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Medical technology consultation: MT496 Leukomed Sorbact for preventing surgical site infection

Supporting documentation – Committee papers

The enclosed documents were considered by the NICE medical technologies advisory committee (MTAC) when making their draft recommendations:

1. **EAC assessment report** – an independent report produced by an external assessment centre who have reviewed and critiqued the available evidence.
2. **Assessment report overview** – an overview produced by the NICE technical lead which highlights the key issues and uncertainties in the company's submission and assessment report.
3. **Scope of evaluation** – the framework for assessing the technology, taking into account how it works, its comparator(s), the relevant patient population(s), and its effect on clinical and system outcomes. The scope is based on the sponsor's case for adoption.
4. **Adoption scoping report** – produced by the adoption team at NICE to provide a summary of levers and barriers to adoption of the technology within the NHS in England.
5. **Sponsor submission of evidence** – the evidence submitted to NICE by the notifying company.
6. **Expert questionnaires** – expert commentary gathered by the NICE team on the technology.
7. **EAC correspondence log** – a log of all correspondence between the external assessment centre (EAC) and the company and/or experts during the course of the development of the assessment report.
8. **Company fact check comments** – the manufacturer's response following a factual accuracy check of the assessment report.

Please use the above links and bookmarks included in this PDF file to navigate to each of the above documents.

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical technologies guidance

MT496 Leukomed Sorbact for preventing surgical site infection

External Assessment Centre report

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Contains confidential information: YES

Number of attached appendices: 2

Purpose of the assessment report

The purpose of this External Assessment Centre (EAC) report is to review and critically evaluate the company's clinical and economic evidence presented in the submission to support their case for adoption in the NHS. The report may also include additional analysis of the submitted evidence or new clinical and/or economic evidence. NICE has commissioned this work and provided the template for the report. The report forms part of the papers considered by the Medical Technologies Advisory Committee when it is making decisions about the guidance.

Declared interests of the authors

Description of any declared interests with related companies, and the matter under consideration. See NICE's Policy on managing interests for board members and employees.

None.

Acknowledgements

Copyright belongs to King's Technology Evaluation Centre.

Dr Thirumagal Bavananthan is a Consultant obstetrician and gynaecologist, Wye Valley NHS Trust, no conflict.

Mr George Smith Senior Lecturer and Honorary Consultant Vascular Surgeon, Academic Vascular Surgery Unit, Hull and York Medical School, declared receiving honoraria from the UK distributor and the manufacturer for presenting trial results in symposia and at conferences.

Mr Joshua Totty is a Core Surgical Trainee Doctoral Candidate, Yorkshire and Humber Deanery Hull York Medical School, declared receiving honoraria for speaking on behalf on BSN Medical (now a part of Essity) at education events on the topics of surgical site infection and telemedicine in healthcare. Mr Totty is principle investigator and lead author on one of the research studies in this report (Totty et al 2019), and a named author on another (Bua et al 2017).

Ms Lucy Woodhouse, Tissue Viability Lead Clinical Nurse Specialist, Wye Valley NHS Trust, no conflict.

Responsibility for report

The views expressed in this report are those of the authors and not those of NICE. Any errors are the responsibility of the authors.

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Abbreviations

Term	Definition
CDC	Centre for Disease Control
CI	Confidence interval
CS	Caesarean section
DACC	Dialkylcarbomoyl chloride
EAC	External Assessment Centre
MAUDE	Manufacturer and User Facility Device Experience
MHRA	Medicines & Healthcare products Regulatory Agency
MTEP	Medical Technologies Evaluation Programme
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NICE CG	NICE clinical guideline
NICE MTG	NICE medical technology guidance
NICE QS	NICE quality standard
NPWT	Negative pressure wound therapy
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomised controlled trial
SD	Standard deviation
SSD	Standard surgical dressing
SSI	Surgical site infection
Vs	Versus

Executive summary

The company included 9 fulltext studies in their clinical submission. One further audit study was provided by the company as academic in confidence. The EAC excluded 5 studies from the company's selection due to study design (a single patient case study (Abigo Medical, 2017)) or the intervention not being relevant to the decision problem (Lee et al. 2018, Meberg et al. 1990, Nielsen et al. 2012, Romain et al. 2020). An independent review of evidence found no additional studies to the company submission. The EAC included 4 studies from the submission that included Leukomed Sorbact as an intervention. Stanirowski et al. (2016a) was an RCT in women who had undergone caesarean section. Totty et al. (2019) and Stanirowski et al. (2016b) were pilot RCTs into vascular surgery patients and women who had undergone caesarean section, respectively. Bua et al. (2017) was a pilot non-randomised controlled trial in vascular surgery patients.

[redacted] The company did not carry out a meta-analysis, stating that the studies differed widely in population and indication; the EAC agreed.

All studies in vascular surgery patients and women who had undergone caesarean section indicated that there was a lower rate of SSI in the Leukomed Sorbact group compared to standard surgical dressing (with follow up times ranging from 5-7 to 30 days post-surgery). However, it is important to note that in 3 studies, outcomes were underpowered ([redacted]) and results in 2 of the studies were not statistically significant for the primary outcome. The strongest evidence is from Stanirowski et al. (2016a) indicating that there was a significantly lower rate of SSI in the Leukomed Sorbact group versus a standard dressing group at 14 days post-surgery in women who had undergone caesarean section. The EAC's economic analysis indicates that the technology may produce cost savings per patient of £107.43 and £17.82 for caesarean sections and vascular surgeries, respectively. The EAC considers the economic evidence and analysis undertaken to be sufficient to conclude that Leukomed Sorbact is cost saving in caesarean sections and vascular surgery. Insufficient evidence hinders an analysis of all surgical specialties combined.

Overall, the EAC believes the case for adopting the technology is supported for preventing SSIs in women who have undergone a caesarean section. The case for wider adoption would however be further strengthened by adequately powered multicentre RCTs comparing Leukomed Sorbact with standard care and other dressings (such as PICO) in targeted surgical populations to address uncertainties and understand the generalisability of this result.

1 Decision problem

The company clarified two points in the scope, which the EAC accepts as valid (see Table 1).

Table 1 Decision problem from final scope

Decision problem	Scope	Proposed variation in company submission	EAC comment
Population	People that have post-operative clean or clean-contaminated wounds with moderate exudate	People that have post-operative clean or clean-contaminated wounds with low to moderate exudate Please amend in line with description of the technology on pg.1 of final scope and the Leukomed Sorbact MIB	The EAC agrees with this variation and would also clarify that the scope is focused on closed wounds.
Intervention	Leukomed Sorbact	None.	Sorbact Surgical will also be included as another name for Leukomed Sorbact.
Comparator(s)	Conventional post-surgical wound dressings Negative pressure wound therapy	None.	None.
Outcomes	Incidence of surgical site infection Rate of wound dehiscence Rate of abnormal scarring ASEPSIS (additional treatment, serous discharge, erythema, purulent exudate, separation of tissues, isolation of bacteria, stay duration as an inpatient) wound score Length of post-operative stay in	None.	None

	hospital relating to SSI Readmission related to SSI Time until full wound closure Prescription and dose of antibiotics Patient pain and discomfort Condition specific and generic quality of life measures Outpatient clinic attendances Post-operative mortality rate Device related adverse events		
Cost analysis	Costs will be considered from an NHS and personal services perspective. The time horizon for the cost analysis will be long enough to reflect differences in costs and consequences between the technologies being compared. Sensitivity analysis will be undertaken to address uncertainties in the model parameters.	None.	None.
Subgroups	Where evidence allows: Site of surgery (including but not limited to c section, vascular) Clean Clean contaminated surgery	None.	None.

	Older people are at an increased risk of surgical site infection. Age is a protected characteristic. Leukomed Sorbact can be used following the delivery of a baby by caesarean section. Pregnancy and maternity are protected characteristics. Leukomed Sorbact should not be used where a person has a known sensitivity to active components of the dressing.	Leukomed Sorbact should not be used where a patient has known sensitivity to the dressing components Please amend wording in line with the Leukomed Sorbact IFU provided. Use of the word active potentially implies it contains a chemical or pharmacological agent	The EAC understands this change and would accept removing the word active to prevent confusion. However, the EAC notes that dressing is interactive according to NICE NG125 definition: "Dressings designed to promote the wound healing process through the creation and maintenance of a local, warm, moist environment underneath the chosen dressing, when left in place for a period indicated through a continuous assessment process."

2 Overview of the technology

Leukomed Sorbact (Essity) also known as Sorbact Surgical dressing, is a sterile, single-use, bacteria binding, adhesive-bordered wound dressing. It is designed to prevent surgical site infection (SSI) in people with post-operative clean or clean-contaminated closed surgical wounds that have low to moderate levels of exudate. It is available in the following 7 sizes (5cm x 7.2cm, 8cm x 10cm, 8cm x 15cm, 10 x 20cm, 10cm x 25cm, 10cm x 30cm, 10cm x 35cm).

Each dressing has an absorbent non-woven wound contact pad and a transparent, adhesive polyurethane film layer. The pad is made of white viscose polypropylene and polyester laminated to the proprietary dialkylcarbamoyl chloride (DACC)-coated Sorbact mesh. The DACC coated Sorbact wound contact layer differentiates Leukomed Sorbact from other interactive post-operative wound dressings. DACC is a fatty acid derivative that is hydrophobic. Microorganisms commonly responsible for causing SSI or colonising chronic wounds generally have hydrophobic extracellular surfaces and bind to the DACC coating. The bound microorganisms are not able to move into the wound decreasing the risk of SSI. Rather than killing microbes, the binding process is designed to leave the cell wall intact so avoiding the release of endotoxins into the wound, which may impair the healing process. The microorganisms are removed from the wound each time the dressing is changed. The company claims that this method of reducing the microbial load means that the dressing is effective against microorganisms that are resistant to antibiotics. The outer transparent polyurethane film is designed to maintain a moist environment and protect the wound from external contamination.

The frequency of dressing change depends on the wound status (including exudate level and presence of infection), and overall condition of surrounding skin. Should the clinical condition allow, the dressing can be left in place for up to 7 days. The company recommends an average wear time for the dressing of between 5-7 days.

There is a range of DACC-containing dressings (branded as Cutimed Sorbact) for infection management in chronic wounds. These have different physical constructions and indications for use to Leukomed Sorbact.

Leukomed Sorbact has been CE marked as a class IIb device since December 2014.

3 Clinical context

The NICE guideline on preventing and treating SSI recommends a range of preoperative, intraoperative and postoperative measures. It also suggests offering prophylactic antibiotics before a clean surgery involving the placement of an implant or before a clean-contaminated surgery. The guideline recommends covering surgical incisions with an appropriate interactive dressing at the end of the operation and that dressings should be changed or removed using an aseptic non-touch technique. Interactive dressings are "designed to promote the wound healing process through the creation and maintenance of a local, warm, moist environment underneath the chosen dressing, when left in place for a period indicated through a continuous assessment process". The guideline does not specify which interactive dressings to use. If an SSI is suspected, antibiotics that cover the likely causative organisms should be used.

NICE has published Leukomed Sorbact advice (MIB197) that describes the potential use of the dressing in people with closed surgical incisions with up to moderate exudate levels. Leukomed Sorbact could be used instead of existing interactive postoperative wound dressings in people at risk of developing SSI from closed surgical incisions. NICE has also published advice on using PICO dressing (MIB149) in people with closed surgical incisions at high-risk for developing SSIs.

The company suggests that Leukomed Sorbact could be used to replace existing interactive postoperative dressings for preventing SSI in clean and clean-contaminated surgeries as per the NICE clinical pathway on preventing

and treating surgical site infections. The company suggests that, if adopted, Leukomed Sorbact could be added to wound management in theatre and wound management after surgery (sections 9 and 10 of the pathway) with a recommendation to "use Leukomed Sorbact for closed surgical incisions with low to moderate levels of exudate, post clean and clean-contaminated surgeries".

The WHO guideline (2016) on the prevention of surgical site infections suggests that advanced ("interactive") dressings should not be used instead of a standard dressing on primarily closed surgical wounds for the purpose of preventing SSI. This is due to the conditional strength of evidence and low quality of evidence. The guideline suggests that future clinical studies should focus on generating a large sample size and include blind outcome assessment.

Recent European Wound Management Association (EWMA) guidance on the prevention and management of SSI (Stryja et al., 2020) notes the lack of definitive evidence for the use of any particular type of interactive wound dressing for preventing SSI. The guidance recommends the use of interactive dressing that creates and maintain a local, warm, moist environment if an SSI is present.

A best practice statement by Wounds UK also highlights the NICE recommendation that surgical incisions should be covered with an appropriate interactive dressing at the end of a surgical procedure.

Special considerations, including issues related to equality

The company's submission notes that older people are at an increased risk of SSI. Age is a protected characteristic. Leukomed Sorbact can be used following the delivery of a baby by caesarean section. Pregnancy and maternity are protected characteristics. The company also notes that the technology should not be used where a person has a known sensitivity to components of the dressing.

The EAC did not have further considerations to add.

4 Clinical evidence selection

4.1 *Evidence search strategy and study selection*

The EAC considered the company's search strategies to be thorough and appropriate for the topic. The EAC re-ran the company's search with new date limits. There was no separate search for economic evidence; the results from the clinical evidence search were filtered in EndNote and reviewed separately.

The database searches revealed 2137 records and following deduplication there were 1465 records. The titles and abstracts of these records were evaluated by 2 reviewers and sifted for relevance. Following the first sift, there were 42 records remaining. The full-text versions of the remaining records were sifted against the inclusion and exclusion criteria and following this second sift, 4 studies were included (plus 1 cost-effectiveness analysis). One more study was provided by the company as academic in confidence. The full search strategies and a PRISMA flow diagram is included in Appendix A. Otherwise the EAC considered the company's inclusion and exclusion criteria to be appropriate.

The company included 9 fulltext studies in their clinical submission. One further audit study was provided by the company as academic in confidence and was included by the EAC ([redacted] The EAC excluded 5 studies from the company's selection due to the intervention not being relevant to the decision problem (Lee et al. 2018, Meberg et al. 1990, Nielsen et al. 2012, Romain et al. 2020) or the study design (a single patient case study (Abigo Medical, 2017). The EAC only included evidence with Leukomed Sorbact or Sorbact Surgical as an intervention. The EAC conducted its own search for economic evidence (see Appendix A) to confirm no relevant papers had been missed out. Following application of cost and economic filters, the EAC searches retrieved 89 abstracts related to economic evidence.

4.2 *Included and excluded studies*

Table 2: Studies selected by the EAC as the evidence base

Study name and location	Design and intervention(s)	Participants and setting	Outcomes	EAC comments
Totty et al. 2019 UK	Prospective feasibility RCT comparing Leukomed Sorbact with standard surgical dressing (Opsite) SSI defined by ASEPSIS score ≥ 21 or by CDC criteria Wounds assessed by 1 investigator blinded to the allocated dressing. Telephone contact was made after 30	144 people having clean or clean-contaminated vascular surgery Leukomed group (n = 74; 48 men; mean age 63.91[±12.38]), mean BMI 27.65, 27% patients with diabetes (20/74) Standard care group (n = 70; 46 men; mean age 62.36 [±12.31]), mean BMI 27.73, 33% patients with diabetes (23/70) Most common types of surgery: lower limb arterial surgery, open abdominal surgery (57.6% of patients who were randomised, 83/144). Most patients were ≥3 on the American Society of Anesthesiologists (ASA)	**Primary: Rate of SSIs at 30 days after surgery** Leukomed: 16% (12/74) Standard dressing: 26% (18/70) P = 0.161 Relative risk reduction at 30 days: 36.9% **Secondary: Rate of SSI at 90 days** (51 implant patients only) Leukomed at 30 days: 7.7% Standard dressing at 30 days: 24.0% P = 0.109 There was no new infection between postoperative day 30 and postoperative day 90.	UK study. Randomisation performed using an online randomisation service in the theatre after wound closure to prevent performance bias, and stratified for prosthetic implant/non-implant, wound site (upper limb/lower limb/trunk), and diabetes (yes/no). Authors note that in a full-scale, two-arm RCT based on this study design, for 90% power and 5% significance, 772 participants would be required. There appears to be a high dropout rate - 23.6% (34 patients of 144). Sixteen patients withdrew during the study period. The most common reason for withdrawal was an inability/unwillingness to attend study follow-up visits. Seven patients died in follow up,

	post-operative days Study not funded by company Intervention ● Comparator ●	grade physical status classification system: 56.9% (82/144) The primary method of wound closure was subcuticular suturing, 82.6% (119/144), followed by interrupted, skin clips and continuous – 9.1% (13/144), 4.2% (6/144) and 2.8% (4/144) respectively. Single tertiary vascular surgery unit in the UK January 2017 – February 2018 ●	**Satisfactory healing:** Leukomed = 62.3% Standard = 50% P = 0.236 **Factors with statistically significant effect on rates of SSI:** presence of diabetes, peripheral vascular disease and the type of surgery performed ($p < 0.05$). ●	unrelated to study outcomes or interventions. Eleven patients attended no follow-up visits and returned no questionnaires. Authors note that amending follow up methods might have contributed to the dropout rate seen in this pilot study. As this was a pilot study, authors note that at the median recruitment rate of 10 participants per centre per month, completing study recruitment in 18 months would require approximately 5 centres to take part in a future full trial. The authors note that the wide range of surgical procedures performed introduces a level of heterogeneity into the study that may impact the results. Performance bias was eliminated by randomising patients after wound closure. Patient reported outcomes were captured. Although the study was open label because of difference in the appearance of

				the dressing, outcome assessors were blinded.
Bua et al. 2017 UK	Prospective non-randomised study comparing Leukomed Sorbact with various standard surgical dressings SSI defined by ASEPSIS wound score ≥ 21 Study not funded by company Intervention ● Comparator ●	200 people undergoing clean or clean-contaminated non-implant vascular surgery. Implant patients excluded due to length of time needed for follow up Leukomed group (n = 100; 54 men; mean age 63 [range 29 - 94]; 39 with diabetes), mean BMI 28, 39% patients with diabetes (39/100) Standard care group (n = 100; 66 men; mean age 63 [range 27 – 97]; 52 with diabetes), mean BMI 27, 52% patients with diabetes (52/100) The most common type of surgery was major limb amputation, followed by limb revascularisation and open varicose vein surgery (75.5% of patients who were randomised, 151/200).	**Primary: Rate of SSI at 5 to 7 and 30 days after surgery** At 5 to 7 days after surgery: Leukomed: 1% Standard dressing: 10% P < 0.05 1 patient with SSI in Leukomed group needed intravenous antibiotics; 2 patients with SSI in the standard dressing group needed intravenous antibiotics (remaining 8 had oral antibiotics). At 30 days: Leukomed: 9.09% Standard dressing: 10% P = 0.83	UK study. Authors note that this was an exploratory, proof-of-concept study. Therefore it may not have been adequately powered. The first 100 people had wounds dressed with standard dressing and the second 100 people had their wounds dressed with Leukomed Sorbact. Both groups were well matched for most variables, however a higher proportion of people had diabetes in the standard care group. The method of analysis controlled for confounding variables that could impact healing. Outcome assessors were not blinded. No patient withdrawals/lost to follow up were reported, however, the patient numbers at 30 days compared with 5-7 days imply that 1 patient and 10

		Most patients were ≥3 on the American Society of Anesthesiologists (ASA) grade physical status classification system: 65% (130/200). The wound closure method in Bua et al. (2017) was primarily continuous: 97.5% (189/200) versus interrupted (11/200). Single tertiary vascular surgery unit in the UK August 2015 – February 2016 ●	**Secondary: evidence of satisfactory healing (ASEPSIS score ≤10)** At 5 to 7 days after surgery: Leukomed: 85% (85/100) Standard dressing: 74% (74/100) P = 0.07 At 30 days: Leukomed: 88.9% (88/99) Standard dressing: 83.3% (75/90) P = 0.37 **Readmission due to SSI at 30 days** Leukomed: 7.07% (7/99) Standard dressing: 10% (9/90) P = 0.47 **Factors in early SSI**	patients may have been lost to follow up at 30 days in the Leukomed Sorbact and standard dressing groups respectively. The EAC calculates this as a possible dropout rate of 5.5%.

			Dressing used was the most prominent predictor in early SSI (p=0.028). ●	
Stanirowski et al. 2016a Poland	Single-blinded Randomised Controlled Trial Leukomed Sorbact surgical dressing vs Standard surgical dressing (Tegaderm Pad) Transverse skin incision (Pfannenstiel) followed by transverse uterine incision in lower segment used in all women. All patients received antibiotic prophylaxis (1g	543 women aged >18 years having elective or emergency caesarean section for single or multiple pregnancy. Study group: Age 31.2 ± 4.8 (range: 18-43) years, mean pre-pregnancy BMI 23.9 +/- 4.5, 9.6% people with diabetes (26/272), 78.7% elective CS (214/272) Control group: Age 30.6 ± 4.8 (range: 18-44) years mean pre-pregnancy BMI 24.2 +/- 4.9, 12.9% people with diabetes (35/271), 77.9% elective CS (211/271) Tertiary Care Centre. June 2014 – April 2015 ●	Study Group n = 272, control group n = 271. **Primary: Rate of SSIs 14 days after surgery** (p=0.04): Study group, 1.8% Control group, 5.2% **Outpatient visits in patients with SSIs** (p=0.02): Study Group, n = 4.6 ± 1.67 Control Group, n = 2.9 ± 1.1 **Secondary:** **Mean length of additional hospital stay in control group**: 8.2 ± 3.2 days.	A power of 90%, α=0.05 was calculated to require 248 patients per group. Of 586 eligible patients for the study, 43 (7.3%) failed to report for follow-up visits and were excluded from further analysis. In the final stage, the study and control groups consisted of 272 and 271 patients, respectively. Overall dropout rate of 9.3% (EAC calculated). Simple randomisation was used with a 1:1 allocation ratio, conducted by an operating nurse. Surgical team blinded to type of dressing until skin closure. Groups well matched for most patient characteristics, including smoking during pregnancy and pre-pregnancy BMI. No

	of cefazolin) administered zero to 30 min before the surgery. Dressing left in-situ for 48h post-operatively unless reasons for replacement. Funding source unclear. Intervention ● Comparator ●		Leukomed Sorbact lowered **risk of SSI** (OR=0.3; [95% CI: 0.09–1.03]; p = 0.04) Multivariable logistic regression with backwards selection showed that pre-pregnancy BMI, smoking in pregnancy and standard dressing application were independent factors influencing the risk of SSI. **Total estimated cost of SSI prophylaxis and treatment**: 5775EUR in study group vs 1065EUR in control group. ●	statistically significant differences in any characteristic. SSIs defined by US CDC criteria Observation period was shorter than recommended by the CDC. Included only superficial and deep SSIs, excluded organ/space SSIs, so may have slightly underestimated total rate of SSI. Women undergoing caesarean section represent a generally younger population with few comorbidities than the general population of surgical patients.
Stanirowski et al. 2016b Poland	Single-Blinded Randomised Controlled Pilot Study Leukomed Sorbact surgical dressing vs Standard	142 women aged >18 years having elective or emergency caesarean section. Study group: Age 30.9 ± 4.5 (range: 19-41) years, mean pre-pregnancy BMI 24.3 +/- 4.1, 9.8% people with	Study Group n = 71, control group n = 71. **Primary: Rate of SSIs 14 days after surgery** (p=0.08): Study group, 2.8% Control group, 9.8%	This was a pilot study that preceded Stanirowski et al. 2016a, above. No power calculation reported. Simple randomisation was used with a 1:1 allocation ratio,

	surgical dressing Transverse skin incision (Pfannenstiel) followed by transverse uterine incision in lower segment used in all women. All patients received antibiotic prophylaxis (1g of cefazolin) administered zero to 30 min before the surgery. Dressing left in-situ for 48h post-operatively unless reasons for replacement. Funding source unclear. Intervention ●	diabetes (7/71), 74.7% elective CS (53/71) Control group: Age 31.2 ± 5.1 (range: 19-43) years mean pre-pregnancy BMI 25.3 +/- 6.0, 9.8% people with diabetes (7/71), 71.8% elective CS (51/71) Tertiary Care Centre December 2013 – March 2014. ●	**Secondary**: 5 women in the control group required systemic antibiotic treatment vs 0 in the study group (p=0.03). Pre-pregnancy BMI was found to be the only statistically significant predictor of developing SSI (p=0.015) according to logistic regression analysis. ●	conducted by an operating nurse. No statistically significant differences in any patient characteristics. No statistically significant difference in SSI development between groups, possibly due to small population. The EAC calculated a dropout rate of 8.8% (20 of 162 women randomised in the study) Observation period was shorter than recommended by the CDC.

