NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

HealthTech Programme

GID-HTE10165 Surgical mesh for treatment of non-primary ventral hernias (provisional title)

Final scope

1. Introduction

The technologies included in this NICE HealthTech evaluation are surgical meshes for treatment of non-primary hernias.

The technologies are proposed to be assessed for existing use. Existing-use assessments consider HealthTech products that are already in established use within the NHS, to inform commissioning and procurement decisions.

This scope document describes the context and the scope of the assessment. Questions for the scoping workshop are in appendix A. The methods and process for the assessment follow the NICE HealthTech programme manual.

2. The condition

Ventral hernia occurs when tissue or an organ (often part of bowel) pushes through a weakened area in the abdominal wall, creating a visible bulge. This can be uncomfortable or painful. If not treated, a ventral hernia can occasionally lead to serious complications, such as incarceration (when tissue becomes trapped) or strangulation (when the blood supply is cut off), both of which require urgent medical attention.

Non-primary ventral hernias are those that do not develop because of natural weaknesses in the abdominal wall. This includes herniation at the site of a previous hernia repair or other abdominal surgery (incisional hernia), or around a stoma (parastomal hernia). Among all ventral hernias, incisional hernias represent the most heterogeneous category in terms of size, location, and associated anatomical challenges (Karimov et al., 2025).

There are around 100,000 hernia repairs undertaken in the NHS annually in England (Pawlak M, 2020), with experts estimating that between 10,000 to 20,000 involve incisional hernias. Risk factors for development of non-primary hernias include patient-related factors (BMI, smoking, diabetes, immunosuppression) and surgery-related factors (type of abdominal incision and closure). Non-primary hernias can develop after any type of abdominal incision, but herniation following a previous midline incision (subxiphoidal, epigastric, umbilical, infraumbilical and suprapubic) is believed to be most common type encountered in surgical practice (European Hernia Society, 2023).

3. Current practice

There is no single national care pathway for hernia repair. The management of incisional hernias in the NHS is informed by guidelines from European Hernia Society (EHS), American Hernia Society and local clinical commissioning policies. British Hernia Society (BHS) signposts to the guidelines developed by European Hernia Society and American Hernia Society. The relevant guidelines are:

- Midline incisional hernia guidelines: the European Hernia Society, 2023.
- Guidelines on prevention and treatment of parastomal hernias: the European Hernia Society, 2019.
- Updated Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias from the International Endohernia Society (IEHS), 2019.
- Guidelines for Laparoscopic Ventral Hernia Repair from the SAGES Guidelines Committee, 2016.

- Prevention and treatment of parastomal hernia: a position statement on behalf of the Association of Coloproctology of Great Britain and Ireland, 2018.
- Laparoscopic treatment of ventral hernias: the Italian national guidelines, 2023.
- WSES guidelines for emergency repair of complicated abdominal wall hernias, 2017.
- Management of Primary Ventral and Incisional Hernias Under Emergency Conditions, EHS, 2026.
- Laparoscopic ventral incisional hernia repair: evidence-based guidelines of the first Italian Consensus Conference, 2013 (updated by The Executive board of the Italian Society for Endoscopic Surgery in 2015).

3.1 Hernia classification and complexity

Classification of hernias is used to help surgeons to plan the surgical repair approach, choice of mesh, and to predict complications after surgery. Different classification systems are used in practice, considering aspects such as hernia characteristics (location and size), patient characteristics (e.g. comorbidities) and wound characteristics (e.g. contamination). Classification systems used include:

- **European Hernia Society classification of primary and incisional abdominal wall hernias** (Muysoms FE et al, 2009): classifies incisional ventral hernias by location (midline zone or lateral zones), size and whether the incisional hernia is recurrent. For midline incisional hernias, the EHS classify 5 zones: subxiphoidal, epigastric, umbilical, infraumbilical and suprapubic. For classifying incisional hernia size, width is used: W1, less than 4 cm; W2, 4–10 cm; and W3, 10 cm or larger.
- **European Hernia Society classification of parastomal hernias** (Smietanski et al., 2013): classifies parastomal hernias by size and presence of concomitant incisional hernia.
- **The Ventral Hernia Working Group classification** (VHWG, 2009; modified by Kanters et al., 2012): stratifies patient risk of wound

complications (e.g. surgical site infection, seroma (fluid collection), hematoma (blood clots) and skin or soft tissue necrosis (skin death)) and recurrences following open incisional hernia surgery. The modified system (Kanters et al., 2012) uses the following grades:

