1-1-2018

Increasing Compliance with the National Sepsis Management Guideline through Sepsis Screening Form Utilisation

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Citation

Brett O. Increasing Compliance with the National Sepsis Management Guideline through Sepsis Screening Form Utilisation [MSc Thesis]. Dublin: Royal College of Surgeons in Ireland; 2018.

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Increasing Compliance with the National Sepsis Management Guideline through Sepsis Screening Form Utilisation.

MSc Physician Associate Studies 2018

Submitted in part fulfilment of the degree of MSc in Physician Associate Studies, RCSI.

Student ID: 16171438
Submission Date: 19th September 2018
Word Count: 11,873
Supervisor: Dr. Pauline Joyce
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:

Date:
Acknowledgements

I would like to acknowledge the following people:

First and foremost, I would like to thank my family. Thank you to my parents, Kathleen and George, and my sister Ciara, for your constant words of encouragement and support. I would like to thank my sister Aishling in particular, for forcing me to stay in the library until I reached my daily goal. Thank you for pushing me to do my best each and every day. It’s all ahead of you next year!

Dr. Pauline Joyce for her continued support and advice throughout this entire process.

Thank you to those who attended my presentation, for your expertise and advice on quality improvement. It was great to have your support.

And finally, thank you to my classmates, in particular the ‘QIP gals’, for listening to my proposals and ideas, keeping me focused in the right direction and ranting about how much we rant.
Abstract

Sepsis continues to be a major burden on the healthcare service at both a national and international level, affecting millions of people annually. Sepsis is a medical emergency and if not recognised and treated promptly, can be fatal. In an aim to tackle this burden, the National Sepsis Management Committee introduced the sepsis screening form to Irish hospitals in 2016. Using the DMAIC (define, measure, analyse, improve, control) framework for quality improvement (QI), this QI project plan aims to improve staff compliance to the National Sepsis Management Guideline by promoting the sepsis screening form and encouraging its use amongst staff in a public teaching hospital. This DMAIC framework guided this QI project plan through each stage. Using a variety of QI tools, including stakeholder analysis, fishbone diagram and process flow maps; the root cause of reduced compliance was identified. The results of this project showed that the sepsis screening form was not used in any of the patient charts investigated as part of this QI project plan. This QI project plan will discuss ways in which this problem can be improved through staff education and awareness.
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Chapter One

1.0 Introduction

1.1 Introduction

This chapter introduces the topic of this QI project plan. It discusses the organisation within which this project plan will take place and the context of this QI project plan within the organisation. The rationale for carrying out this QI plan will be outlined along with the role of the student in both the organisation and the project. Finally, this QI project plan will be described in this chapter and the aims and objectives will be defined.

1.2 Organisational Context

This QI project plan will be carried out in a public, University Teaching Hospital, located in Dublin. It is the second largest hospital in the Republic of Ireland (Beaumont Hospital, 2016), providing 24 hour emergency care and acute care services over 54 specialties to approximately 290,000 people. An average of 60 patients are admitted daily via the emergency department or for elective surgery. It has 820 beds and approximately 3,000 working staff along with students from the RCSI. Some of these specialties include Ear, Nose and Throat (ENT), Neurology and Neurosurgery, Renal Transplantation and Cochlear Implantations. Two surgical wards, each with a capacity of 35 beds each, were chosen to participate in this QI project plan.
1.3 Rationale for Quality Improvement Project Plan

The Global Sepsis Alliance, composed of experts from around the world, met in Autumn 2010 and agreed a publicly accessible definition of sepsis:

‘Sepsis is a life threatening condition that arises when the body’s response to an infection injures its own tissues and organs. Sepsis leads to shock, multiple organ failure and death, especially if not recognised early and treated promptly. Sepsis remains the primary cause of death from infection despite advances in modern medicine, including vaccines, antibiotics and acute care. Millions of people die of sepsis every year worldwide.’ (Czura, 2011) (Page 1.)

Singer et al. (2016) updated the definition of sepsis and septic shock. They recommend sepsis be defined as a life-threatening condition caused by a response to an infection, resulting in organ dysfunction. It can lead to severe sepsis; acute organ dysfunction or tissue hypoperfusion secondary to an infection or suspected infection and septic shock; severe sepsis as described with the addition of hypotension despite fluid resuscitation. Sepsis has the highest rate of mortality across all age groups affecting an estimated 20-30 million people annually worldwide (Albur et al., 2016). Research, published by the National Sepsis Programme, suggests that approximately 15,000 cases of sepsis were documented in Ireland in 2016, with 2,735 of those cases resulting in death (HSE, 2017b). Sepsis has no respect for age, colour, education or status. It is a silent and deadly killer. Sepsis is a medical emergency and if not recognised and treated promptly, can be fatal. A septic patient can present with in variety of ways with inconsistent signs and symptoms, thus making it all the more difficult to recognise and treat. In an effort to fight sepsis, a number of national screening tools have been put in place to aid in the early recognition and management of a patient who is at risk or who has developed sepsis.
Sepsis has become a topic of national interest recently since the death of Rory Staunton and Savita Halappanavar. The Irish television programme, Prime Time, broadcasted a segment on sepsis in February 2018. It focused on the lack of public knowledge around sepsis in Ireland, explaining that most do not possess even a basic understanding of the serious condition. A poll, carried out in January 2018 by Behaviour and Attitudes for RCSI and the Rory Staunton Foundation for Sepsis Prevention showed that only 28% of Irish people have an understanding of what sepsis is, with the majority of these people over the age of fifty (Kerrigan and Martin-Loeches, 2018). The Rory Staunton Foundation for Preventing Sepsis, founded in 2012, after the death of Rory Staunton, a twelve year old Irish boy living in New York. He contracted sepsis after scraping his elbow at school basketball game. Healthcare professionals, who cared Rory during his two presentations to hospital in the preceding days, missed the signs and symptoms of sepsis and as a result, Rory was not treated appropriately and died of sepsis after three days. The Rory Staunton Foundation was established to ensure that no other child or young adult dies from sepsis as a result of lack of prompt diagnosis and appropriate treatment (RSF, 2018).

The mission statement of the hospital involved in this QI project plan aims to deliver best quality of care to patients. Part of their aim is to work together to improve the way in which care is delivered by engaging in continuous development and enhancement (Beaumont Hospital, 2016). The aim of QI project plan encompasses the values of the hospital in that patient care is the main focus. The rationale for this QI project plan came from the student’s direct observation on clinical rotations in the chosen hospital. It was noted that the
sepsis screening form did not seem to be used regularly in patient’s charts on hospital wards based on their National Early Warning Score deterioration (score of \( \geq 4 \) or \( \geq 5 \) on supplementary oxygen). In addition to this, it was observed that, many patient charts with the sepsis screening forms attached, were not filled out correctly or in their entirety.

\[ \text{1.4 Aim & Objectives} \]

\[ \text{1.4.1 Aim} \]

The aim of this project was developed with guidance from the SMART model. The SMART model is a systematic approach in the production of a project aim. It requires the user to think about a Specific, Measurable, Achievable, Realistic, and Timely manner. Beginning this QI project plan, it was impossible to devise a SMART aim without obtaining some base line data. However, once this QI project plan was presented to stakeholders and other healthcare professionals and data was collected and analysed, it allowed the student to produce a focused aim. With guidance from the SMART model, the aim of this proposed QI project plan is to improve compliance with the sepsis-screening pathway adhering to the National Sepsis Management Guideline (NCG, 2014). The project will focus on improving staff adherence to the utilisation of the sepsis screening form on two surgical wards in a large, urban, public hospital in Dublin by 50% by December 2018.
1.4.2 Objectives

In order to achieve the aim outlined above, objectives were set out from the beginning. The objectives for the QI project plan are to:

1. Assess compliance with Sepsis Screening Pathway by May 2018
2. Establish baseline data on the usage of the sepsis screening form by June 2018
3. Explore reasons for predicted reduced compliance by talking with clinical staff and stakeholders by June 2018
4. Recommend areas possible for improvement by July 2018

1.5 Role of the Student in the Organisation

As a Year 2 Physician Associate student carrying out three weekly clinical rotations in the organisation described above, I do not have authority or power in the hospital setting. I am not present at all times. I acknowledge that there is a hierarchical structure in the hospital setting and I am at the lower end of this. My ability to influence others is limited as a student. I am aware that this is not a project that can be undertaken by myself alone. Therefore, my role in this QIP plan is to work as part of a team and work closely with a multidisciplinary team. I understand the importance of acknowledging the work already done by members of the hospital staff on this topic. I will set out my aims of the project and hope to get others involved and build interest in the project. I will require stakeholders with power, influence and interest to get involved and assist me in this QIP project plan.
1.6 Summary

This chapter provides an introduction to this QI project plan. It describes the organisation within which this QI project plan will take place and the role of the student in both the organisation and in the QI project plan. This chapter outlines the rationale for choosing this QI project plan and concludes by defining the project’s aim and objectives. Chapter 2 reviews the literature regarding the recognition and management of sepsis at both a national and international level. It also discussed the role of clinical support tools such as checklists in the healthcare system. Chapter 3 describes the methodology of the QI project plan. It explores different QI tools including stakeholder analysis and DMAIC framework. It defines the aim of the QI project plan, details how data was measured and analysed, and explains how an improvement would be implemented and controlled. Chapter 4 evaluates the QI project plan using evaluation methods. Finally, Chapter 5 provides a discussion and conclusion of the QI project plan as a whole. It discusses the project’s strengths and limitations. It also reflects on QI and QI methods used.
Chapter Two

2.0 Literature Review

2.1 Introduction

This chapter presents a review of the literature relating to the QI project plan undertaken by the student. The topics reviewed in this section are directed by the project aim outlined previously. Section 2.2 will outline the search strategy performed by the student in order to discover research related to the specific topic. Section 2.3 will explore three key themes related to the project aim, based on the literature.

