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## Post-Operative Hernia Site Infections

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# Walden University

College of Nursing

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Agatha Gittens-Stay

has been found to be complete and satisfactory in all respects,  
and that any and all revisions required by  
the review committee have been made.

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Walden University  
2026

Executive Summary: Clinical Practice Guideline

Post-Operative Hernia Site Infections

by

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MS, Walden University, 2016

Executive Summary Submitted in Partial Fulfillment

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## Summary

This doctoral project was a clinical practice guideline (CPG) focused on the development of a perioperative guideline for patients undergoing various types of hernia repairs. Hernia repair is a common surgical procedure to address various types of hernias.. To assure continued compliance with nationally set benchmarks and minimize the rate of postoperative hernia infections, a systematic review of evidence-based practices (EBP) to foster infection prevention was initiated at a hospital in England. The practice-focused question used was: For patients who underwent hernia repair surgery, what evidence informs CPG recommendations on the type of material, surgical interventions, and nursing interventions to prevent post-operative hernia site infections in hospitals? The purpose of the project was to address gaps in nursing practice by developing an evidence-based CPG. The Appraisal of Guidelines for Research and Evaluation (AGREE) II tool was used to assess the methodological quality of practice guidelines. A 7-point Likert scale ranging from 7 (strongly agree) to 1 (strongly disagree) examined the 23 categories in six domains: scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. Mean of reviewers' scores ( $N = 4$ ) was 7 in four out of six domains and 6.75 in two of the domains, indicating a robust CPG had been developed and recommended for use, strengthening the use of evidence-based practice and enhancing accountability to reduce post-operative hernia site infection at the hospital site.

## Background

Post-operative hernia infections are a challenge that impacts patient recovery, contributes to readmissions, increases health care costs and impacts patient recovery.

(Wilson et al., 2022). In spite of advances in health care, this problem persists. Current practices will be benchmarked against effective strategies. Established guidelines for surgical site infections, as advised by Berríos-Torres (2017), should be considered. The purpose of the project was to address gaps in nursing practice by developing a CPG based on evidence on types of mesh used, surgical interventions, and nursing interventions that contribute to post-operative hernia infections. The project sought to contribute to efforts to reduce post-operative hernia site infections and enhance patient outcomes. The project question was: For patients who underwent hernia repair surgery, what evidence informs the type of mesh material, surgical interventions, and nursing interventions to prevent post-operative hernia site infections?

A literature search was performed using CINAHL, MEDLINE, PubMed, ScienceDirect, and the Centers for Disease Control and Prevention. Key search terms to guide my project included *hernia site infection*, *post-operative hernia infection*, *hernia repair* AND *surgical site infection*. I found 22 articles using the search terms published over the past 5-8 years.

The search yielded 22 articles, including a Level I meta-analysis of 24 articles of random controlled trials that were reviewed by independent reviewers to determine if administering a prophylactic antibiotic lessened a patient's likelihood of developing a post-operative infection by Wijono (2023). A Level III article by Christou et al. (2022) contained a prospective cohort study with observations of 21,976 postoperative hernia repair patients for over 16 years and determined there were no differences in postoperative infections with regard to the surgical technique used, open hernia repair versus laparoscopically repaired hernia, as well as the type of mesh implanted,

polypropylene versus polyester mesh. This article was directly related to this topic. A Level III article from Proctor et al (2023) of a prospective descriptive study for surgical site infections following emergency hernia repairs in 238 patients for 90 days revealed differences in infection rates based on the patient's Body Mass Index and the type of hernia repaired; femoral, incisional, and umbilical were associated with higher infection rates. Four Level V articles, two literature reviews and two case studies were reviewed. One case study published by Ito et al (2021) was the results of one patient who had right inguinal inflammation 11 years after their hernia repair. Ozaki et al (2017) published on one patient who developed a postoperative infection following an umbilical wall hernia repair with mesh implant. Prior to the patient becoming pregnant, the mesh was removed successfully, and she experienced no further complications. One literature review published by Linxiang et al (2022) discussed a limited number of patients at a small facility who had conservative treatments for postoperative infections. Finally, a literature review published by Wilson et al (2022) discussed the use of bundles recommended by the American College of Surgeons and was excluded. This doctoral project was supported with high-quality Level I evidence from a meta-analysis and two Level III sources of evidence from non-experimental, cohort, prospective studies.

### **Clinical Practice Guideline Development**

The CPG was appraised by four practitioners using the AGREE II instrument. The expert panel of reviewers included the Infection Control and Prevention nurse, the Quality Control nurse, the Clinical Lead on the surgical unit and my preceptor, a gastroenterologist specialist. They were selected because of their expertise in infection prevention and their responsibilities to ensure quality patient outcomes. Their vast

clinical expertise allowed for a widespread evaluation of the CPG. The AGREE II instrument utilises a 7-point Likert scale that ranges from 7 (strongly agree) to 1 (strongly disagree).