- Grade 1—low risk, for healthy patients with no history of wound infection (a clean field).
- Grade 2—co-morbid, for patients with diabetes, chronic obstructive pulmonary disease, immunosuppression, smoking, or obesity. There may have been previous wound infection, but the wound is considered to be clean at the time of hernia repair.
- Grade 3— contaminated, for patients with wound contamination. Grade 3 is further stratified based on Centre for Disease Control (CDC) classification for surgical wound contamination: wounds may be Class I (clean), Class II (clean-contaminated), Class III (contaminated), Class IV (dirty-infected).

- **Hernia-Patient-Wound (HPW) classification (Petro and Novitsky, 2016):** uses hernia size, patient comorbidity and wound contamination to estimate postoperative complications and recurrence risk.
- **CeDAR tool (Augenstein et al., 2015):** mathematical equation that predicts the risk of postoperative complications and the associated costs.

3.2 Surgical repair

For symptomatic ventral hernias, surgical repair is the definitive treatment. Without surgery, there are risks of strangulation, bowel obstruction and incarceration, which could require emergency surgical intervention. The majority of patients with a non-primary hernia are managed in the elective setting without a time-critical need for surgery. It is estimated that mesh reinforcement is used in about 82% of repairs (Pawlak M, 2020). Hernia repair surgery may be performed by hernia specialists or general surgeons, depending on the site and clinical scenario.

A small number of non-primary hernias may instead be repaired using a non-mesh alternative, such as suture-based repair. This assessment will not determine when mesh should be used for non-primary hernia repair, or when non-mesh alternatives should be used. Rather, the considerations around surgical mesh choice apply only where a clinical decision has already been made for a mesh-based repair to be performed.

Interoperative management for mesh-based repair

For each clinical case, the surgical approach, choice of mesh and mesh placement will be discussed by a multidisciplinary team prior to surgery.

The choice of mesh placement depends on multiple factors, including the surgical approach. Common mesh placement techniques for non-primary hernia repair include: onlay (mesh is placed on top of the abdominal muscle, just beneath the skin), retromuscular or preperitoneal (mesh is placed behind the muscle but still outside the abdominal cavity); and intraperitoneal placement (mesh is placed inside the abdominal cavity, directly against the peritoneal lining) (Henriksen et al., 2025). The EHS recommends that for repair of midline incisional hernia, mesh should be placed in the retromuscular plane (European Hernia Society, 2023). However, there are cases where retromuscular mesh placement is not possible or very difficult and therefore it is important to be familiar with the surgical technique for placing the mesh in other positions. Different methods of mesh fixation exist, with glue and tackers commonly used.

There are different types of surgical mesh available, broadly categorised by their composite materials (see section 4). Multidisciplinary teams will decide on the surgical approach and type of mesh that is most appropriate for the clinical case. The type of surgical mesh selected for use in a surgical repair depends on multiple factors, including anatomical location of the hernia, the repair technique being performed and the intended mesh placement, patient-specific considerations, surgeon experience, tissue integrity, contamination risk, and overall complication risk stratification.

3.3 Current NHS market for the technologies

Surgical meshes are primarily purchased through NHS Supply Chain's surgical mesh framework agreement, under medical and surgical consumables. At present, there are 21 suppliers on the NHS Supply Chain framework offering 3 categories of mesh: synthetic, biological and specialist mesh, with more than 1,100 products available. The framework offers a National Pricing Matrix to facilitate discounted pricing based on value or volume commitments with 8 suppliers currently offering this commitment. The current framework reflects a competitive market with two new suppliers entering and four suppliers being delisted at the start of the new framework agreement.