2.2 Search Strategy

Research papers for this literature review were gathered through multiple sources including PubMed, Google Scholar and key websites such as the HSE website. A broad search was conducted initially, using Google Scholar, searching terms such as ‘sepsis’ and ‘quality improvement’, which yielded results. Pubmed was the major database used to search the literature for research surrounding sepsis. When using Pubmed, MESH terms including ‘sepsis’, ‘sepsis management’, ‘sepsis related mortality’, ‘quality improvement’, ‘checklists’, and ‘sepsis guideline’ were searched in order to narrow the search for studies relevant to this topic. The student scanned the abstract of selected papers and decided whether they were suitable. Search engines allowed the search year to be tailored to the users needs. Initially, only papers published in the last 5 years were selected, however, as the search continued, seminal pieces were discovered and so, were included.
in this literature review. This literature review also contains information from national audits such as the National Sepsis Report by the HSE, which was the main source of Irish data. International studies, national guidelines including the National Sepsis Management Guideline and news articles were also used.

2.3 Review of Themes

Certain themes evolved from searching the literature described above. The three themes compiled include: recognition of sepsis, sepsis management and checklists in healthcare. It is imperative that the student understands the current guidelines in place in Irish hospitals along with key studies that contributed to the development of sepsis management guidelines.

2.3.1 Recognition of Sepsis

The diagnosis of sepsis is difficult. Septic patients, or those at risk of developing sepsis, present in a variety of ways. Patients may present with unclear signs in the early stages of infection but clearer or more obvious signs in later stages. The HSE (2017b), showed that sepsis affected over 14,000 in-patient adults, excluding maternity patients, in Ireland in 2016 with a mortality rate of 25.8% in patients ≥75 years. A seminal piece of work by Rivers et al. (2001) stated that it is at the early stage that treatment is most effective and so the early recognition of sepsis is crucial to give patients the best opportunity to survive. In 2012, the National Early Warning Score (NEWS), Appendix 2, was introduced in phases
into Irish hospitals (Neary et al., 2015). This screening tool is aimed at categorising the severity of a patient’s illness, aiding early detection of patient deterioration, implementing a definitive escalation protocol and providing a structured communication tool between staff. It is a simple, cost-effective, ward based tool used for medical and surgical adult patients in acute hospital settings. It comprises of six physiological parameters that can be measured at the patient’s bedside. These parameters include respiration rate (per minute), peripheral oxygen saturations (SpO₂), heart rate (beats per minute), blood pressure (mmHg), mental state and temperature (°C) with each parameter given an objective score based on each reading (Neary et al., 2015, Albur et al., 2016). Each patient will receive a total NEWS score ranging from zero to twenty-one.

The NEWS Observation Chart also provides an Escalation Protocol Flow Chart, shown in Appendix 3. Each patient’s individual score will determine if: the patient’s minimum observation frequency should be increased by nursing staff, a doctor (intern); or their senior; should be notified for a medical review and finally, when a response is expected. For example, does the patient need to be reviewed by a doctor immediately, within 30 minutes or 1 hour (Neary et al., 2015). The National Sepsis Management Guideline states that if a patient’s national early warning score (NEWS) is 1 or 2, a nurse should respond and review the patient. A senior house officer (SHO) should be notified to review the patient within one hour if the NEWS is 3. If the NEWS of a patient is greater than or equal to 4 (or greater than or equal to 5 if patient is on supplementary oxygen (O₂)), and at risk of an infection, the Sepsis Screening Pathway should be started. A NEWS of greater than or equal to 7 requires a registrar review immediately. Evidence
suggests that prompt recognition of sepsis and early intervention and treatment of severe sepsis and septic shock saves lives, and so, it is imperative that a system is put in place to optimise early recognition and delivery of this care (Bond et al., 2013).

2.3.2 Sepsis Management

The management of sepsis still remains a challenge for clinicians and physicians (Zhang et al., 2017). As discussed previously, sepsis presents in many ways, varying in each presenting patient. Despite efforts to tackle this silent killer, sepsis is still a major cause of mortality in hospitals around the world. International sepsis related mortality accounts for more than that of myocardial infarcts (Yeh et al., 2010) and stroke (Feigin et al., 2009). In 2016, approximately 15,000 cases of sepsis were documented in Ireland in 2016, with 2,735 of those cases resulting in death. Early goal-directed therapy is a systems-based approach used in the management of conditions such as myocardial infarcts and stroke for over two decades (Weston et al., 1994). It was crucial that a protocol be produced formalising the management of sepsis and septic shock in an effort to identify and treat septic patients early.

Rivers et al. (2001) published a piece of work using early goal-directed therapy when approaching sepsis and septic shock management. Prior to this clinical trial, sepsis and septic shock were treated upon admission to the intensive care unit (ICU) (Nguyen et al., 2016). However, this clinical trial, carried out between 1997 and 2000, investigated the outcome of early goal-directed therapy, prior to
the admission of patients to ICU, where this therapy would normally be initiated. For the purpose of this clinical trial, patients with sepsis or septic shock were randomly selected during their admission into one single emergency department to receive either six hours of early goal-directed therapy or the standardised care for management of sepsis or septic shock, which was used as the control group. Early goal-directed therapy involved the early identification of sepsis, obtaining blood cultures, identifying a source of infection, prescribing and administering appropriate antimicrobial therapy and measuring and managing oxygen homeostasis optimally (Rivers et al., 2001). It also included administration of crystalloid fluids, vasopressors or vasodilators, inotropic support based on oxygen saturations and mechanical ventilation if haemodynamically unstable. In-hospital mortality, along with other parameters, were measured for 72 hours and then analysed against the control group. In-hospital mortality rates were 30.4%, after 72 hours, in the early goal-directed therapy group, which consisted of 130 patients, and 46.5% in the control group of 133 patients. This demonstrated a significant reduction in in-hospital mortality rates when compared to the control group who received standard therapy (Rivers et al., 2001).

The Acute Physiology, Age and Chronic Health Evaluation II (APACHE II) score, used to predict severity of disease and predicted mortality using 12 physiological variables, has been shown to be a good predictor of in-hospital sepsis related mortality (Sadaka et al., 2017). Rivers et al. (2001), not only demonstrated a reduction in in-hospital mortality, but improvements were also seen in patient’s central venous oxygen saturations, lactate levels, and APACHE II scores in the early goal-directed therapy group compared to the standardised therapy group.
Osborn (2017) and Weisberg et al. (2018) agree that this clinical trial was important in the overall development of targeted sepsis management and provided a structured protocol for clinicians. As a result, early goal-directed therapy was incorporated into the Surviving Sepsis Campaign’s 2004, 2008 and 2012 guidelines (Dellinger et al., 2004, 2008, 2013) to act as an international standardised care pathway for the management of sepsis and septic shock (Barochia et al., 2013, Nguyen et al., 2016). However, despite the incorporation of early goal-directed therapy into the Surviving Sepsis Campaign’s guidelines, compliance with this therapy was not universal (Osborn, 2017).

Following the publication of the clinical trial by Rivers et al. (2001), a trio of independent, multi-centre trials were carried out and published in 2014 and 2015: Protocolized Care for Early Septic Shock (ProCESS) (Yealy et al., 2014); Australasian Resuscitation in Sepsis Evaluation (ARISE) (Peake et al., 2014), and Protocolised Management in Sepsis (ProMISe) (Mouncey et al., 2015). This trio of randomized trials challenged the results of Rivers et al. (2001) finding that there was no mortality benefit after 90 days between patients who received 6 hours of early goal-directed therapy versus patients receiving normal resuscitation (Peake et al., 2014, Yealy et al., 2014, Mouncey et al., 2015). However, there are many reasons accounting for these results. One being that the ProCESS, ARISE and ProMISe clinical trials were performed over a decade after the original publication by Rivers et al. (2001). During this time, many interventions involved in the early goal-directed therapy protocol by Rivers et al. (2001) were widely accepted with the aid of the Surviving Sepsis Campaign.
guidelines 2004-2012, and initiated before randomisation for participation in preceding challenging clinical trials (He et al., 2007, Yealy et al., 2014).

The Surviving Sepsis Campaign devised a clever method of remembering the initial steps of the sepsis resuscitation bundle which is aimed at junior doctors and staff nurses. It is referred to as the ‘sepsis six’, shown in Appendix 1. The sepsis six include six non-specialised interventions to be carried out in the first hour of recognising sepsis (Robson and Daniels, 2008) with the aim of improving a patient’s chance of survival. A seminal study carried out by Daniels (2011) demonstrated that each element of the sepsis six, shown in Appendices 1, is associated with a reduced mortality. Care bundles such as this, are devised in an effort to increase staff compliance with evidence-based practice.

More recently, the Surviving Sepsis Campaign have updated their sepsis bundle once again as research and new evidence is continuously emerging (Levy et al., 2018). A “hour-1 bundle” has been developed, based on the 2016 guidelines by Rhodes et al. (2017). This updated sepsis bundle involves early resuscitation and treatment of patients with sepsis or septic shock. Clinicians are required to obtain blood samples including lactate, blood cultures, administer fluids and appropriate antibiotics and vasopressor commencement if required within one hour starting from “time-zero” (Levy et al., 2018). The updated sepsis bundle is encouraged to be initiated in a variety of settings including the emergency department, on in-patient wards and in an ICU setting.
2.3.3 Checklists in Healthcare

Checklists are becoming increasingly popular in the healthcare environment with the aim of reducing errors. They are a useful tool in improving processes and reducing mortality and morbidity (Thomassen et al., 2011). The idea of a checklist in any industry is to act as a reminder tool to ensure processes and protocols are adhered to (Haugen et al., 2013). Providing a checklist as a solution to a problem will not necessarily fix the problem as the success of a checklist relies heavily on human behavioural change and interaction and communication between team members (Leape, 2014).

