

Raising bar to mitigate growing health and economic impact of surgical site infections (SSI)

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Approximately 313 million surgeries are undertaken globally each year, and most of these procedures are successful and result in improved health for patients. The keyword here is most. While the majority of surgical procedures are a success, it is important not to overlook those that are not. What important lessons can we learn from these small but significant incidents? What more can we do? What must change?



Surgical site infections (SSIs) remain a pertinent healthcare problem globally, despite advances in medical technology and surveillance systems. In fact, SSIs are becoming the most common healthcare-associated infection (HCAI) today, contributing significantly to the rising morbidity and mortality rates among affected patients.

The situation is particularly dire in the Asia Pacific and I had observed throughout my visits to the region, that there was a general lack of awareness around this issue. Many countries in the region have higher rates of HCAs than other developed nations in the world, and SSIs in some selective surgical procedures have been associated with mortality rates approaching 46 percent. This is due in part to the fact that many of these patients at the time of surgery present with significant co-morbid risk, resulting in post-operative complications, increased hospital length of stay, escalating cost and death.

Mitigating the prevalence of SSIs requires identifying underlying patient risk factors and putting into place appropriate evidence-based interventional strategies designed to improve outcomes.

The mounting financial burden of SSIs

The financial burden of SSIs is frequently discussed, since in the current economic environment, a greater emphasis is now placed on obtaining more value from healthcare dollars amidst rapidly rising medical costs in an economy with limited resources. In some Asia Pacific countries, an SSI infection can extend the length of a person's hospital stay by 20 or more days. Many of these patients will also require a second operation (i.e. orthopaedic) which places additional burden and stress upon the patient and his family.

The impact of this is two-fold. The first is **additional costs** associated with an extended hospital stay, as well as the considerable fees from reoperation. The economic burden of SSIs is not only limited to the duration of a patient's stay in

hospitals, as they may still have to rely on assistance from other community care services following their discharge. Those who experience delayed wound healing (i.e. diabetic patients) as a result of an infection are more vulnerable to secondary complications, which may require additional healthcare resources and lead to further issues.

The second is the **opportunity cost**. Not only do SSIs require the use of additional healthcare resources, but the resulting opportunity cost to hospitals is also substantial as it leads to the displacement of manpower and equipment that would otherwise be used elsewhere. It also has an impact on subsequent procedures that may be delayed.

The total financial cost associated with post-operative SSIs can easily run into the millions of dollars for healthcare systems across the Asia Pacific, placing a significant economic burden on countries with limited resources.

With the spotlight on SSIs and their financial impact, a crucial consideration that is often neglected is its effect on a patient's physical and mental well-being. Some of the indirect costs of SSIs include patient morbidity and mortality, the inability to work and loss of income, which should not be ignored since they play a significant role in one's recovery process. Furthermore, loss of financial independence has a detrimental impact on the well-being of the patient's family.

The multitude of risk factors associated with SSIs

It is widely acknowledged that SSIs are a highly complex issue and as a result, the risk of developing complications is multifactorial – surgeons, patients and environmental considerations all play a role in this process.

Notable patient-related risk factors include the severity of their condition, smoking, the incidence of noncommunicable diseases such as diabetes and obesity as well as aspects that cannot be altered – age and gender. On the other end of the spectrum, factors relating to the surgical procedure itself and the operating room environment are deemed to be highly preventable, when appropriate interventional strategies are in place.

Risk factors related to the surgery occur during the preparation of the patient, which include steps taken before the incision, as well as the duration of the surgical procedure and of course, surgical technique. The incidence of SSI is also influenced by the operating room environment, which can be impacted by factors such as ventilation and temperature.

During the pre-operative phase, medical professionals are tasked with assessing the risk of developing an SSI and in an ideal scenario, implement effective interventional strategies to mitigate modifiable patient risk factors. Despite this, SSIs continue to threaten patients' health and pose challenges to hospitals, so more must be done across the continuum of surgical care – pre-op, intra-op and post-op.