The AGREE II tool (Brouwers et al., 2010) contains 23 items categorized into six domains: scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence. The AGREE Reporting Checklist was used to guide reporting of CPGs. Each of the four expert practitioners completed the AGREE II independently and included written feedback. Findings were collected for the reviewers' feedback and development of the CPG (see Appendix). Their findings were analysed using Excel software.

## **Results**

The four expert practitioners with diverse backgrounds used the AGREE II to assess the guideline quality of the CPG using the 23 domains on a Likert scale with 7 = strongly agree, 6 = agree, 5 = somewhat agree, 4 = neither agree nor disagree, 3 = somewhat disagree, 2 = disagree, and 1 = strongly disagree. Once completed, the AGREE II data from the four practitioners were compiled and analyzed. See Table 1 and Figure 1.

### **Domain 1: Scope and Purpose.**

In accordance with the AGREE II domain, Scope and Purpose, the proposed CPG for the prevention of post-operative hernia site infection was reviewed by the key stakeholders and end users to ensure relevance, clarity and applicability. End users also reviewed the clinical question, which was addressed by the guideline. They agreed that the question was clinically relevant, specific and reflected practice needs.

**Domain 2: Stakeholder Involvement**

The mean score for this domain was 6.75. Stakeholders believed broader participation from experts working in the community setting may have enhanced the guideline. The scope of the project did not allow for wider involvement outside the practice institution.

**Domain 3: Rigor of Development**

This domain scored high across all items, receiving a perfect score of seven. This indicated there was agreement that the guideline met the scientific standards for guideline development through a systematic process of evidence identification, assessment and synthesis. All elements, including search strategies, evidence description, linking risk factors for infection to evidence and formulating recommendations were rated high (7).

**Domain 4: Clarity and Presentation**

This domain received a perfect score of seven in all items. This result is an indication that the panel determined the recommendations were clearly communicated and unambiguous, and the guideline is user-friendly.

**Domain 5: Applicability**

The expert panel scored a mean score of 6.75 in this domain. They considered resource allocation to be a barrier to effective and sustained implementation. Budget cuts and staff shortage are barriers beyond my ability to influence the facility. This could potentially erode the project, which is otherwise evaluated to be well developed.

**Domain 6: Editorial Independence**

This domain received a perfect score of seven, indicating the practitioners considered the guideline free from bias and undue influence. This validates trust in the

editorial independence of the process and the guideline. Editorial independence indicated the guideline withstood the test of scientific integrity.

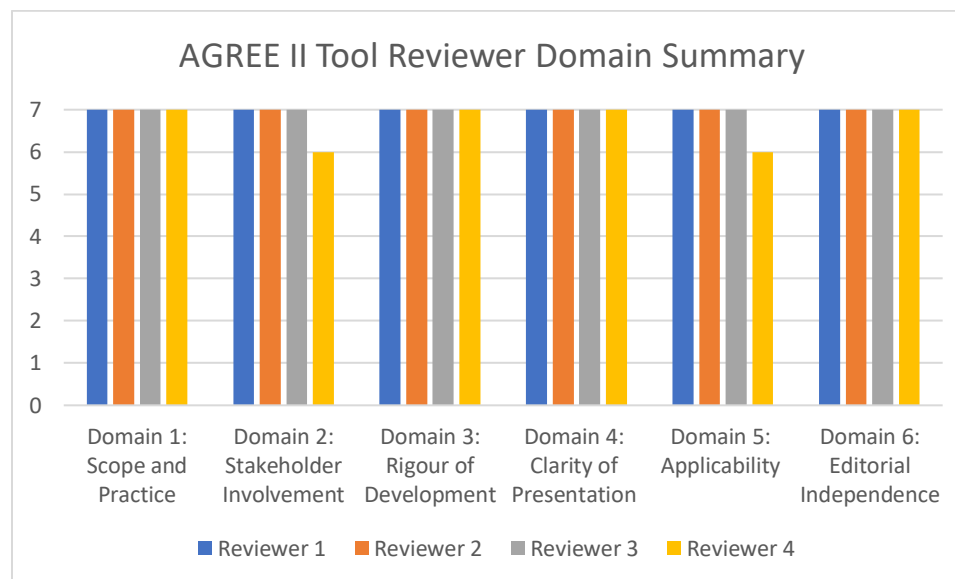
Overall, the panel assessed the guidelines to be of high quality and recommended the development of implementation tools. Perfect scores of seven indicated consensus and strong endorsement of the guideline. In the areas of community engagement and applicability, where scores were six (agree), the challenges are beyond my scope as a DNP student or employee of the Trust. Resource allocation is constrained by budget cuts, and the project was narrowed to the site institution.