One of the most widely used checklists in the hospital is the Surgical Safety Checklist (SSC), which was introduced by the World Health Organisation (WHO) in 2008 as part of the Safe Surgery Saves Lives campaign launch (Sivathasan et al., 2010, Haugen et al., 2013). The aim of this checklist was to reduce the number of surgical deaths and complications by improving communication between surgical staff and encouraging members of the theatre staff to voice any concerns they may have with regard to a patient, surgical equipment or the surgical procedure itself. The SSC was focused towards three key moments where errors were known to occur: sign-in, time-out and sign-out (Sivathasan et al., 2010) and required involvement of the surgeon, the anaesthetist and theatre nursing staff (Clay-Williams and Colligan, 2015). The ‘time-out’ stage of the SSC is an example of how staff communication, interaction and change in behaviour is imperative to its success. Everyone in the operating theatre is expected to gather together, stop what he or she is doing and listen for a few moments before each procedure begins (Haugen et al., 2013). This also supplies staff with the
opportunity to introduce themselves, aiding in the overall communication of those involved. An international pilot study highlighted the success of the SSC, which resulted in a decreased mortality and morbidity rate and reduced inpatient complication rates (Haynes et al., 2009).

Sepsis proves to be a serious burden on the health service in Ireland with approximately 15,000 cases reported in Ireland in 2016 (Doyle et al., 2017, HSE, 2017b). It is associated with high mortality and cost and increased use of resources (Hayden et al., 2016). In an aim to tackle this burden a clinical decision support tool (CDST) was introduced, by the National Clinical Sepsis Committee, to Irish hospitals in 2016 in an effort to encourage early recognition, treatment and management of sepsis and to improve the quality of life of sepsis sufferers and survivors (Doyle et al., 2017). CDSTs give the user a systematic approach to the delivery of care (Amland and Hahn-Cover, 2016). The National Clinical Guideline in Sepsis Management introduced a CDST in the form of the ‘Sepsis Screening Form’ in 2016. The sepsis screening form (SSF), Appendix 5, acts as a way to standardise practice of care (HSE, 2017b).

One downfall of many clinical checklists is its lack of focus in certain specialty areas. For example, Djogovic et al. (2012) aimed to identify specific care items from the Canadian Association of Emergency Physicians (CAEP) sepsis guidelines that were key and necessary in the emergency department (ED). Of the 20 care items listed on the CAEP sepsis guidelines, 15 were deemed necessary for the ED. Following from this, two levels of checklists were designed based on whether a hospital was a community, tertiary or rural hospital. In
contrast to this, the Sepsis Screening Form, implemented in Ireland by the Health Service Executive (HSE) in 2016, has not only been developed for hospital inpatients and ED patients, but for specialist areas including maternity, paediatric and neonates also to ensure a consistent care and communication pathway is established (Doyle et al., 2017, HSE, 2017b).

2.4 Implications of the Project

The publications reviewed in this literature review demonstrated the current guidelines on sepsis management at a national and international level. It also examined the research carried out, which aided the development of these guidelines. Many methods have been put in place in an effort to aid the early recognition of sepsis and appropriate management. These methods include the launch of the NEWS score, ISBAR Communication Tool, the sepsis six and the SSF. The SSF was introduced to Irish Hospitals in an effort to encourage early recognition, treatment and management of sepsis and to improve the quality of life of sepsis sufferers and survivors. From the literature reviewed, it is suggested that the initiation of the sepsis six resuscitation bundle and the use of the SSF reduces mortality rates of patients with sepsis. The clinical trails discussed in the literature review, demonstrates that the management of sepsis is ever evolving, however, sepsis remains a challenge for the healthcare systems. Based on the literature reviewed in this chapter, it was decided to focus on compliance with the National Sepsis Management Guideline. Elements of the guideline are not only associated with a reduced mortality, but should also have positive effects on the organisation.
2.5 Summary

In this chapter the literature review was introduced, accompanied by the search strategy undertaken by the student. This literature review focused on developing three themes, which became apparent while reading various publications. The three themes developed in this literature review included recognition of sepsis, sepsis management and checklists in healthcare. From the literature discussed in this chapter, it is evident that the fight against sepsis is occurring worldwide, in the community, emergency departments, in-patient wards and ICU departments. This literature review also reveals that there is still a long way to go in tackling sepsis and saving patient’s lives.
Chapter Three

3.0 Methodology

3.1 Introduction

This chapter examines QI in healthcare. Approaches to QI, with an overview of key QI methodologies, including six-sigma and plan-do-study-act, will be discussed in this chapter. The QI tools selected for this QI project plan will be described and the rational for the using these tools will be discussed.

3.2 Approaches to Quality Improvement

Quality assurance (i.e. a system for evaluating the level of quality of the delivery of a product or service) and quality control (i.e. a system of maintaining a desired level of quality of a product or service), both of which have been a focus of healthcare, are not sufficient to enhance outcomes (Varkey et al., 2007). Recommending changes and/or solutions without recognising the effects of these changes on the overall process of an organisation may improve one aspect, but cause harm to others. Therefore, organisations are consequently combining the historical focus on quality assurance with Quality Improvement (QI). As the healthcare system is naturally under financial constraint, effective QI methods are necessary. Methods that support the continuous development of interventions to care whilst having the ability to tested and evaluated for the delivery of high quality at a low expense must be sought (Taylor et al., 2014). Improvement tools
such as QI tools, have been used in the healthcare setting to decrease errors, reduce length of stay and improve patient satisfaction (Loftus et al., 2015).

There are many models used when approaching QI, some of which will be discussed here. The HSE (2016) established a framework for improving quality, which was focused towards improving quality, patient safety, experience and patient outcomes. This model is one example in approaching QI. The Framework defines ‘quality’ in Irish healthcare by four domains: person centred, effective, safe and better health and wellbeing. The HSE defines QI in healthcare as the efforts of not one individual, but the joint efforts of healthcare professionals, patients and their families, researchers, commissioners, providers and educators to drive change. These changes will result in improvements including better patient outcomes, care experience and continued support and development for staff driving these improvements (HSE, 2016).

The Plan-Do-Study-Act (PDSA) cycle and rapid cycle change are very commonly used improvement models when approaching QI in health care (McQuillan et al., 2016). Rapid cycle change involves continuous repetition of PDSA cycles, each one guiding and informing the aim of the succeeding cycle (McQuillan et al., 2016). PDSA cycles provide a structured model and method for the continuous development towards improvement in health care (Taylor et al., 2014). The PDSA model, displayed in Figure 1, is in a cyclical formation, demonstrating its ability to aid in continuous improvement. The PDSA cycle, combined with three fundamental questions for improvement, results in the Institute for Healthcare Improvement’s (IHI) Model for Improvement, which aims to accelerate
improvement. These fundamental questions are as follows: What are we trying to accomplish? How will we know if a change is an improvement? What change can we make that will result in an improvement? (Langley et al. 1996).

*Figure 1: IHI Model for Improvement*

The first step of the PDSA cycle is ‘Plan’. During this step, an area for improvement is identified and the plan for change is outlined (McQuillan et al., 2016). The ‘Do’ phase of the cycle is where the details and change outlined in the ‘Plan’ phase is implemented. The ‘Study’ phase is the third step of the cycle and involves analysis of the results of the implemented change, positive and negative, to determine its success. Finally, the ‘Act’ phase is used to determine if the change should be kept and continued, modified, or discarded and will impact the change of the next PDSA cycle beginning at the first step ‘plan’ once more (McQuillan et al., 2016, Taylor et al., 2014). Each step of the PDSA cycle assists in answering the core questions of the IHI Model for Improvement. QI models, such as Lean Six Sigma, allows and encourages one to look at the effects of change throughout an organisation or process.
3.3 Lean Six Sigma Model

Lean Six Sigma is the model selected for this QI plan. This model is a combination of two individual QI models, Lean and Six-Sigma. The QI methodology, Lean, was derived in 1990 from the Toyota Production System (Mason et al., 2015). Lean management is focused on eliminating waste; therefore creating value for customers while simultaneously standardising quality. Six Sigma, developed by Motorola Corporation in 1990 (Polk, 2011), reduces defects by identifying and solving problems effectively. The combination of these two models ‘Lean Six Sigma’ increases the efficiency of problem solving and process improvement using measurable results establishing time and cost savings and sustainable long-term targets (Liberatore, 2013, Loftus et al., 2015).

3.4 DMAIC

The Define-Measure-Analyse-Improve-Control (DMAIC) framework, Figure 2, is a QI model that combines both Lean and Six Sigma. It is a five-phase model used to reduce errors and variability. The five phases are as follows: (1) define the problem and issues that need to be addressed; (2) measure and quantify the problem by obtaining baseline data; (3) analyse the cause of the problem; (4) improve the process and remove barriers; and (5) control the process solution by routine monitoring (Loftus et al., 2015).

Figure 2: DMAIC Framework
A number of QI tools are used within each phase including stakeholder analysis, creation of a process flow map, developing a data collection plan and plotting results on a table. These tasks and tools displayed under each phase of the DMAIC framework, Figure 3, will be used in the development of this QI project plan.