NHS Supply Chain information indicates that the pricing of mesh varies widely based on material types and marketed benefits. For example, inclusive of 20% VAT, a synthetic hybrid or synthetic shaped mesh can range from less than £100 to approximately £10,000 depending on the factors such as shape, size, thickness, absorbable versus non-absorbable components, with or without reinforcement, and other design features. Biological meshes cost more and prices can range from less than £200 to approximately £19,000, similarly influenced by shape, size and other features of the products.

Based on expert advice, about 70% of mesh procurement goes through the NHS Supply Chain, while 30% is purchased independently by NHS Trusts by securing their own deals directly with manufacturers, often leading to a default choice based on cost-saving deals.

4. The technologies

This section describes the properties of surgical meshes based on information provided to NICE by manufacturers and experts, and publicly available information. NICE has not carried out an independent evaluation of these descriptions. Technologies will only be considered and assessed as per their intended use.

4.1 Purpose of the technologies

NHS Supply Chain defines surgical mesh as a woven sheet which is used as either a permanent or temporary support for organs and other tissues during surgery. In hernia repair, surgical mesh is used to reinforce weak tissue and lower recurrence rates. When implanted, the mesh acts as a support structure, promoting tissue ingrowth that integrates. The ideal properties of a surgical mesh for a given clinical scenario are influenced by multiple factors; such as wound classification (e.g. size), risk and history of contamination (see section 3.1), patient factors (e.g. comorbidities, lifestyle factors), and surgeon preference.

4.2 Properties of surgical mesh

Surgical mesh properties (i.e. material, structural, mechanical and biological characteristics) influence clinical performance, safety and suitability for different surgical approaches. Some mesh characteristics are influenced by other characteristics (for example, mesh weight, pore size and elasticity). It is the combination of characteristics, and magnitude and mode of expression of characteristics that determines distinct mesh properties and clinical behaviour. Mesh characteristics need to be considered when decisions are being made on which mesh to use in each clinical scenario, with no “gold standard“ mesh existing. The degree of importance of different mesh properties will vary between clinical cases. For some properties, there may be different definitions and classifications used in clinical practice where standardisation has not yet been established.

Material

Based on source of material used, surgical mesh can be broadly categorised as being synthetic (permanent, bioresorbable or composite), biologic or hybrid.

Permanent synthetic mesh provides long-term structural reinforcement. They are composed of non-absorbable polymers such as polypropylene (PP), polyester, polytetrafluoroethylene (PTFE) and expanded polytetrafluoroethylene (ePTFE). Permanent synthetic mesh may be associated with complications such as chronic pain, infection, adhesions, and fistula formation. Permanent synthetic mesh is commonly used in the repair of non-primary hernias, with available data from NHS England showing that the majority of incisional hernias were repaired using synthetic mesh in the years 2017-2018 (NHS Digital Hospital Episode Statistics, 2017-2018). National registries provide data showing that 95% of meshes used for incisional hernia repair are permanent synthetic (López-Cano et al., 2018).

More recently, bioresorbable meshes (also known as bioabsorbable or biosynthetic) have been introduced to address the limitations and complications associated with both synthetic and biological mesh. Bioresorbable mesh provides temporary reinforcement of the abdominal wall during the critical healing period following hernia repair. They degrade over time (resorbing over a period of 6 months to around 1.5 years), to avoid the long-term presence (and complications) of permanent synthetic material. They are composed of are made from synthetic polymers such as polyglycolic acid, polyglactin and polydioxanone (PDO), produced through biological fermentation. They are often considered in contaminated or high-risk surgical fields where permanent mesh implantation may not be appropriate.

Composite mesh combines 2 or more synthetic materials, such as a permanent synthetic polymer (such as polypropylene, polyester, or polytetrafluoroethylene) with a smooth visceral surface barrier (e.g. collagen), anti-adhesive substance (e.g. hyaluronate), or surface coatings such as titanium. The barrier layer reduces bowel/viscera adhesions (making them suitable meshes for intraperitoneal placement), while the permanent synthetic core maintains long-term reinforcement.

