with planned post-operative analgesia and anti-emetics (Al-Qahtani et al., 2015). This study influenced the methods of improvement chosen for this QIPP and suggests a strong template for the eligibility criteria checklist, which could be utilised. The inclusion and exclusion criteria as shown in the table in Appendix 3. demonstrates the criteria used for patient selection suitability for this particular study. Although this study was carried out retrospectively and in only one hospital situated in Saudi Arabia, it still has very positive success rates and findings (Al-Qahtani et al., 2015).

A similar prospective study carried out by Briggs et al. (2009) in a UK teaching hospital showed that the introduction of day surgery LC is safe and feasible for patients. Briggs et al. (2009) performed day surgery LC on 106 patients and 84% of these patients were discharged on the same day. Similarly to the study by Al-Qahtani et al. (2015), a patient satisfaction of 84% was recorded and was carried out by telephone questionnaire. The readmission rate after surgery was 2%. Although this study was carried out in 2009 and did not use eligibility criteria but instead considered all patients who were scheduled for LC for day surgery, it suggests that day surgery for LC can be a safe, feasible and effective option for patients undergoing this procedure.
2.4 Implications of the Literature review for the Project

The literature review discussed in the themes highlights an area of improvement that could be focused on. The current evidence highlights the extensive wait times for patients across many areas in healthcare but with particular emphasis for patients waiting for inpatient procedures. Whilst continued efforts are constantly being made to try and tackle this issue it still remains apparent. The Beaumont Hospital (2016) annual report highlights the work that has been carried out in improving patient wait times for both surgical and outpatient procedures but a great deal of possible improvements still remain. Every healthcare worker has a duty of care to their patients to providing the best standard of care possible and ultimately, every service has possible areas for improvement. Quality Improvement is a team based task and requires a large team of people to carry out these surgical procedures. Communication is vital involving all of the stakeholders involved in the potential project and in order to decrease wait times for this cohort of patients, all stakeholders must be informed and educated (Cooper et al., 2015). There have been several studies carried out proving that LC can be carried out safely and effectively as day surgery procedures for majority of patients, but not all patients may be eligible (Tebala et al., 2017). The literature review has helped guide the project by providing useful insight into methods of improvement and also postulated ideas of ways to decrease wait times for patients and therefore provided the idea of increasing the number of day surgery compared to inpatient procedures for LC.
2.5 Summary

This chapter has discussed the search strategy employed for a review of the literature and discussed the themes of the implications of gallbladder disease in the developed world and how it affects patients, wait times in healthcare and the evidence comparing day surgery LC compared to inpatient procedures. Reviewing the literature helped to drive the project and emphasise where specific areas of improvement could be focused on.
3.0 Methodology
3.1 Introduction

This chapter examines the Quality Improvement tools utilised during the project. The tools used to define the problem and methods of data collection are described and how the improvement idea was devised is discussed. This chapter also describes how the proposed improvement plan will come into effect and how it could be further analysed in order to see if it is successful and if it achieves its aim and objectives. It identifies the reasoning for the project through various QI models and provides a deeper understanding of the rationale as to why the project will be carried out in the future and the benefits it will have.

3.2 Approaches to Quality Improvement

Quality Improvement in healthcare is about examining standards and protocols already in place and adjusting them to make healthcare safer, more effective, patient-centred, timely, efficient and equitable in order to positively benefit the patient and improve their experience (Salmond and Echevarria, 2017). Quality Improvement has not always been an area of focus in the healthcare sector, unlike other industries such as car manufactures and aviation (Chassin and Loeb, 2013). The main focus of Quality Improvement in healthcare is bringing about a measurable improvement by applying specific methods using various tools of which there are many different approaches (Silver et al., 2016). There are multiple different approaches to improvement within the healthcare sector, which can be applied to a variety of specialities, from improvement of wait times to process flows within the service. Small improvements within a speciality can make a significant impact to the medical team and more importantly patient experience (Mosadeghrad, 2014). The aim of
Quality Improvement is for better patient outcomes, better experience of care and for continued development and supported staff (HSE, 2016)

3.2.1 PDSA Cycle and the IHI Model for Improvement

The PDSA model, (Plan, Do, Study, Act) is a powerful improvement tool, as shown in Figure 1, that focuses on accelerating improvement. This tool works in combination with the Institute for Healthcare Improvement (2018) model for improvement, which asks three simple questions; what are we trying to accomplish, how will we know that a change is an improvement, and what changes can we make that will result in an improvement (Coury et al., 2017). This model has been used by many health organisations worldwide to implement improvement in a healthcare setting (Taylor et al., 2014). However, there are some limitations to the PDSA model as it can be regarded as an over simplistic method and fails to invest in rigorous and tailored application. (Reed and Card, 2016). In order for success, the resources and supportive context must be available (Reed and Card, 2016). Even though there are some limitations, it can be a useful tool if the correct stakeholders, resources and communication are put in place for the beginning of the project.
3.2.2 Lean Six Sigma