<table>
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*Figure 3: Lean Six Sigma DMAIC Tools*

### 3.4.1 Define

The first of the DMAIC framework is the Define phase. In this phase the project leaders are required to define problems and issues that need to be addressed and setting the project’s improvement goals. The student was aware of advances regarding sepsis awareness in a public hospital during clinical rotations. The National Sepsis Guidelines (HSE, 2017b) including the ‘sepsis six’ are regularly
promoted in different ways throughout the hospital and are aimed at staff, patients and their families.

The National Sepsis Management Guideline, *Figure 4*, is an algorithm for the management of sepsis in an adult in-patient. It is initiated if a patient has an NEWS is ≥4 or ≥5 on supplementing oxygen or if an infection is suspected. Patients who fall into this category are then screened as to whether they are of high or low risk for contracting sepsis. The SSF should be used if a patient’s NEWS is ≥4 (or ≥5 on oxygen) and if there is suspicion of infection (HSE, 2017b).

Three groups of patients have been identified as being high-risk patients, with a mortality risk of >20% if they develop sepsis. These patients include: 1. Those at risk of neutropenia i.e. patients receiving cancer treatment in the form of chemotherapy or radiotherapy; 2. Patients with clinical evidence of new onset
organ dysfunction e.g. acutely altered mental status or evidence of a non-blanching rash; 3. Patients with comorbidities e.g. Diabetes Mellitus or Chronic Obstructive Pulmonary Disease plus ≥2 modified systemic inflammatory response syndrome (SIRS) criteria: temperature >38°C, or <36°C, heart rate >90 beats per minute, respiratory rate ≥20 breaths per minute, white cell count <4 or >12g/L, blood glucose >7.7 mmol/L (non-diabetic), new altered mental status (Kaukonen et al., 2015). If a patient falls into any of these 3 categories, the SSF states that a medical review is warranted within 30 minutes followed by initiation of the sepsis six resuscitation bundle. The purpose this guideline and the SSF is to standardise practice and to inform and guide healthcare professionals in the early recognition, treatment and appropriate referral process for patients with sepsis. Once a patient has been screening and is shown to be at high risk, the SSF should be used and filled out appropriately. However, from the student’s direct observation, the SSF did not seem to be utilised and implemented in patient’s charts on hospital wards. Evidence shows that patient outcomes are better when the SSF is used compared to sepsis cases where the SSF is not used (HSE, 2017b, Doyle et al., 2017). The student decided to improve the awareness and use of the SSF on two surgical wards in the project site. For this project, the goal is to increase compliance with the National Sepsis Management Guideline, focusing on the use of the SSF.

3.4.1.2 Process Flow Map
To begin to understand the reasons contributing to the reduced compliance with the National Sepsis Management Guideline, the student first had to ascertain if
the guideline itself was being used. The first step in determining this was to create a process flow map. This tool is an obvious choice during the early stages of a QI plan. It allowed the student to investigate each step of the guideline so it could be broken down, critiqued, questioned and improved.

![Process Flow Map](image)

**Figure 5: Process Flow Map**

The process flow map constructed by the student, *Figure 5*, begins when a patient presents with a NEWS of ≥4 or ≥5 on supplementing oxygen or if an infection is suspected. The nurse must then decide if there is suspicion of an infection in the patient and whether they are at high or low risk of contracting sepsis. This risk is based on the patient’s initial presenting complaint and inpatient hospital course. High-risk patients include: those at risk of neutropenia,
patients with clinical evidence of new onset organ dysfunction or patients with comorbidities plus $\geq 2$ modified SIRS criteria. If the patient is suspicious for having an infection or falls into one of the high-risk categories, the SSF should be filled out and management should ensue. The process flow map demonstrated that, while septic patients were being screened, escalated to an NCHD and initially managed using the sepsis six, the SSF was not being used to document and guide healthcare professionals through the sepsis management process. The process flow map was a very useful QI tool to allow the writer to understand the steps involved in the sepsis management algorithm. Upon completion of the process flow map, and student then continued with the QI project plan with the aid of a second QI tool, a stakeholder analysis.

3.4.1.3 Stakeholder Analysis

A stakeholder is anyone who has a particular interest in a project and one who can also have an impact on its success or failure (Silver et al., 2016). Stakeholders can be individuals or groups, supporters or resisters, people with high or low power or those with high or low levels of interest. It is important to include possible resistors of change, as their involvement from the beginning can influence how smoothly the QI plan develops and ultimately avoids conflict (Silver et al., 2016). The student must build a relationship with individuals and groups involved in order to gain their perspective and learn from their past experience to aid in a greater understanding of the QI project plan. For this QI plan, stakeholders were mapped out on a power versus interest grid (Bryson, 2004) under four categories; high power with high interest, high power with low interest,
low power with high interest and low power with low interest. Once the stakeholders are identified and mapped, it can be analyses and decided who should be approached. The stakeholder analysis map constructed for this QI plan is displayed below in Figure 6.

![Stakeholder Analysis Map](image)

Figure 6: Stakeholder Analysis Map

Upon talking to various stakeholders about the National Sepsis Management Guideline, it became apparent that, although the SSF was available on the wards at a designated sepsis station, the SFF was still not being filled out and displayed in patient’s charts. The SSF outlines that it is the nurse’s responsibility to engage Section 1 of the SSF. To ensure cooperation from nurses and other stakeholders, it is imperative that they understand that they are not being accused for the
reduced compliance of the SSF and that the responsibility and management of a septic patient lies with the entire team.

As part of the first phase of the DMAIC framework, a key sponsor must be chosen. A general surgeon, whose patients are primarily based on one of the wards partaking in this study, was chosen as the project sponsor for this QI project plan. The project sponsor should have high interest and high power in an effort to drive the success of the project and any improvement implemented.

3.4.2 Measure
The second phase of the DMAIC framework is the Measure phase. Measure is a vital component of any QI project (Varkey et al., 2007) and is necessary in objectively establishing baseline data. This baseline data aids with the recognition of problem areas along with the QI tools discussed above in the Define phase. The process flow map and fishbone diagram give a good indication as to what stage of the process data should be collected. There are different measures that should be taken into consideration including input measures (care provided by healthcare professionals), process measures and output measures (improvement in patient care) (Kassardjian et al., 2015, Silver et al., 2016). Structural measures should also be taken into consideration. Structural measures are those that assess the availability and quality of resources and policy guidelines already in place, which are crucial in the long-term sustainability of a process (Varkey et al., 2007). Together, these measures outline the ultimate goal, the process changes or protocol changes that need to be made (staff
education/ communication), unforeseen consequences and staff time costs (Silver et al., 2016). One process measure in this QI plan was to establish the number of times the SSF was used in patient charts as per the National Sepsis Management Guideline (Doyle et al., 2017).

This crucial measurement phase was carried out over a one-week period (including Saturday and Sunday) from 26/04/18- 02/05/18 on two surgical wards, each with a bed capacity of 35, in a public hospital. Clinical nurse managers (CNM) were notified that this project was taking place. However, the rest of the nursing staff remained unaware. This was important because a sudden behavioural change of clinical staff may have resulted, if it was known the QI project plan was being carried out on the wards selected. Data was collected by obtaining a daily list of all patients, on the two selected surgical wards, who had blood culture samples sent to microbiology for analysis in the 24-hour period prior. A Surveillance Scientist working in the Microbiology Department using the ‘ORDER AREA’ variable on Beaumont hospital information system (BHIS) computer system accessed the list. The list of specimen numbers was then entered into patient information profile explorer (PIPE), accessed from a hospital computer, to obtain the name and bed number of the patient listed. The student then examined the charts of each patient daily as the microbiology list was updated to determine SSF interaction. The total number of blood cultures sent to the microbiology lab for analysis over the 7-day measurement period on the two selected wards amounted to 17. The results are displayed in Table 1 below.
Table 1: Data Collection demonstrating use of SSF on Ward A and B

The table above, *Table 1*, displays the number of charts included in this study on two surgical wards, A and B, and whether or not the SSF was used in each chart. Data was collected over a 1-week time period (including Saturday and Sunday) and limited to 2 surgical wards with a bed capacity of 35 on each ward. Within this relatively short period of time it was revealed that the SSF was not used in any of the charts participating in the study.

### 3.4.3 Analyse

The Analyse phase is the third phase of the DMAIC framework. It is critical in deciding the root cause or causes of the problem defined (Loftus et al., 2015, Kassardjian et al., 2015). Each solution should be examined based on its potential impact, effort and cost (Kassardjian et al., 2015). Collected data can be analysed quantitatively, qualitatively, or both. The data analysis for this QI project plan was analysed quantitatively. Factors that contributed to a reduced compliance with the sepsis-screening pathway were explored using a fishbone diagram.
3.4.3.1 Fishbone Diagram

A fishbone diagram is a useful QI tool aiding the third phase of the DMAIC framework. This tool allows the different factors influencing the identified problem to be explored and easily visualised for everyone to interpret. The fishbone diagram devised for this QI plan includes contributions made by the student, nursing staff (including CNMs), members of the sepsis committee on the project site, non-consultant hospital doctors (NCHDs) and consultants. Contributions made by these staff members are displayed in Figure 7.

![Fishbone Diagram](image)

**Figure 7: Fishbone Diagram**

There were a number of factors contributing to a reduced compliance with the National Sepsis Management Guideline, all of which were divided into four categories: people, environment, method/process and equipment. Factors under
each heading were analysed and discussed with stakeholders. The student then proceeded to eliminate issues under each category.