	Comparator ●			
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 3: Studies included by company and excluded by the EAC

Study name and location	Design and intervention(s)	Participants	Outcomes	EAC comments
Lee (2018) South Korea	Retrospective Cohort study Sorbact Compress vs chlorhexidine acetate-soaked paraffin gauze Patients were split into thick and thin skin groups which were subsequently subdivided into control and experimental groups. 🔴	60 patients who underwent split-thickness skin graft procedures 🟡	In the thick skin group, the median healing duration was 12 days in the control subgroup, compared with 9.5 days in the DACC subgroup (p=0.049). In the thin skin subgroup, the median healing duration in the control group was 18 days, compared with 10 days in the DACC subgroup (p=0.013) 🟢	Intervention not in scope

Meberg (1990) Norway	Prospective randomised controlled trial Sorbact vs routine umbilical disinfection regimen with daily cleansing of the cord stump with 0.5% chlorhexidine in 70% ethanol 🔴	2441 newborn infants requiring umbilical care 🔴	n=1213 in Sorbact group and n=1228 in control group 410 infections were registered in 377 (15.4%) of the infants Total infection rate was 16.3% and 14.6% in the study group and control group, respectively (p>0.05) 🟢	Intervention not in scope
Nielsen (2012) Location unclear	Prospective cohort study Cutisorb Sorbact vs a polyhexanide-containing biocellulose dressing (Suprasorb X) 🔴	60 patients with secondary intention surgical wounds 🟡	Pain levels in the biocellulose dressing group were significantly lower (p<.000) than the Cutisorb group. No anesthesia was required for the patients in the Suprasorb group where 16% of patients in the Cutisorb group required general anaesthesia for dressing removal. 🟡	Intervention not in scope

Romain 2020 France	Multicentre randomised controlled trial Sorbact dressings vs alginate dressings 🔴	246 patients undergoing surgery for pilonidal disease 🟡	N=120 in the Sorbact dressings group N = 126 in the alginate group There were significantly more patients with completely healed wounds after 75 days in the Sorbact group than in the alginate group (OR: 2.55, 95% CI, 1.12 to 5.92; p=0.023): Sorbact group: 78 of 103 (75.7%) Aliginate: 58 of 97 (60%) 🟡	No way to determine which patients were given Leukomed Sorbact dressings specifically, rather than other DACC-coated dressings
Abigo Medical (2017)	Case Study/Adverse Event Report 🔴	1 patient undergoing total knee replacement with Leukomed Sorbact placed on surgical site 🔴	The patient was admitted to an emergency department with a chemical burn with eschar on the entire surgical site. 🔴	This is an adverse event report.

For each of the 'design', 'participants' and 'outcomes' entries indicate with a green, amber or red colour coding whether the study matches the scope fully, partially, or not at all: 🟢🟡🔴

You can use other methods to indicate compliance with the scope (for example ticks, crosses or icons) but please describe it.

5 Clinical evidence review

5.1 *Overview of methodologies of all included studies*

Three studies were RCTs (Stanirowski et al. 2016a, Stanirowski et al. 2016b, Totty et al. 2019) and 1 was a non-randomised controlled trial (Bua et al. 2017).

[redacted] All studies compared Leukomed Sorbact against standard surgical dressings. Overall, baseline patient characteristics were well matched between intervention and control groups. Two studies stated the specific standard dressing: Opsite in Totty et al. (2019) and Tegaderm in Stanirowski et al. (2016a). Three studies were published as pilot or feasibility studies (Totty et. al 2019, Bua et al. 2017, Stanirowski et al. 2016b), the remaining study was published as a full RCT. All studies were single centre and published in full.

Two UK studies (Totty et al. 2019 and Bua et al. 2017) were carried out in patients undergoing vascular surgery; Totty et al. 2019 included patients receiving an implant (and included a subgroup analysis), and Bua et al. 2017 excluded patients receiving an implant. The type of vascular surgery varied, including major limb amputation and open abdominal surgery. Most patients undergoing vascular surgery were ≥3 on the American Society of Anesthesiologists (ASA) grade physical status classification system (see table 2 in section 4.2 for more information). Mean age ranged between 62.36 to 63.91 years in all study groups. BMI ranged from 27 to 28. The percentage of people with diabetes ranged from 27% to 52%.

Two Polish studies (Stanirowski et al. 2016a, Stanirowski et al. 2016b) were carried out in women having elective or emergency caesarean sections. The majority of surgeries were elective (versus emergency), ranging from 71.8% to 78.7% over each study group. Mean age ranged between 30.6 to 31.2 years in all study groups. BMI ranged from 23.9 to 25.3. The percentage of women with diabetes ranged from 9.6% to 12.9%.

The duration of follow up ranged from 5-7 days (Bua et al. 2017) to 30 days (Totty et al. 2019). The follow up time in both Stanirowski et al. (2016a and 2016b) studies

was 14 days. Totty et al. (2019) also included rate of SSI at 90 days as a secondary outcome for the subgroup of implant patients only. Therefore all studies provided outcomes within 30 days. [redacted]

A double-blinded study design was not possible due to the nature of the intervention; 1 study was open-label (Bua et al. 2017) and three studies were single-blinded. In Totty et al. (2019), outcome assessors were blinded, and in both Stanirowski et al. (2016a and 2016b) studies the surgical team was blinded to the type of dressing until skin closure.

All studies had the rate of SSI as the primary outcome as defined by the ASEPSIS (Totty et al. 2019, Bua et al. 2017) or CDC criteria (Totty et al. 2019, Stanirowski et al. 2016a and 2016b) and assessed factors influencing SSI rate. Follow up times of 5-7, 14 or 30 days were included. Other outcomes included: wound dehiscence (Stanirowski et al. 2016a and 2016b), satisfactory healing (ASEPSIS ≤ 10) (Totty et al. 2019, Bua et al. 2017, need for antibiotic treatment (Bua et al. 2017, Stanirowski et al. 2016a and 2016b), readmission due to wound complication (Bua et al. 2017, Stanirowski et al. 2016a), and length of hospital stay (Stanirowski et al. 2016a).

The 2 Polish studies highlighted that both superficial and deep SSIs were included, but were not reported separately. The 2 UK studies ([redacted]) did not mention deep or superficial SSIs.

The only adequately powered study was Stanirowski et al. (2016a) which was a full RCT (as opposed to a pilot or feasibility study) and is therefore deemed the highest quality study.

5.2 *Critical appraisal of studies and review of company's critical appraisal*

The company's submission did not contain a formal critical appraisal of the evidence. The submission does contain an outline of the limitations for each of the selected studies (within section 5, details of relevant studies). Overall, the company considered all studies to be well designed, noting that 3 of the studies were UK

based. The company did note that limitations may include studies being single centre. The company also noted that 2 studies were carried out in Poland, but they did not expect this to significantly limit generalisability to the UK.

The company notes that 3 of the studies included are carried out in the NHS (Totty et al. 2019, Bua et al. 2017 and [redacted]). The submission notes that not all the results are statistically significant at the conventional 5% level, but describes the observed effect sizes in these studies as clinically and economically meaningful. It does not explain further why the results are judged to be meaningful. Clinical experts noted that results that were not statistically significant may in practice be regarded as clinically significant when considered within the larger context of other confounding risks and underlying causes. A relative risk reduction of 36.9% may be considered clinically significant but the fact that the study was a pilot and underpowered (also that the effect is not maintained at 30 days) limits drawing conclusions about its efficacy. Two of the RCTs (Totty et al. 2019, Stanirowski et al. 2016b) were pilot trials that were not powered to detect a difference in SSI rates, but rather to test the feasibility of conducting a larger study. The submission notes that Stanirowski et al. (2016a) is a large RCT in women undergoing caesarean section and provides the best quality evidence.

The EAC carried out an independent critical appraisal of the 4 full text publications included in the assessment report. Cochrane Risk of Bias 2 (RoB2) tool was used for the 3 RCTS. The CASP guidelines were used for the non-randomised study [redacted]. A copy of the EAC's methodological quality appraisal checklist is included in appendix B. Figure 1 illustrates the overall judgement of risk for the RCTs.

The largest RCT (Stanirowski et al. 2016a) was deemed the lowest risk of bias. There may have been some concern over the lack of full blinding in the study, however, because the surgical team was blinded to the type of dressing until skin closure overall the algorithm and the EAC judged the risk of bias to be low. The study has been analysed on an intention-to-treat basis. The number of patients lost to follow-up was similar in both groups and the EAC considered that it is unlikely that it affected the outcome given the study design and the nature of the intervention. The pilot RCT into women undergoing caesarean section (Stanirowski et al. 2016b) was

also judged to be low risk overall. There were similar potential concerns about blinding and the analysis carried out. The study was analysed per protocol and similar numbers of patients were lost to follow-up in both groups. Contrary to Stanirowski et al. (2016a) this pilot RCT did not report a sample size calculation raising some concerns about the reliability of the reported outcomes. The results correspond with the rest of the evidence base.

The RCT in vascular surgery patients (Totty et al. 2019) was considered to have some concerns about randomisation as there was a slightly higher proportion of patients with diabetes in the control group. As diabetes is a potential risk factor for SSI, this may have increased the baseline risk of SSI, however the difference was small and unlikely to impact results. The study also had a relatively high dropout rate compared to the other studies (but numbers were similar between both study arms). The authors note the study is underpowered. Although the study was conducted as an open-label study, blinded outcome assessors were used, therefore the EAC considered it unlikely that the lack of blinding before dressing application would have a significant impact on outcome.

Aside from the lack of blinding, no significant risks of bias were identified in Bua et al. (2017) by the CASP checklist.

[redacted]

Overall, the EAC agrees with the company submission that studies are low risk of bias with some concerns about blinding and sample size. All studies (albeit in heterogenous populations) showed a reduction in SSI rates within 30 days of surgery ([redacted] however most studies were underpowered for this outcome.

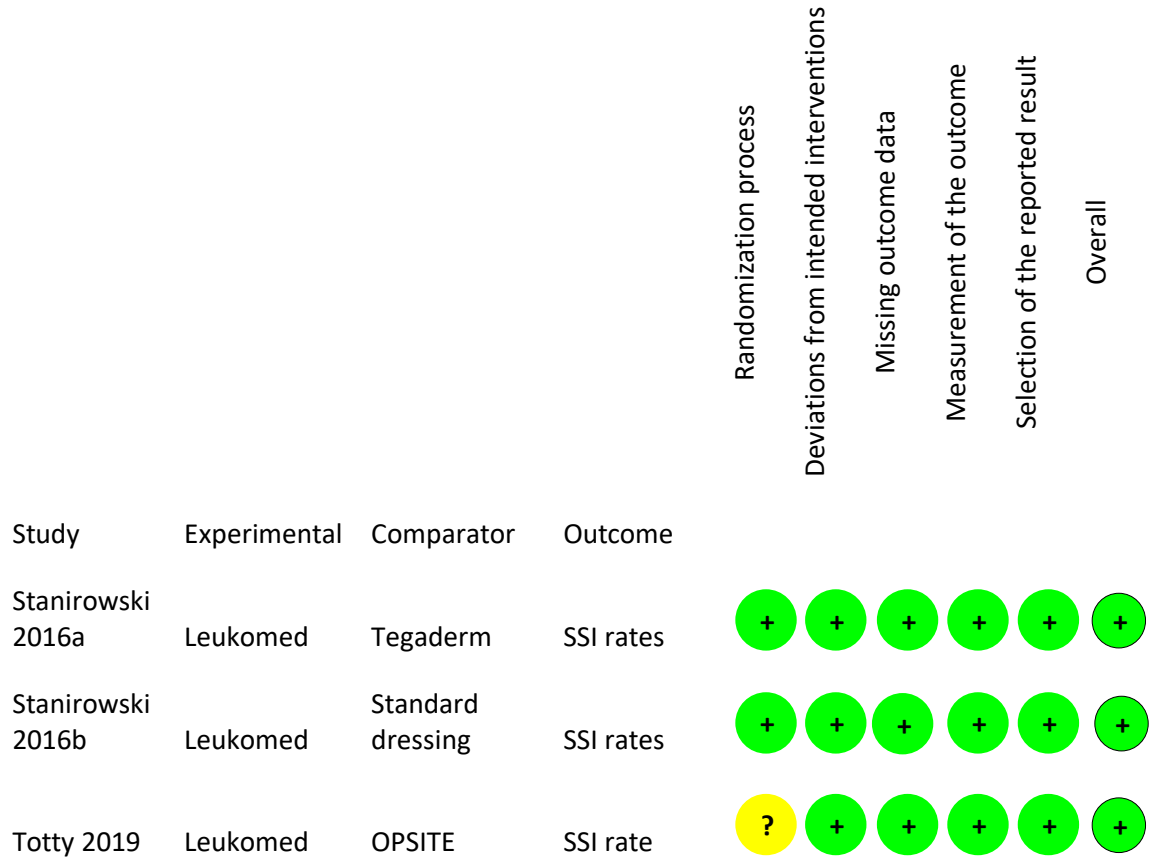


Figure 1 RoB2 results for the RCT studies

5.3 *Results from the evidence base*

A total of 4 comparative studies (all identified by both the company and the EAC) and 1 academic in confidence audit provided by the company were included in this assessment report. The results from these studies are included in Table 4 below.

Table 4 Outcomes and results from selected studies

Study	SSIs at 5 – 7 days	SSIs 14 days	SSI at 30 days	Wound dehiscence	Satisfactory healing (ASEPSIS ≤ 10)	Factors influencing SSI rate	Need for antibiotic treatment	Readmission due to wound complication	Length of hospital stay
Totty et al. 2019 UK	NA	NA	Leukomed: 16% (12/74) Standard dressing: 26% (18/70) P = 0.161 RR reduction 36.9%	NA	Leukomed = 62.3% Standard = 50% P = 0.236 (at 30 days)	Presence of diabetes, peripheral vascular disease and the type of surgery performed (p < 0.05).	NA	NA	NA

Study	SSIs at 5 – 7 days	SSIs 14 days	SSI at 30 days	Wound dehiscence	Satisfactory healing (ASEPSIS ≤ 10)	Factors influencing SSI rate	Need for antibiotic treatment	Readmission due to wound complication	Length of hospital stay
Bua et al. 2017 UK	Leukomed: 1% (1/100) Standard dressing: 10% (10/100) P < 0.05	NA	Leukomed: 9.09% (9/99) Standard dressing: 10% (9/90) P = 0.83	NA	At 5 to 7 days after surgery: Leukomed: 85% (85/100) Standard dressing: 74% (74/100) P = 0.07 At 30 days: Leukomed: 88.9% (88/99) Standard dressing: 83.3% (75/90) P = 0.37	Dressing used was the most prominent predictor in early SSI (p=0.028).	1 patient with SSI in Leukomed group needed intravenous antibiotics; 2 patients with SSI in the standard dressing group needed intravenous antibiotics (remaining 8 had oral antibiotics).	At 30 days Leukomed: 7.07% (7/99) Standard dressing: 10% (9/90) P = 0.47	NA

Study	SSIs at 5 – 7 days	SSIs 14 days	SSI at 30 days	Wound dehiscence	Satisfactory healing (ASEPSIS ≤ 10)	Factors influencing SSI rate	Need for antibiotic treatment	Readmission due to wound complication	Length of hospital stay
Stanirowski et al. 2016a Poland	NA	Study group, n=5 (1.8%) Control group, n = 14 (5.2%) (p=0.04):	NA	1 patient in the study group and 2 in the control group had wound dehiscence (p>0.99)	NA	Risk of SSI was shown to depend on smoking in pregnancy, pregnancy induced hypertension and pre-pregnancy BMI by univariate analyses	4 women in the control group required systemic antibiotic treatment and 3 required hospital readmission vs 0 in the study group (p=0.13 and p=0.24, respectively).	**Number of ambulatory visits in patients with SSIs** (p=0.02): Study Group, n = 4.6 ± 1.67 (range: 2-6) Control Group, n = 2.9 ± 1.1 (range: 1-4)	Mean length of additional hospital stay in the control group was 8.2 ± 3.2 (range: 5-11) days.

Study	SSIs at 5 – 7 days	SSIs 14 days	SSI at 30 days	Wound dehiscence	Satisfactory healing (ASEPSIS ≤ 10)	Factors influencing SSI rate	Need for antibiotic treatment	Readmission due to wound complication	Length of hospital stay
Stanirowski et al. 2016b Poland	NA	Study group, n=2 (2.8%) Control group, n = 7 (9.8%) (p = 0.08)	NA	1 patient in the control group had wound dehiscence.	NA	Pre-pregnancy BMI was found to be the only statistically significant predictor of developing SSI (p=0.015) according to logistic regression analysis.	5 women in the control group required systemic antibiotic treatment and 1 required hospital readmission vs 0 in the study group (p=0.03 and p=0.5, respectively).	NA	NA

Study	SSIs at 5 – 7 days	SSIs 14 days	SSI at 30 days	Wound dehiscence	Satisfactory healing (ASEPSIS ≤ 10)	Factors influencing SSI rate	Need for antibiotic treatment	Readmission due to wound complication	Length of hospital stay
[redacted]	NA	NA	[redacted]	NA	NA	NA	NA	NA	NA

6 Adverse events

The company submission listed adverse events relating to the use of DACC (Sorbact) technology across all indications, identifying 5 entries on the FDA MAUDE database relating to 3 separate incidents. Only 1 of these related to the Leukomed Sorbact dressing, which the EAC's searches also identified.

The EAC carried out a separate search into adverse events, solely for Leukomed Sorbact. The EAC performed a search of the FDA website ("Leukomed Sorbact") and found the following 2 reports listed for the same adverse event: 31/03/2017 and 20/03/2018. The reports describe a female patient who underwent total knee replacement and was treated with Leukomed Sorbact dressing at her surgical site. About a month later, she was reported to have developed a chemical burn with eschar on the entire surgical site due to a device malfunction. She was discharged 2 days later.

The EAC's search of the MHRA drug and device alerts found no references.

The company also describe an observational study in a poster presentation (Coldwell et al. 2014) that found 2 hypersensitivity reactions to the adhesive in 55 treated patients in an Australian primary care setting.

7 Evidence synthesis and meta-analysis

The company did not carry out a meta-analysis, stating that the studies differed widely in population, indication and in the specific type of DACC dressing used. The EAC notes that after the exclusion of studies assessing Cutimed Sorbact, the study population remains a particular source of heterogeneity. The EAC agrees that a meta-analysis carried out with the current clinical evidence would not be robust.

8 Interpretation of the clinical evidence

Overall, the EAC considered the evidence to be generalisable to the NHS population. Two of the studies included patients from the same vascular surgery centre in the UK. The remaining 2 comparative studies were from

Poland. Experts noted that though protocols for SSI prevention would have local variations within the UK, most would tend to be based around NICE SSI prevention guidance. Experts also noted that though WHO guidelines on SSI prevention are international, it was unclear whether more specific wound care guidelines differed between Poland and the UK.

The ASEPSIS and CDC SSI definitions were used in all 4 comparative studies. Though there is no universal definition of SSI, both are commonly used for research purposes in the UK, therefore the EAC considers these definitions appropriate. The CDC defines superficial SSIs as occurring in the superficial (skin or subcutaneous) tissues within 30 days, and deep infections (deep soft tissue) as occurring in the deep tissues and can occur either early (within 30 days) or later (within 90 days) if a prosthetic implant is used (such as a vascular graft or orthopaedic prosthesis). Two NICE experts noted that a minimum of 30 days would be required to adequately assess the effectiveness of a surgical dressing. Another expert explained that SSI may be monitored for between 14 and 30 days based on national surveillance protocols in different parts of the UK. Both Stanirowski (2016a and 2016b) studies had follow up periods of 14 days. It is unclear if this was an adequate length of follow up. The follow up period in the 2 vascular surgery studies were at least 30 days and therefore considered adequate.

The strongest evidence on outcomes comes from a single centre Polish RCT in women undergoing caesarean sections (Stanirowski et al. 2016a) that showed that there was a significantly lower incidence of SSI in the Leukomed Sorbact group compared with the standard dressing group within 14 days of surgery. In all 3 other smaller studies, the incidence of SSI was also lower in the Leukomed Sorbact group compared with standard dressing, though this effect was strongest in the immediate post-operative period. For example, there was significantly fewer SSIs in the Leukomed Sorbact group at 5-7 days follow-up in Bua et al. 2017, but there was no difference in SSI rates at 30 days. The result was not significant in either Totty et al. (2019) or Stanirowski et al. (2016b).

[redacted]

[redacted]

The World Union of Wound Healing Societies (WUWHS) Consensus document provides a framework for stratifying patients according to risk of SSI. According to the guidance, the risk for surgical site complications is dependent on a large number of patient-related and/or surgical procedure-related factors. The risk of SSI in caesarean section surgeries may vary by underlying patient characteristics such as BMI and diabetes. Wound infection is more common following emergency caesarean section compared with elective caesarean section. Regarding generalisability to the UK population, Stanirowski et al. (2016a) notes that depending on the definition and the observational period, baseline SSI occurs in about 1.8%–9.8% of all CS patients internationally. NICE experts differed on the expected baseline rate of SSI in CS patients in the UK. Three experts noted SSI rates for CS of approximately 1.7% to 10%, which is in line with the rates in Stanirowski et al. (2016a). A fourth expert suggested baseline SSI rates for CS may be between 10% to 20%. The same expert noted that baseline SSI rates rely on method of surveillance used. If the SSI rate is not actively being investigated then SSIs may primarily be identified through readmitted patients or SSIs occurring during hospital stay. The expert highlighted that many SSIs are managed within community or tertiary services, therefore the true number of SSIs may not be recorded. The rate of SSI may also vary substantially both within and between types of vascular surgery. One expert noted that groin surgery and amputations are considered elevated risk but overall risks depend upon many other factors than surgery type alone. Another expert highlighted that SSI rates following open varicose vein surgery have been reported between 1.5% and 24% (Hirsemann et al., 2005, Hayden and Holdsworth, 2001). In one study, infection rates following major lower limb amputation were found to be as high as 22.5% (Sadat et al., 2008). The Public Health England reported an SSI incidence of 2.5% for vascular surgery in 15 English hospitals (between April 2014 to March 2019). Levels of exudate also vary by patient and procedure and affect the suitability of Leukomed Sorbact, which is intended for wounds with low to moderate levels of exudate. For example, vascular

surgery, particularly on the lower limbs, may lead to wounds that have a higher than average level of exudate. None of the studies discussed the level of wound exudate.

The effect of a wound dressing on SSI may vary according to whether the SSI occurs in superficial or deep layer tissues. The company notes that the Sorbact bacteria-binding technology works by contact with bacteria present within the wound and on the surrounding skin therefore it anticipates that that the dressing will have a significant impact on preventing and managing superficial SSIs. However, it was unaware of evidence to demonstrate the impact this technology on deeper tissue layers. The 2 Polish studies highlighted that both superficial and deep SSIs were included, but were not reported separately. The 2 UK studies (and 1 academic in confidence UK audit) did not mention deep or superficial SSIs. Therefore, the effect of Leukomed Sorbact on deep versus superficial SSIs is unclear.

NICE experts noted that “non-active” pad-and-film dressings are used as standard for most procedures in the NHS. Totty et al. (2019) Stanirowski et al. (2016a) both used this type of dressing within the standard dressing group. Therefore, the comparators in these studies are considered appropriate. One expert noted that other dressings may be used depending on underlying conditions. For example, negative wound pressure dressings may be used in caesarean section procedures if a patient has raised BMI, or active dressing may be used in emergency lower segment caesarean section procedures.

One expert suggested that populations undergoing caesarean section or vascular surgery may be viewed as two ends of a risk spectrum. The populations in the caesarean section studies were younger, with lower BMI, lower levels of diabetes compared with the vascular surgery populations. In addition, the caesarean section operations were mainly lower risk elective surgeries. Most people in the vascular surgery populations were recorded as ASA grade ≥ 3. If Leukomed Sorbact benefits both groups of patients, an assumption may be drawn that results could be generalised to other patient groups. The expert noted however, that adequately powered RCTs in each individual patient group are required to validate this assumption. Another

expert agreed that relatively consistent effects across trials in both specialties may indicate generalisability, but noting that both procedures have relatively high rates of SSI and similar effects would be less likely in procedures where SSI are very rare (elective orthopaedic surgery for example). Overall, the EAC believes the case for adoption is supported to prevent SSIs in women who have undergone caesarean section, however, an adequately powered, blinded, multicentre trial comparing Leukomed Sorbact with standard care and other dressings such as PICO needs to be done to address any uncertainties. For example, the evidence into women undergoing caesarean section could be improved by increasing the length of follow up to 30 days. Impact of an intervention may also vary by whether the surgery is emergency or elective. The evidence into vascular surgery populations would benefit from adequately powered multicentre RCTs investigating specific patient groups to understand and validate any assumptions about the generalisability of this result.

8.1 *Integration into the NHS*

The patients in the included studies were selected from settings appropriate to the likely use of the device in the NHS.

The Leukomed Sorbact dressing will replace existing interactive postoperative dressings for preventing SSI in clean and clean-contaminated surgeries. It would be used in line with existing guidelines for preventing SSI in closed surgical incisions. SSIs comprise up to 20% of all healthcare associated infections. NICE's guideline on surgical site infections advises that at least 5% of patients undergoing a surgical procedure develop a surgical site infection.

The EAC does not anticipate that the adoption of the technology would require a significant change to the current care pathway. All experts noted that Leukomed Sorbact could directly replace standard dressings in the NHS. Leukomed Sorbact can be applied after an operation in the operating room by a surgeon or theatre nurse. It can also be used in the early post-operative period if a dressing needs to be replaced. Minimal training would be needed to apply the dressing.

8.2 *Ongoing studies*

The EAC believes the company's description of ongoing studies is adequate. The company submitted 5 ongoing studies, of which 2 are investigating Leukomed Sorbact. The EAC did not retrieve any other relevant ongoing studies.

[redacted]

The other submitted study is a new analysis of data on patients undergoing non-implant and implant vascular surgery. This analysis is aiming to estimate the attributable resource use and costs associated with SSI in these patients.