The Lean Six Sigma is a QI model used in many production industries to improve efficiency and quality (Schweikhart and Dembe, 2009). Over the past number of years this QI model has been utilised by a number of manufacturing industries and has proved to be very successful but only in recent years has it began to be utilised in the healthcare setting (Haughey, 2014). Healthcare is one of the most important industries that constantly have areas for improvement in order to provide patient centred medical care. The LSS can be applied in many healthcare settings including clinical areas and also in research setting. Improving quality in the healthcare setting helps to avoid delays and errors, which can cause massive domino effects to patients in the medical field (Schweikhart and Dembe, 2009). The cost of healthcare is substantially rising on an annual basis due to a multitude of factors including, increase in population, increased need for resources and decreased budgeting by the Irish Government.
The aim of implementing QI in healthcare is to reduce waste and costs and improve the quality of services, which in turn will benefit both financially (Polk, 2011). The LSS is a combination of two QI techniques, the Lean and the Six Sigma, which in recent years have been combined together to enhance business performance compared to using each model individually. Healthcare costs are continuing to increase exponentially on an annual basis due to the over utilisation of resources (Almorsy and Khalifa, 2016). Implementing a QI model using the LSS framework can significantly help reduce the overuse of resources and cut down waste and therefore make a more profitable organisation for both the hospital and improve patient experience. According to a study by Polk (2011), the lean aspect of the LSS model focuses on the removal of waste and therefore reducing variation compared to the Six Sigma element which helps to reduce the amount of variation around the mean. For example, a small improvement in a service takes you closer to the desired goal of one hundred per cent success rates. In order to carry out a QI project a specific question and desired result must be clearly outlined from the beginning and a QI models including the DMAIC and PDSA models and SMART aims helps to achieve this aspect of the project (Lau, 2015).

3.2.3 DMAIC model

The QI model known as the DMAIC model is the tool used by the LSS, which stands for Define, Measure, Analyse, Improve and Control (Go Lean Six Sigma, 2018). Each component of this model allows the project to be broken up into stages to allow it to be carried out in an organised manner. The DMAIC model allows us to take each aspect of the project step by step in an organised fashion, to define the problem, to measure the extent of the problem by using quantitative or qualitative
data, to analyse the results in a non-bias opinion through statistics of the results and to improve the original defined problem (Go Lean Six Sigma, 2018).

3.3 Rationale for model selected

For this Quality Improvement project plan, the DMAIC model has been selected. The PDSA cycle was not chosen for this project as although it is a power improvement tool, there are limitations as it can be regarded as an over simplistic method when approaching a QI project. The DMAIC model has been selected as the most preferable model as it provides an organised, stepwise approach for a QI project and allowed specific areas of improvement to be identified. The define phase of the model identified the stakeholders involved in the project and also identified the many causes which can all be contributing to the long waiting lists for LC. The measure and analyse phase allowed the data to be collected and interpreted and the improve stage identified areas for improvement that can be implemented in the future.

3.4 DMAIC Model

3.4.1 Define

The first stage of the DMAIC model is the Define phase and it is used to decipher what the main problem at hand is. In order to start any QI project it is important to start at the beginning and decipher what is the main problem at hand, and so start at the Define stage of the DMAIC model. In order to define the problem the leaders of the group, otherwise known as the stakeholders must identify where the main issues lie. On observation of the specific specialty chosen for the project, it was detected that one particular type of surgery had a predominantly long waiting list compared to
others carried out by the same surgeon. There are numerous reasons as to why this surgery has a longer waiting list than other surgeries. For the define phase of the project, it was required to decide what the actual problems are rather than identify why they are arising, which can be identified in different phases of the project. This particular service was chosen, as it is an in demand and varied speciality within the chosen hospital among its popular specialties of nephrology, neurosurgery and neurology in a highly populated area of Dublin (Beaumont Hospital, 2016). The general surgery specialty encompasses a range of simple and complex procedures from haemorrhoidectomies to abdominoperineal resections. A common procedure included in these surgeries is the LC, which is well known to have extensive waiting times. As discussed in chapter 2, it is very common as thousands of these surgeries are being carried out in Ireland every year, with 3,960 patients undergoing an elective LC in 2012 (HIQA, 2014).

There are a number of various tools that can be utilised in the define phase including the stakeholder analysis to identify who the key stakeholders are and the power they hold. A process flow map aids in identifying where the main problem arises and a driver diagram facilitates in identifying the causative reasons for this defined problem. One of the most useful tools for defining complex problems is a flow chart to illustrate the process flow map, which lays out the steps that must occur for an outcome to happen. The process flow map illustrated in figure 2, illustrates the sequence of events a patient would proceed through from when they first present with their symptomatic gallstones to their elective procedure and also highlights unnecessary steps that do not add value to the patient (Lau, 2015). By creating a process flow map we can map out step by step what the patient actually goes
through compared to what we may perceive them to go through. In the process flow map we can clearly see there are a number of steps involved, all of which uniquely or collectively can cause a significant delay to the patient availing of their procedure. These flow charts most importantly highlight areas of unnecessary work, delay, and communication failures that may all be attributing to the problem (Lau, 2015).