Firstly, contributing factors that were out of the student’s control were established. These included arterial blood gas (ABG) analyser access and availability, which could not be influenced by the student undertaking this QI project plan. Other factors that were deemed out of the student’s control include lack of staff and frequency of staff turnover. Secondly, factors contributing to the reduced compliance that could possibly be influenced by the student were explored. It was thought that availability and access to the SSF and other fundamental equipment necessary to carry out the sepsis six was a contributor. However, further investigation suggested that this was not the case. Multiple SSFs are displayed at a designated ‘Sepsis Station’ near the nurse’s station on both surgical wards involved, along with the vital equipment necessary to proceed with the next steps of the sepsis screening protocol. Environmental contributors such as storage space and difficulty finding the SSF were also addressed and was decided that they were not major contributing factors to the overall reduced compliance. Delays in the process were explored briefly but were not measured as part of this study. The Fishbone QI tool aids greatly when deciding which factors influence the reduced compliance in the protocol while also assisting the student when deciding which factors can be influenced and changed as a student.

As each possible contributing factor was explored and investigated, it ultimately became apparent that it was partially due to lack of awareness and education on
when and how the SSF should be used and placed in patients’ charts. The student questioned clinical hospital staff on their opinion of the necessity of the SSF in an inpatient setting on surgical wards. It seems that a number of NCHD’s were unaware that a charted SSF supplied sufficient documentation in patients’ charts. Their view of the SSF was that it was a further task to be undertaken in addition to their own handwritten clinical notes, which is not the case. Rather, that the SSF solely acts as sufficient documentation.

Another possible factor contributing to the reduced compliance with the National Sepsis Management Guideline and the use of the SSF was the design of the form itself. It was reported from many clinical staff that the SSF is trying to do too much. For example the two-paged document it is expected to be a checklist, an educational document, a clinical guide and a time-flow chart all at once. Clinical staff reported that they are less likely to use it due to the form being overloaded with information and difficult to navigate. This issue however, was out of the student’s control. It states in the National Sepsis Management Guidelines that the SSF must be documented in relevant patient charts (HSE, 2017b).

3.4.4 Improve

The fourth phase of the Lean Six Sigma DMAIC framework is the Improve phase. It is during this phase that a solution is explored and created. Based on the results outlined in the sections above, improving the use of the SSF in patients’ charts was decided as the focus of this QI project plan. The use of this form is vital, not just because it is outlined in the National Sepsis Management Guideline,
but also because it has been proven that patient outcomes are improved when the SSF is used (Doyle et al., 2017) (HSE, 2017b). In order to improve to the use of the SSF, the lack of education and awareness of staff will be addressed. Awareness and promotion of the SSF will be executed in a variety of ways including education sessions, regular audits on wards and promotion during World Sepsis Day. Nursing staff could be approached initially, to emphasise the need for the SSF and to promote its utilisation. Awareness amongst nursing staff could be addressed as a priority as Section 1 of the SSF is required to be completed by them. Once all nursing staff have been targeted and made aware of the SSF and its role in the management of sepsis, awareness could be directed at NCHDs and physician associates. This would give other members of the medical team the knowledge of when the form should be initiated and ensure everyone works together to comply with the National Sepsis Management Guideline.

One possible opportunity, where staff of all levels meet on a regular basis, is at Medical and Surgical Grand Rounds. This is a weekly meeting where medical and physician associate students, nurses, CNMs, advanced nurse practitioners, laboratory staff, NCHDs and consultants all meet to present surgical cases, announce hospital updates and changes in protocols and inform staff on new publications across a variety of specialties. It is important that information given to staff is frequently updated as new evidence emerges.

A sepsis champion could audit and check patients’ charts on a regular, monthly basis. A sepsis champion on the wards would be a point of contact for any
queries regarding the SSF or the guideline itself. Staff members may feel supported knowing that someone onsite has specific knowledge and advice regarding the use of the SSF. A dedicated sepsis nurse could also encourage the correct documentation and coding of septic patients as demonstrated in the National Sepsis Report 2016 (HSE, 2017b). The allocation of a sepsis champion will also be discussed with stakeholders and the sepsis committee.

World Sepsis Day, an initiative by the Global Sepsis Alliance, is approaching once again in September. It was launched with the aim of raising awareness of sepsis amongst healthcare professionals and the general public alike and in an effort to promote QI initiatives towards sepsis recognition and management (Reinhart et al., 2013). World Sepsis Day occurs annually and will provide the perfect opportunity to spread awareness about the SSF and the National Sepsis Management Guideline. It is suggested that awareness is spread regularly in order to avoid frequent turnover of staff; 3 monthly for junior doctors (intern) and 6 monthly for senior house officers (SHO) and registrars becoming a potential barrier. The student has planned to contact the hospital’s sepsis committee to discuss and suggest ideas for promotion of the SSF on World Sepsis Day.

It is important that any improvement made, whether it is big or small, must have the ability to be evaluated in the future. Each improvement or solution should be implemented as a trial for a designated amount of time allowing for associated risks to be evaluated (Loftus et al., 2015). This will allow those involved to determine if a particular change was in fact an improvement. Once this is the
case, the improvement can be effectively implemented and controlled in an effort to maintain its success.

3.4.5 Control

The Control Phase is the fifth and final phase of DMAIC framework. It is crucial that once the changes are made and proved to be successful, the goal is to then maintain these improvements in the long-term (Kassardjian et al., 2015). This project is a QI project plan and so implementation of the proposed changes and improvements was not required. Methods describing how the improvement could be controlled will be discussed in the Evaluation Chapter.

3.5 Summary

In this chapter, the methodology chapter, a variety of QI models were introduced to the reader. Reasons for selecting the DMAIC framework were then discussed. Finally, the five phases of the DMAIC framework were outlined in detail and demonstrated how the student used this framework to develop this QI plan. The aim of this QI project plan is to improve sepsis management awareness on two surgical wards through the use of the SSF. Methods of improvement and control were explored and discussed in this methodology chapter and will continue to be discussed throughout the next chapter entitled ‘Evaluation’.
4.0 Evaluation

4.1 Introduction

This chapter will evaluate the QI project plan proposed. An overview of the QI plan and expected outcomes will be outlined. The aim of the Control phase of the DMAIC framework and proposed methods of how the improvement will be maintained in the future will also be discussed in this chapter.

4.2 Overview of QI plan and Expected Outcomes

The aim of this QI plan is to improve compliance with the National Sepsis Management Guideline. The project focused on staff adherence to the utilisation of the sepsis screening form on two surgical wards on the project site. The student began with a review of the literature, gathering information from a variety of sources relevant to the theme of the QI project plan. Based on the themes revealed upon reading the literature, the student created a SMART aim. The SMART aim encouraged the student to think about a specific, measurable, achievable, realistic and time-based aim. Once a defined aim was developed, Lean Six Sigma’s DMAIC framework was employed to assist the student in each phase of the project.

Expected outcomes for this QI project plan are divided into short-term and long-term outcomes. Short-term expected outcomes include implementation of a
Sepsis Screening Guideline promotional programme and increased awareness of the SSF amongst staff. It is expected that with the initiation of a promotional programme, increased use of the SSF will result and better patient outcomes will occur in the long-term. This has been evidenced in the National Sepsis Report in 2016 (HSE, 2017b). It is expected that along with better patient outcomes, staff will feel better equipment to manage a septic patient or patients with suspected sepsis.

4.3 Evaluation

4.3.1 Aim of Control Phase of DMAIC

As this project is a QI project plan, suggested changes were not implemented. As a result of this, the final phase of the DMAIC framework, the Control phase, was not carried out. However, methods and tools that would be used in this phase will be discussed in this chapter.

A process flow map is an effective tool for displaying steps involved in the National Sepsis Management Guideline. Once this guideline was investigated further and changes at key moments were advised, an updated process flow map was devised. Updating the process flow map is imperative for controlling and monitoring change.
The proposed change or improvement suggested in this QI project plan was to focus on increasing compliance with the use of the SSF. With the improvements suggested in Figure 8, it is hoped that there will be an increased compliance with the SSF and the National Sepsis Management Guideline (HSE, 2017b) will be adhered to. It is important to emphasise any new change in a process to staff to gain their understanding and support. It is crucial that a new process or change in a key moment of a process is clear and concise and that all staff involved are updated to ensure compliance and the highest quality of care and patient safety. The emphasis directed at staff should ultimately lead to the project’s success.
4.3.2 Monitoring & Review

Assessment of the success or failure of the implementation by re-evaluating and collecting new baseline data is required with any QI project. This additional data collection can be carried out in a similar way to that described in the measure phase in the methodology chapter. Measurement of improvement efforts post-implementation can result in the either the desired outcome, unforeseen problems in other steps of the process or highlight the need for additional efforts to be made ensure the success of the change (Varkey et al., 2007).

In order to monitor and review a change, results must be re-measured and evaluated. Data will be collected at different stages of this monitoring and review process. Pre-intervention data, discussed in the methodology chapter, will be compared with data collected during the start up phase of the implementation, followed by further data collection reflecting compliance post full implementation. The data will be collected in a similar method to the original baseline data. A list of specimen numbers is compiled, with the help of the microbiology department. These specimen numbers represent blood cultures, taken in the last 24 hours, on participating wards. Each specimen number is inserted into PIPE to obtain the patient name, medical record number (MRN), ward, and bed number. Compliance with the Sepsis Screening Guideline is then measured by investigating whether or not the SSF is displayed and filled out in the patient’s chart. An excel spread sheet is created displaying the results with a ‘yes’ and ‘no’ column for whether or not the SSF is used. These results will be compared to the pre-intervention excel spread sheet. The patient’s personal details are not displayed in this project in an effort to maintain patient confidentiality and adhere
to ethical guidelines. Timing of the evaluation is important and should be undertaken at a similar time as the original baseline data collection e.g. mid intern rotation (occurs quarterly) to minimise variability.