9 Economic evidence

9.1 *Published economic evidence*

Search strategy and selection

A search for economic evidence was carried out by the company encompassing the following databases: MEDLINE, MEDLINE In-Process, MEDLINE Daily and Epub Ahead of Print, Embase, Cochrane Database of Systematic Reviews (CDSR), Cochrane Central Register of Controlled Trials (CENTRAL), Database of Abstracts of Reviews of Effects (DARE), Health Technology Assessment Database (HTA Database),NHS Economic Evaluation Database (NHS EED), Conference Proceedings Citation Index – Science (CPCI), Econlit, WHO International Clinical Trials Registry Portal (ICTRP), ClinicalTrials.gov, Be Part of Research, Cost-Effectiveness Analysis Registry (CEA Registry). The EAC considers the search strategy (Company submission Appendix A) used by the company to be appropriate. The PRISMA flow diagram (Figure 2) describes the search results. In total, 2 published and 2 unpublished (academic in confidence) studies were included. The EAC conducted its own search (see Appendix A) to confirm no relevant papers had been missed. Following the application of cost and economic filters, the EAC searches retrieved 89 abstracts related to economic evidence.

After reviewing these abstracts, the EAC confirmed that no economic evidence in addition to the studies submitted by the company was available.

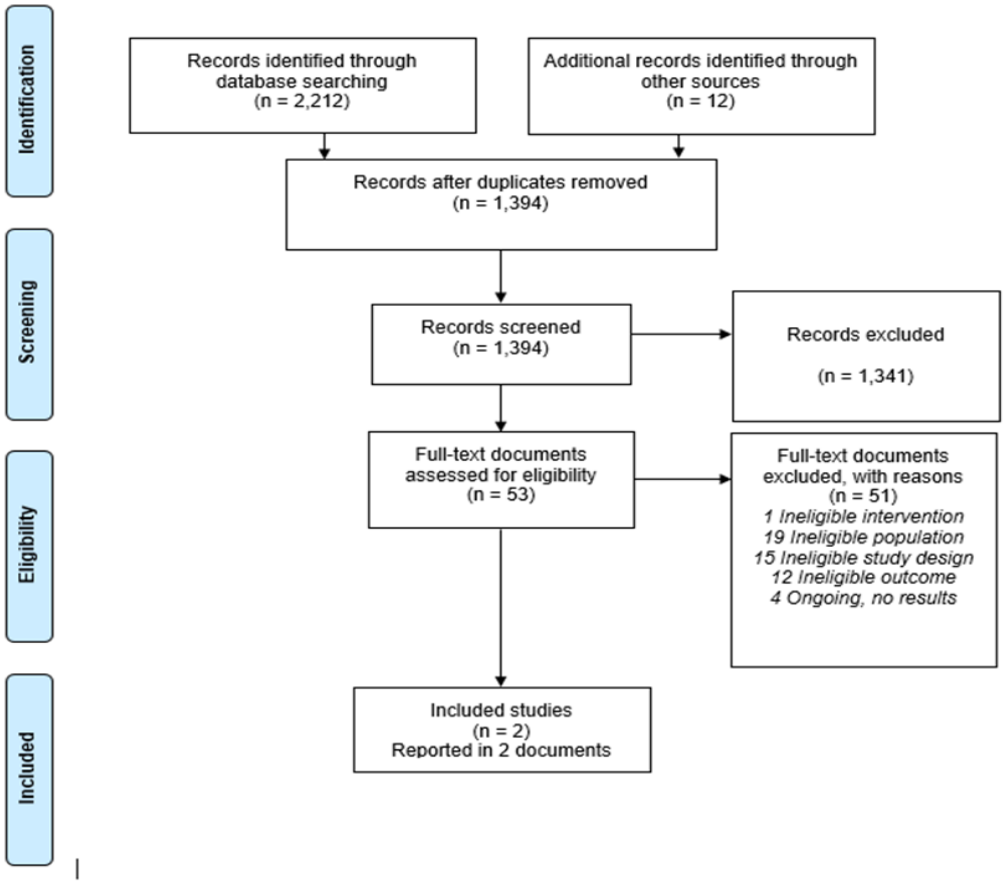


Figure 2: PRISMA flow diagram for economic evidence.

Specific inclusion and exclusion criteria were applied for study selection. The inclusion criteria were patients of any age who are at risk of developing any post-operative surgical site infection; Sorbact or DACC impregnated dressings and variants; resource use, cost-effectiveness studies and economic evaluations; and English language studies with no date limit. The exclusion criteria applied by the company were: study designs that were not any type of economic evaluation; patients with chronic wounds; and studies not evaluating DACC impregnated dressings. The EAC applied the same criteria, except with regard to variants of Sorbact; the EAC restricted their search to Leukomed Sorbact only, this being the technology relevant to the scope. Two unpublished studies were identified and linked to the decision problem ([redacted]). Therefore, 4 studies were included as part of the

economic evidence by the company (Stanirowski 2016b, Stanirowski 2019, [redacted]).

Stanirowski 2016b compared the cost of Sorbact with standard dressing in women undergoing caesarean section in Poland. Stanirowski 2019 utilised clinical data from Stanirowski et al. (2016a) and evaluated the cost-effectiveness of Sorbact from the perspective of UK NHS. Both the studies were considered relevant by the EAC.

[redacted]

Published economic evidence review

Stanirowski et al. (2016a) reports a single blinded clinical trial in which women undergoing caesarean section were randomised to one of two postoperative dressings: a bacterial-binding dressing (Sorbact) and a standard surgical dressing (Tegaderm) in Poland. Dressings were left in place for the first 48 hours and then removed. The presence of SSI during the first 14 days after surgery was recorded. The cost of an episode of SSI was estimated from patient-level data on the use of systemic antibiotics, outpatient visits and additional hospitalisation.

Using the clinical outcomes from Stanirowski et al. (2016a), Stanirowski et al. (2019) developed a decision-analytic model from the perspective of the NHS. The model applied a time horizon of 14 days matching the timescale of the

original trial. Both dressings used in the original trial are available in the UK as Leukomed Sorbact (Essity) and Tegaderm plus pad (3M). The main outcomes of the analysis were the number of SSI events avoided, the incremental cost per patient and the incremental cost per SSI avoided. The study simulated the incidence of SSI during the first 14 days after surgery. Resource use considered in the simulation included: the number of dressings per patient; use of systemic antibiotics; outpatient visits; and additional hospitalisation. Unit costs were sourced from the most recently published NHS National Schedule of Reference Costs and the British National Formulary (BNF).

[redacted]

Results from the economic evidence

The company included 4 studies as a part of their economic evidence submission. Stanirowski et al. (2016a) was an RCT of the technology compared to standard dressing in Poland including associated costs. Total estimated cost of SSI prophylaxis and treatment was greater in the control group as compared with the study group, and amounted to 5,775 EUR vs. 1,065 EUR, respectively. The increased cost in the standard dressing group arose from prolonged hospitalization, additional nursing care, and a higher cost for the standard dressing (4.9 EUR) compared to Leukomed Sorbact (2.8 EUR).

Using the clinical outcomes from this study and UK unit costs, Stanirowski et al. (2019) estimated the cost of the technology in an NHS setting. The expected per patient costs of SSI prophylaxis and treatment were £48.97 and

£24.69 in the standard dressing group and Leukomed Sorbact groups respectively, generating a difference of £24.27 (49.6%) per patient. The main driver of lower costs for Leukomed Sorbact was the reduction in the number of SSI cases, resulting in a reduction in outpatient attendances and inpatient length of stay. Sensitivity analysis was undertaken in which the cost of SSI (£3,976) was taken from a UK-based study (Jenks et al. 2014). This generated an expected cost of £206.64 and £87.50 per patient in the standard dressing and Leukomed Sorbact groups, respectively, yielding a difference of £119.07 (57.6%) per patient.

The company concludes that this evidence supports the adoption of Leukomed Sorbact. The EAC agrees that the studies provide evidence to support the assertion that Leukomed Sorbact is cost-saving.

[redacted]

9.2 *Company de novo cost analysis*

Economic model structure

Patients included in the model are those having post-operative clean/clean contaminated wounds. The model considers 3 populations: patients undergoing caesarean-section, vascular surgery and all surgery. The technology Leukomed Sorbact is compared with a standard post-surgical dressing. No direct comparison between Leukomed Sorbact and NPWT has

been made, due to the lack of evidence. The populations and interventions considered are in line with the scope.

The company has used a decision tree (Figure 3) in which patients enter the model at the end of a surgical procedure when the incision is to be covered with an appropriate dressing (either standard post-surgical dressing or Leukomed Sorbact). The outcomes are either SSI or no SSI. The time horizon is 30 days. An SSI incurs additional cost due to extended inpatient stay or readmission, and antibiotics. In the absence of SSI, no additional costs are incurred. The EAC considers the simple model structure and time horizon to be appropriate to capture the relevant outcomes of the technology.

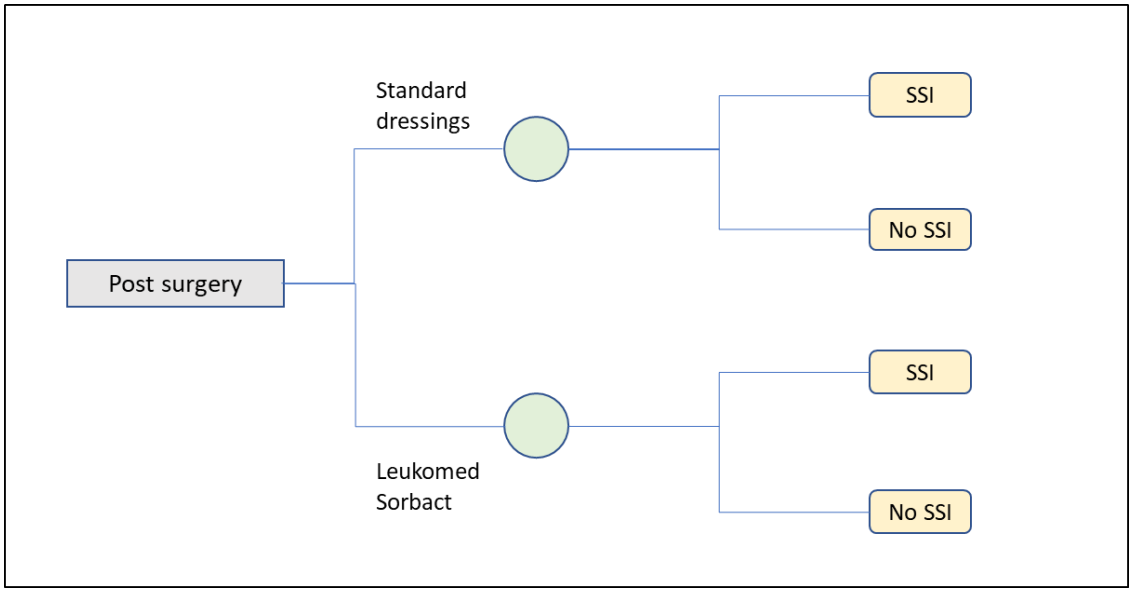


Figure 3: Decision model structure
The model makes the following assumptions:

- Opsite™ Post-OP, the best-selling standard dressing in the category of vapour-permeable adhesive films and absorbent sterile pad, is a representative standard dressing.
- No recurrence of infection.
- [redacted]There is no impact of dressing choice on SSI infections detected and treated entirely in the community.

The EAC considered these assumptions to be reasonable for the economic modelling of the technology.

Economic model parameters

Clinical parameters and variables

- The main clinical parameters used in the model include baseline and post-operative SSI rates for the technology and comparator. A relative risk reduction is applied to the baseline risk. The estimates used in the model are presented in Table 5.
- The baseline SSI for all surgeries and vascular surgeries are sourced from Public Health England surveillance data on SSI rates in England (PHE 2019). In the absence of baseline rates for caesarean section in the Public Health England surveillance data, the Welsh National Surveillance data (PHW 2017) is used. Evidence from the literature and from clinical experts indicates a higher rate of SSI than that reported in the national data. Sources reporting lower rates are likely to be capturing only the most serious infections which will be associated with higher treatment costs. The EAC notes that the data on costs of SSI are taken from a publication which reports higher infection rates than those of the national data. This source may include less serious infections resulting in a lower mean cost of treatment than the cost associated with infections captured in the national data. For these reasons the EAC believes that the use of the national data may underestimate cost savings associated with reduced SSI arising from the use of Leukomed Sorbact. However, the EAC notes that Leukomed Sorbact is cost saving when the national data on the rate of SSI is used. Though conservative, the EAC agrees to the use of national data for the base case estimations. In its additional work, the EAC has undertaken sensitivity analysis in which both the cost and the rate of SSI are taken from Jenks et al. (2014).
- The SSI rate for caesarean section used pooled published estimates at 14 days from two studies (Stanirowski 2016a & 2016b). A relative risk reduction for the technology (67%) was applied to the baseline SSI rates. The company submission notes the limited follow-up but considered the analysis at 14 days to be representative of the risk reduction at 30 days. Whilst this is not ideal, the EAC considers it is reasonable to use the estimates in the lack of evidence for 30 days.
- The SSI rates for vascular surgery used pooled estimates from published literature (Bua 2017, Totty 2019) on the technology at 30 days. A relative risk reduction of 42% was applied to the baseline rates. This published evidence was considered relevant for the

assessment in the clinical review, and the EAC considers them an appropriate source for the relative risk reduction.

- The company submission further pooled the data on SSI in vascular surgery and caesarean section to estimate a relative risk reduction for all surgery. The EAC did not consider this to be appropriate. Pooling estimates from only 2 surgery subspecialties is unlikely to be representative of surgery in general if relative risk reductions differ across subspecialties. Therefore, the EAC believes that analysis should be restricted to caesarean section and vascular surgery.
- In general, the EAC considers the clinical parameters to be reasonable and sourced from relevant evidence.

Table 5: Clinical parameters used in the company's model and any changes made by the EAC

Variable	Company value	Source	EAC comment
Baseline risk of SSI (All surgeries)	1.09%	NHS England	Acceptable
Baseline risk of SSI(Vascular)	2.5%	NHS England	Acceptable
Baseline risk of SSI(Caesarean)	4.35%	NHS Wales	Acceptable
SSI relative risk (Caesarean) - Leukomed	67%	Stanirowski 2016a, 2016b	Acceptable
SSI relative risk (Vascular) - Leukomed	42%	Bua 2017, Totty 2019	Acceptable
SSI relative risk (All surgery) - Leukomed	50%	Combined Caesarean and Vascular	The EAC considers the available data insufficient to generalise to all subspecialties

Resource identification, measurement and valuation

- Table 6 provides all the cost estimates used by the company and the EAC. The cost of SSI episode for all surgeries (£5,708) and caesarean section (£4,048) is sourced from Jenks (2014) and inflated to 2018/19 prices. The EAC considered this source appropriate.

- The technology list price in the NHS Supply Chain price for Leukomed Sorbact 10cm x 25cm (item EY582) is £182.92 ex. VAT for a pack of 20. This estimated to £9.15 per dressing. [redacted]. Both the prices are deemed appropriate by the EAC.

- The cost of an SSI episode for vascular surgery [redacted] for vascular surgery was sourced from an unpublished study [redacted] The EAC notes that a cost of an SSI in vascular surgery is available in a published study (Jenks et al. 2014) which is lower (£2,702). The EAC considered the estimate in Jenks et al. (2014) to be more appropriate.

Table 6: Cost parameters used in the company's model and changes made by the EAC

Parameter	Company value	EAC value	Source
Cost of Leukomed Sorbact dressing	£9.15 per dressing	Same	Company
Cost of Standard Surgical dressing	[redacted]	Same	[redacted]
SSI episode cost (vascular)	[redacted]	£2,702	[redacted] EAC: Jenks 2014
SSI episode cost (Caesarean)	£4,048	Same	Jenks 2014
SSI episode cost (All surgery)	£5,708	NA	Company: Jenks 2014

Sensitivity and scenario analysis

The company undertook one-way sensitivity analysis on the cost per SSI episode in the 3 populations under consideration. This analysis varied the cost estimates within their respective confidence intervals. The company reported the breakeven episode cost for each population. A second sensitivity analysis considered the joint impact of variation in the cost of the standard dressing and the cost of Leukomed Sorbact. The standard dressing cost was

reduced by 50% and the cost of Leukomed Sorbact was increased by 100%. Additionally, the company conducted scenario analysis varying the relative risk reduction by +/- 25% in all populations analysed. Breakeven points were reported accordingly.

The EAC considers the sensitivity and scenario analyses conducted by the company to be appropriate. However, the EAC undertook additional analysis to examine the impact of varying the baseline risk of SSI, and to identify the cost breakeven point estimates for the baseline risk, the cost of SSI and the relative risk reduction.

9.3 *Results from the economic modelling*

Base case results

Tables 7a, b and c show the base case results of all surgery, vascular surgery and caesarean section populations respectively. The company's result for all surgery suggest Leukomed Sorbact is cost saving in comparison to current care (£20.56 per patient). The EAC did not undertake analysis in all surgeries as it considered the data on relative risk reduction insufficient to generalise to all surgery. The results for the caesarean section population show the technology generates a cost saving of £107.43 per patient. The EAC accepts this analysis. The company's submission indicates a cost saving of £23.55 per vascular surgery patient. The EAC replaced the SSI episode cost with £2,702 taken from Jenkins 2014 for vascular surgery. This reduced the cost saving per patient to £17.82.

Table 7a: Summary of base case results (All surgery)

	Company's results			**EAC results**		
	Technology	**Comparator**	**Cost saving per patient**	**Technology**	**Comparator**	**Cost saving per patient**
Dressing cost	£11.44	£0.89	-£10.55	Not considered		
SSI episode cost	£31.11	£62.22	£31.11			

Total	**£42.55**	**£63.11**	**£20.56**	

Table 7b: Summary of base case results (Caesarean)

	Company's results			**EAC results**		
	Technology	**Comparator**	**Cost saving per patient**	**Technology**	**Comparator**	**Cost saving per patient**
Dressing cost	£11.44	£0.89	-£10.55	£11.44	£0.89	-£10.55
SSI episode cost	£58.11	£176.09	£117.98	£58.11	£176.09	£117.98
Total	**£69.55**	**£176.98**	**£107.43**	**£69.55**	**£176.98**	**£107.43**

Table 7c: Summary of base case results (Vascular)

	Company's results			**EAC results**		
	Technology	**Comparator**	**Cost saving per patient**	**Technology**	**Comparator**	**Cost saving per patient**
Dressing cost	£11.44	£0.89	-£10.55	£11.44	£0.89	-£10.55
SSI episode cost	£47.08	£81.18	£34.10	£39.17	£67.55	£28.37
Total	**£58.52**	**£82.06**	**£23.55**	**£50.61**	**£68.43**	**£17.82**

Sensitivity analysis results

Table 8a shows the results of the sensitivity analysis on the cost of SSI conducted by the company. The company reported that Leukomed Sorbact is cost saving in all cases. Breakeven SSI episode costs were £2,000, £1,000, and £350 for all surgery, vascular surgery and caesarean section respectively.

Table 8a: SSI episode cost

Population	Parameter value	Incremental cost per patient	Breakeven point
All surgeries	Base case: £5,708	-£20.56	£2,000
	Lower bound 95%CI: £5,035	-£16.89	
	Upper bound 95%CI: £7,320	-£29.34	
Vascular surgery	Base case: £3,247	-£23.54	£1,000
	Lower bound 95%CI: £1,732	-£7.64	
	Upper bound 95%CI: £4,733	-£39.15	
Caesarean section	Base case: £4,048	-£107.43	£350
	Lower bound 95%CI: £975	-£17.64	
	Upper bound 95%CI: £5,344	-£145.20	

Results of sensitivity analysis on dressing costs are shown in table 8b. An increase of 100% in the cost of Leukomed Sorbact and a reduction in 50% in the cost of the standard dressing generated cost savings per patient of £8.67, £11.66 and £95.54 in all surgery, vascular surgery and caesarean sections respectively.

Table 8b: One- and two-way sensitivity analyses on dressing costs

Population	Parameter value	Incremental cost per patient
All surgery	Base case: SSD cost £0.71 Leukomed Sorbact cost: £9.15	-£20.56
	SSD cost -50%: £0.35	-£20.11

Population	Parameter value	Incremental cost per patient
	Leukomed Sorbact cost +100%: £18.30	-£9.12
	SSD cost -50%: £0.35 and Leukomed Sorbact cost +100%: £18.30	-£8.67
Vascular surgery	Base case: SSD cost £0.71 Leukomed Sorbact cost: £9.15	-£23.54
	SSD cost -50%: £0.35	-£23.09
	Leukomed Sorbact cost +100%: £18.30	-£12.11
	SSD cost -50%: £0.35 and Leukomed Sorbact cost +100%: £18.30	-£11.66
Caesarean section	Base case: SSD cost £0.71 Leukomed Sorbact cost: £9.15	-£107.43
	SSD cost -50%: £0.35	-£106.98
	Leukomed Sorbact cost +100%: £18.30	-£95.69
	SSD cost -50%: £0.35 and Leukomed Sorbact cost +100%: £18.30	-£95.54

Additional results

Table 9a, b, and c show the results of scenario analyses conducted by the company. The company reported the technology does not become cost incurring within the scenarios evaluated. The breakeven baseline risks of SSI are 17%, 13% and 6% are observed for all surgery, vascular surgery and caesarean section respectively. Across scenarios, cost savings were at least £12.78, £15.02 and £77.93 for all surgery, vascular surgery and caesarean section, respectively.

Table 9a: Scenario 1. Variation on relative risk reduction in all surgery group.

Scenario: parameter value used	Incremental cost per patient	Breakeven point estimate for relative risk reduction
Base case:	-£20.56	17%

Scenario: parameter value used	Incremental cost per patient	Breakeven point estimate for relative risk reduction
50%		
Lower bound: 37.5%	-£12.78	
Upper bound: 62.50%	-£28.34	

Table 9b. Scenario 2. Variation of relative risk reduction and alternative source for baseline risk of SSI in vascular surgery.

Scenario: parameter value used	Incremental cost per patient	Breakeven point estimate for relative risk reduction
Base case: 2.5% for base case baseline SSI risk and 42% for relative risk reduction	-£23.54	13%
Alternative baseline risk of SSI scenario (pooled from Bua 2017 and Totty 2019): 21.8%	-£288.16	
Lower bound of relative risk reduction: 31.5%	-£15.02	
Upper bound of relative risk reduction: 63%	-£40.59	

Table 9c. Scenario 3. Variation of relative risk reduction and alternative source for baseline risk of SSI in Caesarean sections.

Scenario: parameter value used	Incremental cost per patient	Breakeven point estimate for relative risk reduction
Base case: 4.35% for base case baseline SSI risk and 67% for relative risk reduction	-£107.43	6%

Scenario: parameter value used	Incremental cost per patient	Breakeven point estimate for relative risk reduction
Alternative baseline risk of SSI scenario (pooled from Stanirowski 2016a and b): 6.1%	-£154.89	
Lower bound of relative risk reduction: 50.25%	-£77.93	
Upper bound of relative risk reduction: 83.75%	-£136.92	

EAC threshold analysis

The EAC conducted complementary threshold analyses on the SSI episode cost, baseline SSI risk, and relative risk reduction for caesarean sections and vascular surgery populations only. Results of this analysis are summarised in table 10 and graphically displayed in figures 4, 5 and 6 for the SSI episode cost, baseline SSI risk, and relative risk reduction respectively.

In caesarean section populations the breakeven point estimates for baseline SSI risk, relative risk reduction and SSI episode cost are 0.38%, 6% and £362, respectively. There are no discrepancies between the company and EAC analysis on the breakeven relative risk reduction. The value reported by the company on breakeven point estimate for SSI episode cost (£350) differ slightly to the estimate calculated by the EAC (£362). The EAC notes this difference is likely due to a rounded estimate reported by the company. The breakeven point estimate for baseline SSI risk was not calculated by the company. The EAC found this parameter to be 0.4%.

For vascular surgery, all breakeven point estimates were recalculated. The EAC found the baseline SSI risk, relative risk reduction and SSI episode cost breakeven points are 0.93%, 16%, and £1,004, respectively. In comparison to

sensitivity analysis reported by the company (13% for relative risk reduction and £1,000 for SSI episode cost), the EAC results are not materially different.

Table 10: Threshold analysis conducted by the EAC.

Population	Parameter evaluated	Base case value	Breakeven point
Caesarean section	Baseline SSI risk	4.35%	0.389%
	Relative risk reduction	67%	6%
	SSI episode cost	£4,048	£361.98
Vascular surgery	Baseline SSI risk	2.50%	0.930%
	Relative risk reduction	42%	16%
	SSI episode cost	£2,702	£1,004.76

Figure 4: Threshold analysis on cost of surgical site infection episode.

