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Implementing a surgical site infection care bundle: Implications for perioperative practice

Introduction

Surgical care bundles are made up of a group of evidence-based practice interventions which when performed together can have a positive outcome on patient care¹. The *ACORN Standards for Perioperative Nursing in Australia*² outline practices that should be adhered to in Australia; however, practices can be further refined clinically to ensure best practice. Surgical site infection is one of the most preventable causes of hospital-acquired infections in Australia³. Research suggests that care bundles implemented by the perioperative team can reduce the incidence of such infections while also offering additional benefits. Surgical site infection intervention bundles can support nurses in their evidence-based practice, contribute to continuing professional development and encourage communication and teamwork. Bundles are simple to implement, can be individualised to each facility and can support culture change using a scale-up approach with long term benefits for the health care organisation.

Care bundles have been implemented into operating theatres internationally and are recognised to reduce surgical site infection through a combination of evidence-based interventions^{4,5}. However, the uptake of these bundles in Australian health care is not optimal even though they offer benefits to health care organisations, nurses and patients as well as being able to be implemented on a clinical level as a quality

improvement project. Care bundles can be designed and implemented by members of the perioperative team using a collaborative, educational approach that supports evidence-based practices in reducing surgical site infection. Not only do bundles support best nursing practice for better patient outcomes and meet organisation goals, they support the professional development of individual nursing staff members. Through the implementation of bundles, nurses can achieve educational requirements, inspire one another with a shared goal and become individual change agents in the department to support a scale-up practice change approach for long-term benefits.

What is a care bundle?

The idea of the care bundle was first proposed in 2001 by the Institute for Health care Improvement⁶ to improve teamwork and communication and enhance the consistency and safety of patient care delivery. Bundles specifically targeting areas of harm and cost were divided into three to five achievable evidence-based interventions which exceeded expectations in improving patient outcomes. These structured practices based on existing guidelines aimed to simplify decisions and reduce errors⁷. Similar projects specifically targeting surgical site infection were later implemented by the Centre for Medicare and Medicaid Services (CMS) in 2003 across the United States of America and later in the United Kingdom by the Department of Health^{5,8}. More recently,

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implementation of care bundles based on Australasian practice was observed to improve standards and consistency in reducing surgical site infection in the Pacific Islands⁹.

Why is surgical site infection prevention so important?

The burden of hospital-acquired infection has a considerable effect on health care with nearly 4000 surgical site infections occurring yearly in Australia¹⁰. Surgical site infection is the most preventable hospital-acquired infection^{11,12}. Even though there are many recommendations and standards in place to reduce surgical site infections, they remain one of the most common causes of hospital-acquired infections, occurring in three per cent of surgical procedures^{3,13}. Many current interventions are well researched and supported; however, research in health care is constantly being updated. It is imperative for perioperative teams to take responsibility and be accountable for remaining up to date with new evidence and to implement training which promotes an educational team-based approach¹⁴.

Discussion

In recent research, care bundles in the perioperative environment were examined in the Netherlands and America in 2017 in three retrospective cohort studies followed by a meta-analysis evaluating the reduction in surgical site infection after care bundle implementation^{13,15-17}. Each of the research papers evaluated the incidence of surgical site

infection reduction in facilities that had implemented a care bundle of similar interventions and found a significant reduction as a result. The meta-analysis found a 40 per cent reduction in surgical site infection and concluded that the implementation of care bundles at a clinical level significantly reduced incidence.

A study conducted in Singapore between 2015 and 2017 looked at bundle interventions and their effect on surgical site infection in hip surgery patients¹⁸. Although the multifaceted nature of the bundles can make it difficult to pin-point the exact intervention that contributed most to reducing surgical site infections, the collection of interventions over the course of the study showed surgical site infections rates at the reduced rate of 1.8 per cent. However, this retrospective study did not offer a comparison of results, whereas a phased study may have illustrated this. It did demonstrate, however, that effective multidisciplinary involvement with shared responsibilities capitalising on individual nurse strengths and expertise promoted an integrated team-based approach.

Weiser et al. studied the efficacy of a surgical bundle in three phases – baseline, implementation and sustainability. A significant decrease in infection was observed during the implementation phase and sustainability of the interventions was demonstrated in the third phase¹⁹. This was later supported by Hoang et al. who examined bundle implementation in 1351 colorectal surgeries and found not only that infection in deep and superficial wounds was reduced but also that compliance with evidence-based practice increased and was continued²⁰. The study illustrated that

the small changes implemented led to significant changes in practice over time.

Professional development opportunity for nurses

Registration with the Australian Health Practitioner Regulator Agency (AHPRA) as either an enrolled or a registered nurse requires demonstrating that 20 hours of continuing professional development have been completed over the course of 12 months²¹. This requirement ensures that we, as perioperative nurses, stay up to date, maintain our knowledge and remain inspired to provide better care outcomes. However, many nurses express that it is difficult to maintain this while juggling full-time work, family commitments and additional responsibilities. Nurse involvement in the development and design of the care bundle process from the beginning and driving the project while maintaining responsibility and accountability can inspire nurses to contribute by improving areas in which they are most interested. In addition, opportunities for quality improvement activities among clinical staff can enhance team morale, support evidence-based practice, initiate team communication and inspire new ideas among staff¹⁶.