Biologic meshes are derived from animal (commonly bovine or porcine) or human tissues. They provide temporary support and gradually remodel into host tissue (degrading enzymatically). They may be considered in complex hernia repairs and contaminated surgical fields, where synthetic mesh may pose a higher risk of complications such as infection, or reaction against foreign body. The Ventral Hernia Working Group (VHWG) recommends that biologic repair materials with specific characteristics are preferred over synthetic mesh for use in infected fields (Grade 3) and should be strongly considered when contamination is suspected (VHWG, 2010). However, more recent systematic review evidence does not necessarily support the use of biologics for ventral hernia repair, even in contaminated settings (Khan et al., 2025).

Hybrid mesh combines permanent synthetic polymers (such as polypropylene, polyester, or polytetrafluoroethylene) with a biological scaffold component (e.g. collagen, extracellular matrix) to promote tissue growth and reduce inflammation and infection.

Mesh weight and tensile strength: The mechanical properties influencing the strength of the mesh. The weight of the mesh depends on both the weight of the polymer and the amount of material used (pore size; Brown and Finch., 2010). Characterised by mesh material weight per unit area (g/m^2). There are different definitions and classifications of mesh weight. One classification (Coda A et al., 2012) is less than 35 g/m^2 for ultra-lightweight; 35 g/m^2 to less than 70 g/m^2 for lightweight; 70 g/m^2 to less than 140 g/m^2 for standard weight; and 140 g/m^2 or greater for heavyweight. Another classification suggested by experts is less than 45 g/m^2 for lightweight, 45-65 g/m^2 for medium weight and above 65 g/m^2 for heavyweight. The weight of a mesh can affect durability, foreign body sensation, chronic pain and other mesh-related complications. The tensile strength of a mesh is the amount of physiological abdominal wall pressure that can be withstood without failure. The maximum intra-abdominal pressure generated in a healthy adult occurs when coughing or jumping and is estimated to be approximately 170 mmHg. Mesh used to repair abdominal hernias must withstand at least 180 mmHg (20 kPa) before failing (Brown and Finch., 2010).

Elasticity: Mesh should have sufficient elasticity to accommodate abdominal wall dynamics. Lightweight meshes demonstrate 20% to 35% elasticity at 16

N/cm. Heavyweight meshes generally exhibit lower elasticity, approximately 4% to 16% at 16 N/cm (Brown and Finch., 2010).

Mesh size and shape: Different sizes and shapes of mesh are required in different clinical scenarios. Many types of mesh are available in a range of pre-cut sizes. Some mesh may be suitable for trimming, such that its size can be customised for a person. Meshes may be pre-shaped to ensure compliance of the mesh-tissue interface (e.g. fitting a particular anatomical location without folding).

Porosity: Porosity is the size and amount of open space between fibres. It is the main determinant of tissue reaction. A proposal of pore size classification (Earl and Mark., 2008) is: microporous, less than 100 µm; small pore, 101 to 600 µm; medium pore, 601 to 1000 µm; large pore, 1001 to 2000 µm; and very large pore, greater than 2001 µm. Another classification of pore size suggested by experts is less than 10µm for microporous mesh, and larger than 75µm for macroporous mesh. A pore size larger than 75 µm is needed in order to allow infiltration by macrophages, fibroblasts, blood vessels and collagen. This promotes improved soft tissue ingrowth and resistance to bacterial colonisation and greater flexibility by reducing granuloma bridging (Brown and Finch., 2010). Microporous mesh, such as those made from expanded polytetrafluoroethylene (ePTFE,), permit minimal tissue ingrowth and may be associated with chronic inflammation (Baylón et al., 2017).

Filament type and structure: Mesh fibres can be monofilament (consisting of a single continuous fibre), multifilament (composed of multiple fibres woven or twisted together), or patches (for example, ePTFE). Fibre architecture may affect infection risk of the mesh and tissue response, with multifilament fibres have a higher risk of infection (Brown and Finch., 2010).