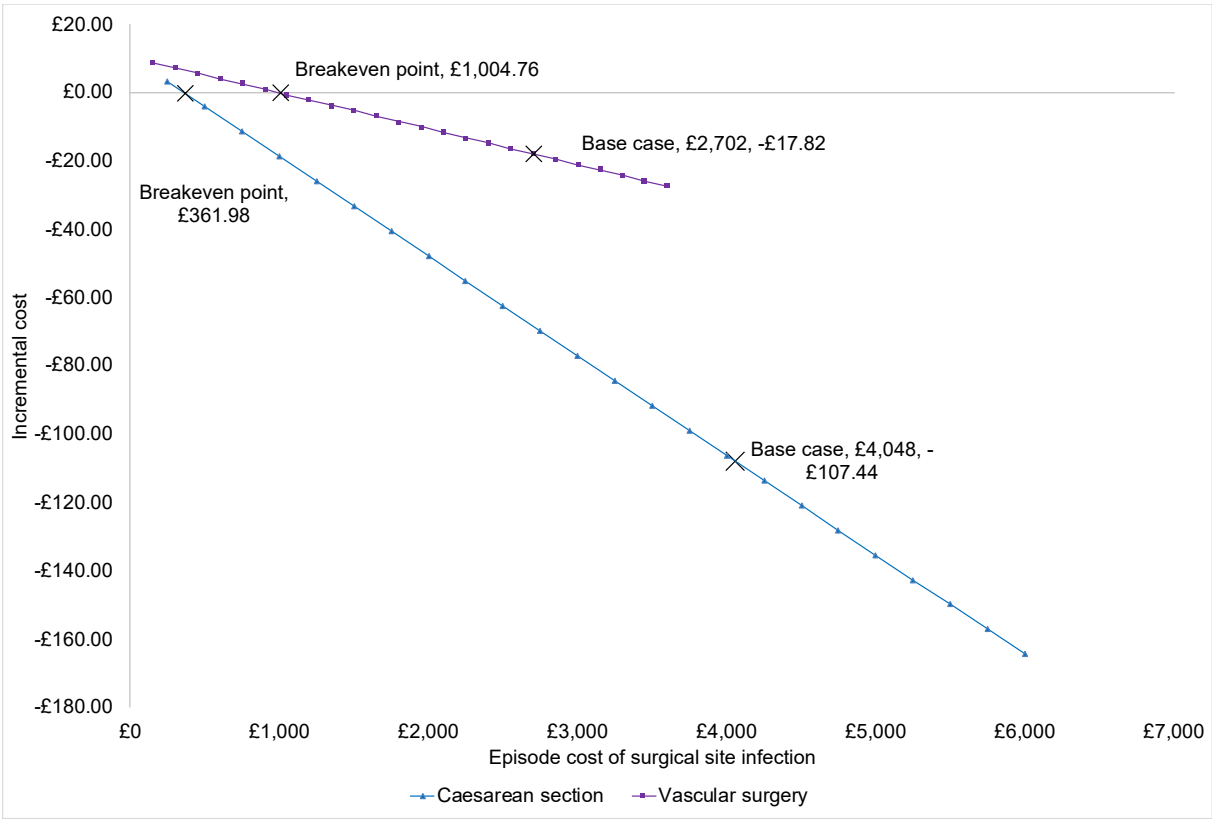


Figure 5: Threshold analysis on baseline risk of SSI

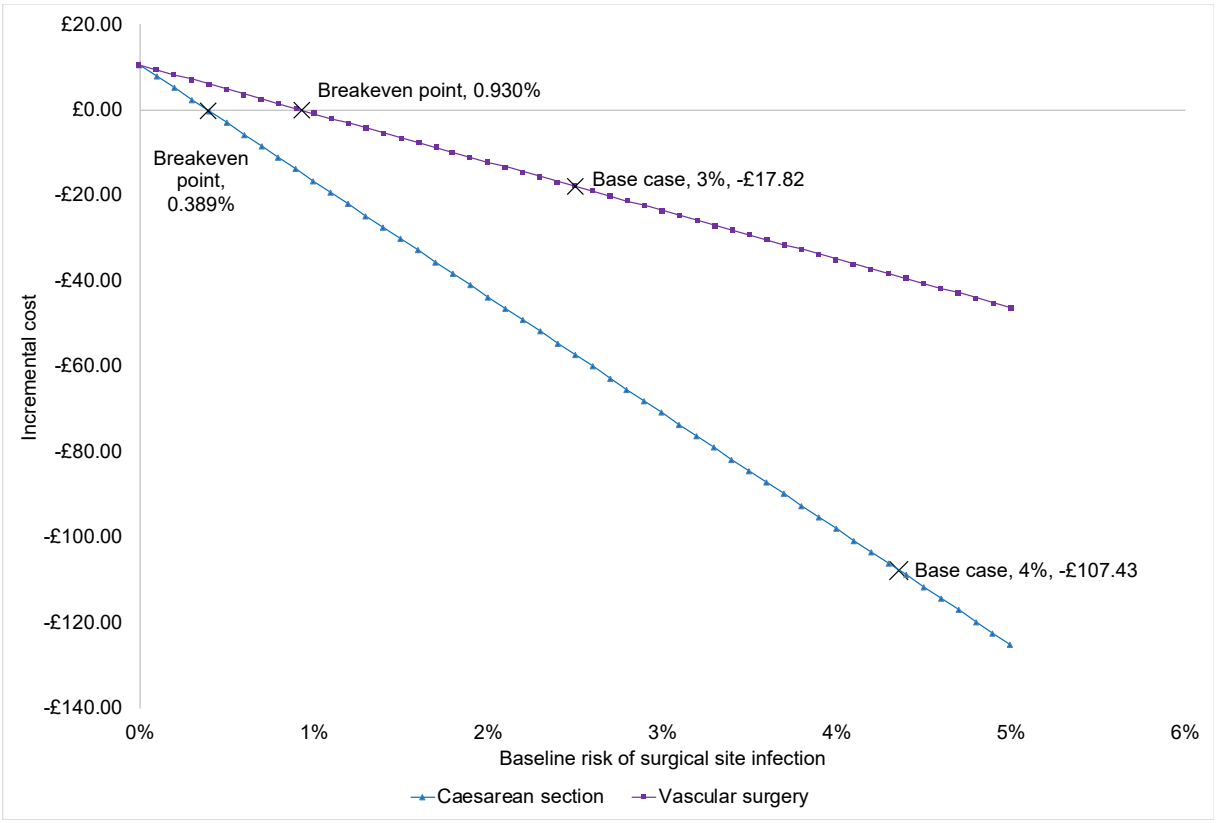
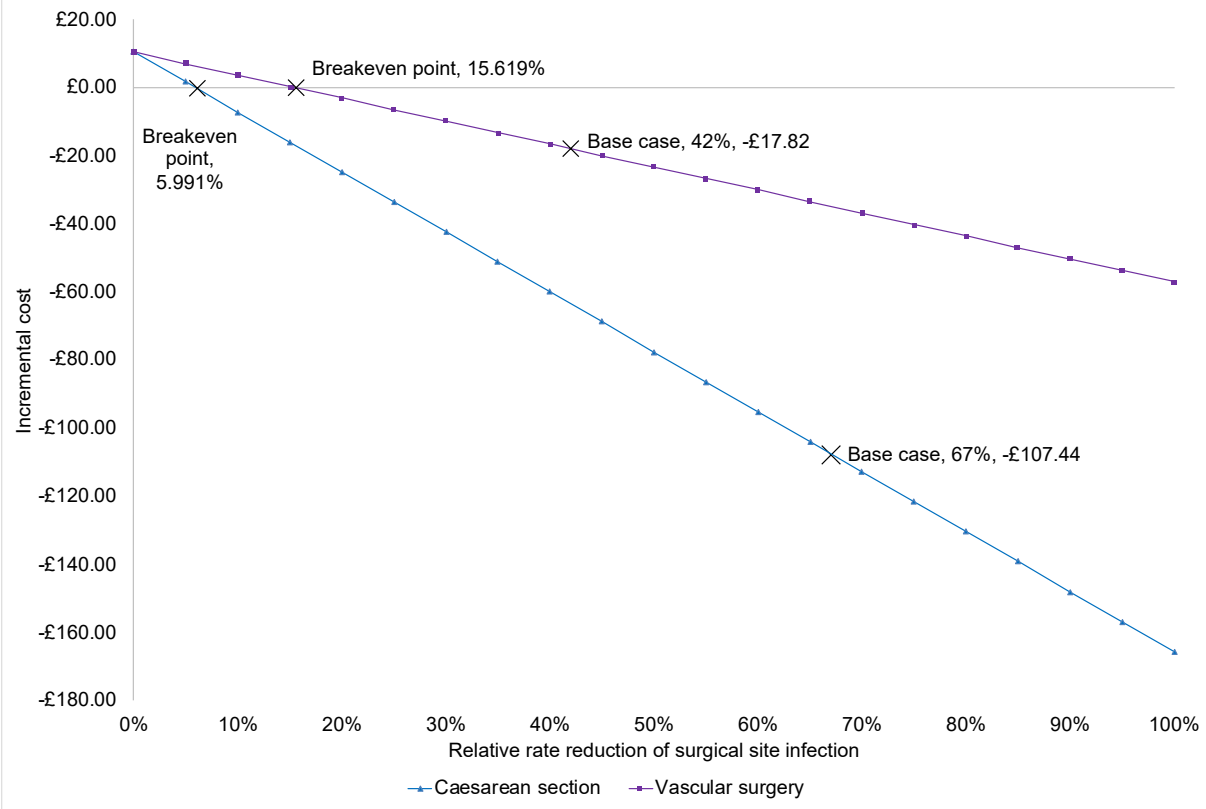


Figure 6: Threshold analysis on relative risk reduction



9.4 *The EAC's interpretation of the economic evidence*

The EAC considers the economic model submitted by the company to be appropriate and generally agrees with the inference from the economic submission. The EAC made a change to a parameter in the cost analysis for vascular patients. The EAC regarded the estimate of the cost of SSI in vascular surgery from Jenks et al. (2014) to be robust, and favoured it over the unpublished evidence [redacted]. The difference in the cost of SSI across the 2 sources is small, and the change had a modest impact on results in this patient group. The EAC considered the evidence on Leukomed Sorbact to be insufficient to support an analysis for all surgery combined. Nevertheless, the threshold analysis undertaken by the EAC indicates a high likelihood that Leukomed Sorbact is cost saving in caesarean section and vascular surgery patients. This would suggest it may be cost saving in other surgical subspecialties.

The EAC agrees with the inference from the company's submission that Leukomed Sorbact is cost saving in caesarean section and vascular surgery patients. Cost savings were robust to plausible values for the baseline risk and the cost of SSI, Leukomed Sorbact was cost saving at modest reductions in the risk of SSI. Cost savings are driven by a reduction in the risk of SSI which is supported by trial data. Any reduction in the risk of SSI is likely to benefit hospitals in reducing readmission rates, and to generate health benefits for patients.

The EAC considered the evidence on effectiveness of Leukomed Sorbact to be insufficient to support an analysis of all surgery. However, the EAC's threshold analysis suggests Leukomed Sorbact is cost saving if modest reduction in the risk of SSI can be achieved, increasing confidence that it is cost saving in other surgical areas.

10 Conclusions

10.1 *Conclusions from the clinical evidence*

The company included 9 fulltext studies in their clinical submission. One further audit study was provided by the company as academic in confidence and was included by the EAC ([redacted] The EAC excluded 5 studies from the company's selection due to the intervention not being relevant to the decision problem (Lee et al. 2018, Meberg et al. 1990, Nielsen et al. 2012, Romain et al. 2020) or the study design (a single patient case study (Abigo Medical, 2017). The EAC only included evidence with Leukomed Sorbact or Sorbact Surgical as an intervention: 3 RCTS, 1 non-randomised controlled trial and [redacted] The company did not carry out a meta-analysis, stating that the studies differed widely in population and indication and in the specific type of DACC dressing used. The EAC agreed with the company.

Two RCTs into women who had undergone caesarean section and 1 RCT and 1 non-randomised controlled trial in vascular surgery patients all indicated that the rate of SSI was lower in the Leukomed Sorbact intervention group versus the standard surgical dressing control group, however this outcome was only statistically significant in 2 studies (1 full RCT in women who had

undergone caesarean section, and 1 non-controlled RCT in vascular surgery patients).

[redacted] Though the 4 parallel comparative studies were deemed low risk of bias, only 1 study was adequately powered. This study indicated that there was a significantly lower rate of SSI at 14 days post-surgery in women who had undergone caesarean section, therefore this is the strongest evidence for the impact of Leukomed Sorbact. The other 3 studies were pilot or feasibility studies. No studies were double-blinded. [redacted]

10.2 *Conclusions from the economic evidence*

The EAC estimated cost savings in the base case from the use of Leukomed Sorbact in C-sections and vascular surgery. The model was evaluated using cost data from Jenks et al. (2014). The EAC undertook threshold analysis on the baseline, relative risk reduction and episode cost of SSI. The analysis indicates the technology is cost saving when considering baseline infection rates lower than 1% in both specialties. Modest infection reduction produces cost savings in caesarean sections. In vascular surgery the technology requires a larger reduction in SSI rate to become cost saving. However, the breakeven point is a significantly smaller reduction in SSI than the value applied in the base case.

The EAC considers the evidence identified by both the company and the EAC to be insufficient to carry pooled analysis across all surgical specialties. The company evaluated the model using a pooled estimate of the technology effectiveness from trial data on vascular and obstetric specialties. An assumption of similar impact on superficial infections across different surgical specialties may be more acceptable than an assumption of a similar impact on deep infections across different surgical specialties. The available data limited consideration of the cost impact of Leukomed Sorbact beyond caesarean section and vascular surgery.

The EAC considers that the economic evidence and the analysis undertaken is sufficient to conclude that Leukomed Sorbact is cost saving in caesarean sections and vascular surgery. Insufficient evidence hinders an analysis of all surgical specialties combined. Nonetheless, the threshold analysis results indicating that the technology is cost saving assuming a modest improvement in SSI rate in vascular and obstetric surgeries, may suggest the technology is cost saving in other areas.

11 Summary of the combined clinical and economic sections

All studies in vascular surgery patients and women who had undergone caesarean section indicated that there was a lower rate of SSI in the Leukomed Sorbact group compared to standard surgical dressing. However, it is important to note that in 3 studies, outcomes were underpowered ([redacted]) and results in 2 of the parallel studies were not statistically significant for the primary outcome. The strongest evidence is from an RCT indicating that there was a significantly lower rate of SSI in the Leukomed Sorbact group versus a standard dressing group at 14 days post-surgery in women who had undergone caesarean section. The EAC's economic analysis indicates that the technology may produce cost savings per patient of £107.43 and £17.82 for caesarean sections and vascular surgeries, respectively. The EAC considers the economic evidence and analysis undertaken to be sufficient to conclude that Leukomed Sorbact is cost saving in caesarean sections and vascular surgery. Insufficient evidence hinders an analysis of all surgical specialties combined. Overall, the EAC believes the case for adopting the technology is supported for preventing SSIs in women who have undergone a caesarean section, but there are still several unknowns that may need addressing first. The case for adoption would be further strengthened by adequately powered RCTs into other specific surgical populations.

12 Implications for research

Overall, the EAC believes the case for adoption is supported to prevent SSIs in women who have undergone a caesarean section, however, an adequately powered, blinded, multicentre trial comparing Leukomed Sorbact with standard care and other dressings such as PICO needs to be done to address uncertainties. The case for wider adoption would be further strengthened by adequately powered RCTs into other targeted surgical populations to understand the generalisability of this result.

13 References

Ab AM. BSN Medical Inc. leukomed sorbact dressing, wound, drug. 2017. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/detail.cfm?mdrfoi__id=6449224&pc=FRO, Accessed 29 April 2020

Bua, N., Smith, G. E., Totty, J. P., Pan, D., Wallace, T., Carradice, D. & Chetter, I. C. 2017. Dialkylcarbamoyl Chloride Dressings in the Prevention of Surgical Site Infections after Nonimplant Vascular Surgery. Annals of vascular surgery, 44, 387-392.

[redacted]

Coldwell J, Curtin J. Management of the surgical site post local skin excision using a bacteria and fungi binding dressing in the primary care setting - an observational study. Poster Abigo Medical AB data on file. 2014.

Hayden A, Holdsworth J. Complications following re-exploration of the groin for recurrent varicose veins. *Annals of the Royal College of Surgeons of England,* 2001: 83**,** 272-273.

Hirsemann, S., Sohr, D., Gastmeier, K. & Gastmeier, P. Risk factors for surgical site infections in a free-standing outpatient setting. *American Journal of Infection Control,* 2005: 33**,** 6-10.

Jenks, P.J., Laurent M., McQuarry S., Watkins R. Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. Journal of Hospital Infection 2013: 86(1): 24-33.

Lee JW, Park SH, Suh IS, Jeong HS. A comparison between DACC with chlorhexidine acetate-soaked paraffin gauze and foam dressing for skin graft donor sites. J Wound Care. 2018;27(1):28-35.

Meberg A, Schoyen R. Hydrophobic material in routine umibilical cord care and prevention of infections in newborn infants. Scand J Infect Dis. 1990;22(6):729-33.

NICE. 2019 Surgical site infections: prevention and treatment (NG125). Available at https://www.nice.org.uk/guidance/ng125, Accessed 29 April 2020

NICE. 2019 Leukomed Sorbact for preventing surgical site infection (MIB197). Available at https://www.nice.org.uk/advice/mib197, Accessed 29 April 2020

NICE. 2019 PICO negative pressure wound therapy for closed surgical incision wounds (MIB149). Available at https://www.nice.org.uk/advice/mib149, Accessed 29 April 2020

Nielsen AM, Andriessen A. Prospective cohort study on surgical wounds comparing a polyhexanide-containing biocellulose dressing with a dialkyl-carbamoyl-chloride- containing hydrophobic dressing. Adv Skin Wound Care. 2012;25(9):409-13.

Romain B, Mielcarek M, Delhorme JB, et al. Dialkylcarbamol chloride-coated versus alginate dressings after pilonidal sinus excision: a rendomized clinical trial (SORKYSA study). British Medical Journal Open, 2020 Feb 4.

Sadat U, Chaudhuri A, Hayes PD, Gaunt M, Boyle J, Varty K. Five day antibiotic prophylaxis for major lower limb amputation reduces wound infection rates and the length of in-hospital stay. *Eur J Vasc Endovasc Surg,* 2008: 35**,** 75-8.

Stryja J, Sandy-Hodgetts K, Collier M, Moser C, Ousey K, Probst S, Wilson J. & Xuereb, D. Prevntion and Management Across Health-Care Sectors. *Journal of Wound Care,* 2020: 29**,** S1-S72.

Stanirowski, P. J., Bizon, M., Cendrowski, K. & Sawicki, W. 2016. Randomized Controlled Trial Evaluating Dialkylcarbamoyl Chloride Impregnated Dressings for the Prevention of Surgical Site Infections in Adult Women Undergoing Cesarean Section. Surgical Infections, 17, 427-435.

Stanirowski, P. J., Davies, H., McMaster, J., Mealing, S., Sawicki, W., Cendrowski, K. & Posnett, J. 2019. Cost-effectiveness of a bacterial-binding dressing to prevent surgical site infection following caesarean section. Journal of wound care, 28, 222-228.

Stanirowski, P. J., Kociszewska, A., Cendrowski, K. & Sawicki, W. 2016. Dialkylcarbamoyl chloride-impregnated dressing for the prevention of surgical site infection in women undergoing cesarean section: a pilot study. Archives of medical science, 12, 1-7.

[redacted]

Totty, J. P., Hitchman, L. H., Cai, P. L., Harwood, A. E., Wallace, T., Carradice, D., Smith, G. E. & Chetter, I. C. 2019. A pilot feasibility randomised clinical trial comparing dialkylcarbamoylchloride-coated dressings versus standard care for the primary prevention of surgical site infection. International wound journal, 16, 883-890.

WHO. 2016 Global guidelines on the prevention of surgical site infection. Available at https://www.who.int/gpsc/ssi-prevention-guidelines/en/, Accessed 29 April 2020.

World Union of Wound Healing Societies (WUWHS), 2016. Consensus Document: *Closed surgical incision management:Understanding the role of NPWT*. Wounds International. Available at https://www.woundsinternational.com/resources/details/closed-surgical-incision-managementunderstanding-the-role-of-npwt, Accessed 29 April 2020.

Wounds UK (2020) Best Practice Statement: Post-operative wound care – reducing the risk of surgical site infection. Wounds UK, London.

[redacted]

14 Appendices

Appendix A

Clinical evidence

Total records retrieved: 2138

Total following de-duplication in EndNote X7.8: 1465

- 4 records from MIB182
- 5 records from the company submission
- Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 1946 to March 16, 2020
- Search date: 16th March 2020

1	"Dialkylcarbamoyl chloride".ti,ab,kf.	10
2	Dialkyl carbamoyl chloride.ti,ab,kf.	5

3	Dialkylcarbamoylchloride.ti,ab,kf.	4
4	dacc.ti,ab,kf.	754
5	(dacc$ adj3 coat$).ti,ab,kf.	12
6	sorbact$.ti,ab,kf.	23
7	leukomed$.ti,ab,kf.	3
8	cutimed$.ti,ab,kf.	21
9	(hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kf.	32
10	or/1-9	805
11	Bandages/	16884
12	Carbamates/	11957
13	11 and 12	5
14	(antiseptic adj3 dressing$1).ti,ab,kf.	121
15	((bacteria$ adj4 bind$) and dressing$1).ti,ab,kf.	21
16	or/10,13-15	934
17	exp Animals/ not Humans/	4678989
18	16 not 17	897
19	remove duplicates from 18	889

- Embase 1974 to 2020 Week 11
- Search date: 16th March 2020

1	"Dialkylcarbamoyl chloride".ti,ab,kw.10	10

2	Dialkyl carbamoyl chloride.ti,ab,kw.	7
3	Dialkylcarbamoylchloride.ti,ab,kw.	4
4	dacc.ti,ab,kw.	1140
5	(dacc$ adj3 coat$).ti,ab,kw.	18
6	sorbact$.ti,ab,kw.	32
7	leukomed$.ti,ab,kw.	5
8	cutimed$.ti,ab,kw.	32
9	(hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kw.	37
10	or/1-9	1202
11	bandage/	9991
12	carbamic acid derivative/	6948
13	11 and 12	4
14	(antiseptic adj3 dressing$1).ti,ab,kw.	133
15	((bacteria$ adj4 bind$) and dressing$1).ti,ab,kw.	22
16	or/10,13-15	1346
17	(animal/ or animal experiment/ or animal model/ or animal tissue/ or nonhuman/) not exp human/	5972692
18	16 not 17	1248
19	remove duplicates from 18	1231

- Cochrane Central Register of Controlled Trials Issue 6 of 12
- Search date: 16th March 2020

ID	Search	Hits
#1	Dialkylcarbamoyl chloride"	10
#2	"Dialkyl carbamoyl chloride"	1
#3	Dialkylcarbamoylchloride	6
#4	dacc	120
#5	(dacc* near/3 coat*)	6
#6	sorbact*	23
#7	leukomed*	3
#8	cutimed*	17
#9	hydrophob* near/4 (dressing* or bandage*)	7
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9	146
#11	[mh ^Bandages]	1672
#12	[mh ^Carbamates]	491
#13	#11 and #12	2
#14	(antiseptic near/3 dressing*)	32
#15	(bacteria* near/4 bind*) and dressing*	9
#16	#10 or #13 or #14 or #15	181
#17	#10 or #13 or #14 or #15 in Trials	150

- Cochrane Database of Systematic Reviews, Protocols
- Search date: 16th March 2020

ID	Search	Hits
#1	"Dialkylcarbamoyl chloride":ti,ab,kw	9
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#3	Dialkylcarbamoylchloride:ti,ab,kw	5
#4	dacc:ti,ab,kw	100
#5	(dacc* near/3 coat*):ti,ab,kw	6
#6	sorbact*:ti,ab,kw	11
#7	leukomed*:ti,ab,kw	3
#8	cutimed*:ti,ab,kw	3
#9	hydrophob* near/4 (dressing* or bandage*):ti,ab,kw	3
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9	110
#11	[mh ^Bandages]	1672

#12	[mh ^Carbamates]	491
#13	#11 and #12	2
#14	(antiseptic near/3 dressing*):ti,ab,kw	22
#15	(bacteria* near/4 bind*) and dressing*:ti,ab,kw	7
#16	#10 or #13 or #14 or #15	134
#17	#10 or #13 or #14 or #15 in Cochrane Reviews, Cochrane Protocols	4

Source: Econlit

Interface / URL: ProQuest

Database coverage dates: 1886 to March 17, 2020

Retrieved records: 2

Search strategy:

1 Dialkylcarbamoyl chloride (0)

2 Dialkyl carbamoyl chloride (0)

3 Dialkylcarbamoylchloride (0)

4 dacc (2)

Ongoing studies

Total records retrieved: 1

WHO ICTRP (default search)

- Search date: 16th March 2020

"leukomed sorbact" – 0 results

ClinicalTrials.gov (expert search)

- Search date: 24th April 2020

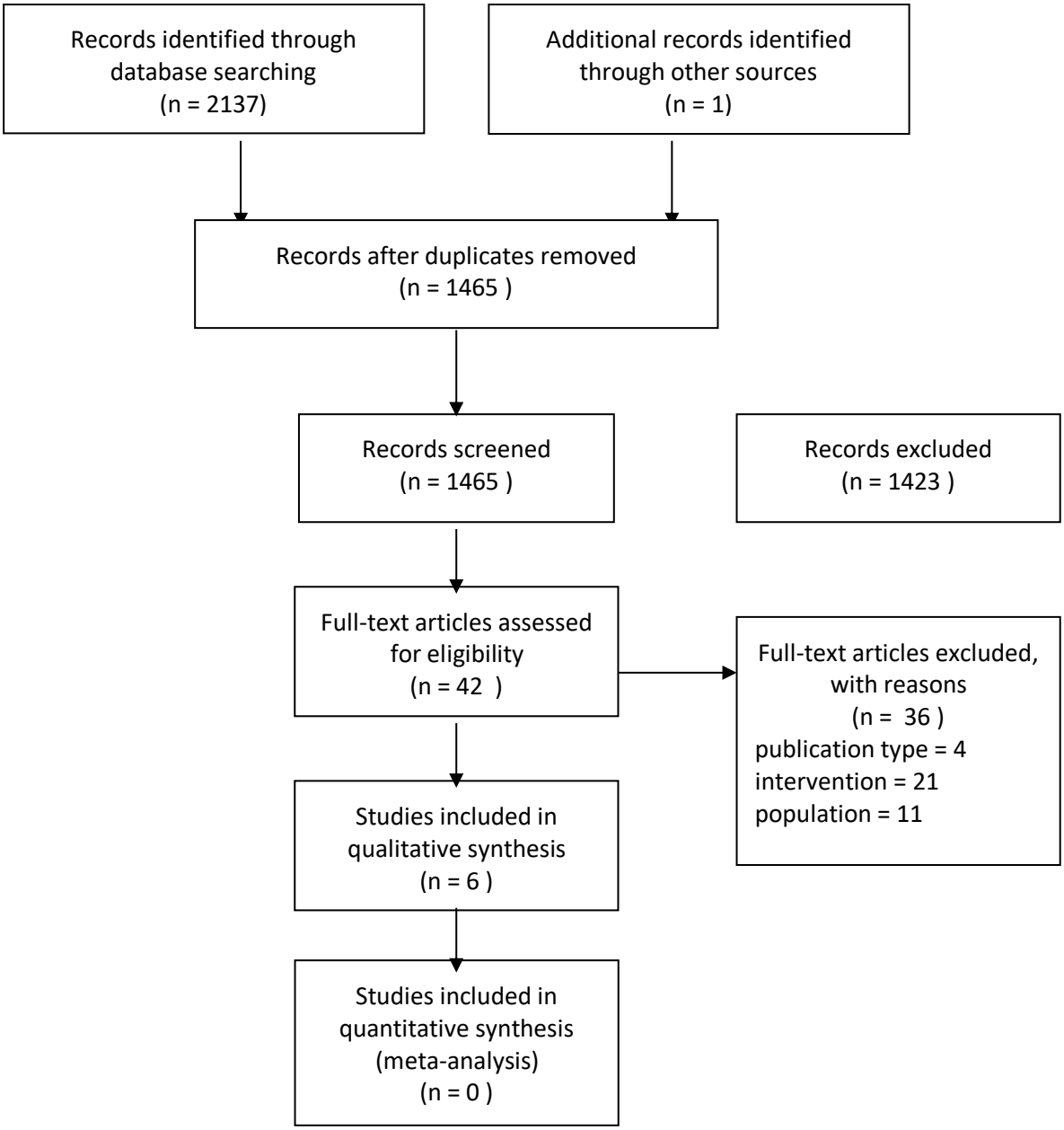
"leukomed sorbact" – 1 result

1 result from the CENTRAL search. NCT02992951 (recruitment marked as completed)

Economics studies

The EAC did not run an additional search for economic evidence. The results of the clinical evidence searches (see Appendix A) were filtered in EndNote X7.8, using terms “econo*” and “cost*”. There were 89 results, which were sifted for relevance by two independent health economists.