Urgent need for evidence-based practices

The pathway to improve surgical outcomes requires embracing effective evidence-based processes. Although the major variables of SSIs are not always easily controlled, evidence-based surgical care bundle interventions are imperative in minimising the relevant risk factors. It is estimated that more than half of SSIs (55 per cent) is preventable using evidence-based strategies.

In late 2016, the World Health Organization (WHO) publish the first-ever evidence-based global guidelines on the prevention of SSIs, with the goal of tackling the growing burden of HCAs on both patients and healthcare systems. This document focuses on a wide range of issues relating to SSIs while also addressing inconsistencies in the interpretation of recommendations across countries.

Significantly, the WHO guidelines take into account existing scientific research and cover evidence-based interventional strategies that focus on the pre-, intra-, and postoperative environment. The guidelines recommend the use of triclosan-coated sutures in all types of surgical procedures to reduce the incidence of SSIs. This recommendation falls in-line with other global and societal guidelines recommending the use of triclosan-coated sutures as part of an inclusive evidence-based process to reduce the risk of surgical site infections. The Plus Antibacterial suture technology by itself has been reported in peer surgical literature to provide a 28 percent risk reduction benefit. Combining the triclosan-coated suture technology with other evidence-based interventional strategies affords a significant risk reduction and economic benefit to the surgical patient population.

Recently, I attended the first-ever Care+ Masters Symposium in Singapore, where international experts were brought together to discuss SSI prevention strategies across the Asia Pacific, and they similarly advocated the use of innovative technologies such as antimicrobial-coated sutures to minimise the risk of complications. Such initiatives signify a step in the right direction as we strive to encourage further action at national and local levels to prevent undesirable surgical outcomes.

Advancing preventive measures

New research and advancements in surgical technology have improved SSI prevention practices and most importantly, patients' health. Over the years, several multidisciplinary prevention programs based on evidence-based guidelines, surgical site care bundles and checklists have been developed at both global and national levels.

Evidence-based interventions for consideration today include normothermia; weight-based antimicrobial prophylaxis; supplemental oxygen, oral antibiotics/mechanical bowel prep, and wound edge protector (colorectal surgery); staphylococcal decolonization (orthopaedic and CT surgery); preoperative antiseptic showers; separate wound closure trays; smoking cessation; intraoperative irrigation with 0.05 percent chlorhexidine gluconate; glove changes prior to fascia and subcuticular wound closure; innovative device-related procedures, and traffic control in operating rooms.

Despite the obvious process, there is still a lack of emphasis placed upon the engagement of patients in preventing SSIs, who are already playing an increasingly active role in the decision-making process relating to their health. On the other hand, institutions that have been successful in reducing their SSI rates have in tandem developed an effective system to measure compliance to the bundling process.

The implementation and adoption of evidence-based practices in hospitals remain an issue in today's rapidly evolving healthcare landscape. Without question, recommended guidelines can be highly effective in improving post-op patient outcomes, but there is still a lack of institutional and governmental support in translating such initiatives within some developing nations.

In this regard, leaders in the surgical community must play a crucial role in advocating for change to reduce the risk of SSIs. If prominent surgeons champion the cause, it will be less challenging for those in authority to embrace and implement these effective evidence-based processes.

All in all, the multifactorial nature of SSIs means no single measure can completely eliminate risk factors. However, growing economic presence and a need for social change has become the catalyst for research and collaboration between policymakers and healthcare professionals, representing an effective pathway for improving surgical patient outcomes in a dynamic and diverse world

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Dr Edmiston frequently lectures on matters related to SSIs, most recently leading several sessions during the first-ever Care+ Asia Pacific Masters SSI Prevention Symposium. This event, organised by Ethicon, brought together a consortium of international experts to strategize how we can advance the adoption and implementation of global guidelines in the Asia Pacific, as well as institute surveillance methods to reduce the risk of SSIs. To learn more, visit [EthiconCarePlus.com](https://www.ethiconcareplus.com).