**Table 1**

*AGREE 2 Expert Panel Summary*

Domain	Minimum score	Maximum score	Obtained score	Standardized domain score
Scope and Purpose	12	84	84	100%
Stakeholder Involvement	12	84	81	96.4%
Rigour of Development	32	224	224	100%
Clarity of Presentation	12	84	84	100%
Applicability	16	112	108	96.4%
Editorial Independence	8	56	56	100%

*Note.* The percentage was obtained by subtracting the minimum score from obtained score and adding to the maximum score minus the minimum score. (Obtained Score - Minimum Score + Maximum Score - Minimum Score X 100

**Figure 1***AGREE II Tool Reviewer Domain Summary*

There is clarity and clinical applicability. However, more details on the strategies for implementation are needed due to the resource limitations of the setting. The reviews of the *Clinical Practice Guideline on Post-Operative Hernia Site Infections* from the stakeholders included physicians, nurses, infection control and prevention staff, as well as the quality improvement officer. Some of the highlights included the following.

- Nurses valued their full involvement from the conceptualization of the project. They felt like valued members of the team.
- Physicians appreciated the evidence-based rationale.
- Finance officials considered the project as cost-efficient. Reduced post-operative infections will result in overall cost reduction for the institution.

The potential impact of the CPG on patient outcome and the institution as a whole relates to standardization of evidence-based practice and a reduction in variability. Clear

protocols will increase staff efficiency, improve communication, and workflow. The adoption of the CPG will align practice with national standards and have implications for institutional accreditation. The long-term benefits include cost containment and improved public image of the institution as one that delivers quality, patient-centered care. In the short term, cost will be an investment in staff training. This project is significant beyond the site hospital. Other institutions that are similar in nature will be able to benchmark against the outcome of this project.

The project was limited to one institution and did not include community services or any other institution. The findings, therefore, cannot be generalised to any other institution or the entire health system of England.

Resource constraints due to budget cuts: Limited access to evidence-based infection prevention and control supplies, such as advanced wound-care materials, can prevent adherence to best practices. Financial cutbacks resulted in reduced staff levels and reduced funding for staff training and education. This can affect the ability to offer consistent perioperative and postoperative infection practices and impact compliance relating to auditing of infection prevention protocols.

### **Conclusions**

The adoption of the project will scientifically contribute to the standardisation of care at the national and international levels with evidence dissemination, which supports other healthcare systems desirous of similar improvements. The project has the potential to strengthen the leadership of the DNP-prepared nurse and to inform policy. Key recommendations include the provision of adequate resources and workflow support and the use of varied teaching strategies to support adherence to infection prevention

protocols and enhance nursing skills and competence. The implication for nursing practice is reinforced integration of evidence-based practice, expanded roles in advocacy and quality improvement and accountability. Evaluation for sustainability will be through ongoing monitoring of budgetary support and continuous tracking of key infection metrics by infection control teams and nurse leaders. Evaluation method for this project included the use of the AGREE II Tool for initial review, scoring and evaluation, summarizing comments from reviewers, and finalizing the CPG. The AGREE II Tool provided a standardized approach with consistency from all reviewers. Using the AGREE II Tool ensured the CPG was developed using evidence-based practice methods which will improve outcomes in hernia patients.

## References

- Berrios-Torres, S. I., et al. (2017). Centers for Disease Control and Prevention guideline for the prevention of surgical site infection, 2017. *JAMA Surgery*, 152(8), 784–791.
- Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., Fervers, B., Graham, I. D., Grimshaw, J., Hanna, S. E., Littlejohns, P., Makarski, J., Zitzelsberger, L., & AGREE Next Steps Consortium (2010). AGREE II: advancing guideline development, reporting and evaluation in health care. *Journal of Clinical Epidemiology*, 63(12), 1308–1311.  
<https://doi.org/10.1016/j.jclinepi.2010.07.001> Centers for Disease Control and Prevention. (2023). Guidelines for the prevention of surgical site infections.  
<https://www.cdc.gov/infection-control/hcp/surgical-site-infection/index.html>
- Christou, N., Ris, F., Naumann, D., Robert-Yap, J., Mathonnet, M., Gillion, J. F., & Club-Hernie Members (2022). Risk factors for surgical site infection after groin hernia repair: does the mesh or technique matter?. *Hernia : the journal of hernias and abdominal wall surgery*, 26(1), 233–242. <https://doi.org/10.1007/s10029-021-02512-7>
- He, L., Wang, X., Fan, G., & Zhao, Y. (2022, October 25). Hernia mesh infection treatment following the repair of abdominal wall hernias: A single-center experience. *Frontiers in Surgery*, 9, 993855.  
<https://doi.org/10.3389/fsurg.2022.993855>