Monitoring and review of the project implementation, along with additional data collection and result comparison, will involve meetings with stakeholders and other team members involved. The supervising consultant, along with CNMs, staff nurses and the hospital’s sepsis committee will be questioned on their thoughts on the outcome of the project and whether they view it as a success or fail. It will also provide the opportunity to address further areas of improvement and ways with which the long-term goals can be driven to further success. Stakeholder’s continued involvement in the project is imperative for this reason. Finally, a staff survey will be issued questioning reasons for reduced compliance to the National Sepsis Management Guideline, specifically use of the SSF. It will shed light on whether concerns outlined in discussions with staff before the implementation of change are still evident.

4.3.3 Expected Results

It is expected that all patients suspected of having sepsis will have a SSF completed fully and displayed in their chart. This expectation is provided that members of staff identified on the NEWS chart, ISBAR communication tool and SSF carry out their roles as described in the guideline. This QI project plan is not setting out to change the National Sepsis Management Guideline, but to promote the guideline and ensure that it is carried out correctly. It may be that the majority
of staff are already aware of the National Sepsis Management Guideline and the SSF, in which case could be an advantage or disadvantage to the project. If this is the case, and the protocol is still not being adhered to, despite possessing the knowledge necessary, the implementation of change could be even more challenging. For this improvement to be a success, a change in behaviour of staff is required. Attempting to change the behaviour of staff in an already busy environment can be difficult. It requires continued support and reinforcement for its success.

4.4 Dissemination Plan

The first step in the dissemination plan of this project must involve the stakeholders identified. The student will commit to presenting the project findings and the proposed improvement plan to the project sponsor initially and with agreement from them, to stakeholders, the hospital’s sepsis committee and staff members on each participating ward. Further to presenting this QI project plan to the project’s stakeholders, it will written up with the hope, that after further development, that it may be published in the future. The findings and improvement plan of this QI project plan will also be presented at the 5th Sepsis Summit in September 2018 as a poster presentation. It is important to share the findings of the project with staff members on the wards involved and with other healthcare staff and so it will be presented at Medical and Surgical Grand Rounds at the project site in an effort to reach a wider variety of healthcare professionals. Presenting one’s work is important to initiate and encourage conversation around the topic specified and more. The goal of this QI project is to
increase awareness and proper use of the SSF as per the National Sepsis Management Guideline. Promotion of the SSF will ultimately lead to its increased use in patients’ charts.

4.5 Summary

The evaluation process involved in this QI project plan was discussed in this chapter. It outlines an overview of the QI project, which began with a review of the literature and discusses the QI tools used in proceeding process. The Control phase of the DMAIC framework was explored in further detail here. Methods on how the project would be monitored and reviewed were discussed and expected results were reviewed. This chapter also detailed the dissemination plan, which is of great importance when moving forward with a project.
Chapter Five

5.0 Discussion & Conclusion

5.1 Introduction

In this final chapter, the potential impact of this QI project plan will be discussed. The project will be critiqued through the exploration of its strengths and limitations. The potential impact of the project will also be discussed from the point of view of specific stakeholders. Research contributing to the further development of this QI project plan will also be suggested. To conclude this chapter, the student’s thoughts on the QI process will be explained.

5.2 Project Impact

As this QI project plan was not carried out, the project impact can only be predicted. Thus, the potential impact of this QI project plan on stakeholders and practices on hospital wards will be discussed in section 5.2.1 and 5.2.1.

5.2.1 Stakeholders

Identifying stakeholders is vital in the early phases of any QI project. They play a very important role in the development and advancement of each phase involved in QI. Maintaining a good relationship is key to a smooth progression through the QI journey. Many key stakeholders were identified in the early stages of this QI project plan, all of which had varying levels of interest and power. These include
hospital management, the consultant GI surgeon sponsoring this project, CNMs, nursing staff and most importantly, patients.

Patients were identified as having low interest and low power in Figure 6. Improving early recognition and timely management of patients with sepsis is a key focus of the National Sepsis Management Guideline and Surviving Sepsis Campaign. Further to this, the SSF acts as a checklist and reminder to hospital staff of each step required in the National Sepsis Management Guideline to be carried out in a given time frame. As a result, a reduced mortality has been associated with the use of the SSF (HSE, 2017b). This result highlights the importance of the SSF and makes this QI project all the more relevant. Using this tool consistently ensures every patient has access to the highest level of care and equal opportunity of survival.

This QI project would potentially have a positive impact on hospital expenses. This would be of great interest to hospital management. Patients with sepsis more often than not require admission to an ICU setting resulting in a prolonged length of stay and increased expenditure. Studies have shown that early recognition and appropriate management of patients with sepsis or septic shock results in a reduced hospital length of stay (NCG, 2014).

The potential impact of this QI project plan on nursing staff and CNMs will be a standardisation of practice. Initially, it may seem like extra work for nursing staff to initiate the use of the form, but with increased awareness and education of the positive impact of the SSF, staff will want to use the form, not just because it is
part the National Sepsis Management Guideline, but because of the proven
benefits for patient outcomes.

5.2.2 Practice

It is hoped that promotion of the National Sepsis Management Guideline will
provide staff with a clear understanding of the guideline. It is anticipated that with
knowledge of the benefits provided by the SFF, compliance will be increased.
Practice relating to sepsis management on hospital wards will require change in
behaviour from staff members. The day-to-day management of sepsis must
automatically include initiation of the SSF without thought. The desire would be
that with promotion and education regarding the role the SSF plays in the
recognition and management of sepsis and septic shock will result in the SSF
being used in 100% of appropriate patient charts. As a result, coding of sepsis
will improve allowing auditors to access data that represents a true reflection of
sepsis and its management in Irish hospitals.

5.3 Strengths of the Project

A strength of this QI project plan is that it was developed through the use of QI
tools such as Lean Six Sigma DMAIC framework. QI tools equipped the student
with a step-by-step guide to undertaking a QI project. The student progressed in
the project beginning with the define phase of the DMAIC framework and
continuing on to the proceeding phases: measure, analyse, improve and control.
The SMART aim assisted the student in producing a **Specific**, **Measurable**, **Achievable**, and **Realistic** aim to be carried out in a **Timely** manner.

Targeted communication with stakeholders also proves another strength of this QI project plan. CNMs on participating wards were made aware initially that the student was considering undertaking a project on sepsis management. As the project progressed, CNMs were made aware of the student’s intentions by being invited to attend a presentation by the student and to offer advice. It was important to the student that the nursing staff did not feel targeted as the cause for the non-compliance to the SSF utilisation and that they were reassured that sepsis management requires the combined effort of the entire team.

A non-biased approach was taken throughout the process of this QI project plan. It was important that the student remain unbiased during the measure phase of the DMAIC framework where a baseline data was collected. Ultimately the strength of this QI project plan was the way in which it identified the problem of non-adherence to the National Sepsis Management Guideline. The data collected for this QI plan determined a 0% compliance with use of the SSF on two surgical wards over a one-week period. The use of the SSF has been shown to improve patient outcomes (HSE, 2017b, Doyle et al., 2017). Focusing on the key element of the Sepsis Management Guideline will benefit patients directly.
5.4 Limitations of the Project

A number of limitations exist in this QI project plan. Firstly, due to time constraints, staff opinions regarding the non-use of the SSF were not formally quantified. The student would have hoped that, given more time, a survey, targeting clinical staff, be carried out with the aim of compiling reasons for non-compliance and prioritising them accordingly. Secondly, the timeframe within which this data was collected was only over a one-week period (including Saturday and Sunday) and therefore included a small cohort of patients. The data collected over this time period suggested a clear trend in the use of the SSF and so, the student viewed this data as sufficient for the purpose of this QI project plan. Finally, this QI project plan only collected data from two surgical wards, excluding medical wards. This was one contributing reason for the small patient cohort available for inclusion in this QI project plan.

5.5 Recommendations

This QI project plan focused on the use of the SSF, however, there were many aspects of the National Sepsis Management Guideline that were not explored in this QI project plan. This includes the use of the sepsis six take three, give three protocol and the appropriate use of the escalation protocol. Further investigation into whether the sepsis six, is being carried within the recommended one-hour time frame with and without out the aid of the SSF would be interesting. Additionally, assessing the appropriate use of the escalation protocol as per the ISBAR Communication tool, Appendix 4, and NEWS Patient Observation Tool, Appendix 2, would also be related to this project and assist in assessing
compliance to the National Sepsis Management Guideline in its entirety (HSE, 2017b).

For this QI project plan, the data collected suggested a trend in SSF utilisation on surgical wards. Ideally, data would be collected over a much longer period of time, possibly up to one year, to include a larger patient sample size. It would be recommended that quantitative data, in the form of a staff survey, be collected to establish the primary reason for the non-compliance with the SSF.

Staff feedback after attending a sepsis protocol awareness session could be encouraged in order to maximise the effectiveness of the session. Staff who work on wards and manage septic patients on a daily basis would have an abundance of knowledge and could recommend what they think may or may not work. This feedback is vital in supporting staff in the continuous fight against sepsis. It is recommended that all new incoming healthcare staff members attend a mandatory session outlining the hospital’s sepsis management protocol so that an expected standard of care is highlighted from the beginning, aiding the hospital’s adherence to the National Sepsis Management Guideline.