![Process flow map]

Figure 2. Process flow map

The most important aspects of a QI plan include communication, collaboration and consensus. All roles within the healthcare environment are team based and so it is imperative to include all members of the team and evaluate their influence on the project in order to check if the aims can be successful (Babiker et al., 2014). A useful QI tool in establishing this is a stakeholder analysis. The stakeholder analysis shown in Figure 3 demonstrates who is of high or low power and the interest they have within the project. One of the most important stakeholders in the project are the
patients who are undergoing the procedure. These patients have high interest in the project being successful as it can greatly decrease their waiting time for their surgery however, they have very low power in allowing this aim to become achievable. Other key stakeholders are the members of the medical team including NCHDs (non-consultant hospital doctors), PAs and nurses who all play a role in allowing the plan to be carried out effectively but have little power in controlling the change. In particular NCHDs and PAs will play an important role in verifying patient eligibility for day surgery and organising the day surgery waiting lists. However, a cautious approach needs to be undertaken when using a stakeholder analysis as it can lead to various biases and uncertainties but if used correctly it is still a very useful tool as it outlines the advantages and disadvantages of an individual and a team approach (Varvasovszky and Brugha, 2000).

There are a number of key stakeholders who have high power and high interest as they are the driving forces of the project and have the power to implement the change. The general surgery consultant wants to improve both the quality of their service and patient satisfaction while allowing them to prioritise procedures to run their service more efficiently. The hospital management withholds the most power in order to implement the change and have high interest as the QI plan can help decrease hospital costs and also allow more beds to become available for other inpatients, which also causes the bed manager to have high interest.
The high power, low interest category however is where most attention needs to be focused as these stakeholders play an important role but may have little interest in the project as they may believe proves little benefit to them or it may create extra work. One of the biggest challenges of the project is to present the project plan to these stakeholders, including radiology, anaesthetists and the day hospital management and influence them to have high interest in the project as it can allow more services to run more efficiently and improve patient care, which is the most important feature of the QI project. In order to have a successful outcome and achievable aims it is vital to have as many stakeholders in the high interest box as possible as a QI project cannot be successful without a team element.

Figure 3. Stakeholder analysis
Another useful QI tool utilised in the Define phase of the DMAIC model is a driver diagram. The driver diagram illustrated in Figure 4, is used to plan improvement project activities. The aim is clearly laid out with specific measurable aims and the primary drivers causing majority of the obstacles, which are preventing the aim from being achieved with the secondary drivers influencing the primary drivers. In essence, it is a visual strategy for tackling the complex problem. The primary drivers are the biggest areas that require improvement and allow specific areas to be focused on. For timing reasons and based on the resources available for the project it is important to find a specific area that can be improved one step at a time and allows the aim to be more achievable. By analysing the driver diagram the specific areas for improvement can be identified. There are many advantages to using a driver diagram as it allows a focused and motivated aim to be reached, it helps to identify which processes can be measured, it can be reviewed frequently depending on the circumstances and it is easy to communicate the improvement activities (Fathima, 2016). The driver diagrams are very useful tools in this project as it allows specific areas to be focused on for areas of improvement to reach the aim and ultimately, provides an area for the PDSA cycle to focus on (Fathima, 2016).
3.4.2 Measure

The second phase of the DMAIC model is the measure phase. Data collection is a fundamental component of any Quality Improvement project plan. The following data collection was carried out retrospectively over a two-year time frame for one chosen general surgery consultant within the chosen project site. Data collection can be carried out qualitatively, quantitatively or by a combination of both. The define phase of the DMAIC model is one of the most important phases as it allows us to map out the full progression using the process flow map and illustrate what happens in the
service. The driver diagram illustrates all of the driving forces that cause the problem of prolonged waiting lists for this cohort of patients waiting for LC. By analysing the driver diagram and process flow map, and advice from the stakeholders involved in the service, it was decided what data was required to be collected.

The cohort of patients was originally identified by obtaining a theatre schedule list from the chosen surgeon over a two-year timeframe and all procedures labelled ‘elective LC’ were selected. The patients name and MRN (medical registration number) were collected and the medical charts were obtained from medical records in the project site. For patient confidentiality and ethical purposes the patient details including their name, MRN and past medical history were not included in the data collection. The data was collected over a two-year period, from April 2016 to April 2018 to provide an adequate number of participants to allow reproducible results. Data collected for the study included patient demographics and was split into interval A and interval B type scenarios. Interval A calculated from their first presentation to pre procedure appointment and interval B being from when they were added to the waiting list to their elective surgery (Lau et al., 2007). Other process measures included reason for procedure, day surgery or inpatient procedure, length of stay, planned day of discharge, ASA grades, BMI, any pre or post-operative complications and time of day of the actual procedure. The data was entered into an Excel spreadsheet and analysed by the student as shown in Appendix 1. Some inconsistencies occurred in the data collection due to insufficient information available in the medical chart on certain patients. Five patients were also not included in the data collection due to inaccessibility of patient medical charts. Data collection solely relied on medical records for evidence and therefore results were
analysed from the information available in the charts. The results were then analysed and presented in pie charts, as illustrated in figures 5-8 to be easily visualised and interpreted to see where the problems arise and establish what QI plan could be carried out.