PRISMA 2009 Flow Diagram



Appendix B

Table 8 Methodologies of company and EAC included studies available in full-text

Study and type	population	intervention	comparator	outcomes	Other (follow up, setting, versions of device etc.)	EAC comment
Abigo Medical 2017	1 adult female	Leukomed sorbact dressing for knee surgery	None			Not included in the list of relevant studies as it is a single case study, however, included in the adverse events section. Company included EAC excluded from main relevant studies
Bua 2017	Adult patients undergoing clean or clean contaminated non-implant vascular surgical procedures	Leukomed Sorbact	Standard surgical dressings			Company included EAC included
Lee 2018	Patients who underwent split-	Sorbact Compress + chlorhexidine acetate-	Conventional foam dressings			Population and intervention not relevant to scope.

	thickness skin graft procedures	soaked paraffin gauze				Company included EAC excluded
Meberg 1990	Newborn infants nursed in a maternity ward with modern sanitary facilities requiring umbilical care	Sorbact	Routine disinfection cleaning regimen			Population and intervention not relevant to scope. Company included EAC excluded
Nielsen 2012	Patients aged over 18 years with surgical wounds	Cutisorb Sorbact	Polyhexanide -containing biocellulose dressing			Intervention not relevant to scope. Company included EAC excluded
Stanirowski 2016a	Patients aged over 18 years after planned or emergency caesarean section	Sorbact Surgical	Standard surgical dressing			Company included EAC included
Stanirowski 2016b	Patients aged over	Sorbact Surgical	Standard surgical			Company included

	18 years after planned or emergency caesarean section		dressing (Tegaderm + Pad)			EAC included
Totty 2019	Patients aged over 18 years undergoing clean or contaminated vascular surgery and capable/willing to give informed consent.	Leukomed Sorbact	OPSITE Post-op (non-DACC-coated occlusive absorbent dressing)			Company included EAC included
Romain 2020	Patients with a pilonidal sinus undergoing sinus excision	Sorbact dressings	Alginate dressings			Population and intervention not relevant to scope. Company included EAC excluded

Table 9 Cochrane Risk of Bias (RoB 2) tool for RCTs

Unique ID	1	**Study ID**	2016a	**Assessor**	JE
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to intervention…**	failures in implementing the intervention that could have affected the outcome
Experimental	Leukomed	**Comparator**	Tegaderm Pad	**Source**	Journal article(s) with results of the trial
Outcome	Rate of SSI	**Results**	p=0.04	**Weight**	1
Domain	**Signalling question**			**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?			Y	Simple randomisation was used with a 1:1 allocation ratio, conducted by an operating nurse. Surgical team blinded to type of dressing until skin closure.
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?			Y	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?			N	
	Risk of bias judgement			**Low**	

Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NA	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	NA	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	NA	
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	43 (7.3%) failed to report for follow-up visits and were excluded from further analysis
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	

Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?			N	CDC Criteria
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?			PN	
	4.3 Were outcome assessors aware of the intervention received by study participants?			NI	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?			N	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?			NA	
	Risk of bias judgement			**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?			Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?			N	
	5.3 ... multiple eligible analyses of the data?			N	
	Risk of bias judgement			**Low**	
Overall bias	**Risk of bias judgement**			**Low**	

Unique ID	2	**Study ID**	2016b	**Assessor**	JE
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to intervention…**	failures in implementing the intervention that could have affected the outcome
Experimental	Leukomed	**Comparator**	Standard Dressing	**Source**	Journal article(s) with results of the trial
Outcome	Rate of SSI	**Results**	%	**Weight**	1
Domain	**Signalling question**			**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?			Y	Simple randomization with the 1 : 1 allocation ratio performed by an operating theatre nurse was used to alternate patients enrolled for alternate dressings – even number: DACC-impregnated dressing; odd number: standard surgical dressing.
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?			Y	

	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	NI	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NA	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	NA	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	NA	
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	N	10 were lost to follow up in each group (12.3%)
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	PY	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	

	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	Y	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	N	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Low**	

Unique ID	3	**Study ID**	Totty 2019	**Assessor**	KG
Ref or Label		**Aim**	assignment to intervention (the 'intention-to-treat' effect)	**The effect of adhering to intervention…**	NA
Experimental	Leukomed	**Comparator**	OPSITE	**Source**	Journal article(s) with results of the trial
Outcome	SSI rate	**Results**	% (p=0.161)	**Weight**	1
Domain	**Signalling question**			**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?			Y	Simple randomization with the 1 : 1 allocation ratio performed by an operating theater nurse was used to alternate patients enrolled for alternate dressings – even number: DACC-impregnated dressing; odd number: standard surgical dressing.
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?			Y	

	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	PN	Baseline characteristics are tabulated and both study groups appear well matched. No statistical test to confirm. Slightly higher number of people with diabetes in Leukomed group.
	Risk of bias judgement	**Some concerns**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	N	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	NA	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	NA	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	PY	It is unclear if analyses excluded participants with missing outcome data (e.g. patients who withdrew).

			Authors noted that "Data on SSI within 30 days were available for 119 participants (82.6%)" however also state that "fewer patients in the DACC-coated group had an SSI at 30 days than the control group (12/74 (16%) and 18/70 (26%) respectively).", which indicates that all 144 participants were included in the analysis.
	2.7. If N/PN/NI to 2.6: Was there potential for a substantial impact (on the result) of the failure to analyse participants in the group to which they were randomized?	NA	
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	PY	Yes, however, there appears to be a fairly high dropout rate - 23.6% (34 patients of 144).
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	

	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	Y	Main outcome was SSI at 30 days as measured by (ASEPSIS) score ≥ 21 or according to the Centers of Disease Control (CDC) definition of SSIs. NB. This study included implant patients in the overall analysis (carrying out a subgroup analysis on the implant patients). Bua et al. 2017 excluded implant patients due to potential length of follow up.
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	PN	Same used in both groups. Assessors were blinded to intervention.

	4.3 Were outcome assessors aware of the intervention received by study participants?	N	Wounds were assessed using the ASEPSIS scale by an investigator blinded to the allocated dressing
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	PY	Ethical approval was obtained (16/LO/2135), and study conduct was in accordance with the Declaration of Helsinki (1975).15 The study was prospectively registered with clinicaltrials.gov (NCT02992951).
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	The EAC does not consider this likely. The ASEPSIS scale is a standard method of assessing SSI.
	5.3 ... multiple eligible analyses of the data?	N	Analyses appear appropriate for the

			data, however it is unclear how data from participants who withdrew was incorporated (see also section 2.6).
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Some concerns**	Low level of concern about differing number of patients in each group

Table 10 CASP checklist

Bua et al. 2017	Comment	Response
Section A: Are the results of the study valid?		
1. Did the study address a clearly focused issue?	Non-randomised study comparing the effect of Leukomed Sorbact compared with standard surgical dressing on SSIs in a cohort of patients who had undergone vascular surgery.	Y
2. Was the cohort recruited in an acceptable way?	Prospectively recruited, non-randomised cohort. Patients with known allergies to the dressings and patients who were undergoing treatment with antibiotics were excluded.	Y
3. Was the exposure accurately measured to minimise bias?	Open label, non-blinded to intervention. First 100 patients were recruited into the standard dressing group, second 100 into Leukomed Sorbact group. All patients were given same treatment “all aspects of perioperative care remained unchanged between cohorts”.	Y
4. Was the outcome accurately measured to minimise bias?	Outcome assessors were not blinded. Used standard ASEPSIS scoring system.	Y

5. (a) Have the authors identified all important confounding factors?	The study identified: presence of diabetes, BMI, smoking, grade of operating surgeon, early SSI, ASA grade ≥3, type of surgery.	Y
5. (b) Have they taken account of the confounding factors in the design and/or analysis?	The method of analysis controlled for confounding variables that could impact healing.	Y
6. (a) Was the follow up of subjects complete enough?	The study did not indicate that there were any patients who had dropped out. The follow up protocol was standardised between both groups.	Y
6. (b) Was the follow up of subjects long enough?	The other study into vascular patients (Totty et al. 2019) also had a 30 day follow up. The EAC considers this to be adequate.	Y
Section B: What are the results?		
7. What are the results of this study?	Rate of SSI at 5 days was significantly lower in the Leukomed group. There was no difference at 30 days.	NA
9. Do you believe the results?	The direction of effect is the same as Totty et al. 2019. Same as Stanirowski studies (although this is a different population).	NA
Section C: Will the results help locally?		
10. Can the results be applied to the local population?	The direction of effect is the same as Totty et al. 2019. Same as Stanirowski studies (although this is a different population). No reason to suspect the results are not generalizable to other similar populations.	Y
11. Do the results of this study fit with other available evidence?	The direction of effect is the same as Totty et al. 2019. Same as Stanirowski studies (although this is a different population).	Y
12. What are the implications of this study for practice?	Leukomed may help reduce SSI rate in early postoperative period in vascular patients (non implant).	NA

[redacted]	[redacted]	[redacted]
[redacted]		
[redacted]	[redacted]	[redacted]

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical technology guidance

Assessment report overview

MT496 Leukomed Sorbact for preventing surgical site infection

This assessment report overview has been prepared by the Medical Technologies Evaluation Programme team to highlight the significant findings of the External Assessment Centre (EAC) report. It includes **brief** descriptions of the key features of the evidence base and the cost analysis, any additional analysis carried out, and additional information, uncertainties and key issues the Committee may wish to discuss. It should be read along with the company submission of evidence and with the EAC assessment report. The overview forms part of the information received by the Medical Technologies Advisory Committee when it develops its recommendations on the technology.

Key issues for consideration by the Committee are described in section 6, following the brief summaries of the clinical and cost evidence.

This report contains information that has been supplied in confidence and will be redacted before publication. This information is highlighted in [redacted]. This overview also contains:

- Appendix A: Sources of evidence
- Appendix B: Comments from professional bodies
- Appendix C: Comments from patient organisations
- [Appendix D: Additional analyses carried out by External Assessment Centre] [delete if no appendix D]

1 The technology

Leukomed Sorbact (Essity), is a sterile, single-use, bacteria-binding, adhesive-bordered wound dressing. It is used to prevent surgical site infection (SSI) in closed surgical wounds that have low to moderate levels of exudate.

The dressing comprises an absorbent non-woven wound contact pad and an outer transparent adhesive polyurethane film. The pad is made of white viscose polypropylene and polyester laminated to the proprietary dialkylcarbamoyl chloride (DACC)-coated mesh. DACC's hydrophobicity (inability to mix with water and tendency to bind together in the presence of moisture) means it can physically bind to hydrophobic microorganisms responsible for SSI. Hydrophobic interaction moves these microorganisms from the wound surface and binds them to the dressing meaning they are removed at dressing change. The polyurethane film is designed to maintain a moist environment and protect the wound from external contamination. The dressing is available in various sizes.

Leukomed Sorbact is intended to be applied after an operation in the operating room by a surgeon or theatre nurse. It can also be used in the early period after an operation if a dressing needs to be replaced.

2 Proposed use of the technology

2.1 Disease or condition

Surgical site infection is a type of healthcare-associated infection in which a wound infection occurs after an invasive (surgical) procedure. NICE's guideline on preventing and treating surgical site infection states that at least 5% of patients undergoing a surgical procedure develop a surgical site infection which are usually caused by contamination of an incision with microorganisms from the patient's own body during surgery. The risk of SSI varies between surgery types, typically contaminated or clean-contaminated surgery procedures are associated with increased risk of SSI.

2.2 Patient group

Leukomed Sorbact is intended for use in the prevention of surgical site infection in closed surgical wounds with low to moderate exudate following clean or clean-contaminated (surgery where bacteria density is high) incisions.

2.3 Current management

The NICE guideline on preventing and treating surgical site infection recommends a range of preoperative, intraoperative and postoperative measures to prevent SSI. It also suggests offering prophylactic antibiotics before a clean surgery involving the placement of an implant or before a clean-contaminated surgery. The guideline recommends covering surgical incisions with an appropriate interactive dressing (where the dressing components interact with the wound bed) at the end of the operation and that dressings should be changed or removed using aseptic non-touch technique. The guideline does not specify which interactive dressings to use.

NICE has recommended PICO negative pressure wound dressings for closed surgical incisions in people at a high risk of SSI.

2.4 Proposed management with new technology

Leukomed Sorbact is intended to be used as an alternative to interactive postoperative dressings for preventing SSI in clean and clean contaminated surgeries. Leukomed Sorbact can be used for closed surgical incisions as part of wound management in theatre and after surgery in line with the NICE clinical pathway on preventing and treating surgical site infections.

3 Company claimed benefits and the decision problem

These are described in the scope here

Decision problem	Variation proposed by company	EAC view of the variation
Population – People that have post-operative clean and contaminated wounds with moderate exudate	People that have post-operative clean or clean-contaminated wounds with low to moderate exudate	The EAC agreed with the variation and also clarifies that the scope is focused on closed wounds
Intervention	none	Sorbact Surgical will be included as another name for Leukomed Sorbact
Subgroups - Leukomed Sorbact should not be used where a person has a known sensitivity to active components of the dressing.	Please amend wording in line with the Leukomed Sorbact IFU provided. Use of the word active potentially implies it contains a chemical or pharmacological agent	The EAC understands this change and would accept removing the word active to prevent confusion. However, the EAC notes that dressing is interactive according to NICE NG125 definition: "Dressings designed to promote the wound healing process through the creation and maintenance of a local, warm, moist environment underneath the chosen dressing, when left in place for a period indicated through a continuous assessment process."

4 The evidence

4.1 Summary of evidence of clinical benefit

The evidence included in the company submission consisted of 9 full text publications and data from 1 unpublished audit. The submission included 5 randomised controlled trials (Totty et al, 2019; Stanirowski et al, 2016a; Stanirowski, et al, 2016b; Meberg, 1990; Romain, 2020), a non-randomised controlled trial (Bua et al, 2017), a prospective cohort study (Nielsen, 2012), a retrospective cohort study (Lee, 2018), an adverse event report (Abigo Medical, 2017) and an unpublished Audit ([redacted]). Five of the clinical studies included in the submission were selected by the EAC to be presented

in the assessment report, the rationale for selection is described in section 4.3 of the assessment report. The EAC identified no additional evidence in its searches.

Study	Type of publication	Type of study	Comment
Studies included by both EAC and company	*4 full text publications and an unpublished data (AiC)*	*One RCT, two pilot RCTs, a non-randomised controlled trial and an audit (AiC)*	*Totty et al, 2019; Stanirowski et al, 2016a; Stanirowski, et al, 2016b; Bua et al, 2017;* [redacted]
Studies in submission excluded by EAC	*5 full text publications were not included by the EAC*	*Retrospective cohort study, two randomised controlled trial, prospective cohort study, case study*	*Lee, 2018 – intervention not in the scope* *Meberg, 1990 – intervention not in the scope* *Romain, 2020 – The interventional arm included a range of Sorbact products and does not report the results by product* *Nielsen, 2012 – intervention not in the scope* *Abigo Medical, 2017 – adverse event report*

All the included published studies compared Leukomed Sorbact against standard surgical dressings. Overall, baseline patient characteristics were well matched between intervention and control groups. Follow up time ranged from 5-7 to 30 days. All studies were single centre, 2 from the UK (Totty et al. 2019 and Bua et al. 2017) in patients undergoing vascular surgery, 2 from Poland (Stanirowski et al. 2016a, Stanirowski et al. 2016b) in women having elective or emergency caesarean sections.

[redacted]. All studies had the rate of SSI as the primary outcome as defined by the ASEPSIS or CDC criteria.

The EAC judged Stanirowski et al. 2016a the study least at risk of bias and most relevant as it was the only full RCT, and the only study adequately powered. Overall, the EAC agrees with the company that the studies are at low risk of bias but had concerns about blinding and sample size. All studies (albeit in heterogenous populations) showed a reduction in SSI rates within 30 days of surgery, however most studies were underpowered for this outcome.

Table 1: Pivotal studies in the EAC report

Study and design	Participants/ population	Intervention & comparator	Outcome measures and follow up	Results	Withdrawals	Funding	Comments
Totty et al (2019) *Prospective randomised controlled trial*	*144 people having clean or clean-contaminated vascular surgery.* *Most common types of surgery: lower limb arterial surgery, open abdominal surgery (57.6% of patients who were randomised, 83/144).*	*Leukomed Sorbact (n=74;* 48 men; mean age 63.91[±12.38]*)* *Standard care group (n=70;* 46 men; mean age 62.36 [±12.31])	*Rate of SSI defined by ASEPSIS score at 30 days and 90 days post discharge* *Satisfactory haling at 90 days post discharge*	*Rate of SSI at 30 days* *Leukomed: 16% (12/74)* *Standard dressing: 26% (18/70)* *(p=0.161)* *Rate of SSI at 90 days* *Leukomed: 7.7%* *Standard dressing: 24%* *(p=0.109)* *Satisfactory healing* *Leukomed: 62.3%* *Standard dressing (Opsite): 50%* *(p=0.236)*	*Drop out rate of 23.6% (34/144). 16 patients withdrew during the study, the most common reason being choosing inability/unwillingness in attending follow up visits.*	*Not company funded*	*Randomisation was completed using a computerised online service in the theatre after wound closure to reduce performance bias. The online service stratified for prosthetic implant/non-implant, wound type and diabetes.* *The RCT is a pilot study and is underpowered to detect differences in rates of SSI between groups.* *A wide range of surgical*

							procedures increases the heterogeneity in the study and may impact results. The study was also open label as the products looked different, however the investigator assessing the wound at 30 day follow up was blinded to the allocation, all follow up appointments after 30 days post discharge were completed by telephone.
Bua et al. 2017 Prospective non-randomised study comparing	200 people having clean or clean-contaminated non-implant vascular surgery	Leukomed group (n = 100; 54 men; mean age 63 [range 29 - 94]; 39 with diabetes)	Rate of SSI defined by ASEPSIS score of ≥ 21 at 5 to 7 days and 30	Rate of SSI at 5 to 7 and 30 days after surgery At 5 to 7 days after surgery: Leukomed: 1%	No patients are reported to have withdrawn from the study although fewer patients returned for the 30-day assessment which suggests some	Not funded by the company	This is a proof of concept study conducted in the UK. No power calculations so may not have been adequately powered to detect

Leukomed Sorbact with various standard surgical dressings	The most common type of surgery was major limb amputation, followed by limb revascularisation and open varicose vein surgery (75.5% of patients who were randomised, 151/200).	Standard care group (n = 100; 66 men; mean age 63 [range 27 – 97]; 52 with diabetes)	day after surgery Satisfactory healing defined as ASEPSIS score ≤10 at 5 to 7 days and 30 days after surgery Number of SSI related readmissions post 30-day follow up	Standard dressing: 10% P < 0.05 1 patient with SSI in Leukomed group needed intravenous antibiotics; 2 patients with SSI in the standard dressing group needed intravenous antibiotics (remaining 8 had oral antibiotics). At 30 days: Leukomed: 9.09% Standard dressing: 10% P = 0.83 Readmission due to SSI at 30 days Leukomed: 7.07% (7/99) Standard dressing: 10% (9/90) P = 0.47	patients were lost to follow up (1, Leukomed Sorbact and 10, standard care). The EAC calculated a drop out rate of 5.5%		differences between rates of SSI between groups. Patients were recruited sequentially, the first 100 patients were recruited to the standard care group, the following 100 were recruited to the Leukoomed Sorbact group. Groups were well matched, and analysis controlled for confounding variables, Outcome assessors were not blinded,

Stanirowski et al, 2016a Single-blinded randomised controlled trial	543 women aged >18 years having elective or emergency caesarean section for single or multiple pregnancy.	Leukomed Sorbact surgical dressing (n=272, age 31.2 ± 4.8 years) Standard (Tegaderm Pad) surgical dressing (n=271, 30.6 ± 4.8 years)	Rate of SSIs 14 days after surgery Outpatient visits in patients with SSIs Mean length of additional hospital stay in control group Risk of SSI Total estimated cost of SSI prophylaxis and treatment	Primary: Rate of SSIs 14 days after surgery (p=0.04): Study group, 1.8% Control group, 5.2% Outpatient visits in patients with SSIs (p=0.02): Study Group, n = 4.6 ± 1.67 Control Group, n = 2.9 ± 1.1 Secondary: Mean length of additional hospital stay in control group: 8.2 ± 3.2 days. Leukomed Sorbact lowered risk of SSI (OR=0.3; [95% CI: 0.09–1.03]; p = 0.04) Multivariable logistic regression with backwards selection showed that pre-pregnancy BMI, smoking in pregnancy and SSD application were independent factors	Of 586 eligible patients for the study, 43 (7.3%) failed to report for follow-up visits and were excluded from further analysis. In the final stage, the study and control groups consisted of 272 and 271 patients, respectively. Overall dropout rate of 9.3% (EAC calculated).	Funding source is unclear	

				influencing the risk of SSI. Total estimated cost of SSI prophylaxis and treatment: 5775EUR in study group vs 1065EUR in control group.			
Abbreviations used: BMI = Body Mass Index; SSI = Surgical site infection; SSD= Standard surgical dressing; ASEPSIS (additional treatment, serous discharge, erythema, purulent exudate, separation of tissues, isolation of bacteria, stay duration as an inpatient) wound score							

4.2 Summary of economic evidence

The company identified 2 published and 2 unpublished studies in its search of the economic evidence. The EAC agreed with the company's searches and identified no further studies in its searches. It noted that 3 of the studies provided costing information relevant to the Leukomed evaluation, one unpublished study, [redacted].

The published economic evidence (Stanirowski et al, 2016a and Stanirowski et al, 2019) both find Leukomed to be cost saving. Stanirowski et al, 2016a reports total costs of SSI prophylaxis and treatment of 5,775 EUR in the standard care group vs. 1,065 EUR in the Leukomed group. Stanirowski et al, 2019 takes the same data and applied it to a decision-analytic model with a UK NHS perspective, finding a cost saving of £119.07 per patient in the Leukomed group. See section 9.1 of the AR for further details

De novo analysis

The company submitted a simple decision tree model with 2 interventions (Leukomed or standard dressing) and 2 outcomes (SSI or no SSI). The time horizon was 30 days. The EAC considered the model and time horizon to be appropriate and made no changes to the model structure. Patients included in the model are those having post-operative clean/clean contaminated wounds. The model considered 3 populations: patients undergoing caesarean-section, vascular surgery and all surgery.

Model parameters

Costs and resource use

The EAC largely agreed with and retained the company's values for clinical and cost parameters, changing only the cost of an SSI episode (vascular surgery) in its revised model. For full details see Table 2 below.