5.6 Learning about Quality Improvement

This QI project plan was my first endeavour into the process of Quality Improvement. Whilst I had experience in certain aspects of this process, it was largely new to me. The process began with a review of the literature. This I had experienced whilst undergoing previous studies and research. However, the standard expected for this piece of work was higher than that produced in the
past, which I found challenging at times. Once key themes were identified, their development was very interesting. The stages following the literature review required the incorporation of a variety of QI tools. Previous to this QI project plan, I was not aware of tools designed specifically for QI. My understanding of QI was to simply change or alter something with the intention of improving it. I was unaware of the planning and measurement involved before a change can be implemented. The Lean Six Sigma DMAIC framework provided invaluable guidance throughout this QI process with a clear and precise outline of what is involved in each section. The DMAIC framework is outlined in Figure 3. The Control phase was one that I had never considered before, but realise now that a method of control is vital to the continued success of a QI project. Another QI tool that assisted me greatly was the fishbone diagram. This diagram allowed structured brainstorming to occur for different potential contributors causing an effect. It was useful to look back on at various stages of the project as a reminder of where to focus. Through studying QI, I have a newfound appreciation of the work that goes into implementing any change, big or small. QI tools have been used in companies such as Toyota and Motorola, worldwide for many years. The continuous use of these tools and their transition into healthcare, demonstrates their importance and ability to succeed. Upon reflection of this process as a whole, I am certain that I will use QI tools, similar to those used in this QI project plan, when approaching QI projects in the future.
5.7 Summary and Conclusion

Sepsis is a major burden on healthcare services worldwide, claiming the lives of millions annually (Fleischmann et al., 2016). This QI project plan aimed to increase staff compliance to the National Sepsis Management Guideline through the use of the SSF, on two surgical wards of a public hospital. The pathway outlined by the National Sepsis Management Guideline requires that a SSF be initiated and filled out accordingly if a patient’s NEWS is ≥4 (or ≥5 on oxygen) and if there is suspicion of infection. However, the SSF is not being utilised in patients’ charts. The student felt an improvement on the compliance with these forms, would have a positive impact on the hospital and patient’s chance of survival (HSE, 2017b). The improvement proposed by the student, after undergoing each stage of Lean Six Sigma’s DMAIC framework, was to increase the awareness of the SSF to staff and to educate current and incoming staff when and how the SSF should be used and the advantages of using the SSF.
6.0 References


Kerrigan, S. W. & Martin-Loeches, I. 2018. Public awareness of sepsis is still poor: we need to do more. Intensive Care Med


### Appendix 1: Sepsis Six 1-Hour Bundle

<table>
<thead>
<tr>
<th>Take 3</th>
<th>Give 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Culture</td>
<td>Oxygen</td>
</tr>
<tr>
<td>Lactate</td>
<td>Fluid</td>
</tr>
<tr>
<td>Urinary Output</td>
<td>Antimicrobials</td>
</tr>
</tbody>
</table>
# Appendix 2: National Early Warning Score Chart

## NATIONAL EARLY WARNING SCORE

### ADULT PATIENT OBSERVATION CHART

**Escalation Protocol Flow Chart**

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Minimum Observation Frequency</th>
<th>ALERT</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12 Hourly</td>
<td>Nurse in charge</td>
<td>Nurse in charge to review if new score 1</td>
</tr>
<tr>
<td>2</td>
<td>6 Hourly</td>
<td>Nurse in charge</td>
<td>Nurse in charge to review</td>
</tr>
<tr>
<td>3</td>
<td>4 Hourly</td>
<td>Nurse in charge &amp; Team/On-call SHO</td>
<td>1. SHO to review within 1 hour</td>
</tr>
<tr>
<td>4-6</td>
<td>1 Hourly</td>
<td>Nurse in charge &amp; Team/On-call SHO</td>
<td>1. SHO to review within 1/2 hour 2. Screen for Sepsis 3. If no response to treatment within 1 hour contact Registrar 4. Consider continuous patient monitoring 5. Consider transfer to higher level of care</td>
</tr>
<tr>
<td>≥ 7</td>
<td>½ Hourly</td>
<td>Nurse in charge &amp; Team/On-call Registrar Inform Team/On-Call Consultant</td>
<td>1. Registrar to review immediately 2. Continuous patient monitoring recommended 3. Plan to transfer to higher level of care 4. Activate Emergency Response System (ERS) (as appropriate to hospital model)</td>
</tr>
</tbody>
</table>

**Note:** Single Score triggers

- Score of 2 HR ≤ 40 (Bradycardia) ½ Hourly Nurse in charge & Team/On-call SHO 1. SHO to review immediately
- Score of 3 in any single parameter ½ Hourly or as indicated by patient’s condition Nurse in charge & Team/On-call SHO 1. SHO to review immediately 2. If no response to treatment or still concerned contact Registrar 3. Consider activating ERS

*In certain circumstances a score of 3 in a single parameter may not require ½ hourly observations i.e. some patients on O₂.

- When communicating patients score inform relevant personnel if patient is charted for supplemental oxygen e.g. post-op.
- Document all communication and management plans at each escalation point in medical and nursing notes.
- Escalation protocol may be stepped down as appropriate and documented in management plan.

**IMPORTANT:**

1. If response is not carried out as above CNW/Nurse in charge must contact the Registrar or Consultant.
2. If you are concerned about a patient escalate care regardless of score.

### National Early Warning Score (NEWS) Key

<table>
<thead>
<tr>
<th>SCORE</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Rate (bpm)</td>
<td>≤ 6</td>
<td>0 - 11</td>
<td>12 - 20</td>
<td>21 - 24</td>
<td>≥ 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SpO₂ (%)</td>
<td>≤ 91</td>
<td>92 - 95</td>
<td>≥ 96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhaled O₂ (F.O₂)</td>
<td>Ar</td>
<td>Am. O₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>≤ 90</td>
<td>91 - 100</td>
<td>101 - 116</td>
<td>111 - 249</td>
<td>≥ 250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Rate (BPM)</td>
<td>≤ 40</td>
<td>41 - 50</td>
<td>51 - 90</td>
<td>91 - 110</td>
<td>111 - 130</td>
<td>≥ 131</td>
<td></td>
</tr>
<tr>
<td>AVPU/CNS Response</td>
<td>Alert (A)</td>
<td>Voice (V), Pain (P)</td>
<td>Unresponsive (U)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp (°C)</td>
<td>≤ 35.0</td>
<td>35.1 - 36.0</td>
<td>36.1 - 38.0</td>
<td>38.1 - 38.9</td>
<td>≥ 39.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* When systolic blood pressure is ≤ 90mmHg, request Doctor to review.

**Version 7 April 2016**
### Early Warning Score System

**Patient Name:**
**Date of Birth:**
**Healthcare Record No.:**
**Address:**

**Consultant:**

**Screen for Sepsis:** If NEWS ≥ 4 (despite supplementary O₂) and Infection suspected

#### Frequency of Observations

<table>
<thead>
<tr>
<th>Year</th>
<th>ABCDE Assessment</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### ABCDE Assessment

- **A (Airway):**
  - Airways
  - Tachypnea
  - Aspirate
  - Oxygen saturations
  - Requires intubation

- **B (Breathing):**
  - Apnea
  - Tachypnea
  - Bruxism
  - Cyanosis
  - H 25

- **C (Circulation):**
  - Cardiac output
  - Hypotension
  - Blood pressure
  - Fluid resuscitation
  - Requires invasive monitoring

- **D (Disability):**
  - Delirium
  - Coma
  - Hemiparesis
  - Change in level of consciousness
  - Requires ICU

- **E (Exposure):**
  - Fever
  - Chills
  - Shaking
  - Rhinorrhea
  - Skin turgor

#### Hypertension

- **Condition:**
  - Hypertension
  - Hypotension
  - Intensive medical review
  - 12 lead ECG

#### Bradycardia

- **Condition:**
  - Bradycardia
  - Sinus bradycardia
  - Cardiac arrest
  - V 15

#### Sepsis

- **Condition:**
  - Sepsis
  - Septic shock
  - Septicemia
  - Requires ICU

#### Blood pressure

- **Condition:**
  - Blood pressure
  - Hypotension
  - Hypertension
  - V 10

#### Heart rate

- **Condition:**
  - Heart rate
  - Arrhythmia
  - Bradycardia
  - Tachycardia

#### Temperature

- **Condition:**
  - Temperature
  - Fever
  - Hypothermia

#### Light

- **Condition:**
  - Light
  - Pupil size
  - Pupil reaction

#### Oxygen saturation

- **Condition:**
  - Oxygen saturation
  - Respiration rate

#### NEWS

- **Condition:**
  - NEWS
  - Respiratory rate
  - Oxygen saturation

#### Diagnosis

- **Condition:**
  - Diagnosis
  - Hypertension
  - Hypotension
  - Bradycardia
  - Sepsis

#### Urine Output

- **Condition:**
  - Urine output
  - Post-renal failure
  - Renal failure

**Urine Output:** If there are concerns about urine output (>1.5 x body weight), contact Doctor for review.
Appendix 3: NEWS Escalation Protocol Flow Chart

**NATIONAL EARLY WARNING SCORE**

**Escalation Protocol Flow Chart**

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Minimum Observation Frequency</th>
<th>ALERT</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12 Hourly</td>
<td>Nurse in charge</td>
<td>Nurse in charge to review if new score</td>
</tr>
<tr>
<td>2</td>
<td>6 Hourly</td>
<td>Nurse in charge</td>
<td>Nurse in charge to review</td>
</tr>
<tr>
<td>3</td>
<td>4 Hourly</td>
<td>Nurse in charge &amp; Team/On-call SHO</td>
<td>1. SHO to review within 1 hour</td>
</tr>
<tr>
<td>4-6</td>
<td>1 Hourly</td>
<td>Nurse in charge &amp; Team/On-call SHO</td>
<td>1. SHO to review within 1/2 hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. If no response to treatment within 1 hour contact Registrar</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Consider continuous patient monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Consider transfer to higher level of care</td>
</tr>
<tr>
<td>≥ 7</td>
<td>1/2 Hourly</td>
<td>Nurse in charge &amp; Team/On-Call Registrar Inform Team/On-Call Consultant</td>
<td>1. Registrar to review immediately</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Continuous patient monitoring recommended</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Plan to transfer to higher level of care</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Activate Emergency Response System (ERS) (as appropriate to hospital model)</td>
</tr>
</tbody>
</table>

**Note: Single Score triggers**

- Score of 2
  - HR ≤ 40 (Brady/cardiaca)
  - 1/2 Hourly
  - Nurse in charge & Team/On-call SHO |
  - 1. SHO to review immediately

- Score of 3 in any single parameter
  - 1/2 Hourly or as indicated by patient’s condition
  - Nurse in charge & Team/On-call SHO |
  - 1. SHO to review immediately
  - 2. If no response to treatment or still concerned contact Registrar
  - 3. Consider activating ERS

*In certain circumstances a score of 3 in a single parameter may not require 1/2 hourly observations i.e. some patients on O2.