The majority of the participants in the study were female patients with an average of forty-eight years of age and an average BMI of 36.1. The most common reason for symptomatic gallstones was due to cholelithiasis and cholecystitis. The average waiting time for the patients was 14.7 months with 100% of the procedures carried out as inpatient cases. The student also investigated the number of cases admitted through the Emergency Department compared to GP referral, which revealed that 60% of patients were referred from GP and only 35% being admitted through ED as shown in figure 5. The student also investigated the start times for each procedure, if they were started before or after 12pm midday and from the participants included, only 42% of the cases were started before 12pm as shown in figure 6. 58% of cases were not started until after 12pm, with some cases not starting to as late as 5:15pm. There are several studies showing that start times have a huge influence on successful day surgery procedures running efficiently, as will be discussed in chapter 4. Discharges were also analysed to identify the LOS stay for this cohort of patients and it was identified that over 65% of patients were discharged the following day, 20% were discharged 2 days post-op and less than 15% of patients were discharged more than 2 days post-op as shown in figure 7. The ASA grades were also collected to identify if participants could have possibly been suitable for day surgery procedure. However, as discussed in the literature review this criteria is multifactorial.
Figure 5. Proportion of patients admitted through ED vs GP or other hospitals

Figure 6. Procedures starting before or after 12pm

Figure 7. Percentage of patients discharged on day 1 or 2 post op
3.4.3 Analyse

The third phase of the DMAIC model is the Analyse phase. This phase allows the team to interpret and analyse the data that was collected in phase two and identify where the main causes of waste are arising and how they could be eliminated. We will begin to see the root cause of the problem and highlight an area where improvements could be made and implemented to provide a more efficient well run service for better patient experience and decreased costs for the hospital. By analysing the data the root cause of the problem can be identified. A useful QI tool in helping establish the possible cause of the problems is a Fishbone Diagram, also known as the cause-and-effect diagram. A Fishbone diagram illustrates the possible causes that can all contribute to the problem (Lau, 2015). However, there are some limitations to the fishbone diagram as it only deals with time direction and not quantity. It portrays all of the causes listed in the diagram as equally important and therefore, the main root of the problem can be overlooked and effort can be wasted analysing the factors that may be only slightly contributing (Luca, 2016). Nevertheless, this QI tool was used for the project as it allows easy visualisation of the many causes of the complex problem with many contributory

![ASA Grade Diagram]

Figure 8. Proportion of patients in ASA grades 1-3

ASA Grade

- 23%
- 24%
- 53%
reasons. By dividing into groups including process, equipment, environment and staff we can visually analyse distinctive areas that can all be contributing to the problem. As seen in figure 9, there are a number of contributory reasons for long waiting lists.

![Fishbone Diagram](image)

**Figure 9. Fishbone Diagram**

Staffing can cause huge issues regarding waiting lists as these surgical procedures involve a multi-disciplinary team including anaesthetists, surgeons, nurses, physician associates and other possible medical teams such as cardiology and respiratory if the patients have other co-morbidities. Lack of communication between the teams or within
the team itself can cause massive issues and delays in patients undergoing their procedures. One of the biggest contributory factors is miscommunication within the team itself, between the consultant and NCHDs regarding the physical aspect of adding the patients to the waiting list. When it is decided that the patient requires the surgery there can be uncertainty as to who adds the patient to the list and also to which list they are being added to, if they are fit for surgery or not. Patients themselves can also contribute delays, due to the average age of the cohort of patients they can postpone procedures due to lack of availability and contribute further delays.

The process flow map as seen in figure 2, highlights a number of areas that can have delays in each step including whether they were admitted through ED or by GP referral. It was found that some of the ED admissions had shorter waiting times due to being added straight to the waiting list on first admission compared to GP referral, which always had to wait on a pre-clinic appointment, which added significant delays before they were added to the list. If the patient had a pre-clinic appointment, this also added delays as they were involved in both interval A and B compared to the patients who were added straight to the waiting list from admission, had a significantly reduced waiting time. Surgical complications including requirement of a drain post-operatively, post-operative pain and infection and nausea can also cause implications in non-suitability for day surgery procedures which cause delays in scheduling patients for day surgery procedures as opposed to inpatient. One of the causes for delay is the higher prioritised and emergency surgeries that are scheduled instead of elective ‘less urgent’ surgeries. With only ten theatres in total available in this hospital it is difficult for elective procedures to always be carried out as planned due to emergency procedures, which may take priority and utilise the theatre space. This general and colorectal speciality
also performs a number of other surgeries for example colon and rectal tumour excisions, which are seen as more of a priority then elective LC and so they can be pushed further down the waiting list and therefore causes further delays.

Equipment and environment also play influential roles contributing to delays as there is only one day hospital affiliated with the chosen hospital with only two available theatres for all services across the hospital and so availability can be limited due to high demand. Bed shortage can also be a huge problem as there is a lack of beds available in such a busy hospital located in the centre of Dublin, and beds must be available if possible complications arise during the procedure and therefore this can cause interruption in scheduling patients for day surgery procedures.

### 3.4.4 Improve

The fourth phase of the DMAIC model is known as the improve phase whereby certain aspects of the Analyse phase are highlighted for possible areas of improvement and a specific measurable aim is generated as a QIPP for implementation. The aim of this project is to help decrease waiting times for patients waiting for elective LC and so by analysing the first three steps of the DMAIC model the student identified that focusing on increasing the number of day surgeries compared to inpatient would help decrease these waiting lists.