Material absorption: Whether the mesh material fully or partially degrades in the body over time or remains permanent. Experts suggest that the rate of material absorption is influenced by the clinical setting in which the mesh is placed (e.g. presence of contamination can mean absorption is faster). In the case of permanent meshes, they are intended to provide long-term reinforcement without intentional absorption.

Biocompatibility: Biocompatibility of surgical mesh refers to the extent to which it provokes an immune response. Modern synthetic mesh biomaterials are designed to be physically and chemically inert and stable, non-immunogenic and non-toxic (Klosterhalfen et al., 2005). Despite this, they are not biologically inert, with their presence triggering a foreign body response. This response can involve inflammation, fibrosis, calcification, thrombosis and formation of granulomas. The extent of the reaction triggered by a surgical mesh is affected by the amount of material present (Brown and Finch., 2010). Pore size and mesh weight can therefore affect biocompatibility.

Native tissue remodelling: The degree to which the mesh allows organised tissue ingrowth and long-term incorporation.

Long term durability and shrinkage: Shrinkage occurs due to contraction of the scar tissue formed around the mesh. Scar tissue shrinks to about 60% of the former surface area of the wound. The smaller pores of heavy weight meshes lead to more shrinkage due to the formation of a scar plate (Brown and Finch., 2010).

Infection safety: The risk of infection is determined by the type of filament used and pore size. The meshes at lowest risk of infection are, therefore, those made with monofilament and containing pores greater than 75 μm (Brown and Finch., 2010).

4.3 Innovative aspects

Surgical meshes may have potential incremental innovations, continuous improvements and copycat devices under the Department of Health and Social Care's medical technology innovation classification framework. Manufacturers tend to add in innovations that fall into category of incremental improvement rather than fundamentally changing mechanism of action. For example, surgical mesh innovations may enhance the mesh properties outlined in section 4.2. This may lead to improved outcomes, with experts suggesting that they would look for innovative features that could improve chronic pain, hernia recurrence, infection and other patient-related factors. The innovative features in this section are not exhaustive, and other distinguishing or innovative features may be available. Some features may enhance more than 1 mesh property. Additional or innovative features include:

- Material: advanced synthetic material (e.g. bioabsorbable, composite), biologic or hybrid materials.
- Mesh weight and tensile strength: extra-lightweight construction (claims to reduce sensation of foreign body). Strength enhancements include structural or mechanical innovation such as tailored strength.
- Elasticity: dynamometric elasticity (non-constant elasticity, depends on load level).
- Mesh size and shape: may be customisable such that it can be trimmed to fit a person’s anatomy, or pre-shaped to fit a particular anatomical location.
- Porosity: advanced pore size.
- Filament structure: advanced filament structure (e.g. knit pattern).
- Resorbability: Materials enable tailored (long-term/predictable) resorbability.
- Biocompatibility: enhanced biocompatibility, e.g. absorbable scaffolds or surface coatings/mesh content (e.g. collagen or titanium), biocompatible materials (e.g. PVDF).
- Native tissue remodelling: Advanced surface engineering to optimise cellular (parietal) adhesion behaviour: e.g. self-gripping/fixing features, nanocoating.
- Long term durability/shrinkage: properties or materials (e.g. PVDF) to ensure long term durability/ageing resistance.
- Infection safety: advanced infection tolerance, safety innovation such as antimicrobial surfaces/mesh content, use of infection-tolerant materials (e.g. PVDF).

- Safety in contact with the bowel: advanced mesh surface engineering such as absorbable anti-adhesive barriers, films or nanocoating technology to minimise visceral tissue attachment.
- Improved visibility: Enhanced visibility, e.g. radiopaque markers for postoperative visibility, guiding lines for interoperative visibility.
- Improved handling: mesh features to support mesh deployment, e.g. self-expanding mesh, or mesh with balloon-assisted deployment.

It is important to note that the features and potential innovations listed in this section are not exhaustive and other distinguishing or innovative features may be identified for assessment.

5. Comparator

https://www.nice.org.uk/process/PMG48A comparator has not been defined. Comparators will be considered relevant to the assessment if the value of innovative features is able to be assessed (section 4.2.1, NICE HealthTech programme manual).