Aren't nurses currently practising through an evidence-based approach?

Australian perioperative nursing practice is currently governed by *Standards for Perioperative Nursing in Australia* which includes standards and guidelines that are closely aligned with similar international standards²². They are designed to provide detailed specifications of nursing practices that have been rigorously assessed for credibility, reliability and consistency²³. Although all registered nurses endeavour to

deliver safe patient care according to the most up-to-date evidence available for practice²³, research suggests that nurses often practise in ways other than those which follow the rules and standards²². While the Australian Commission on Safety and Quality in Health Care encourages an evidence-based approach, perioperative nurses feel that lack of time, support and education commonly prevents the implementation of evidence-based practice²⁴. Improved practices are constantly emerging through research; however, transition and uptake into practice is delayed while nurses lack tools and support. Becoming an evidence-informed practitioner can be overwhelming, especially in a culture that does not foster change, and can be a complex process to put into practice²⁴. Bingham et al.²² found that perioperative nurses find it challenging to meet the needs of patients as well as the demands of doctors, the team and the health care organisation and this may lead to deviations from recommended practices. Surgical bundle development can assist the clinical nurse to integrate evidence into practice while supporting nurses to speak up and scrutinise current practice.

How do I implement a care bundle in the perioperative environment?

Surgical site infection bundles can be implemented relatively rapidly in health care facilities, with the *Standards for Perioperative Nursing in Australia* and other hospital policy resources²⁵ providing a basis for recommended practice. It is not a case of there being a particular bundle which it is recommended to implement; instead, bundles can be tailored to health care facilities based on the facility's needs and specialities. Care bundle interventions enhance how the

existing policies and procedures are achieved rather than replacing or changing hospital policies and other documentation already in place.

Perioperative nurse educators as well as clinical nurses can reflect on current departmental practices and identify opportunities for improvement which reflect their own expertise and interests^{3,26}. They would then research areas of individual interest and, based on the literature and recommendations available, develop interventions and share them with colleagues, peers and key players^{27,28}.

Implementing evidence-based practice can be challenging, while a top-down approach to change stemming from managers and administrators may not foster culture change easily²⁹. A bottom-up approach to fostering cultural change in health care organisations in which each member is supported as a change agent to implement improvements in their own practice can yield permanent positive change more effectively³⁰.

Examples of evidence-based bundle interventions

Scrub-scout nurse role

1. Removal of hair from the operating site should be avoided unless completely necessary³¹. If the surgeon feels that hair at the surgical site should be removed it is recommended that clipping should be done as close to the commencement of the procedure; however, it should be done outside the operating room³².
2. Excessive theatre traffic and opening of the operating door increases air-borne bacteria, increasing the risk of surgical site infection. A maximum number of door openings should be agreed upon for each speciality

of surgery³³. Measures should be taken to ensure that door openings are kept within this number.

3. Incise adhesive drapes, impregnated or not, should not be used for the purpose of preventing surgical site infection³¹. However, they do offer additional benefits which may be considered important in practice.
4. Changing of gloves prior to wound closure has been demonstrated as having a significant reduction in surgical site infection incidence¹³.

Anaesthetic nurse

1. Active warming via a warming device, as opposed to passive warming, should be used for patients undergoing a surgical procedure³³.
2. Blood glucose levels for both diabetic and non-diabetic adult patients undergoing a surgical procedure should be closely monitored by the anaesthetic team with the aim of reducing surgical site infection^{31,34}.
3. Education and monitoring of hand hygiene for anaesthetic staff has been identified as an area of improvement in the operating room. Strategic placement of alcohol-based hand rub and non-sterile gloves may support compliance³⁵.

Conclusion

Surgical care bundles have been implemented in health care facilities internationally for nearly two decades and offer many benefits to health care organisations, clinical staff and hospital patients. The risk of infection is reduced when all interventions that make up care bundles are performed every time and for every patient. Although

Australian health care facilities abide by guidelines and recommendations, new and improved practices are constantly being researched and nurses need the support, tools and confidence to integrate these into their practice. Surgical care bundles can facilitate improved practices; support continuing professional development, communication and teamwork; improve morale; and inspire nurses to share a vision of an improved health care service for patients.

Care bundles empower nurses to make changes for the better through a scale-up approach that supports cultural change with long-term benefits for all involved. These small interventions aligned with hospital policies and the ACORN standards can make a significant difference to the quality of life for patients through reducing their risk of developing a surgical site infection with an extended hospital stay and through lowering morbidity and mortality. Surgical care bundles are simple to implement and can make an enormous difference to rates of hospital-acquired infection in health care facilities throughout Australia.

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