Table 2: Clinical and cost parameters used in the company's model and any changes made by the EAC – adapted form Tables 5 and 6 in the AR

Variable	Company value	Source	EAC changes/comments
Baseline risk of SSI (All surgeries)	1.09%	NHS England	N/A
Baseline risk of SSI(Vascular)	2.5%	NHS England	N/A
Baseline risk of SSI(Caesarean)	4.35%	NHS Wales	N/A
SSI relative risk (Caesarean) - Leukomed	67%	Stanirowski 2016a, 2016b	N/A
SSI relative risk (Vascular) - Leukomed	42%	Bua 2017, Totty 2019	N/A
SSI relative risk (All surgery) - Leukomed	50%	Combined Caesarean and Vascular	The EAC considers the available data insufficient to generalise to all subspecialties
Cost of Leukomed Sorbact dressing	£9.15 per dressing	Company	N/A
Cost of Standard Surgical dressing	[redacted]	[redacted]	N/A
SSI episode cost (vascular)	[redacted]	[redacted] EAC: Jenks 2014	EAC changed to £2702 (Source: Jenks 2014)
SSI episode cost (Caesarean)	£4,048	Jenks 2014	N/A
SSI episode cost (All surgery)	£5,708	Company: Jenks 2014	N/A

Results

Table 3: Company and EAC base case results – adapted from Tables 7a-c in the AR

	Base case results: Caesarean					
	Company's results			EAC results		
	Technology	Comparator	Cost saving per patient	Technology	Comparator	Cost saving per patient
Dressing cost	£11.44	£0.89	-£10.55	£11.44	£0.89	-£10.55
SSI episode cost	£58.11	£176.09	£117.98	£58.11	£176.09	£117.98

Total	**£69.55**	**£176.98**	**£107.43**	**£69.55**	**£176.98**	**£107.43**
	Base case results: Vascular					
Dressing cost	£11.44	£0.89	-£10.55	£11.44	£0.89	-£10.55
SSI episode cost	£47.08	£81.18	£34.10	£39.17	£667.55	£28.37
Total	**£58.52**	**£82.06**	**£23.55**	**£50.61**	**£68.43**	**£17.82**
	Base case results: All surgery					
Dressing cost	£11.44	£0.89	-£10.55	**Not considered by EAC**		
SSI episode cost	£31.11	£62.22	£31.11			
Total	**£42.55**	**£63.11**	**£20.56**			

The company and EAC base case results are the same or similar due to the limited changes the EAC made to the company's parameters. The EAC did not model all surgery as it considered the data on relative risk reduction insufficient to generalise to all surgery. The results for caesarean and vascular in both the company results and any EAC changes showed cost savings from the use of Leukomed, most notably for those receiving vascular surgery.

The company undertook a number of sensitivity analyses. It performed two way deterministic sensitivity analysis varying the price of the Leukomed dressing by +100% and the cost of the comparator by -50%, and in all circumstances Leukomed remained cost saving. It performed probabilistic sensitivity analyses on the cost of a surgical site infection and Leukomed remained cost savings in all circumstances. This analysis showed that the breakeven cost for an SSI episode were £2,000, £1,000, and £350 for all surgery, vascular surgery and caesarean section respectively. The company conducted scenario analyses varying the baseline risk and relative risk reduction and reported the technology does not become cost incurring, see Tables 9a-c in the AR. The company reported the breakeven baseline SSI risks were 17%, 13% and 6% for all surgery, vascular surgery and caesarean section respectively. Cost savings were at least £23.33, £15.02 and £77.93 for all surgery, vascular surgery and caesarean section, respectively.

The EAC conducted its own threshold analyses for SSI episode cost, baseline SSI risk, and relative risk reduction for caesarean sections and vascular surgery populations only. The results were similar to those reported by the company and are summarised in Table 4 below

Table 4: Threshold analysis conducted by the EAC (Table 10 AR)

Population	Parameter evaluated	Base case value	Breakeven point
Caesarean section	Baseline SSI rate	4.35%	0.389%
	Relative rate reduction	67%	6%
	SSI episode cost	£4,048	£361.98
Vascular surgery	Baseline SSI rate	2.50%	0.930%
	Relative rate reduction	42%	16%
	SSI episode cost	£2,702	£1,004.76

5 Ongoing research

One ongoing study was identified, DACC in the REduction of Surgical Site INfection (DRESSINg), NCT02992951. No results have been published, last updated July 2019.

6 Issues for consideration by the Committee

Clinical evidence

The EAC considered the evidence on Leukomed Sorbact to be insufficient to support an analysis for all surgery combined, but stronger and sufficient in vascular surgery and caesarean section. The committee must decide if it agrees with this decision.

Cost evidence

The EAC considered the estimate of the cost of SSI in vascular surgery from Jenks et al. (2014) to be robust, and favoured it over the unpublished evidence [redacted]. The committee must decide if this change is appropriate

The EAC agrees with the company's findings that Leukomed is cost saving when used in a vascular surgery and caesarean section surgery setting, and that savings are robust and remain after parameter changes. However it did not consider if was appropriate to assess its cost effectiveness for all surgery. The committee must decide if it agrees with this decision.

7 Authors

Neil Hewitt, Technical analyst

Lizzy Latimer, Technical adviser

NICE Medical Technologies Evaluation Programme

October 2020

Appendix A: Sources of evidence considered in the preparation of the overview

A Details of assessment report:

- Chalikidou A, Erskine J, Goddard K, et al. Leukomed Sorbact for preventing surgical site infection, August 2020

B Submissions from the following sponsors:

- Essity

C Related NICE guidance (VERY limited list of very directly related guidance)

- Surgical site infections: prevention and treatment (2019) NICE guideline NG125
- Prevena incision management system for closed surgical incisions (2019) NICE medtech innovation briefing 173
- PICO negative pressure wound dressings for closed surgical incisions (2019) NICE medical technologies guidance 43
- Prevention and control of healthcare-associated infections overview (2019) NICE Pathway
- The V.A.C. Veraflo Therapy system for infected wounds. NICE medical technology guidance. Publication expected October 2020.

D References

Ab AM. BSN Medical Inc. leukomed sorbact dressing, wound, drug. 2017. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/detail.cfm?mdrfoi__id=6449224&pc=FRO, Accessed 29 April 2020

Bua, N., Smith, G. E., Totty, J. P., Pan, D., Wallace, T., Carradice, D. & Chetter, I. C. 2017. Dialkylcarbamoyl Chloride Dressings in the Prevention of Surgical Site Infections after Nonimplant Vascular Surgery. Annals of vascular surgery, 44, 387-392.

Coldwell J, Curtin J. Management of the surgical site post local skin excision using a bacteria and fungi binding dressing in the primary care setting - an observational study. Poster Abigo Medical AB data on file. 2014.

Hayden A, Holdsworth J. Complications following re-exploration of the groin for recurrent varicose veins. *Annals of the Royal College of Surgeons of England,* 2001: 83**,** 272-273.

Hirsemann, S., Sohr, D., Gastmeier, K. & Gastmeier, P. Risk factors for surgical site infections in a free-standing outpatient setting. *American Journal of Infection Control,* 2005: 33**,** 6-10.

Jenks, P.J., Laurent M., McQuarry S., Watkins R. Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. Journal of Hospital Infection 2013: 86(1): 24-33.

Lee JW, Park SH, Suh IS, Jeong HS. A comparison between DACC with chlorhexidine acetate-soaked paraffin gauze and foam dressing for skin graft donor sites. J Wound Care. 2018;27(1):28-35.

Meberg A, Schoyen R. Hydrophobic material in routine umibilical cord care and prevention of infections in newborn infants. Scand J Infect Dis. 1990;22(6):729-33.

Nielsen AM, Andriessen A. Prospective cohort study on surgical wounds comparing a polyhexanide-containing biocellulose dressing with a dialkyl-carbamoyl-chloride- containing hydrophobic dressing. Adv Skin Wound Care. 2012;25(9):409-13.

Romain B, Mielcarek M, Delhorme JB, et al. Dialkylcarbamol chloride-coated versus alginate dressings after pilonidal sinus excision: a rendomized clinical trial (SORKYSA study). British Medical Journal Open, 2020 Feb 4.

Sadat U, Chaudhuri A, Hayes PD, Gaunt M, Boyle J, Varty K. Five day antibiotic prophylaxis for major lower limb amputation reduces wound infection rates and the length of in-hospital stay. *Eur J Vasc Endovasc Surg,* 2008: 35**,** 75-8.

Stryja J, Sandy-Hodgetts K, Collier M, Moser C, Ousey K, Probst S, Wilson J. & Xuereb, D. Prevntion and Management Across Health-Care Sectors. *Journal of Wound Care,* 2020: 29**,** S1-S72.

Stanirowski, P. J., Bizon, M., Cendrowski, K. & Sawicki, W. 2016. Randomized Controlled Trial Evaluating Dialkylcarbamoyl Chloride

Impregnated Dressings for the Prevention of Surgical Site Infections in Adult Women Undergoing Cesarean Section. Surgical Infections, 17, 427-435.

Stanirowski, P. J., Davies, H., McMaster, J., Mealing, S., Sawicki, W., Cendrowski, K. & Posnett, J. 2019. Cost-effectiveness of a bacterial-binding dressing to prevent surgical site infection following caesarean section. Journal of wound care, 28, 222-228.

Stanirowski, P. J., Kociszewska, A., Cendrowski, K. & Sawicki, W. 2016. Dialkylcarbamoyl chloride-impregnated dressing for the prevention of surgical site infection in women undergoing cesarean section: a pilot study. Archives of medical science, 12, 1-7.

[redacted]

Totty, J. P., Hitchman, L. H., Cai, P. L., Harwood, A. E., Wallace, T., Carradice, D., Smith, G. E. & Chetter, I. C. 2019. A pilot feasibility randomised clinical trial comparing dialkylcarbamoylchloride-coated dressings versus standard care for the primary prevention of surgical site infection. International wound journal, 16, 883-890.

[redacted]

Appendix B: Comments from professional bodies

Expert advice was sought from experts who have been nominated or ratified by their Specialist Society, Royal College or Professional Body. The advice received is their individual opinion and does not represent the view of the society.

George Smith

Senior lecturer and honorary consultant vascular surgeon

Joanne Beresford

Tissue viability nurse specialist

Joshua Totty

Core surgical trainee doctoral candidate

- The experts agreed that the technology is innovative and none were aware of any competing technologies
- The experts agreed that using the dressing to prevent SSI would be cost saving but had varying opinions on which setting and which patients it would be most appropriate to use (e.g. high BMI, caesarean section, diabetes mellitus and peripheral vascular disease).
- The experts agreed that NICE guidance on the technology would be useful.

Appendix C: Comments from patient organisations

The following patient organisations were contacted and no response was received:

- British Obesity Surgery Patients Association (BOSPA)
- British Skin Foundation (BSF)
- Children's Burn Trust (CBT)
- Colostomy Association
- Crohn’s and Colitis UK (NACC)
- Diabetes UK
- Foot in Diabetes UK
- IA (Ileostomy and Internal Pouch Support Group)
- Leg Ulcer Charity
- Leonard Cheshire disability
- LifeSIGNS
- MRSA Action UK
- Pressure Ulcers UK
- Self injury Support

Appendix E: decision problem from scope

The benefits to patients claimed by the company are those relating to the prevention of surgical site infections:

- Faster discharge
- Faster recovery time and return to normal function
- Reduced pain and discomfort
- Improved quality of life
- Improved post-operative mortality rate

The benefits to the healthcare system claimed by the company are:

- Reduction in SSI-attributable length of stay
- Reduction in the use of systemic antibiotics
- Reduction in outpatient attendances

Population	People that have post-operative clean or clean-contaminated wounds with moderate exudate
Intervention	Leukomed Sorbact
Comparator(s)	Conventional post-surgical wound dressings Negative pressure wound therapy
Outcomes	The outcome measures to consider include: Incidence of surgical site infection Rate of wound dehiscence Rate of abnormal scarring ASEPSIS (additional treatment, serous discharge, erythema, purulent exudate, separation of tissues, isolation of bacteria, stay duration as an inpatient) wound score Length of post-operative stay in hospital relating to SSI Readmission related to SSI Time until full wound closure Prescription and dose of antibiotics for SSI Patient pain and discomfort Condition specific and generic quality of life measures

	Outpatient clinic attendances Post-operative mortality rate Device-related adverse events	
Cost analysis	Costs will be considered from an NHS and personal social services perspective. The time horizon for the cost analysis will be long enough to reflect differences in costs and consequences between the technologies being compared. Sensitivity analysis should be undertaken to address uncertainties in the model parameters.	
Subgroups to be considered	Where evidence allows: Site of surgery (including but not limited to c-section, vascular) Clean Clean contaminated surgery	
Special considerations, including those related to equality	Older people are at an increased risk of surgical site infection. Age is a protected characteristic. Leukomed Sorbact can be used following the delivery of a baby by caesarean section. Pregnancy and maternity are protected characteristics.	
Special considerations, specifically related to equality	Are there any people with a protected characteristic for whom this device has a particularly disadvantageous impact or for whom this device will have a disproportionate impact on daily living, compared with people without that protected characteristic?	No
	Are there any changes that need to be considered in the scope to eliminate unlawful discrimination and to promote equality?	No
	Is there anything specific that needs to be done now to ensure the Medical Technologies Advisory Committee will have relevant information to consider equality issues when developing guidance?	No
Any other special considerations	Leukomed Sorbact should not be used where a person has a known sensitivity to active components of the dressing.	

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical technology guidance scope

Leukomed Sorbact for preventing surgical site infection

1 Technology

1.1 Description of the technology

Leukomed Sorbact (Essity), also known as Sorbact surgical dressing, is a sterile, single-use, bacteria-binding, adhesive-bordered wound dressing. It is used to prevent surgical site infection (SSI) in closed surgical wounds that have low to moderate levels of exudate.

The dressing comprises an absorbent non-woven wound contact pad and an outer transparent adhesive polyurethane film. The pad is made of white viscose polypropylene and polyester laminated to the proprietary dialkylcarbamoyl chloride (DACC)-coated mesh. DACC's hydrophobicity (inability to mix with water and tendency to bind together in the presence of moisture) means it can physically bind to hydrophobic microorganisms responsible for SSI. Hydrophobic interaction moves these microorganisms from the wound surface and binds them to the dressing meaning they are removed at dressing change. The claimed clinical benefit of Leukomed Sorbact is a reduced risk of SSI due to bacteria binding to the dressing preventing endotoxins (toxic substances released by bacteria which cause inflammation and delayed healing) from being released into the wound bed. A secondary benefit of reducing the risk of SSIs is a claimed reduction in the prescription of SSI associated antibiotics. The company also claim that the DACC molecules are not absorbed by the body and, as a result of no chemical agent being released into the wound, antibiotic resistance is unlikely. The polyurethane film is designed to maintain a moist environment and

protect the wound from external contamination. The dressing is available in various sizes.

Leukomed Sorbact is intended to be applied after an operation in the operating room by a surgeon or theatre nurse. It can also be used in the early period after an operation if a dressing needs to be replaced.

1.2 Relevant diseases and conditions

Leukomed Sorbact is intended for use in the prevention of surgical site infection in closed surgical wounds with moderate exudate following clean or clean-contaminated (surgery where bacteria density is high) incisions. The company estimate 4.5 million clean or clean-contaminated operations are undertaken in the UK each year.

Surgical site infection is a type of healthcare-associated infection in which a wound infection occurs after an invasive (surgical) procedure. NICE's guideline on preventing and treating surgical site infection states that at least 5% of patients undergoing a surgical procedure develop a surgical site infection which are usually caused by contamination of an incision with microorganisms from the patient's own body during surgery.

A surgical site infection surveillance programme conducted by Public Health England (PHE) reported cumulative SSI incidence between April 2014 and March 2019. The risk of SSI varies between surgery types, typically contaminated or clean-contaminated surgery procedures are associated with increased risk of SSI. The PHE reported an incidence of 8.7% for large bowel surgery indicative of the high bacterial load, 2.5% for vascular surgery and <1% for knee or hip replacement surgery. A table presenting all surgery types included in the data analysis can be found in the surveillance of surgical site infections in NHS hospitals in England, April 2018 to March 2019 annual report.

1.3 Current management

The NICE guideline on preventing and treating surgical site infection recommends a range of preoperative, intraoperative and postoperative

measures to prevent SSI. It also suggests offering prophylactic antibiotics before a clean surgery involving the placement of an implant or before a clean-contaminated surgery. The guideline recommends covering surgical incisions with an appropriate interactive dressing (where the dressing components interact with the wound bed) at the end of the operation and that dressings should be changed or removed using aseptic non-touch technique. The guideline does not specify which interactive dressings to use.

NICE has recommended PICO negative pressure wound dressings for closed surgical incisions in people at a high risk of SSI.

1.4 Regulatory status

Leukomed Sorbact received a CE mark in June 2014 as a class IIb device.

1.5 Claimed benefits

The benefits to patients claimed by the company are those relating to the prevention of surgical site infections:

- Faster discharge
- Faster recovery time and return to normal function
- Reduced pain and discomfort
- Improved quality of life
- Improved post-operative mortality rate

The benefits to the healthcare system claimed by the company are:

- Reduction in SSI-attributable length of stay
- Reduction in the use of systemic antibiotics
- Reduction in outpatient attendances

2 Decision problem

Population	People that have post-operative clean or clean-contaminated wounds with moderate exudate
Intervention	Leukomed Sorbact
Comparator(s)	• Conventional post-surgical wound dressings • Negative pressure wound therapy

Outcomes	The outcome measures to consider include: • Incidence of surgical site infection • Rate of wound dehiscence • Rate of abnormal scarring • ASEPSIS (additional treatment, serous discharge, erythema, purulent exudate, separation of tissues, isolation of bacteria, stay duration as an inpatient) wound score • Length of post-operative stay in hospital relating to SSI • Readmission related to SSI • Time until full wound closure • Prescription and dose of antibiotics for SSI • Patient pain and discomfort • Condition specific and generic quality of life measures • Outpatient clinic attendances • Post-operative mortality rate • Device-related adverse events	
Cost analysis	Costs will be considered from an NHS and personal social services perspective. The time horizon for the cost analysis will be long enough to reflect differences in costs and consequences between the technologies being compared. Sensitivity analysis should be undertaken to address uncertainties in the model parameters.	
Subgroups to be considered	Where evidence allows: • Site of surgery (including but not limited to c-section, vascular) • Clean • Clean contaminated surgery	
Special considerations, including those related to equality	Older people are at an increased risk of surgical site infection. Age is a protected characteristic. Leukomed Sorbact can be used following the delivery of a baby by caesarean section. Pregnancy and maternity are protected characteristics.	
Special considerations, specifically related to equality	Are there any people with a protected characteristic for whom this device has a particularly disadvantageous impact or for whom this device will have a disproportionate impact on daily living, compared with people without that protected characteristic?	No
	Are there any changes that need to be considered in the scope to eliminate unlawful discrimination and to promote equality?	No
	Is there anything specific that needs to be done now to ensure the Medical Technologies Advisory Committee will have relevant information to consider equality issues when developing guidance?	No

Any other special considerations	Leukomed Sorbact should not be used where a person has a known sensitivity to active components of the dressing.

3 Related NICE guidance

Published

- Surgical site infections: prevention and treatment (2019) NICE guideline NG125
- Prevena incision management system for closed surgical incisions (2019) NICE medtech innovation briefing 173
- PICO negative pressure wound dressings for closed surgical incisions (2019) NICE medical technologies guidance 43
- Prevention and control of healthcare-associated infections overview (2019) NICE Pathway

In development

NICE is developing the following guidance:

- The V.A.C. Veraflo Therapy system for infected wounds. NICE medical technology guidance. Publication expected October 2020.

4 External organisations

4.1 Professional

The following organisations have been asked to comment on the draft scope:

- Association for Perioperative Practice
- Association of Breast Surgery
- Association of Surgeons of Great Britain and Ireland
- Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland
- British Association of Paediatric Surgeons
- British Obesity and Metabolic Surgery Society
- British Society for Gynaecological Surgery
- Royal College of Nursing
- Royal College of Surgeons

- Society of Vascular Nurses
- The Vascular Society

4.2 Patient

NICE's Public Involvement Programme contacted the following organisations for patient commentary and asked them to comment on the draft scope:

- British Obesity Surgery Patients Association (BOSPA)
- British Skin Foundation (BSF)
- Children's Burn Trust (CBT)
- Colostomy Association
- Crohn's and Colitis UK (NACC)
- Diabetes UK
- Foot in Diabetes UK
- IA (Ileostomy and Internal Pouch Support Group)
- Leg Ulcer Charity
- Leonard Cheshire disability
- LifeSIGNS
- MRSA Action UK
- Pressure Ulcers UK
- Self injury Support

Adoption report: MT496 Leukomed Sorbact

Summary – for first MTAC meeting

Adoption levers

- Easy to apply and sticks well
- Promising real-world experiences obtained with c-section surgery
- Positive response with breast surgery
- Acceptance of scientific plausibility
- Does not contain and may reduce need for antibiotics (by preventing SSI)

Adoption barriers

- Adoption experiences have been on a unit by unit (rather than on a trust-wide) basis meaning adoption could be slow
- Cost may be a barrier
- May be difficult to control stock for intended use if stored in multi-use theatres, compromising cost effectiveness.
- Lack of staff familiarity/knowledge of aftercare may affect monitoring and dressing changes (removal too soon or not soon enough if exudate increases or infection develops)

1 Introduction

The adoption team has collated information from 6 healthcare professionals working within NHS organisations. This adoption report includes some of the adoption considerations for the routine NHS use of the technology.

2 Contributors

The adoption team spoke to a junior sister in breast care, a senior theatre sister (obstetrics) and a lead tissue viability nurse who have experience of using Leukomed Sorbact (Essity). The team also spoke to 3 other wound care experts: a community matron; a diabetes specialist podiatrist and a director of clinical and product assurance. Table 1 summarises clinical settings and use by contributor.

NHS Site	Clinical Setting	User
1	Breast Surgery	Yes. Purchasing from NHS Supply chain as part of an initial evaluation.
2	Non-clinical	No (not a potential end user).
3	Community Tissue Viability and infection control.	No (not yet encountered).
4	Obstetrics	Yes. Purchasing since 2017.
5	Diabetes Podiatry	No. Trauma and Orthopaedic Surgery colleagues have been discussing.
6	Obstetrics	Yes. Purchasing past few months.

Table 1: Clinical settings and use by

3 Use of Leukomed Sorbact in practice

The company confirm that Leukomed Sorbact can be used on all patients with closed surgical wounds, post clean or clean contaminated surgeries. The indication is not limited to high risk (of surgical site infection (SSI)) surgeries.

Contributors agreed that there are a range of clinical areas in which Leukomed Sorbact could be used. However, it was evident from the users that adoption was not trust-wide and was confined to individual speciality areas such as maternity services or breast surgery who may have little or no contact with other local surgical departments.

Two of the users are using in routine clinical practice for women having c-sections (see patient selection below). The other user is purchasing the product and using as part of an evaluation for women undergoing breast surgery (reductions or cancer surgery)) with the aim of introducing into practice after this.

Leukomed Sorbact should be applied at the point of wound closure by the surgeon or theatre support staff. This was the case with two users but the third was applying at follow-up only, approximately 7-10 days after surgery and only if there were signs the wound was starting to dehisce. The rationale for using in this way is that it is still under evaluation and clinical acceptance has not yet reached surgeon level, but their

aim is to prevent further breakdown of skin and to collect some data that may help demonstrate potential value.

The company state absorbency of the dressing is sufficient to handle low to moderate levels of exudate, and recommend that the dressing can be left in place for up to 7 days or changed more frequently depending on exudate levels and the overall condition of the wound and surrounding skin.

Users report that they are following these principles. One user said that they have established a protocol for its use post c-section. This states that the dressing should be removed on the 5th day but if exudate exceeds the capacity of the dressing it would be changed sooner. This user reported it is not always possible to predict the level of exudate at the point of surgery. A second user also changes the dressing after 5 days and the third user reviews patients at least once per week and changes the dressing then.

Depending on the surgery, clinical setting and patient condition, follow-up of patients' surgical wounds could take place in hospital, by ward staff or TVNs, or in the community. Theatre nurses usually have no further contact with the patient.

One user has established good continuation of care with community nursing teams who are familiar with the aftercare regime. They report that maternity services in another local hospital also use the dressing so patients transferring to or from there will be cared for by staff familiar with its use. Lack of healthcare professional familiarity across boundaries and services could influence monitoring and removal and therefore highlights the need for clear protocols to be developed and shared.

Leukomed Sorbact is available on NHS supply chain in 7 different sizes which are sold in boxes of 20. Prices range from £1.58 to £15.36 per unit. Both maternity service users stated they only order one size (1 orders 10 x 25cm, the other 10 x 30cm) as these fit all c-section wounds. The breast care unit user orders the two smallest sizes (5cm x 7.2cm and 8cm x 10cm).

One user advised the wound contact layer (dialkylcarbamoyl chloride (DACC) coated, Sorbact) can be purchased without the film backing (a variety of sizes and

cuttable strips are available) on NHS Supply Chain. This user speculated that an absorbent pad could be applied on top of the mesh and then sealed with a standard film dressing, that could then be suitable for higher levels of exudate.

In larger trusts with multiple operating theatres, especially non speciality specific theatres, contributors thought it was possible that stocks of the dressing could be used on other surgical wound sites, where it is not necessarily intended, if staff were not aware of its indication. This could have cost implications as the alternative (film and pad) dressings are much cheaper.

4 Reported benefits

The potential benefits of adopting Leukomed Sorbact as reported to the adoption team by the healthcare professionals interviewed are:

- Could help reduce SSIs after caesarean section reducing readmissions
- Could be cost saving as result of preventing SSIs
- Cheaper than PICO (a comparator)
- Good patient acceptance - favourable (over PICO) for high risk, c-section patients as discreet and comfortable
- Could reduce frequency of follow-up for breast surgery patients

5 Insights from the NHS

Area of application

The theatre sister in obstetrics reported that the technology is currently only approved for use in maternity services in their trust. This is because the trust does not provide vascular surgery and the trauma and orthopaedics team need dressings that can be used with the high levels of exudate, they often find with larger area orthopaedic surgery.

The breast care unit user reported her trust were trialling the technology in vascular surgery.