- Ito, H., Matsumoto, K., Terauchi, T., Kimata, M., Lefor, A. K., & Shinozaki, H. (2021). Delayed mesh infection after inguinal hernia repair: A case report. *Journal of Surgical Case Reports*, 2021(9), rjab399. <https://doi.org/10.1093/jscr/rjab399>
- Ozaki, K., Tanimura, K., Ebina, Y., Kanemitsu, K., & Yamada, H. (2017). A pregnant woman with a surgical site infection after mesh repair of an abdominal wall incisional hernia: A case report. *Journal of Medical Case Reports*, 11, 66. <https://doi.org/10.1186/s13256-017-1217-3>
- Wijono, H., Kristin, F., Bayanaka Agustha Peerera, B., Herawati, F., & Yulia, R. (2023). Meta-analysis on the effectiveness of the use of prophylactic antibiotics in preventing surgical site infection in patients with hernia surgery. Atlantis Press. [https://doi.org/10.2991/978-94-6463-322-1\\_3](https://doi.org/10.2991/978-94-6463-322-1_3)
- Wilson, R.B., Farooque, Y., (2022). Risks and Prevention of Surgical Site Infection After Hernia Mesh Repair and the Predictive Utility of ACS-NSQIP, *Journal of Gastrointestinal Surgery*, 26(4), 950-964. <https://doi.org/10.1007/s11605-022-05248-6>
- World Health Organization. (2022). Global guidelines for the prevention of surgical site infection. <https://www.who.int/publications/b/31381>

## **Appendix: Clinical Practice Guideline**

### **Clinical Practice Guideline on Post-Operative Hernia Site Infections**

#### **Background**

The review of evidence for developing this guideline was focused on the type of material, surgical interventions, and nursing interventions used for patients who underwent hernia repair surgery and post-operative hernia site infections? The review of evidence by content reviewers was guided by the criteria outlined in the AGREE II tool according to the six domains and informed by reviewer feedback.

#### **Domain 1: Scope and Purpose**

**Objective:** The objective of the clinical guideline is to create an evidence-based set of recommendations that optimizes the selection of the surgical materials used, surgical techniques, and the intervention of nurses in order to reduce the incidence and manage post-operative hernia repair infections among patients undergoing hernia repair

#### **Questions**

- Does the type of surgical mesh used in hernia repair place patients at risk for post-operative hernia site infections?
- Which materials/mesh are associated with lower surgical site infection rates?
- Are antimicrobial-coated materials more effective at preventing hernia site infections?
- What surgical techniques are associated with lower risk for post-operative hernia site infection rates?
- Does the use of antibiotic prophylaxis reduce the risk of hernia site infection?

- Which nursing actions are most effective in preventing hernia site infections during the perioperative and postoperative?
- What are the best nursing practices in hernia site care for early detection of infection?
- How does patient education impact their adherence to infection prevention and control protocols prior to and post-discharge?
- How do comorbidities like obesity, diabetes, and smoking influence hernia site infection?
- What pre-operative interventions (e.g., glycemic control, smoking cessation) should be implemented?
- How can the multidisciplinary team approach optimize infection prevention and control in patients who have had hernia repair?
- What roles should be played by each discipline in an infection prevention and control protocol?

### **Population**

- The setting is a hospital.
- Age Range: Adults 18 years and older
- Context: Patients who undergo invasive inguinal, umbilical, or ventral hernia repair, whether emergency or elective. Patients with co-morbidities such as diabetes, immunosuppression, BMI greater than 30, and a history of smoking
- Exclusion criteria are children under the age of 18 years and patients who have an infection at the surgical site prior to admission for hernia repair.

## **Domain 2: Stakeholder Involvement**

### **Target Population**

- The target population is adult patients, 18 years and older, who are having an emergency hernia repair.
- Patients with co-morbidities are included.
- Excluded are patients under age 18 years and patients with an existing site infection or hernia repair

### **Stakeholder Involvement**

- General Manager, Integrated surgery, Critical Care, and Core. Manages directorates' budget.
- Director of Nursing, Hospital. Informs nurse managers of project progress.
- Physician, Upper Gastrointestinal Consultant, Hospital. Responsible for updating the remainder of the UGI team
- Head of Nursing Surgical Department, Hospital. Responsible for providing ongoing education and training for nursing staff on the latest wound care techniques, infection prevention strategies, and the use of technologies or products
- Consultant Microbiologist, Infection Prevention and Control, Hospital. New data and insights into the microbiological factors contributing to post-operative wound infections, which can help refine existing infection control protocols and strategies

### **Domain 3: Rigor of Development**

#### **Search Strategies**

1. The World Health Organization to obtain infection control and prevention standards, international guidelines, and data on surgical site infections.
2. Google Scholar for scholarly articles and peer-reviewed journals. Boolean prompts used were *surgical mesh, hernia repair, AND infection; nursing interventions AND post-operative infection prevention*. The date timeframe applied was the last 5-10 years.
3. PubMed for peer-reviewed journal articles. The search terms used included *postoperative nursing care, hernia, and surgical wound infection*. The search was for systematic reviews, randomized controlled trials, and clinical guidelines.
4. CINAHL search for *hernia repair AND nursing, postoperative wound care; nursing interventions AND perioperative care*.
5. Cochrane Library Purpose: Access to systematic reviews and evidence summaries.
6. National Institute for Health and Care Excellence (NICE) is a United Kingdom clinical guideline source for health care intervention. The search terms included *surgical infection, hernia, and post-operative care*.