6. Patient and healthcare professional preferences

Discussion regarding the use and choice of mesh should be had with a person prior to their surgery. People who undergo hernia repair value shared decision making and clear information about mesh options, benefits and risks of various types of mesh before their operation (East B et al., 2021). Views on mesh safety may be informed by socioeconomic factors, personal experience and experience of others (e.g. with regards to mesh-related complications, wound problems, or chronic pain). Flexibility of the abdominal wall is important for some people (for example, younger people, people with active lifestyles, people who are planning pregnancy), which could influence mesh choice. Other lifestyle factors/dietary requirements (e.g. vegetarianism and veganism) may influence preferences for mesh type.

In submissions made by people with lived experience, people also emphasised the importance of clear communication and informed consent throughout the care pathway, including accessible information on mesh type, surgical approach, risks, recovery, and long-term outcomes. Confidence in the surgeon's judgement, effective pain management, physiotherapy support, and appropriate postoperative follow-up were seen as essential to recovery and quality of life. The need for acceptable waiting times, good preoperative preparation, accurate documentation, and meaningful choice in treatment options were also highlighted.

Healthcare professionals, mostly surgeons, make the choice about mesh products. Mesh choice is based on a person's medical history, risk factors, hernia size, wound contamination, mesh features and its suitability for the selected surgical approach, anatomical location and availability of evidence. The choice of mesh may change at the time of surgery should unexpected findings be encountered, e.g. infected field or contamination with bowel contents. Factors related to the individual surgeon such as familiarity with specific mesh products, level of expertise, training background and access to training for newer mesh products can further influence mesh selection. Additionally, the range of meshes available to surgeons may be limited by local policies, procurement arrangements, and cost considerations.

7. Potential equality issues

NICE is committed to promoting equality of opportunity, eliminating unlawful discrimination and fostering good relations between people with protected characteristics (Equality Act 2010) and others.

People may avoid animal derived meshes due to cultural or religious beliefs (Koshy RM et al., 2020). Discussion should be had with a person prior to surgery about the acceptability of mesh products derived from animals. https://www.kingsfund.org.uk/insight-and-analysis/long-reads/unpicking-inequalities-elective-backlogs-englandhttps://bmjopen.bmj.com/content/15/3/e097440.info

For people of childbearing age, elective hernia repair is generally recommended after completion of last pregnancy, because pregnancy can increase the risk of hernia recurrence. Additionally, hormonal changes associated with menopause may affect connective tissue, wound healing and abdominal wall strength, potentially influencing postoperative outcomes.

Furthermore, some people may need additional support to understand information about mesh types, benefits and risks of different available options. This may include people with visual or hearing difficulties, cognitive impairment, difficulties with manual dexterity, a learning disability, people who are unable to read or understand health-related information (including people who cannot read English), neurodivergent people or people with mental health conditions. Consideration should be made to provide such information in a format that is accessible to them.

Access to specialist hernia services can vary by region leading to differences in waiting time and treatment options. People living in the most deprived areas are more than twice as likely to experience wait of over a year for elective surgery compared with those in the least deprived areas (Jefferies D, 2023). People from more deprived socioeconomic groups are also more likely to have comorbidities such as obesity, smoking, or diabetes (Madigan CD et al.,2025), which may mean their surgery is delayed due to preoperative optimisation requirements.

The choice of surgical mesh can be influenced not only by clinical factors but also by the procurement policies of local Integrated Care Bodies (ICB) and individual NHS Trusts. Access to specialised or higher cost meshes may be restricted to centres where these products are included in procurement agreements. As a result, people with the same diagnosis and clinical need in different geographical areas may be offered different mesh options based on local purchasing decisions rather than clinical need. This variation in access can contribute towards regional disparities in care and healthcare inequality.

8. Guidance type

Surgical meshes for treatment of non-primary hernias are proposed to be assessed for existing use. This approach to guidance development is proposed because:

- the assessed group of technologies (interventions) comprise similar technologies, at least some of which would be considered established practice in the NHS (NICE HealthTech programme manual provides more detail on how established practice is determined)
- the technologies are potential incremental innovations, continuous improvements or copycat devices, as defined by the Department of Health and Social Care's medical technology innovation classification framework
- there is likely to be variation in price between alternative technologies in the assessed group of technologies.