* When communicating patients score inform relevant personnel if patient is charted for supplemental oxygen e.g. post-op.

* Document all communication and management plans at each escalation point in medical and nursing notes.

* Escalation protocol may be stepped down as appropriate and documented in management plan.

**IMPORTANT:**

1. If response is not carried out as above CNM/Nurse in charge must contact the Registrar or Consultant.
2. If you are concerned about a patient escalate care regardless of score.

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Appendix 4: ISBAR Communication Tool

<table>
<thead>
<tr>
<th>I</th>
<th>Identify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify: You, Doctor, Patient</td>
<td></td>
</tr>
<tr>
<td>Is this Dr. ?</td>
<td></td>
</tr>
<tr>
<td>This is</td>
<td></td>
</tr>
<tr>
<td>(e.g. Mary, I am team leader on 7A)</td>
<td></td>
</tr>
<tr>
<td>I am calling about</td>
<td></td>
</tr>
<tr>
<td>(e.g. Mr. David Jones)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S</th>
<th>Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation: Why are you calling?</td>
<td></td>
</tr>
<tr>
<td>I am calling because</td>
<td></td>
</tr>
<tr>
<td>(e.g. Total EWS of 6 or 3 in a single parameter)</td>
<td></td>
</tr>
<tr>
<td>Resp Rate</td>
<td>Sats</td>
</tr>
<tr>
<td>O2 Delivery</td>
<td>Temp</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>BP</td>
</tr>
<tr>
<td>LOC</td>
<td>(only use abnormal reading initially)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background: What is relevant background?</td>
<td></td>
</tr>
<tr>
<td>They are</td>
<td>years old</td>
</tr>
<tr>
<td>Admitted for</td>
<td></td>
</tr>
<tr>
<td>Recent surgery or procedures</td>
<td></td>
</tr>
<tr>
<td>Relevant past medical/surgical history</td>
<td></td>
</tr>
<tr>
<td>They currently have</td>
<td></td>
</tr>
<tr>
<td>(e.g. IV fluids, Urinary Catheter, PCA)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment: What do you think is the problem?</td>
<td></td>
</tr>
<tr>
<td>I think</td>
<td></td>
</tr>
<tr>
<td>(e.g. they are hypovolaemic)</td>
<td></td>
</tr>
<tr>
<td>(you can skip this if they don’t know what is wrong)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendation: What do you want them to do?</td>
<td></td>
</tr>
<tr>
<td>I would like you to</td>
<td></td>
</tr>
<tr>
<td>(e.g. come and review him please)</td>
<td></td>
</tr>
<tr>
<td>Is there anything you would like me to do</td>
<td></td>
</tr>
<tr>
<td>before you get here?</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5: Sepsis Screening Form for In-Patient Adult

Sepsis Form - In-Patient Adult

Start Sepsis form if there is a suspicion of infection and NEWS ≥ 4 (or ≥ 5 on oxygen) or Exercising clinical judgement.

Section 1: Sepsis screen for Nursing Staff
Suspicion of infection
AND
Patient presentation
(see Section 3 and Adult In-Patient Sepsis Management Algorithm).

Action:
Medical review
within
30 mins

Date: 
Time of NEWS: 
NEWS:

Signature: 
NMBI PIN: 

Section 2: Sepsis diagnosis for Medical Staff
Document site of suspected infection after medical review

- Respiratory Tract
- Intrabdominal
- Urinary Tract
- Skin
- Catheter/Device Related
- intra-articular/Bone
- Central Nervous System
- Unknown
- Other suspected site:

No clinical suspicion of INFECTION: terminate form and sign at bottom.

Section 3:
Who needs to get the “Sepsis 6” – infection plus any one of the following:

1. Patients who present unwell who are at risk of neutropenia, e.g. on anti-cancer treatment.

2. Clinically apparent new onset organ failure, any one of the following:
   - Acutely altered mental state
   - RR > 30
   - O₂ sat < 90%
   - P<0.1
   - P<0.10
   - Other organ dysfunction

3. Patients with co-morbidities plus ≥2 SIRS criteria

- Modified SIRS criteria: Note - physiological changes should be sustained ≥30 mins.
  - Respiratory rate ≥ 20 breaths/min
  - Heart rate > 90 beats/min
  - Temperature <36 or >38.3°C
  - WCC < 4 or > 12 x 10⁹/L
  - Bedside glucose >7.7mmol/L

- Co-morbidities associated with increased mortality in sepsis:
  - COPD
  - DM
  - Chronic liver disease
  - Cancer
  - Chronic kidney disease
  - Age ≥75 years
  - Frailty
  - HIV/AIDS

Section 4: If YES after medical review to Section 2 PLUS 1, 2, or 3 in Section 3.
Start SEPSIS 6 (Section 6)

Time Zero: 

Section 5: If NO to infection with a high-risk presentation (1, 2, or 3), tick NO and sign off. If uncomplicated infection, continue usual infection treatment as appropriate and review diagnosis if patient deteriorates.

Infection
Antimicrobial given:

Has a decision been made to apply a relevant treatment limitation plan.

Doctor’s Name: 

Doctor’s Signature: 

MCRN: 

Date: 

Time: 

Page 1 of 2
Continue overleaf
Sepsis Form - In-Patient Adult

ALWAYS USE CLINICAL JUDGEMENT

Treatment, Risk Stratification and Escalation

Page 2 of 2

Section 6

TAKE 3

SEPSIS 6 - aim to complete within 1 hour

☐ BLOOD CULTURES: Take blood cultures prior to giving antibiotics unless this leads to delay > 45 minutes. Other cultures as indicated by history and examination.

☐ BLOOD TESTS: Point of care lactate (venous or arterial), FBC, LK, LFTs +/- Coag. Other tests and investigations as indicated. Assess requirement for source control.

☐ URINE OUTPUT: Point of care urobilinogen and assess urinary output as part of volume/perfusion status assessment. For patients with sepsis or septic shock start hourly urinary output measurement.

Section 7

Look for signs of new organ dysfunction -- any one is sufficient:

☐ Lactate > 2 mmol/L (following adequate initial fluid resuscitation, typically 30mls/kg in the first hour unless fluid intolerant)

☐ Cardiac: Systolic BP < 90 or Mean Arterial Pressure (MAP) < 65 or Systolic BP more than 40 below patient's normal

☐ Respiratory - New need for oxygen to achieve saturation > 90% (note: this is a definition not the target)

☐ Renal - Creatinine > 170 micromol/L or Urine output < 300 ml/s/24 hrs despite adequate fluid resuscitation

☐ Liver - Bilirubin > 33 micromol/L

☐ Haematological: Platelets < 100 x 10^9/L

☐ Central Nervous System - Acutely altered mental status

One or more new organ dysfunction due to infection:

☐ This is SEPSIS: Seek senior input as per local guideline.

No new organ dysfunction due to infection:

☐ This is NOT SEPSIS: If infection is diagnosed proceed with usual treatment pathway for that infection.

Section 8

Look for signs of septic shock (following adequate initial fluid resuscitation, typically 2 litres in the first hour unless fluid intolerant)

☐ Requiring inotropes/pressors to maintain MAP > 65

☐ Inform consultant

☐ Contact CRITICAL CARE

Practical Guidance

Re-assess the patient's clinical response frequently. Re-assess and repeat lactate, if the first is abnormal, by 3hrs. Achieve MAP > 65mmHg by 6hrs and/or have started pressors. Achieve source control, if required, at the earliest opportunity. Use clinical judgement. If the patient is deteriorating, despite appropriate treatment, seek senior assistance and re-assess antimicrobial therapy.

Pathway Modification

All Pathway modifications need to be agreed by the Hospital's Sepsis Committee and be in line with the National Clinical Guideline.

Section 9

Clinical Handover, Use ISBAR, Communication Tool

This section only applies when handover occurs before the form is completed and the form is then signed off by the receiving doctor.

Doctors Name (PRINT): ____________________________  Doctor's Signature: ____________________________  Doctors Initials: ____________________________  MCN: ____________________________

Patient care handed over to: ____________________________  Time: ____________________________  Sections completed: ____________________________

Form completed by:

Doctors Name: ____________________________  Doctor's Signature: ____________________________

MCRN: ____________________________  Date: ____________________________  Time: ____________________________

File this document in the patient notes – other aspects of patient management should be documented on the continuation sheets.

Page 2 of 2