There are a number of tools that can be used to derive an improvement plan including brainstorming, piloting and simulation and process flow improvement. In order to come
up with ideas for improvement, the stakeholders and other members of the QI team within the hospital had a QI meeting known as ‘Better Beaumont’, which is run weekly to brainstorm ideas for improvement (McNamara et al., 2016). The first three phases of the DMAIC model of this project were presented and various ideas were quickly generated for potential areas of improvement.

By coming up with a SMART aim the student focused particularly on the process flow map and fishbone diagram to identify where a SMART aim could be achieved (Bowman et al., 2015). It was agreed with the stakeholders that focusing on the point of adding the patient to the waiting list could be a good potential area for improvement. The literature suggests that day surgery can help decrease waiting times for multiple reasons due to shorter waiting times, decreased need for an inpatient bed and more efficient turnover (Dodaro et al., 2013). The area of improvement focused on was, patient eligibility criteria for day surgery and how they could be added to a day surgery waiting list instead of the general inpatient waiting list. The proposed improvement plan is to devise an inclusion and exclusion criteria checklist for patient eligibility for day surgery procedure for this particular cohort of patients, as shown in appendix 3. By implementing this checklist all members of the team including the NCHDs and PAs can classify patients for day surgery.
3.4.5 Control

The fifth and final phase of the DMAIC model is to review the improvements and verify if the improvement has been a success. If the project plan is found to be a success on implementation, it is vital to propose guidelines and allow the improvements to be carried out indefinitely and find ways in which they can be re-evaluated over time. By carrying out this phase it allows further areas of improvement to be identified and continuously improve the process and focus on other areas on the process map.
3.5 Summary

This methodology chapter discussed the Lean Six Sigma framework and the DMAIC model. Both of these were described and the various phases of the DMAIC model were discussed. A detailed analysis of each step of the project was explained with the use of various QI tools including the stakeholder analysis, the driver diagram and the fishbone diagram. The proposed project plan has now been mentioned and therefore the evaluation plan will be discussed in chapter 4 on how the proposed implementation plan will be evaluated to establish if it meets its desired aims.
4.0 Evaluation
4.1 Introduction

This chapter will discuss the evaluation methods that will be carried out on the implementation of the project. Section 4.2 will discuss the overview of the QI plan and the expected outcomes upon implementation of the project and section 4.3 will discuss how the project plan will be reviewed to verify if it is successful and how it can continue to be sustained. The control phase of the DMAIC model will be further explored and the dissemination plan will review how the plan will be communicated to all of the stakeholders and how correct education would be implemented.

4.2 Overview of QI Plan and Expected Outcomes

The DMAIC model of the Lean Six Sigma change framework guided this QIPP. A variety of QI tools were used throughout. The aim of this project plan is to increase the number of day surgeries compared to inpatient procedures with a long term overall goal of decreasing wait times for patients awaiting LC. A review of the literature was carried out and common themes provided a suitable area for potential improvement. The most important aspect of the project plan is patient experience and welfare and so this was kept as the main focus for the plan by reducing waste while also providing potential benefits for the hospital. The generation of a process flow map allowed the student to visualise the steps patients proceed through before undergoing their procedure. On analysis of the driver diagram it was identified that there are multiple drivers causing delays for patients awaiting their procedures.

By studying the relevant literature, it was decided that focusing on increasing the number of day surgeries would help to achieve the overall outcome of decreased
waiting times but it was imperative to create an attainable goal of how this could be achieved. Devising an inclusion/exclusion criteria checklist to distinguish patient eligibility for day surgery procedure could be implemented within the chosen general surgical team in the selected hospital. This proposed checklist could be easily available to all members of the team particularly the NCHDs and PAs to allow them to easily distinguish patients eligible for day surgery so they can be automatically booked and pre-assessed. According to the literature, patients should automatically be added to the day surgery waiting list, unless they reach a certain grade on the exclusion checklist.

The expected outcomes of the project are to provide a more efficient method for junior doctors to decide whether or not patients are suitable for day surgery and allow for more organised waiting lists. Based on discussions with the stakeholders one possible reason for extensive waiting lists was highlighted. New junior doctors joining the team every three months may be unaware of the criteria for day surgery and for precautionary measures are scheduling patients for inpatient surgeries where it is not required and therefore adding to the already extensive inpatient waiting lists. The following sections will describe the methods that will be carried out to evaluate if the project that would be implemented would be achievable and successful.
4.3 Evaluation

4.3.1 Aim of Control Phase of DMAIC

The fifth phase of the DMAIC model is the control phase, which describes the methods utilised in monitoring if the proposed method of improvement is sustained and successful in providing better quality of care for the patient. A checklist utilised by the members of the team to distinguish eligibility for day surgery waiting list will guide the proposed method of implementation. It is imperative to ensure that patient care is still being provided adequately and that patients feel they are still receiving the same level of care through day surgery as they would have as an inpatient and therefore this will also be monitored in the control phase to verify successfulness.