9. Decision problem

The key decision questions for this assessment are:

- Do differences in clinical and cost-effectiveness between alternative surgical meshes for treatment of non-primary hernias justify price variation?
- Are there other factors that can inform decisions about which technology to purchase?

Table 1: Decision problem

Proposed type of assessment	Existing use

Population	Use of surgical mesh for repair of non-primary hernias in adults. If evidence is available, the following subgroups will be considered:
	• Type of non-primary hernia:
	    ○ Incisional
	    ○ Parastomal
	• Contamination status (e.g. VHWG grades 1, 2 and 3)
	• Surgical urgency:

	○ Elective surgery ○ Emergency surgery
Interventions	Surgical mesh for ventral hernia available for purchase in the NHS including: • Synthetic mesh • Biological mesh • Hybrid mesh These surgical meshes should meet basic technology requirements and have one or more additional or innovative features.
Comparator	https://www.nice.org.uk/process/PMG48Comparisons may be made between interventions. Comparators will be considered relevant to the assessment if the value of innovative features is able to be assessed.
Setting	Secondary care setting
Outcomes and costs (may include but are not limited to)	**Intermediate outcomes:** • Postoperative pain • Postoperative complications • Readmission within 30 to 90 days • Time to return to normal activities **Clinical outcomes:** • Surgical site occurrence (SSO) - Surgical site infection - Seroma - Hematoma - Wound dehiscence - Skin or soft tissue necrosis - Cellulitis - Chronic wound • Hernia recurrence • Mesh related complications: - Mesh infection - Chronic pain - Chronic foreign body sensation - Mesh migration - Mesh shrinkage or contraction - Mesh failure - Erosion into bowel or other organs - Fistula formation - Adhesion to bowel

	• Long term morbidity • Bowel function • Sexual function (e.g. pain during sex) • Fertility outcomes • Reoperation or reintervention • Ileus/bowel obstruction **Patient-reported outcomes:** • Health-related quality of life • Pain and discomfort • Numbness • Impact on mental health • Satisfaction • Body image • Cosmetic outcome • Impact on daily life **Costs and resource use:** • Cost of surgical mesh • Cost of fixation materials • Staff training cost • Imaging cost • Operating room time including staff time and anaesthesia cost • Cost of surgical approach • Hospitalisation and perioperative resource use (length of hospital stay, readmission rates, emergency department visit, medication and postoperative imaging) • Cost of treating mesh related complication including treatment of SSI or SSO, infection, mesh removal, management of adhesion or erosion • Cost of treating recurrence • Monitoring costs and follow-up visits User preference and non-clinical outcome measures will be based on the prioritisation of outcomes as part of the user preference assessment.
Economic analysis	A health economic model will be developed comprising a cost utility or cost-comparison analysis. Costs will be considered from an NHS and Personal Social Services perspective.

	Sensitivity and scenario analysis should be undertaken to address the relative effect of parameter or structural uncertainty on results. The time horizon should be long enough to reflect all important differences in costs or outcomes between the technologies being compared.

10. Other issues for consideration

10.1 Factors affecting choice of mesh

The choice of mesh used may depend on various patient-related, hernia related, and surgical factors. Patient factors include the individual's health status, future pregnancy plans, and the presence of comorbidities such as diabetes, smoking status, and Crohn's disease. Hernia characteristics such as size, location, and risk of contamination may also affect choice of mesh. Additionally, surgical factors including emergency versus elective repair, and operative technique may influence the selection of mesh for primary ventral hernia repair.

10.2 Evidence

The British Hernia Society (BHS) maintains a hernia mesh registry, launched in November 2024, which may offer real-world evidence. It aims to collect information on all hernia repairs in the UK (both elective and emergency), including patient-reported outcomes and long term follow up, as well as details of mesh removal procedures. At present, entry into the BHS registry is not mandated.

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