Patient selection

The two c-section users had similar indications for using Leukomed Sorbact. These were people with BMI between 28 or 30 kg/m^2 and 39/40 kg/m^2 or people with other medical conditions such as, diabetes, previous c-section, where there is a history of smoking, alcohol or drug abuse or any other concerns.

People with BMI of <30 kg/m^2, first c-section, no immune disorders or other concerns would be classed as very low risk and receive standard care (film and pad dressing). People with BMI of >40 kg/m^2 would receive PICO.

One user raised a concern that it may be used to treat rather than prevent infection which is a different indication. One user was using it as a form of treatment but also as a means of preventing further worsening of early signs of infection.

Clinician confidence/acceptance

The podiatrist interviewed had no experience of the dressing as it is not indicated for people with diabetic foot ulcers but said there could be a place for its use in trauma and orthopaedics.

While not a comparator, Cutimed Sorbact is a similar product produced by Essity that is designed to treat all types of colonised or infective wounds (including chronic wounds) and one contributor felt that familiarity with this product may attract potential users to Leukomed Sorbact.

There was a positive response to the scientific plausibility of the hydrophobic DACC (identified as ‘green gauze’) as a means of infection prevention.

One user raised concern about antibiotic resistance and said that technologies such as Leukomed Sorbact that can avoid antibiotic use should be explored and was an adoption lever.

Cost and Resource Impact

Cost was cited as a possible barrier as it is more expensive than standard film and pad dressings, however all users commented on the fact that it was cheaper than

PICO. The tissue viability nurse user said cost was initially a barrier but once they saw the impact it had on infection rates (none experienced in 2 months after adopting vs 4 in young mothers in the 2 months prior) it was deemed as cost saving locally.

Training on Application and Maintenance

Leukomed Sorbact is reported to be simple to apply and no training or demonstrations on this were thought necessary by the users.

Training on monitoring and dressing change was reported to be necessary for all staff who encounter patients with the dressing to ensure it is not removed too early or too late. Removal too early can be unnecessary and potentially wasteful. Removal too late could risk unseen problems and delayed treatment. This could be a challenge in both inpatient and community settings, especially if the patient lives out of area.

Patient experience

Avoiding SSI is reported to be important for patient experience as it is painful and may lead to admission and IV antibiotics. Because of this none of the users encountered any patient resistance.

One user had personal experience with Leukomed Sorbact following her third c-section. This healed very well with no infection and no dehiscing compared to her painful and infected second c-section that required hospitalisation and IV antibiotics and time away from her other child and new baby who she was breastfeeding. It was reportedly very discreet and practical compared with PICO (which requires carrying a box around) and adhesion was good. Therefore, this user felt that the patient experience was very positive.

6 Comparators

One user indicated that a standard film and pad dressing was used before Leukomed Sorbact. PICO was sometimes used as an alternative (depending on specific factors).

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical technologies guidance

MT496: Leukomed Sorbact for preventing surgical site infection

Company evidence submission

Part 1: Decision problem and clinical evidence

Company name	Essity- Health and Medical Solutions UK and Ireland
Submission date	11.03.2020
Regulatory documents attached	Leukomed® Sorbact® Declaration of Conformity DEKRA Annex 11 Certificate (50708-16-07) Annex to the Annex 11 Certificate No 50708-16-07 ISO 13485 Certificate, relevant IFU's
Contains confidential information	Yes – academic in confidence

Contents

1 Decision problem

	Scope issued by NICE	Variation from scope (if applicable)	Rationale for variation
Population	People that have post-operative clean or clean-contaminated wounds with moderate exudate	People that have post-operative clean or clean-contaminated wounds with low to moderate exudate	Please amend in line with description of the technology on pg.1 of final scope and the Leukomed Sorbact MIB
Intervention	Leukomed Sorbact	Enter text.	Enter text.
Comparator(s)	Conventional post-surgical wound dressings Negative pressure wound therapy	Enter text.	Enter text.
Outcomes	Incidence of surgical site infection Rate of wound dehiscence Rate of abnormal scarring ASEPSIS (additional treatment, serous discharge, erythema, purulent exudate, separation of tissues, isolation of bacteria, stay duration as an inpatient) wound score Length of post-operative stay in hospital relating to SSI Readmission related to SSI Time until full wound closure Prescription and dose of antibiotics Patient pain and discomfort	Enter text.	

	Condition specific and generic quality of life measures Outpatient clinic attendances Post-operative mortality rate Device related adverse events		
Cost analysis	Costs will be considered from an NHS and personal services perspective. The time horizon for the cost analysis will be long enough to reflect differences in costs and consequences between the technologies being compared. Sensitivity analysis will be undertaken to address uncertainties in the model parameters.	Enter text.	Enter text.
Subgroups to be considered	Where evidence allows: Site of surgery (including but not limited to c section, vascular) Clean Clean contaminated surgery	Enter text.	Enter text.
Special considerations, including issues related to equality	Older people are at an increased risk of surgical site infection. Age is a protected characteristic. Leukomed Sorbact can be used following the delivery of a baby by caesarean section. Pregnancy and maternity are protected characteristics.	Leukomed Sorbact should not be used where a patient has known sensitivity to the dressing components	Please amend wording in line with the Leukomed Sorbact IFU provided. Use of the word active potentially implies it contains a chemical or pharmacological agent

	Leukomed Sorbact should not be used where a person has a known sensitivity to active components of the dressing.		

2 The technology

Give the brand name, approved name and details of any different versions of the same device (including future versions in development and due to launch). Please also provide links to (or send copies of) the instructions for use for each version of the device.

Brand name	Leukomed® Sorbact®
Approved name	Leukomed® Sorbact®
CE mark class and date of authorisation	Class 11b - 05.12.2019

Version(s)	**Launched**	**Features**
Sorbact® Surgical (Non-UK equivalent to Leukomed Sorbact)	2005	The composition of Sorbact® Surgical is the same as Leukomed Sorbact i.e. adhesive film layer and an absorbent non-woven pad laminated to a dialkyl carbmoyl chloride DACC) coated Sorbact wound contact layer. The size range is also the same as for Leukomed Sorbact. The IFU for both products is attached, together with a statement from the Essity Regulatory Affairs Director evidencing the 7 day wear time for Leukomed Sorbact. The IFU is in the process of being amended to reflect this. *There are a number of other dressing formats that are sold within the Cutimed® Sorbact® dressing portfolio (see list below). These formats all feature the dialkyl carbamoyl chloride (DACC) coated Sorbact wound contact layer used in Leukomed Sorbact but have a different product composition and so are not the "same device" as Leukomed Sorbact. As indicated below, some of these formats may be used on closed surgical wounds amongst other indications, but are not promoted for this purpose within the UK hospital market. The launch date for the UK product and the non-UK equivalent is shown.

Cutimed® Sorbact swabs – previously branded Cutisorb Sorbact (UK version) Sorbact Compress - previously branded Cutisorb Sorbact (Non-UK equivalent) Cutimed Sorbact round swabs (UK version) Sorbact round swab (Non-UK equivalent) Cutimed Sorbact dressing pad (UK version) Sorbact Absorption dressing (Non-UK equivalent) Cutimed Sorbact ribbon gauze (UK version) Sorbact ribbon gauze (Non-UK equivalent) Cutimed Sorbact gel (UK version)	2007 1984 2007 1984 2007 1984 2007 1984 2009	• Cutimed Sorbact swabs (non-absorbent DACC coated mesh) – indicated for surgical wounds • Cutimed Sorbact round swabs (DACC coated mesh in shape of sphere, held together by a silicone ring) – not indicated for surgical wounds • Cutimed Sorbact dressing pad (non-adhesive, absorbent core plus DACC coated wound contact layer) – indicated for surgical wounds with moderate to high levels of exudate • Cutimed Sorbact Ribbon Gauze (green Sorbact wound contact layer) - not indicated for surgical wounds • Cutimed Sorbact Gel (Sorbact wound contact layer with a water-based gel containing carbomer and propylene glycol,10%) – not indicated for surgical wounds • Cutimed Sorbact Hydroactive (non-bordered absorbent gel dressing with DACC coated wound contact layer) – indicated for low to moderate dehisced post-operative wounds • Cutimed Sorbact Hydroactive B (bordered absorbent gel dressing with DACC coated wound contact layer) – indicated for low to moderate dehisced post-operative wounds • Cutimed Siltec® Sorbact (silicone adhesive foam with DACC coated wound contact layer) – indicated for surgical wounds with moderate to high levels of exudate • Cutimed Sorbion® Sorbact (superabsorbent dressing with DACC coated wound contact layer) – indicated for surgical wounds with high to excessive exudate levels Although these formats are not the “same device” as Leukomed Sorbact, IFU’s for the UK versions are attached in case they are required.

Sorbact Gel dressing (Non-UK equivalent) Cutimed Sorbact Hydroactive (UK only) Cutimed Sorbact Hydroactive B (UK only) Cutimed Siltec Sorbact (UK only) Cutimed Sorbion® Sorbact (UK version) Sorbact Superabsorbent (Non-UK equivalent)	1987 2010 2010 2012 2018 2015	
Enter text.	Enter text.	Enter text.
Enter text.	Enter text.	Enter text.
Enter text.	Enter text.	Enter text.

What are the claimed benefits of using the technology for patients and the NHS?

Claimed benefit	Supporting evidence	Rationale
Patient benefits		
• Faster discharge • Faster recovery time and return to normal function • Reduced pain and discomfort • Improved quality of life • Improved post-operative mortality rate	Stanirowski 2016 [8] Stanirowski 2016b[9] Bua 2017 [13] Totty 2019 [16] [redacted] Gheorghe 2015 [20] Badia 2017 [21] Kirkland 1999 [22] Tanner 2012 [23]	Leukomed Sorbact has been shown to reduce the risk of surgical site infection (SSI) compared to conventional post-operative wound dressings[2,8,9,13,19,]. This will mitigate the negative effects of SSI on patients which are well documented[20,21,22,23].
System benefits		
• Reduction in attributable length of stay • Reduction in the use of systemic antibiotics • Reduction in outpatient attendances	Stanirowski 2016a [8] Stanirowski 2016b [9] Badia 2017 [21] Stanirowski 2019 [17] Jenks 2014 [24]	A reduction in SSI is expected to generate significant resource savings to the NHS. The presence of SSI is documented to be associated with prolonged hospitalisation, increased use of antibiotics, additional outpatient attendances, increased rates of re-admission and re-operation, additional expenditure on medical/other staff costs and increased investigation and treatment costs[8,9,17,21,24].
Cost benefits		
• Cost effective vs. standard care	Stanirowski 2019 [17] De novo cost-effectiveness analysis (Part 2 of the submission)	Use of Leukomed Sorbact results in an increase in overall dressing cost, due to its higher unit cost compared to standard care. This has been shown to be offset by the savings in other SSI attributable costs which result from a reduction in the incidence of SSI, thereby resulting in a lower treatment cost per patient for Leukomed

		Sorbact compared to standard care[17].
• Reduction in costs to the NHS as a result of using Leukomed Sorbact	[redacted] Stanirowski 2019 [17] De novo cost-effectiveness analysis (Part 2 of the submission)	Reducing the incidence of SSI has been shown to generate an overall cost saving for the NHS when using Leukomed Sorbact[17,19,].
Sustainability benefits		
• Reduces the need for systemic antibiotics and the risk of antibiotic resistance • Prevents surgical site infection without exacerbating resistance problems, so helping to safeguard the well-being of the patient and community • Reduces SSI-attributable bed-days and required intervention by medical staff - enhances the efficiency and productivity of the NHS	HM Government 2019 [25] R Cooper 2018 [26] Finley 2015 [27] Lipsky 2016 [28] Chadwick 2019 [29] Jenks 2014 [24] Troughton 2018 [30]	The government's five-year AMS strategy recognises that the rate of antibiotic resistance is directly related to antibiotic use and puts the prevention /reduction of infection firmly at its core. Reducing the incidence of SSI, the third most common HCAI, will reduce the need for antibiotic prescribing thereby decreasing the risk of antibiotic resistant bacterial strains developing[25]. The need to develop non-antibiotic strategies for wound care and encourage clinical practices that conserve use of all antimicrobial interventions is recognised. Clinical reports of bacterial resistant strains to antiseptics such as silver have emerged and cross resistance between antibiotics and antiseptics has been detected[26,27]. The use of an agent with the least risk for adverse effects for the patient and community is advocated

		from an AMS perspective[28]. Leukomed Sorbact, has a purely physical mode of action which prevents infection without exacerbating bacterial resistance problems so helping to safeguard the patient and community[29]. Bed days lost as a result of excess LOS due to SSI are clearly documented[24,30]. Reducing the incidence of SSI releases bed days allowing additional procedures to be performed and patients treated. This aligns with the goal in the NHS long term plan to increase NHS productivity and efficiency.

29

Briefly describe the technology (no more than 1,000 words). Include details on how the technology works, any innovative features, and if the technology must be used alongside another treatment or technology.

Leukomed Sorbact, also known as Sorbact Surgical dressing, is a sterile, single use, bacteria-binding, adhesive bordered post-operative wound dressing. It is indicated for the prevention of surgical site infection in closed surgical wounds with up to and including moderate levels of exudate; it is available in the following 7 sizes (5cm x 7.2cm, 8cm x 10cm, 8cm x 15cm, 10 x 20cm, 10cm x 25cm, 10cm x 30cm, 10cm x 35cm).

The dressing comprises an absorbent non-woven wound contact pad and a transparent, adhesive outer polyurethane film layer. The pad is made of white viscose polypropylene and polyester laminated to the proprietary dialkyl carbamoyl chloride (DACC) coated Sorbact wound contact layer. The film layer acts to maintain a moist wound environment and protect the wound against exogenous contamination until epithelialisation occurs; the absorbent non-woven pad absorbs excess exudate present. The DACC coated Sorbact wound contact layer differentiates Leukomed Sorbact from other interactive post-operative wound dressings. This component of the dressing serves to physically trap and irreversibly bind bacteria and fungi to the dressing surface via a process of hydrophobic interaction. Once bound, the bacteria and fungi exhibit a decreased rate of replication, slower metabolism and decreased production of bacterial toxins. They are prevented from entering the wound, thus decreasing the risk of surgical site infection and large numbers of bound organisms are subsequently removed at each dressing change (Cutting 2015 [31]).

This mode of action is based on the fact that when two hydrophobic (water repellent) surfaces come into close proximity in a moist environment they increase the entropy (disorder of molecules). Although there is no force of attraction between the hydrophobic molecules, they will associate with one another by hydrophobic interaction and expel water molecules. In this way they aggregate and are held together by surrounding water molecules (Ljungh 2006 [32]).

DACC is a strongly hydrophobic fatty acid derivative resulting in a dressing material with highly hydrophobic properties. Micro-organisms commonly responsible for surgical site infections exhibit varying degrees of cell surface hydrophobicity and will therefore bind to the dressing's surface (Ljungh 1995 [33]). A review by Cutting et al reported that DACC coated dressings have been shown to rapidly and effectively bind *Staphylococcus aureus* and *Pseudomonas aeruginosa* within 30 seconds of contact [Cutting 2015 [31]). *In vitro* testing has shown high levels of binding with DACC coated dressings for many pathogens commonly associated with SSI: *Staphylococcus aureus (including Methicillin-sensitive and Methicillin-resistant Staph. Aureus), Enterobacteriaceae, Enterobacter spp., Enterococci faecium, Streptococcus spp., Escherichia coli, Acinetobacter baumannii, Pseudomonas aeruginosa, Bacteroides fragilis, Candida albicans (Ljungh 2006 [32], Ljungh 1995 [33], Ronner 2014 [34], data on file [35]).* A clinical study by Cilberti et al (Cilberti 2016 [36] also reported *Escherichia coli, Citrobacter spp., Klebisella pneumoniae, Proteus spp., Acinetobacter baumanniii, Pseudomonas aeruginosa and Morganella morganii* to be bound to the DACC coated dressing, when examined for bacterial load. Testing carried out by Ljungh et al showed saturation (where no more micro-organisms could bind to the dressing) to be achieved only for *Candida albicans*. Researchers noted that as well as binding to the dressing, the microbes

co-aggregated and bound to each other (Ljungh 2006 [32]). This bacterial binding effect is commonly referred to as a bacteriostatic effect because the microorganisms are not killed by hydrophobic interaction but instead are irreversibly bound and collected for removal.

The ability of Leukomed Sorbact to decrease the microbial load via a physical mode of action, rather than by releasing chemical or pharmacologically active substances (as with antiseptics or antibiotics), is beneficial for all types of wounds

- Rather than killing microbes and disrupting the bacterial cell wall, the natural binding process leaves the cell wall intact so avoiding the release of endotoxins into the wound which can impair the healing process (Cutting 2015 [31])
- No chemicals are released into the wound; there is therefore minimal risk of sensitisation, allergy, cytotoxicity or systemic absorption of DACC coated dressing components. This means the product can be safely used on all patient groups including children, the elderly and pregnant or breast-feeding mothers who may be sensitive to other wound dressings [31]
- The passive trapping mechanism avoids the risk of bacterial resistance seen with antibiotics and some antiseptics meaning that the dressing can safely be used for microbial prophylaxis [31]
- This innovative approach to reducing the microbial load means that the dressing is effective against microorganisms that are resistant to antibiotics. *In vitro* testing and clinical reports have shown many of the organisms featured on the WHO priority list of resistant organisms to be bound by DACC technology [32][33][34][35][36].

In summary, Leukomed Sorbact provides a novel intervention for the prevention of surgical site infection that will not further exacerbate the resistance problems seen with the overuse of antibiotics. This is a particularly attractive approach to infection prevention at a time when antibiotic resistance is a pressing public health problem, the prevention of infection is high on the clinical and political agenda and there is a drive to optimise use of all antimicrobials to minimise the possibility of selecting resistance to all these therapies.

Briefly describe the environmental impact of the technology and any sustainability considerations (no more than 1,000 words).

SSI is associated with a significant economic and human cost. Studies report that hospital patients who develop SSI's constitute a financial burden approximately double that of uninfected patients. Increased morbidity and prolonged hospitalisation associated with SSI negatively impact on patient physical and mental health and percentage mortality among SSI patients post-surgery is reported to be about 2.4 times higher than amongst uninfected patients. It is recognised that the wider impact to society, for example in terms of patient absence from work, distress to families and community healthcare costs, is not fully understood and that the true cost of SSI if often under-estimated (Badia 2017 [21]). Effective prevention of SSI with Leukomed Sorbact will reduce this economic burden, make a positive contribution to patient and community well-being and support the government's five year national AMS strategy to reduce antibiotic prescribing and the risk of antibiotic resistance.

Essity is committed to supporting NHS services to deliver improved health outcomes via sustainable models of care. In the UK we have a dedicated team of Strategic Healthcare Partners who work with service providers to support service redesign, value-based procurement, practice development and clinical pathway implementation - aiding the delivery of high-quality care with a focus on prevention and health improvement.

DoH and NHS Sustainability
At a UK level, Essity UK takes all matters concerning Corporate Social Responsibility seriously, which includes embedding the local Sustainable Sourcing and Labour Standards into our Global policies and procedures.

In order to demonstrate our commitment to ensuring a clean, legitimate and ethically sound supply chain, Essity UK fully complies with the Dept. of Health & Social Care / NHS compliance requirement set in the Labour Standards Assurance System [LSAS] framework. This wholly auditable system looks deep into the Essity supply chain to test the organisation's control and measuring of all suppliers in respect of Labour Standards. LSAS is a continuous improvement matrix where several criteria are assessed on a scoring of 1-4 (4 being the highest). In the last audit [Dec 2019], Essity UK scored level 4 across all criteria.

Responsible product and packaging sourcing
Customers who use our products should feel secure that these are sourced, manufactured and distributed in a sustainable and responsible way. That is why we are committed to responsible business practices – both within Essity and throughout our supply chain. This includes choosing reliable business partners who share our values.

Our production partner for Leukomed Sorbact, ABIGO Medical AB, continuously strives to reduce the environmental impact and improve sustainability by consciously selecting environmentally favourable materials, components and production procedures as well as creating a work environment ensuring safety and health for personnel.

Based on information given by suppliers and to the best of their knowledge, ABIGO Medical AB

can state that none of the substances (chemicals or materials) included in the REACH ((EC) NO 1907/2006) and/or SVHC candidate list are deliberately added to the Sorbact® product range during the production process neither within ABIGO Medical AB nor in the materials used from suppliers. Packaging materials have been selected with emphasis on recyclability (both in terms of using recycled materials as well as using materials which can be recycled), Elemental Chlorine Free (ECF) or Total Chlorine Free (TCF) bleaching procedures as well as being in compliance with the Food Contact Materials Regulation (EC/1935/2004) and Packaging and Packaging Waste Directive (94/62/EC), in addition to compliance with REACH ((EC) NO 1907/2006) and/or SVHC candidate list. Furthermore, the ABIGO Medical AB manufacturing facility is certified according to ISO 14001:2015 (Manufacturing of Medical Device) assuring that any sustainability issues related to production, packaging and transportation which may have an impact on the environment, such as carbon emission, water and energy use, waste and supply chain are assessed, considered and resolved.

Sustainability ambitions

Sustainability is an integral part of Essity's wider business model, and our strategy for growth and value creation. We are dedicated to improving well-being through leading hygiene and health solutions. Our ambition is to improve the well-being of people every day.

Essity strives to offer socially and environmentally sound products and services, capable of continuously meeting customers' and consumers' needs and expectations with respect to functionality, value for money, quality, safety, and environmental impact – today and for future generations.

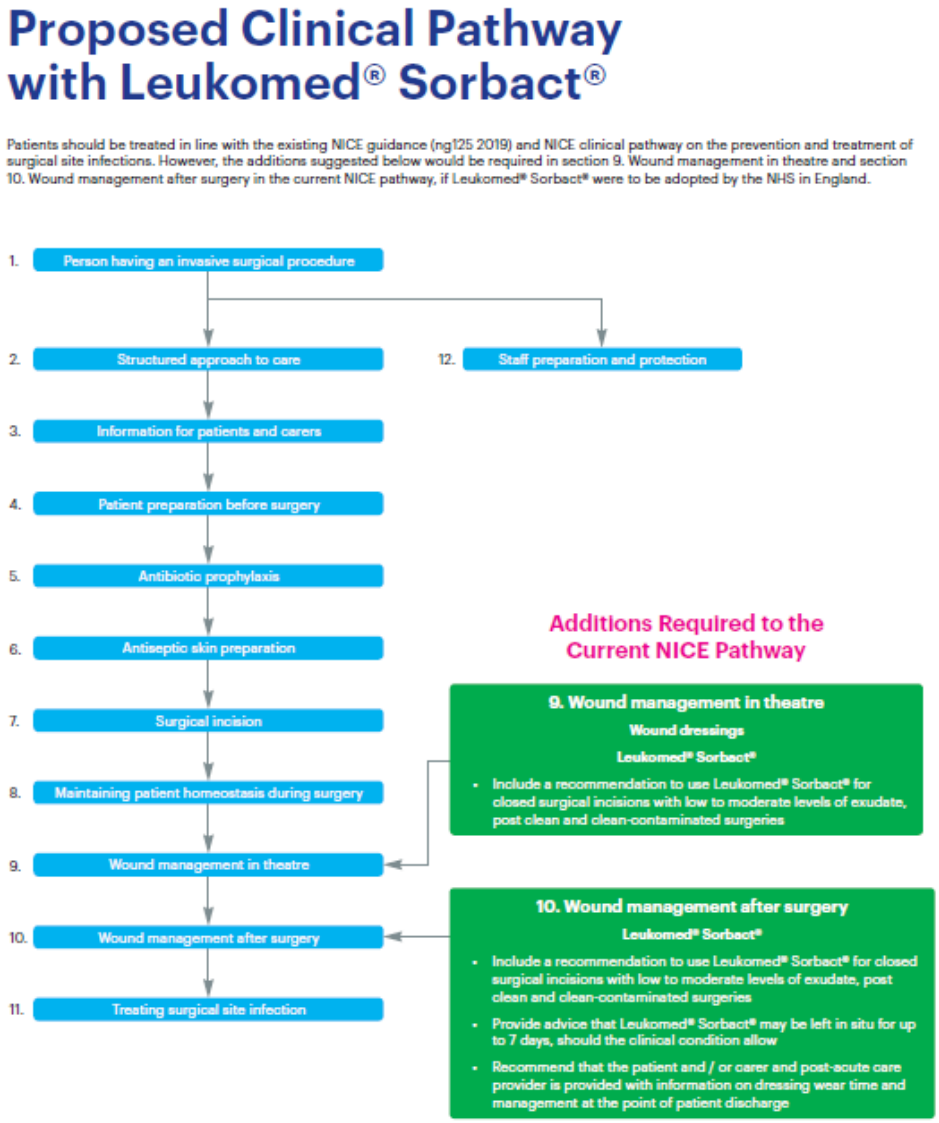
By integrating lifecycle assessments into our innovation work, we monitor how we improve the environmental profile of our innovations. This includes resource efficiency among suppliers and in our own production, superior materials and smarter product design. We strive to use less resources to achieve efficiencies while ensuring greater performance and maximising customer value.

UN Sustainable Development Goals

Akin to NHS England, Essity is committed to support the delivery of the United Nations´ Sustainable Development Goals, SDGs throughout our business operations. This creates business opportunities for Essity, while contributing to a better world. Innovations, partnerships and new ways of thinking are essential. By partnering with others who share the same challenges and opportunities, we will create synergies that contribute to the achievement of the SDGs.

3 Clinical context

Describe the clinical care pathway(s) that includes the proposed use of the technology, ideally using a diagram or flowchart. Provide source(s) for any relevant pathways.