4.3.2 Monitoring & Review

In order to verify if the proposed method of implementation is successful, data collection will be required to be re-measured in the same format using the same guidelines as described in chapter 3. In order to allow sufficient time to establish if an improvement has been made, a significant time frame of 12 months needs to be given to verify if there is an increase in the number of day surgeries compared to inpatients and therefore a decrease in waiting time for this cohort of patients. As seen from the results measured, the average waiting time for a patient awaiting a LC is 14.7 months and an improvement may not be seen within a shorter timeframe. The proposed method of improvement should begin in September 2018 to allow for eight months of utilisation of the checklist before the data will start to be recollected. The data will be collected again from April 2019-April 2020, using the same starting and end months as the previous study to prevent any seasonal change affecting the
results and distinguish if an improvement of decreased waiting times has been established. Any patient who undergoes an elective LC within this timeframe will be identified and included in the study similar to the previous data collection.

As in the previous data collection, the patient details including name, date of birth, MRN and previous medical history will not be collected in order to adhere to patient confidentiality and ethical guidelines. The same parameters of data collection will be gathered from the medical charts obtained from medical records in the chosen hospital and entered into an Excel spreadsheet. The data will then be analysed including new waiting times, LOS, number of day surgeries and inpatient procedures, ‘interval A and B’ waiting times along with other co-morbidities and ASA grade. New data will also be gathered including if the new checklist was used and entered into the medical chart and therefore if the patients who were eligible were scheduled, and underwent day surgery compared to non-eligible patients due to other co-morbidities. Comparison of the old and new figures can be examined and therefore identify if the proposed implementation plan has succeeded.

In addition to the data collection, interviews will be carried out with all of the stakeholders involved in order to establish if there is overall satisfaction with the proposed implementation or if any further improvements can be made. It is vital to receive feedback from the stakeholders including the consultant and NCHDs to identify if they are satisfied with the new pathway process and establish if it is being used consistently particularly with new members in the team during rotation of the NCHDs. In order for a QI project to flourish and thrive it is imperative that all
members of the team are satisfied with the process and feel it is beneficial, otherwise the sustainability of the implementation plan will fail.

Finally, towards the end of the project, patients will also be interviewed to gather feedback on their overall satisfaction of the service and identify if they feel they are still receiving the same standard of care as an inpatient. The most important element of the project is patient experience and quality of care and therefore it is vital that patients are satisfied with the service and their standard of healthcare.

4.3.3 Expected Results
According to the British Association of Day Surgery guidelines, at least 60% of LC should be carried out as day surgery procedures (Solodkyy et al., 2018). It can be seen that 100% of cases over the two-year time period were carried out as inpatient procedures, with an average length of stay of only one night. Based on the HSE/RCSI (2014) document, if the checklist was implemented an initial attainable goal could be increasing the number of day surgeries by 40%. Using the day hospital and morning time scheduled slots this desired goal could be achieved.

4.4 Dissemination Plan
In order to successfully implement the proposed project plan it needs to be formally presented to all of the key stakeholders involved through a presentation. An education session would also need to be organised for all members of the medical team including the junior doctors and nurses as they will be the most likely users of
the checklist as it is in their job role to schedule patients for their procedure. A multi-
disciplinary meeting will be arranged with the project sponsor and stakeholders to
discuss the findings of the project and review how the plan will be implemented in
September 2018. Communication is one of the most important elements of a QI plan
and therefore it is vital that all members of the team involved are correctly educated
on the introduction of the checklist in order for it to be used efficiently and for
sustainability of the implementation plan.

If the evaluation phase proves successful, new results could be analysed and
displayed on a poster and PowerPoint presentation in order to present to other
general surgery teams within the hospital in the future. Long-term goals of the project
would be to decrease waiting times for this cohort of patients and therefore to extend
the checklist for use to other teams within the hospital to allow for decreased waiting
times for LC. This would allow overall data to be collected for the hospital, which
could decrease elective surgery waiting times that could be published in the hospital
annual report. Although these are long-term future plans, it will be considered in the
dissemination plan if the control phase of the project proves successful and
sustainable and the aims are met.

4.5 Summary
This evaluation chapter has discussed how the evaluation of the project will be
carried out following implementation of the project plan. The control phase of the
DMAIC model plays a crucial role in the implementation of a plan as it allows the
stakeholders to evaluate if the project has been successful and if it is being
sustained. Evaluation not only identifies if the project is successful, but also can identify if there are further areas of improvement. The dissemination plan is a critical component of a Quality Improvement project plan as communication and education is one of the most important aspects to involve a large multi-disciplinary team.
5.0 Discussion & Conclusions
5.1 Introduction

The final chapter of the dissertation discusses the impact the project will have on both the stakeholders and selected hospital and most importantly the patients. A review of the literature outlines the possible benefits of implementation, but this chapter discusses the specific benefits to the stakeholders and patients involved in this project. This chapter also discusses the strengths and limitations of the project. One of the most important elements of this chapter will discuss the learning’s from undertaking the project, how the student developed their knowledge throughout, how they have gained from their experience and how they would apply this knowledge in future potential projects.