#### **Evidence Selection Criteria**

In order to ensure that the clinical guideline was built on high-quality, current, and relevant evidence, a structured approach was employed. The selection criteria focused on relevance to the clinical question, study design, date of publication, methodology, and consistency of results. All articles were in English. A variety of articles were selected,

such as systematic reviews and meta-analyses. Case studies were selected when they directly addressed post-operative hernia site infection, however. When the quality was poor, they were excluded. Authorities such as the World Health Organization provided current and relevant clinical guidelines.

A significant factor was consistency across results, and when the evidence was cited in other studies. The direction of the statistical significance was also evaluated for applicability. Studies included were dated within the past 10 years, with the exception of foundational studies such as those on Florence Nightingale's environmental theory. Each study was critically appraised and synthesized using tools provided by Walden University. The goal was to ensure that the clinical guideline was appropriate for hospitals.

### **Strengths and Limitations of Evidence**

Methodologically, the body of evidence that informs a clinical guideline will be good. This evidence consisted of cohort studies, systematic reviews, meta-analyses, and evidence-based guidelines. The evidence provided a sound foundation for crafting recommendations aimed at reducing post-operative hernia site infections through the application of appropriate nursing interventions and operative techniques. The predominance of good-quality study designs was one of the major strengths. There were synthesized views of the various evidence, which allowed for the identification of interventions and highlighted their consistency. Clinical guidelines presented by organizations such as the World Health Organization provided real data that validated the studies.

Most studies followed the scientific protocol for research, including data collection, analysis, and reporting. In most cases, inclusion and exclusion criteria were defined, and the understanding of the hernia site infection. Most studies included the significance of confounding variables such as surgical techniques and comorbidities. Studies selected were applicable to the hospital. The target population was adults undergoing emergency hernia repair.

Although the quality of the evidence was strong, a limitation was one study of poor quality. This was due to weakness in design and inadequate methodology, which will render it difficult to replicate. This study was cautiously used and did not heavily influence recommendations. Another limitation is that most of the studies were conducted in North America, which may have different cultural and health practices and clinical protocols. However, most are transferable to United Kingdom hospitals.

### **Formulation of Recommendations**

The AGREE framework was used to guide the formulation of recommendations. This method ensured that the recommendations are applicable within the hospital and are methodologically sound. The method used included a comprehensive literature search using databases such as Google Scholar, CINAHL, PubMed, and the World Health Organization databases. The selection of studies was based on quality, design, and applicability to hernia surgical site infection. Each study was appraised using evidence appraisal tools for evidence-based practice projects.

The purpose of the review and appraisal was to identify existing guidelines, infection prevention strategies, and evidence related to post-hernia site repair infection. A draft of an initial recommendation was prepared for discussion based on the findings of the

review by the content experts. The team of experts held an open discussion about the evidence. During the first five weeks, it was felt that it was too early, and the evidence was not sufficiently compelling to make and accept recommendations. After nine weeks of continuous review and evidence synthesis, recommendations were accepted.

### **Recommendations**

Recommendations were influenced by evidence synthesis and prioritization of patient safety and outcomes. The outcome of content experts were recommendations that included the following.

- Administer prophylactic antibiotic within 60 minutes of commencing the surgical procedure/incision.
- Continue to use hospital-recommended mesh.
- Patient education pre-operatively and post-operatively on wound care and how to identify early signs of infection.
- Conduct in-service training in infection control and management for nurses.

### **Consideration of Benefits and Harms**

The following were assessed.

- The use of prophylactic antibiotics as a benefit reduces contamination with bacteria at the surgical site. The harm is that the overuse of antibiotics will contribute to resistance to antibiotics. The trade-off is that the benefits outweigh the risks when a limited, single dose is given pre-operatively.
- The use of antimicrobial mesh is a benefit because it can reduce bacterial colonization. The risk is that the quality of evidence that supports efficacy across patient populations is not overwhelmingly strong. The trade-off the antimicrobial

mesh is not recommended for routine use due to cost and uncertainty about the benefits in low-risk situations. There can be a selective use for patients considered to be high-risk.

- Use of pre-operative decolonization, such as chlorhexidine washes, is effective in reducing skin flora such as *Staphylococcus aureus*. It is non-invasive and low-cost. There is, however, the risk of skin irritation. The trade-off is that the benefits outweigh any potential risk.
- In patients who are diabetic, glycemic control. The evidence shows that control of blood glucose reduces risk for infection.
- Pre- and post-patient education on wound care empowers the patient. The benefit of this is that there is early detection. The risk is that the patient may not be able to interpret symptoms correctly.