5.2 Project Impact

The chosen QIPP as described in chapter 3 will have a positive impact on patient’s experience by reducing the waiting times for LC. The QIPP has the potential to provide a more efficiently led service by distinguishing patients who are eligible for day surgery procedures onto a different waiting list as opposed to the general surgery waiting lists that can have a multitude of various higher prioritised procedures. Using both the Lean Six Sigma model and the DMAIC framework, the student was able to highlight possible areas for improvement and devise a QIPP.

The project should have potential benefit for both stakeholders and patients. Patients who are at the frontline of the project receive the most benefit, as they will have decreased waiting times. By allowing this checklist to be implemented, it allows better organisation of the waiting lists for this speciality by categorising procedures,
which can be done as day patient as opposed to inpatient and therefore can allow better scheduling for procedures. According to the literature, patients that have few co-morbidities and a low ASA grade are eligible for day surgery criteria and therefore it is in the patient’s best interest to undergo day surgery procedure instead of having a LOS of at least one day.

The project plan will also positively impact the stakeholders involved in the project as it allows an easier method of distinguishing patients eligible for day surgery procedure particularly junior doctors who are unsure of clinical decision making and also for the consultant as it allows more availability on the inpatient waiting lists for more complex procedures to be carried out earlier. The project will also positively influence the hospital as it increases the availability of beds for other patients that require them and also allow the hospital to help target the national and international guidelines for elective surgery and also national waiting times (Beaumont Hospital, 2016, NICE, 2017).

5.2.1 Stakeholders and Practice

The introduction of an eligibility criteria checklist could have a positive impact on the key stakeholders, as it improves the efficiency and organisation of the service. Decreasing these wait times will not only benefit the patient but also the stakeholders as it allows better prioritisation of procedures and frees up scheduled slots for more acute emergency inpatient procedures and utilises day hospital scheduled slots. By simply better organisation of the surgical timetable, including scheduling the elective LC as the first and second procedure of the day, before 12pm midday provides
better chances that the patient can be discharged on the same day and allow the more complex scheduled inpatient procedures to be scheduled for later in the day. It also allows patients to be more informed and prepared for their surgery. The patients would be aware from the outset if they were scheduled for day surgery as opposed to expecting an inpatient stay with only the possibility of being discharged on the same day. Studies have shown that reduced waiting time for patients results in better surgical outcomes for the patients and therefore has a positive impact on both the patient and hospital. A positive impact from implementing this project would help align the hospital closer to the National standards and guidelines (NICE, 2017, HIQA, 2014).

5.3 Strengths of the project

One of the most important aspects of a QI project is devising SMART aim, which was achieved in this project plan. The student critically analysed the literature in order to highlight a potential area for improvement and proceeded to utilise the Lean Six Sigma model and DMAIC framework to create a specific achievable aim. An improvement plan has been proposed and is designed to have a measurable outcome over a defined period of time i.e. an increase in the number of day surgery procedures by 40% with a long-term goal of decreasing waiting lists for patients awaiting LC.

A particular strength of the project was the non-bias approach. The project was carried out by a PA student who rotated across a variety of different specialties across various different hospitals across the country and although had very little
influence in the process, could approach the data with a non-bias view. This objective view can positively influence the project as the data can be presented non-judgementally and provide an improvement plan. Although the project solution seems relatively simple, it can have major positive implications further down the line that can benefit more than not only the patients and the medical team involved but also other teams in the hospital and hospital resources. This project can provide better utilisation of resources for the hospital and HSE with a reduction in waste and costs. The proposed checklist could possibly be used over a number of other surgical specialities in the future. By carrying out a similar methodology, other procedures that could be carried out as day surgeries instead of inpatient could also have a similar checklist produced, similar to the one proposed for this project.

5.4 Limitations of the project

As a student, I do not have the required expertise or experience to produce a checklist that could be safely implemented but instead can only review the literature and communicate with the stakeholders in order to propose a checklist. Therefore, I will enlist the help of a multi-disciplinary team such as anaesthetists, cardiology and respiratory to physically produce a safe, practical and evidence based checklist that will be beneficial and provide the same standard and quality of care to the patient. The study by Al-Qahtani et al. (2015) could provide a possible template for the proposed checklist and along with advice from the stakeholders involved in the hospital a robust and comprehensive checklist could be implemented.
Another limitation is the small sample size of data collection. Ideally the data collection would have been gathered from all of the general surgery specialty within the project site but due to time constraints this was not feasible. Future work could involve collecting more data across other teams and identify if there is a variation in waiting times and the reasons that may be driving it. There are also limitations on the data collection as data from the sister hospital of the project site was not collected due to inaccessibility of medical records. Possible future research would include collecting this data and to establish if there are an increased numbers of day surgeries carried out within that hospital.

5.5 Recommendations

There are a number of recommendations for the project that can be carried out in the future, both during the implementation of the project plan and after. It is recommended to collect further data across all of the general surgical specialties across the project site to identify any variation in the average waiting times collected. A larger sample size would further verify the data. Compiling this data together would provide a further indication on the genuine waiting times within the hospital and give a true representation of the waiting times compared to the national average.

It is also recommended that on implementation of the project plan, a new process flow map of the patient journey be generated. It is important to follow the patient’s steps to identify if they are faced with any new obstacles compared to the previous journey or if the process flow map is similar just with shorter wait times. It is
imperative that the patients experience is at the same standard of care as previous and so this must be continuously monitored throughout the implementation process.

5.6 Learning about Quality Improvement

This QIPP was my first introduction to Quality Improvement in healthcare and so I believe I gained a lot from this experience. The research and extensive review of the literature I have carried out has broadened my knowledge on the QI process and how important a role it plays in healthcare. By using a variety of QI tools I have gained a greater understanding of the QI process. The Lean Six Sigma model and DMAIC framework helped direct me in defining the problem and what path to explore in order to find an improvement. The define phase helped me tease out the main problems with the help of the driver diagram and process flow map aided in visualising the actual paths a patient must go through the driving forces behind many of the obstacles that occur. The stakeholder analysis helped me to reflect on the multi-disciplinary team which all play a role of the process and their influence and power that they contribute and how to use these strengths in terms of improvement. Communication plays a vital role in the process and I learned that communication between all of the stakeholders was imperative and aided in the participation and involvement of all members.

I also learned that evaluation of a QIPP is as an important role as generating a plan as it establishes if the project has been successful and if any new problems have arose during the implementation plan. It is important to understand that sustainability of the project plan into daily practice is worthwhile as it allows continuous improvement overtime and identifies new areas for improvement.
5.7 Summary and Conclusion

Gallbladder disease is one of the most common GI presentations in hospitals in the developed world. Elective surgical waiting lists are extensive and patients can be waiting for a significant period of times for procedures due to demands in resources and shortages in the Irish healthcare system. The new Sláintecare report published in May 2017 recommends that patients should not wait more than 12 weeks for an inpatient procedure in the near future, but as we can evidently see from the data results in chapter 3, majority of patients are waiting for a considerably longer time than anticipated (Houses of Oireachtas Committee, 2017). These extensive waiting times can cause an increased level of dissatisfaction among patients and worsen their experience while also utilising more hospital resources and creating unnecessary waste.

Patient experience and quality of care is one of the most important aspects of healthcare and patient wait times greatly influence this. Literature shows that day surgery LC are effective procedures and there is strong evidence to show that they should be carried out as opposed to inpatient procedures (Durantez, 2014). By optimising the organisation of surgical waiting lists and scheduling eligible patients for day surgery procedures it will decrease patient wait times due to shorter day surgery lists and reduce hospital wastes and provide more beds for other patients that require them. By implementing the proposed checklist as discussed in this dissertation it will allow patients to be easily categorised onto these waiting lists and allow better organisation of the service. It is vital that the standard of care for patients is still upheld and patient experience is improved and this will be evaluated in the future after implementation of the proposed project plan.
6.0 References


CAMELIONE, J., MIGUEL, P., CARDOZO BIDART, L., TRAPANI, R., PESCE, M. & FERRERES, A. 2016. The waiting list for elective laparoscopic cholecystectomy (LC) and its impact on gallstones' complications. HPB, 18, e494.


DURANTEZ, F. G., MARANCE; CUELLAR, ANAVAS; ROBLES; JMENA; GRAU; JMSUAREZ AND RUIZ, FJPADILLO. 2014. Day surgery laparoscopic cholecystectomy: Comparative analysis in two consecutive periods in a cohort of 1132 patients. Day Surgery Australia, 13.


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<tr>
<td><strong>Submit signed sponsorship form</strong></td>
<td>Laura</td>
<td></td>
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</tbody>
</table>

**Key:**
- Complete
- Planned
- Behind Schedule

**Team members:**
- Laura McCaffrey
- Colorectal Team

**Sponsor:**
- Ms McNamara
Appendix 3: Inclusion/Exclusion Criteria checklist used in the study by Al-Qahtani et al. (2015)

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult patients ≥16 years</td>
<td>ASA grade &gt;II</td>
</tr>
<tr>
<td>American Society of Anaesthesiology (ASA) grade I &amp; II</td>
<td>History of acute cholecystitis</td>
</tr>
<tr>
<td>Symptomatic uncomplicated gallstone disease</td>
<td>Clinical or radiological evidence of acute cholecystitis</td>
</tr>
<tr>
<td>Normal liver function tests</td>
<td>Thickening of the gallbladder wall, or mass in ultrasound</td>
</tr>
<tr>
<td>Patient’s residence in Riyadh</td>
<td>Suspcion of stone in the common bile duct</td>
</tr>
<tr>
<td>Adult company overnight at home until next morning after surgery</td>
<td>Previous major or complicated upper abdominal surgery</td>
</tr>
<tr>
<td>Body mass index &lt;35</td>
<td>Patients who require extra monitoring and observation during the early postoperative period such as insulin-dependent diabetes or epilepsy</td>
</tr>
<tr>
<td></td>
<td>Patient’s residence outside Riyadh</td>
</tr>
<tr>
<td></td>
<td>Pregnant patients; and patients who were deemed unfit for anaesthesia and surgery due to new illness, such as upper respiratory tract infection, or uncontrolled hypertension</td>
</tr>
</tbody>
</table>