### **Key Evidence**

The key evidence supported techniques for hernia repair, prophylactic antibiotics given, medicated mesh used, and patient education. Based on nursing knowledge improvement requires in-service education for nursing staff. Based on guidelines using the AGREE II tool, relevance, benefits, side effects, and risks were taken into consideration when developing the recommendations.

### **Recommendations and Evidence Summaries**

The evidence was mainly of high to moderate quality, with only one study of low quality, and the effect size also supported the findings, for instance, mesh versus no mesh, Cohen's  $h = -0.63$ . The large effect shows significantly lower infection risk with mesh.

With co-morbidities, the findings show Cohen's  $d = 0.24$ ): Small-to-medium effect. This indicates a higher risk for infection with comorbidities.

### **How the Guideline Development Group Linked and Used Evidence to Develop**

A literature search was undertaken using an authentic search strategy. Each literature was appraised using the tools provided by Walden University. The evidence was reviewed by the faculty advisor for the DNP project, and a consensus was arrived at about relevance, risk, and harm. Patients were omitted from guideline development; therefore, their perspectives are absent. Each recommendation is supported by high-quality evidence.

### **Purpose and Intent of External Review**

The purpose of the external review was to confirm that the proposed clinical guideline was clinically relevant, aligned with best practices, and was evidence-based and verified as applicable to the hospital. The method used for external review was a short questionnaire that allowed the experts to identify ambiguities, assess clinical relevance, and suggest refinements. The design of the questionnaire included the following questions.

- Is the guideline clear and easy to understand?
- Are the recommendations consistent with practice at your practice?
- Do you foresee any gaps, risks, or unintended consequences in implementing the guideline?
- Do you have any recommendations for improvement?

### **Description of External Reviewers**

Four external reviewers participated. They were selected because of their expertise on the subject matter and interdisciplinary perspective. The reviewers were.

1. Quality Control Nurse
2. Infection Prevention and Control nurse
3. Preceptor, gastroenterologist
4. Clinical Lead, Surgical Department

### **Information Gathered from External Review**

Information gathered through the external review was systematically analyzed by themes. The reviewers agreed that the guideline reflected processes at the hospital. This confirmed the validity of evidence from the literature. The suggestion was made to match evidence against an infection prevention risk checklist. The external review will inform final development of the guideline, as there will be the inclusion of a decision algorithm for the use of mesh based on the risk for infection, clearly defined high-risk patients such as immunocompromised, the use of color codes based on risk levels, and specific intervals for nurse training on infection prevention and control of surgical site infections

### **Updating Clinical Practice Guideline**

The guideline will be updated annually unless extraneous circumstances occur.

### **Domain 4: Clarity of Presentation**

Mesh is associated with lower rates of infection of the hernia site when compared with non-mesh repairs. Therefore, use mesh in hernia repair once clinically appropriate. The recommendations aim to reduce post-surgical hernia site infections by encouraging evidence-based use of mesh. The target population is adults who will undergo elective hernia repairs, including patients with comorbidities. Caveats include the following.

1. Do not use mesh in cases of infected or contaminated fields, as this will exacerbate post-surgery infection.

2. Exclude patients with a history of prior complications with mesh, such as allergies or bowel perforation.
3. Decision-making should be on an individual basis based on the specific patient condition, expertise of surgeon and patient preferences.

### **Uncertainty and Limitations**

- The data is based on a small sample size,  $n=49$ , and statistical significance was not achieved consistently, even though the effect size is meaningful clinically.
- There were insufficient high-quality randomized controlled trials targeting infection rates in non-mesh as opposed to repairs with mesh in high-risk patients, such as immunocompromised.

### **Management Options**

1. Preoperative Antibiotic Prophylaxis Description. Administer prophylactic preoperative antibiotics within 60 minutes before surgical incision to reduce bacterial contamination during the surgical procedure. The population will be all adult patients undergoing hernia repair.
2. Optimize Patient Risk Factors. For patients who are diabetic, optimize glycemic control. For elective surgeries in patients who smoke, encourage them to stop at least four weeks before surgery. Encourage weight loss in obese patients prior to elective surgery and provide nutritional support for those who are malnourished.
3. Training of Nurses in Infection Prevention and Control. Training enhances competency and promotes best practice and satisfactory patient outcomes. Training will include hand hygiene and how to don and doff gloves, maintaining technique fields when managing surgical wounds, wound assessment and

documentation, patient education on wound care at home, and recognition of signs of infection. Training can be simulation-based with the use of a competency checklist. The target population will be nurses who work in the operating theatre and pre- and post-operative nurses

4. Adequate Antiseptic Preparation of the Surgical Site Prior to Incision. Use hospital hospital-recommended solution to clean the site and use clippers instead of razors to remove hair immediately before surgery. This applies to all patients undergoing hernia repair.
5. Strict Adherence to Intraoperative Sterile Technique to Prevent Contamination (Mesh and Surgical Site). This is done by minimizing traffic in the theatre to only the staff involved in the case. Appropriately use of drapes and maintain oxygenation and normothermia.
6. Use of Mesh-Coated Antibiotics. Based on the literature and evidence obtained during data collection for this project, the use of mesh-coated antibiotics should continue. This is especially for high-risk patients. The cost of infection prevention outweighs the cost of managing infections.
7. Standardized Post-Operative Wound Care to Prevent Contamination and Infection. Wound care is essential to prevent contamination at the surgical site and to prevent infection.

### Summary of Key Recommendations

Strategies to Prevent Infection	Completion Phase	Population
Pre-operative antibiotic prophylaxis	Preoperative	All hernia surgery patients
Optimize patient risk factors	Preoperative	All patients deemed to be a risk, such as diabetic and immunocompromised
Train nursing staff in infection control and prevention strategies	Pre, intra, post	All perioperative nursing staff
Skin preparation with hospital-recommended solution	Preoperative	All patients undergoing surgery
Maintain aseptic surgical technique	Intraoperative	Surgeons, scrub nurses, and the entire operating theatre team
Continued use of antimicrobial-coated mesh	Intraoperative	All patients undergoing hernia repair
Standardize post-operative hernia wound care	Postoperative	All surgical patients
Audits	Ongoing	Infection Control and Prevention Department

### Domain 5: Applicability

The evidence presented in a literature review matrix was sufficient to convince buy-in from stakeholders. A number of facilitators and barriers were important considerations.

#### Facilitators and Barriers

##### Facilitators

- There are infection control and prevention protocols.
- Top leadership support
- An infection control and prevention unit
- Effective communication channels

- Adequate surveillance
- Active in-service department
- Sterile supplies are available.
- Access to technology
- National standards
- Knowledgeable and skilled medical and nursing staff
- System of hospital accreditation

### **Barriers**

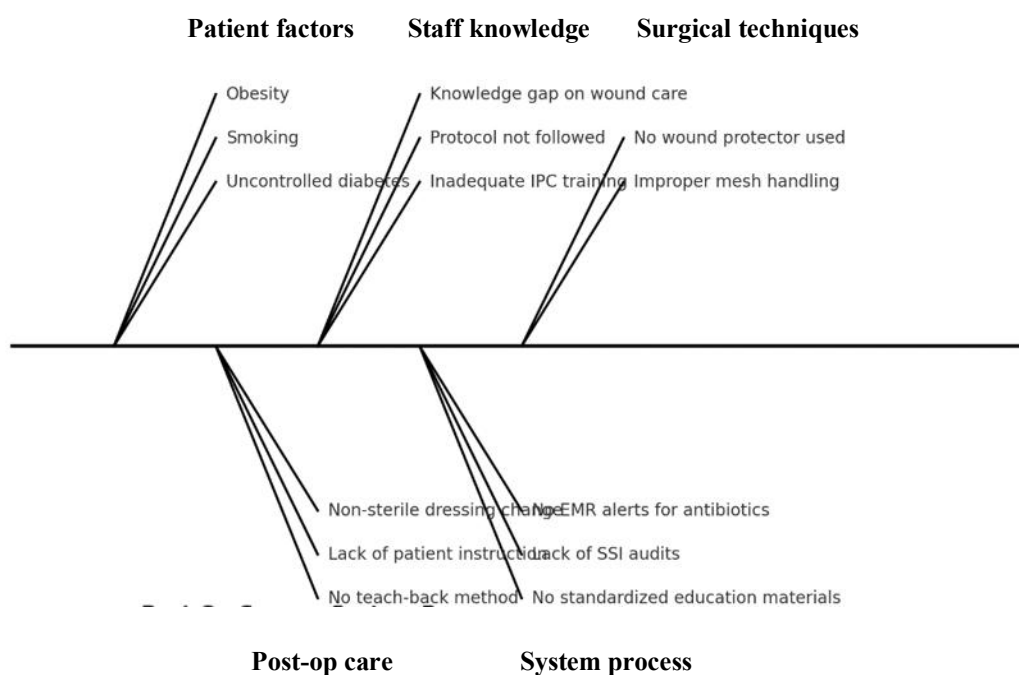
- High workload and inadequate staffing
- Institutional bureaucracy can result in delays in implementing new protocols.
- Bureaucratic delays in implementing new policies.
- Budget cuts
- Burnout
- Greater harmony among interprofessional teams is needed.
- Culture of blame

### **Implementation Toolkit**

The toolkit links barriers to the prevention of post-operative hernia site infections with evidence-based solutions. It aligns best practices with current implementation.

Barrier	Category	Linked Solution
Inadequate training of nurses in infection prevention and control	Training	<ul style="list-style-type: none"> <li>- Review prevention and control training modules</li> <li>- Consider simulation-based surgical wound care training</li> <li>- Create a competency checklist</li> </ul>
High workload		<ul style="list-style-type: none"> <li>- Simplify wound care policy</li> <li>- Encourage the use of time-efficient dressing techniques while maintaining aseptic techniques</li> <li>- Where possible, adjust staffing ratios</li> </ul>
Limited access to antiseptic agents or advanced dressings	Resource-related	<ul style="list-style-type: none"> <li>- Recommend cost-effective, basic antiseptics (e.g., chlorhexidine)</li> <li>- Provide alternatives to advanced dressings in low-resource settings</li> </ul>
Low staff motivation	Human related	<ul style="list-style-type: none"> <li>- Staff must be involved in developing new protocols</li> <li>- Use clinical champions to promote best practices</li> <li>- Have a system of feedback and recognition</li> </ul>
Poor interpretation of post-op wound care protocols	Organizational	<ul style="list-style-type: none"> <li>- Review standardized, evidence-based protocol</li> <li>- Integrate new protocols into documentation</li> </ul>
Poor interdisciplinary communication	Cultural and Interpersonal	<ul style="list-style-type: none"> <li>- Briefings and debriefings should be multidisciplinary</li> <li>- Continue the use of SBAR as a means of communication</li> </ul>
Budget constraints	Financial Resource	<ul style="list-style-type: none"> <li>- Prioritize interventions into high and low</li> </ul>
Limited patient education on infection prevention	People and Patient-related	<ul style="list-style-type: none"> <li>- Structured pre- and post-operative teaching using videos as movie-like visuals leaves a mental impression</li> <li>- Train nurses to deliver impactful discharge teaching</li> <li>- Use the teach-back methods to confirm understanding</li> </ul>
Blame culture discourages reporting of incidents	Cultural	<ul style="list-style-type: none"> <li>- Promote a just culture</li> <li>- Conduct root cause analyses which is not punitive</li> <li>- Encourage reporting anonymously.</li> </ul>

## Fishbone Diagram of Problem Identification



## Resource Implications

### *The Type of Costs Considered*

- Direct medical cost, including surgical supplies and the cost for antiseptic solutions.
- Indirect costs include costs for developing educational materials for staff training.
- Lost man-hours/productivity due to readmission for surgical site infection
- Implementation cost for time spent in training.
- Opportunity cost, including scheduling adjustments for pre- and post-operative.

### *Methods to be Used to Obtain Cost*

- The institutional budget was consulted for the cost of supplies such as mesh and training programs

- Comparison of market cost from online catalogue
- Published literature that indicates the cost of hernia care.

### Description of Cost Information

Resource	Cost	Implication
Antimicrobial-coated mesh	£350–£700 per piece (vs. \$100–\$200 for standard mesh)	
Chlorhexidine skin prep	£3–£5 each application	Low cost but very effective
Nurse Training	£8000 annually	This is a core recommendation in the budget of the infection control department
Patient educational video	£2000	Is cost effective

### How Cost Information Was Used to Inform Guidelines

The cost of mesh caused a recommendation for use in high-risk patients only. The use of alcohol-based preparation antiseptic is low-cost and has a high impact. This made it ideal for use.

### Monitoring Auditing Criteria

A structured monitoring and auditing plan is vital in order to measure its impact of the guideline on clinical outcomes. Process indicators will be used to assess if guidelines are being followed, and outcome indicators will assess the effectiveness of implication on the surgical site infection rate.

In order to monitor guideline implementation, criteria to be used will include prophylactic antibiotics administered within 60 minutes before surgical incision, use of alcohol-based chlorhexidine for skin preparation, and perioperative nurses completing infection prevention and control training. Other criteria include adherence to sterile

technique during dressing change and standardized wound care education to patients upon discharge.

Each criterion will have a defined operational measure. Adherence to pre-operative antibiotic timing of 60 minutes before incision will be measured as the percentage of hernia surgery cases in which antibiotics were administered within the recommended window, as recorded in the medical

Assessment of impact will include the rate of surgical site infections within six weeks post-operatively. These will be measured using standardized tools from the Centers for Disease Control and Prevention.

The interval and frequency of measurement will vary depending on whether it is a process indicator, such as the timing of antibiotic administration, or an outcome indicator, such as readmission due to hernia repair site infection. Patient education can be assessed quarterly and audited through discharge documentation.

### **Domain 6: Editorial Independence**

#### **Funding Body**

There is no funding body. The Hospital is solely responsible for funding services. There are no funding agencies for this project, and no external influence.

#### **Competing Interest**

Although time may have presented competing interests based on deadlines to complete the guideline development while engaged in other work and academic obligations, I declare no competing or conflicting interests. My project team found the time to support this project.