Describe any training (for healthcare professionals and patients) and system changes that would be needed if the NHS were to adopt the technology.

Training Input

As part of Essity's service provision, the training we offer when a new product is adopted is to highlight the change in product/brand in the department/ward/service. This serves to highlight the advantages of the technology and inform healthcare professionals that they can expect to see a new product with differently branded boxes on the shelves, or being used on patients

Our initial training aims to familiarise healthcare professionals with the product and cover aspects such as when to use the dressing, how to apply and remove it, dressing wear time and the basic concept of how Sorbact technology works and the benefits it brings. Dressing application with Leukomed Sorbact is very similar to other post-operative dressings on the market and minimal training is required in relation to this.

Our Account team will work with clinical leads to ensure that all shifts and team members receive appropriate training and will arrange convenient times and locations for this training to take place. They will make themselves available to deliver training before and/or after shift changes where required. In addition, they will also work with clinical leads to assist in the implementation of any protocol changes, where required.

As additional support, staff room posters and flyers highlighting re-order codes for example can also be delivered, along with further supporting literature – plus whatever is needed to support a seamless switch from an administrative perspective.

At the point of patient discharge into the community, the Account team will liaise with the community HCP's to ensure that they receive appropriate training on the product and that consistent use of the product is embedded from the start. This also ensures that all community team members expect to see and use a different dressing in clinics/home visits going forward.

The Account team are available to support ongoing use of the product and will be on hand if any further support is required. In addition, Essity training academies can be delivered by our qualified Clinical Nurse Practitioners should further wound care training be needed by HCP's/other staff, all of which are CPD accredited.

System changes

- As part of pre-surgery protocols, instruct theatre staff/surgical personnel to have Leukomed Sorbact available in theatre for patients undergoing clean and clean-contaminated procedures
- Replace use of existing interactive post-operative dressings with Leukomed Sorbact at the end of clean and clean contaminated surgeries
- Provide advice that Leukomed Sorbact may be left in situ for up to 7 days, should the clinical condition allow
- Advice to be given to the patient, and/or carer and post-acute care provider at the time of discharge on dressing wear time and management

4 Published and unpublished clinical evidence

Identification and selection of studies

Complete the following information about the number of studies identified.

Please provide a detailed description of the search strategy used, and a detailed list of any excluded studies, in appendix A.

Number of studies identified in a systematic search.		1,394 after duplicates removed
Number of studies identified as being relevant to the decision problem.		8 in 12 documents in the original search (June 2019) Plus 1 published and 1 unpublished study identified in the supplementary search (March 2020)
Of the relevant studies identified:	Number of published studies (included in table 1).	9
	Number of abstracts (included in table 2).	0
	Number of ongoing studies (included in table 3).	4 Ongoing studies plus 1 unpublished study

The full database search was carried out between 03/06/19 and 05/06/19, with a supplementary PubMed search on 1/03/20. Details of the search strategy and results of the search are in Appendix A.

The scope for this appraisal includes negative pressure wound therapy (NPWT). The closest negative pressure comparator to Sorbact dressings would be PICO, indicated for closed surgical incisions. The NICE appraisal of PICO (MT390, May 2019) provides a comprehensive summary of the clinical evidence. However, there are no studies, published or unpublished, which compare Sorbact dressings with PICO or with NPWT in general.

List of relevant studies

In the following tables, give brief details of all studies identified as being relevant to the decision problem.

- *Summarise details of published studies in table 1.*
- *Summarise details of abstracts in table 2.*
- *Summarise details of ongoing and unpublished studies in table 3.*
- *List the results of all studies (from tables 1, 2 and 3) in table 4.*

For any unpublished studies, please provide a structured abstract in appendix A. If a structured abstract is not available, you must provide a statement from the authors to verify the data.

Any data that is submitted in confidence must be correctly highlighted. Please see section 1 of the user guide for how to highlight confidential information. Include any confidential information in appendix C.

Table 1 Summary of all relevant published studies

Study name	Primary study reference	Associated records	Population	Intervention	Comparator
Abigo Medical 2017 [14] [15]	Ab AM. BSN Medical Inc. leukomed sorbact dressing, wound, drug. 2017. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/detail.cfm?mdrfoi__id=6449224&pc=FRO.{#1850}	Ab AM. Abigo medical AB leukomed sorbact. 2017. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/detail.cfm?mdrfoi__id=7351851&pc=FRO {#1849}	1 adult female	Leukomed sorbact dressing for knee surgery	None
Bua 2017 [13]	Bua N, Smith GE, Totty JP, Pan D, Wallace T, Carradice D, et al. Dialkylcarbamoyl chloride dressings in the prevention of surgical site infections after nonimplant vascular surgery. Ann Vasc Surg. 2017;44:387-92. {#76}	No additional publications identified	Adult patients undergoing clean or clean contaminated non-implant vascular surgical procedures	Leukomed Sorbact	Standard surgical dressings
Lee 2018 [12]	Lee JW, Park SH, Suh IS, Jeong HS. A comparison between DACC with chlorhexidine acetate-soaked paraffin gauze and foam dressing for skin graft donor sites. J Wound Care. 2018;27(1):28-35. {#1108}	No additional publications identified	Patients who underwent split-thickness skin graft procedures	Sorbact Compress + chlorhexidine acetate-soaked paraffin gauze	Conventional foam dressings
Meberg 1990 [11]	Meberg A, Schoyen R. Hydrophobic material in routine umibilical cord care and prevention of infections in newborn infants. Scand J Infect Dis. 1990;22(6):729-33. {#1051}	No additional publications identified	Newborn infants nursed in a maternity ward with modern sanitary facilities requiring umbilical care	Sorbact	Routine disinfection cleaning regimen
Nielsen 2012 [10]	Nielsen AM, Andriessen A. Prospective cohort study on surgical wounds comparing a polyhexanide-containing biocellulose dressing with a dialkyl-carbamoyl-chloride-containing hydrophobic dressing. Adv Skin Wound Care. 2012;25(9):409-13. {#785}	No additional publications identified	Patients aged over 18 years with surgical wounds	Cutisorb Sorbact	Polyhexanide-containing biocellulose dressing
Stanirowski 2016a [8]	Stanirowski PJ, Kociszewska A, Cendrowski K, Sawicki W. Dialkylcarbamoyl chloride-impregnated dressing for the prevention of surgical site infection in women undergoing cesarean section: a pilot study.	No additional publications were identified One related RCT was identified and is reported below: Stanirowski PJ, Bizoń M, Cendrowski K and Sawicki W. Randomised controlled trial evaluating	Patients aged over 18 years after planned or emergency caesarean section	Sorbact Surgical	Standard surgical dressing

Study name	Primary study reference	Associated records	Population	Intervention	Comparator
	Arch Med Sci. 2016;12(2):1-7. {#352}	dialkylcarbamoyl chloride impregnated dressings for the prevention of surgical site infections in adult women undergoing cesarean section. Surgical Infections 2016;17(4):427-435. {#346}			
Staniro wski 2016b [9]	Stanirowski PJ, Bizoń M, Cendrowski K and Sawicki W. Randomised controlled trial evaluating dialkylcarbamoyl chloride impregnated dressings for the prevention of surgical site infections in adult women undergoing cesarean section. Surgical Infections 2016;17(4):427-435. {#346}	Related pilot study identified and reported above. Stanirowski PJ, Kociszewska A, Cendrowski K, Sawicki W. Dialkylcarbamoyl chloride-impregnated dressing for the prevention of surgical site infection in women undergoing cesarean section: a pilot study. Arch Med Sci. 2016;12(2):1-7. {#352} Medical University of Warsaw. Study to evaluate DACC dressings for the prevention of surgical site infections in women undergoing caesarean section. Identifier: NCT02168023. In: ClinicalTrials.gov [internet]. Bethesda: 2014. Available from https://ClinicalTrials.gov/show/NCT02168023. {#1477}	Patients aged over 18 years after planned or emergency caesarean section	Sorbact Surgical	Standard surgical dressing (Tegaderm + Pad)
Totty 2019 [16]	Totty JP, Hitchman LH, Cai PL, Harwood AE, Wallace T, Carradice D, *et al.* A pilot feasibility randomised clinical trial comparing dialkylcarbamoylchloride-coated dressings versus standard care for the primary prevention of surgical site infection. Int Wound J. 2019:1-8. {#1538}	Trial protocol: Totty JP, Harwood AE, Cai PL, Hitchman LH, *et al.* 2019 [2]. https://doi.org/10.1186/s40814-019-0400-2 {#1593} University of Hull. DACC in the reduction of surgical site infection. Identifier: NCT02992951. In: ClinicalTrials.gov [internet]. Bethesda: US National Library of Medicine: 2017. Available from https://ClinicalTrials.gov/show/NCT02992951. {#1476}	Patients aged over 18 years undergoing clean or contaminated vascular surgery and capable/willing to give informed consent.	Leukomed Sorbact	OPSITE Post-op (non-DACC-coated occlusive absorbent dressing)
Romain 2020 [18]	Romain B, Mielcarek M, Delhorme JB, et al. Dialkylcarbamol chloride-coated versus alginate dressings after pilonidal sinus excision: a rendomized	Sorbact TM: Effect of a microbial binding dressing on wound healing after pilonidal sinus excision (SORKYSA). Clinicaltrials.gov	Patients with a pilonidal sinus undergoing sinus excision	Sorbact dressings	Alginate dressings

Study name	Primary study reference	Associated records	Population	Intervention	Comparator
	clinical trial (SORKYSA study). British Medical Journal Open, 2020 Feb 4.	NCT02011802. Available from https://clinicaltrials.gov/ct2/show/NCT02011802			

Table 2 Summary of all relevant abstracts

Data source	Author, year and location	Study design	Patient population, setting, and withdrawals/lost to follow up	Intervention	Comparator(s)	Main outcomes
	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text
Text	Text	Text	Text	Text	Text	Text

Table 3 Summary of all relevant ongoing or unpublished studies

Data source	Author, year (expected completion) and location	Study design	Patient population, setting, and withdrawals/lost to follow up	Intervention	Comparator(s)	Outcomes
Project sponsored by Essity –	Ongoing. Results expected to be available early April 2020	Data analysis	Patients undergoing non-implant and implant vascular surgery	Leukomed Sorbact	Standard post-surgical dressings	The analysis is designed to estimate the attributable resource use and costs associated with SSI in these patients
ClinicalTrials.gov NCT02334241	Lead investigator: Jan Apelqvist. University hospital of Malmo, Sweden. Complete 2017	Randomised controlled trial with 12-week follow-up. N=200	Diabetic patients with foot ulcers, and no wound infection present at inclusion	Standard care plus Cutimed Sorbact Hydroactive antimicrobial dressing	Standard care	Primary outcomes are wound closure, no infection and no amputation. No results posted. Last update August 2017
Clinicaltrials.gov NCT02662218	Lead investigator: Nicky Ivins. Welsh Wound Innovation Centre. Complete 2017	Observational study, 30 patients will be observed over 14 days	Superficial wounds of any aetiology, including with signs of infection	Evaluation of Cutimed Sorbion Sorbact	No comparator	Clinical performance and safety of the dressing. Outcomes include incidence of new infections. Study complete 2017. No results reported on Clinicaltrials.gov
ISRCTN14126613 Dressings of diabetic foot ulcers; infection deterrent (DRUID)	Lead investigator: Shona Johnston. Cumbria Partnership NHS Foundation Trust. Completed 2019	RCT feasibility study. N=45 with three treatment arms	Diabetic foot ulcer	Arm C: Antimicrobial Cutimed Sorbact	Arm A: Non-antimicrobial Urgotul dressing Arm B: Antimicrobial dressings (Actilite, Urgotul SSD, Inadine)	Outcomes at week 26 including infection and healing. No results reported
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]Table 4 includes all the published studies with the exception of Abigo Medical [14], which is a report of one patient that provides no information relevant to the decision problem. A structured abstract is provided for the one unpublished study [redacted]. No results are available for the ongoing studies.

Table 4 Results of all relevant studies (from tables 1, 2 and 3)

Study name		**Meberg 1990 [11]**
Size of study groups	**Treatment**	Daily Sorbact dressing
	Control	Daily umbilical disinfection with 0.5% chlorhexidine in 70% ethanol
Study duration	**Time unit**	Up to 6 weeks
Type of analysis	**Intention-to - treat/per protocol**	Not reported
Outcome	**Name**	Omphalitis in hospital
	Unit	N (%)
Effect size	**Value**	Sorbact dressing: 1 (0.1) Umbilical disinfection: 3 (0.2)
	95% CI	Not reported
Statistical test	**Type**	Wilcoxon signed-rank test or 2-tailed t-tests.
	p value	p>0.05
Other outcome	**Name**	Omphalitis outside of hospital
	Unit	N (%)
Effect size	**Value**	Sorbact dressing: 7 (0.6) Umbilical disinfection: 8 (0.7)
	95% CI	Not reported
Statistical test	**Type**	Wilcoxon signed-rank test or 2-tailed t-tests.
	p value	p>0.05
Other outcome	**Name**	Overall incidence of infection in hospital or after discharge (includes non-SSI infections)
	Unit	N (%)
Effect size	**Value**	Sorbact dressing: 198 (16.3) Umbilical disinfection: 179 (14.6)
	95% CI	Not reported
Statistical test	**Type**	Wilcoxon signed-rank test or 2-tailed t-tests.
	p value	p>0.05
Other outcome	**Name**	Overall incidence of infection in hospital (includes non-SSI infections)
	Unit	N (%)
Effect size	**Value**	Sorbact dressing: 108 (8.9) Umbilical disinfection: 107 (8.7)
	95% CI	Not reported
Statistical test	**Type**	Wilcoxon signed-rank test or 2-tailed t-tests.
	p value	p>0.05
Other outcome	**Name**	Overall incidence of infection outside of hospital (includes non-SSI infections)
	Unit	N (%)
Effect size	**Value**	Sorbact dressing: 90 (7.4) Umbilical disinfection: 72 (5.9)
	95% CI	Not reported
Statistical test	**Type**	Wilcoxon signed-rank test or 2-tailed t-tests.

	p value	p>0.05
Comments		The umbilical cord separated significantly later in the Sorbact group than in the disinfection group (6.2 (SD 2.2) days versus 5.8 (SD 2.1) days; p<0.05.

Study name		**Stanirowski 2016a [8]**
Size of study groups	**Treatment**	Sorbact Surgical (n=71)
	Control	Standard surgical dressing (n=71)
Study duration	**Time unit**	14 days
Type of analysis	**Intention-to - treat/per protocol**	Per protocol
Outcome	**Name**	Number of patients with surgical site infection
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 2 (2.8) Standard surgical dressing: 7 (9.8)
	95% CI	Not reported
Statistical test	**Type**	T test or Mann-Whitney U test (no further details).
	p value	p=0.08
Other outcome	**Name**	Number of patients with surgical site infection and wound dehiscence
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 0 (0) Standard surgical dressing: 1 (1.4)
	95% CI	Not reported
Statistical test	**Type**	T test or Mann-Whitney U test (no further details).
	p value	p=0.50
Other outcome	**Name**	Number of patients with surgical site infection who required systemic antibiotic treatment
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 0 (0) Standard surgical dressing: 5 (7.0)
	95% CI	Not reported
Statistical test	**Type**	T test or Mann-Whitney U test (no further details).
	p value	p=0.03
Other outcome	**Name**	Number of patients with surgical site infection who required hospital readmission
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 0 (0) Standard surgical dressing: 1 (1.4)
	95% CI	Not reported
Statistical test	**Type**	T test or Mann-Whitney U test (no further details).
	p value	p=0.50
Comments		Of the cases with surgical site infection: Sorbact Surgical: deep infection 0/2, superficial infection 2/2. Standard surgical dressing: deep infection 1/7, superficial infection 6/7.

Study name		**Stanirowski 2016b [9]**
Size of study groups	**Treatment**	Sorbact Surgical (n=272)
	Control	Standard surgical dressing (n=271)
Study duration	**Time unit**	14 days
Type of analysis	**Intention-to - treat/per protocol**	Per protocol

Outcome	**Name**	Proportion of patients with surgical site infection
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 5 (1.8) Standard surgical dressing: 14 (5.2)
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test or Fisher exact test (no further details). Power calculation based on a pilot study indicated a sample size of 248 in each group was required to detect a difference in proportion with surgical site infection, with a power of 90% and alpha = 0.05.
	p value	p=0.04
Other outcome	**Name**	Proportion of patients with surgical site infection and wound dehiscence
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 1 (0.4) Standard surgical dressing: 2 (0.7)
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test or Fisher exact test (no further details).
	p value	p>0.99
Other outcome	**Name**	Proportion of patients with surgical site infection who required systemic antibiotics
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 0 Standard surgical dressing: 4 (1.5)
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test or Fisher exact test (no further details).
	p value	p=0.13
Other outcome	**Name**	Proportion of patients with surgical site infection who required hospital readmission
	Unit	n (%)
Effect size	**Value**	Sorbact Surgical: 0 Standard surgical dressing: 3 (1.1)
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test or Fisher exact test
	p value	p=0.24
Other outcome	**Name**	Length of additional hospitalisation
	Unit	Days
Effect size	**Value**	Sorbact Surgical: 0 Standard surgical dressing: 8.2 (SD 3.2, range (5 to 11)
	95% CI	Not reported
Statistical test	**Type**	Mann-Whitney U test.
	p value	p=0.22
Comments		

Study name		**Bua 2017 [13]**
Size of study groups	**Treatment**	Dialkylcarbamoyl chloride-coated dressings (Leukomed Sorbact) (n=100)
	Control	Standard surgical dressings (n=100)
Study duration	**Time unit**	30 days
Type of analysis	**Intention-to - treat/per protocol**	Not reported
Outcome	**Name**	Surgical site infection, day 5-7

	Unit	n/n at risk
Effect size	**Value**	Leukomed Sorbact: 1/100 Standard surgical dressing: 10/100 OR 0.09
	95% CI	0.01 to 0.072, p=0.005
Statistical test	**Type**	Chi-squared test with Yates correction
	p value	p=0.01
Other outcome	**Name**	Surgical site infection, day 30
	Unit	n/n at risk
Effect size	**Value**	Leukomed Sorbact: 9/99 Standard surgical dressing: 9/90
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test with Yates correction
	p value	p=0.83
Other outcome	**Name**	Incident surgical site infection
	Unit	%
Effect size	**Value**	Leukomed Sorbact: 10% Standard surgical dressing: 19%
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test with Yates correction
	p value	p=0.11
Other outcome	**Name**	Readmission rates at day 30 due to surgical site infection
	Unit	n/n at risk
Effect size	**Value**	Leukomed Sorbact: 7/99 Standard surgical dressing: 9/90
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test or Fisher's exact test (no further details)
	p value	0.470
Comments		Number requiring oral antibiotics at day 5-7 Sorbact Surgical: 0 Standard surgical dressing: 8 Number requiring intravenous antibiotics at day 5-7 Sorbact Surgical: 1 Standard surgical dressing: 2

Study name		**Lee 2018 [12]**
Size of study groups	**Treatment**	Thick skin group: 10 Thin skin group: 10
	Control	Thick skin group: 31 Thin skin group: 9
Study duration	**Time unit**	Not reported
Type of analysis	**Intention-to - treat/per protocol**	All participants (retrospective)
Outcome	**Name**	Wound healing time
	Unit	Days
Effect size	**Value**	Thick skin group Sorbact compress and chlorhexidine acetate soaked paraffin gauze: 9.5 (range 6-18) Standard foam dressing: 12 (range 7-40) Thin skin group Sorbact compress and chlorhexidine acetate soaked paraffin gauze: 10 (range 7-32) Standard foam dressing: 18 (range 10-56)
	95% CI	Not reported

Statistical test	**Type**	Mann-Whitney U-test
	p value	Thick skin group: 0.049 Thin skin group: 0.013
Other outcome	**Name**	Infection rate
	Unit	N
Effect size	**Value**	Thick skin group Sorbact compress and chlorhexidine acetate soaked paraffin gauze: 1 Standard foam dressing: 10 Thin skin group Sorbact compress and chlorhexidine acetate soaked paraffin gauze: 1 Standard foam dressing: 5
	95% CI	Not reported
Statistical test	**Type**	Chi-square
	p value	Thick skin group: 0.167 Thin skin group: 0.033
Comments		No patients required additional intravenous antibiotics or surgical intervention.

Study name		**Totty 2019 [16]**
Size of study groups	**Treatment**	Dialkylcarbamoyl chloride (DACC)-coated occlusive absorbent dressings (Leukomed Sorbact) (n=74)
	Control	Non-DACC-coated occlusive absorbent dressing (OPSITE Post-op) (n=70)
Study duration	**Time unit**	12 months
Type of analysis	**Intention-to - treat/per protocol**	Intention-to-treat
Outcome	**Name**	Surgical site infection within 30 days of surgery
	Unit	n (%)
Effect size	**Value**	Leukomed Sorbact: 12 (16) Non-DACC-coated dressing: 18 (26) ORR = 10% RRR = 37% NNT = 10.5 patients OR = 0.559
	95% CI	For OR [0.247, 1.267]
Statistical test	**Type**	Pearson's Chi-squared test
	p value	p=0.161
Other outcome	**Name**	Satisfactory healing within 30 days of surgery
	Unit	%
Effect size	**Value**	Leukomed Sorbact: 62.3 Non-DACC-coated dressing: 50
	95% CI	Not reported
Statistical test	**Type**	Pearson's Chi-squared test
	p value	0.236
Other outcome	**Name**	Surgical site infection within 30 days for implant subgroup Leukomed Sorbact n=26 Non-DACC coated dressing n=25
	Unit	%
Effect size	**Value**	Leukomed Sorbact: 7.7% Non-DACC-coated dressing: 24%
	95% CI	Not reported
Statistical test	**Type**	Pearson's Chi-squared test
	p value	p=0.109
Comments		Number requiring oral antibiotics within 30 days of surgery Leukomed Sorbact: 7

	Non-DACC-coated dressing: 10 Number requiring intravenous antibiotics within 30 days of surgery Leukomed Sorbact: 5 Non-DACC-coated dressing: 7 No new infections occurred for the implant subgroup between 30 and 90 postoperative days.

Study name		**Nielsen 2012 [10]**
Size of study groups	**Treatment**	Suprasorb X (n=30)
	Control	Cutisorb Sorbact (n=30)
Study duration	**Time unit**	1 day
Type of analysis	**Intention-to - treat/per protocol**	ITT
Outcome	**Name**	Increase in patient-reported pain during dressing removal
	Unit	Mean (SD)
Effect size	**Value**	Suprasorb X: 1.4 (0.67) Cutisorb Sorbact: 2.37 (1.13)
	95% CI	Not reported
Statistical test	**Type**	Independent samples test
	p value	p<0.00.
Other outcome	**Name**	Dressing adherence to wound bed
	Unit	n (%)
Effect size	**Value**	Suprasorb X: 7 (23) Cutisorb Sorbact: 27 (90)
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test
	p value	p=0.000
Other outcome	**Name**	Use of saline for dressing removal
	Unit	n (%)
Effect size	**Value**	Suprasorb X: 5 (17) Cutisorb Sorbact: 16 (53)
	95% CI	Not reported
Statistical test	**Type**	Chi-squared test
	p value	p=0.003
Comments		Patient-reported pain during dressing removal according to category, n (%) Suprasorb X No pain (1): 21 (70) Mild pain (2): 6 (20) Moderate pain (3): 3 (10) Severe pain (4): 0 (0) Unbearable pain (5): 0 (0) Cutisorb Sorbact No pain (1): 8 (27) Mild pain (2): 9 (30) Moderate pain (3): 8 (27) Severe pain (4): 4 (13) Unbearable pain (5): 1 (3)

Study name	**Romain 2020 [18]**

Size of study groups	**Treatment**	DACC dressing (Sorbact) (n=120)
	Control	Alginate (n=30)
Study duration	**Time unit**	Mean of 120 days after surgery
Type of analysis	**Intention-to - treat/per protocol**	Per protocol
Outcome	**Name**	Number of wounds healed after 75 days
	Unit	Mean (%)
Effect size	**Value**	Sorbact: 78/103 (75.7) Alginate: 58/97 (60.0)
	Odds ratio	2.55
	95% CI	1.12 to 5.92
Statistical test	**Type**	Log rank test
	p value	p<0.023
Other outcome	**Name**	Median time to complete wound healing
	Unit	Days (95% CI)
Effect size	**Value**	Sorbact: 69 (62 to 72) Alginate 71 (69 to 85)
	95% CI	-
Other outcome	**Name**	Patient assessment of the dressing
	Unit	Patient assessment VAS for pain
Effect size	**Value**	No difference between dressings in terms of leakage, comfort or mobility
		No difference between dressings in pain score (VAS0 at 10 and 15 days
Other outcome	**Name**	Return to usual activities
	Unit	Days
Effect size		Return to usual activities did not depend on dressing type. At 100 days 83% and 88% had returned to usual activities in the Sorbact and alginate groups respectively

[redacted]

[redacted]

5 Details of relevant studies

Please give details of all relevant studies (all studies in table 4). Copy and paste a new table into the document for each study. Please use 1 table per study.

Table 5: Details of relevant studies (from Table 4)

Meberg 1990 [11]	
Aims of the study	Randomised trial to assess a hydrophobic dressing (Sorbact) compared to routine disinfection with chlorhexidine in ethanol for routine umbilical care of newborn infants in the nursery and outside hospital until 6 weeks of age.
Location	Norway
Sample size	Daily Sorbact dressing (n=1213) Daily umbilical disinfection with 0.5% chlorhexidine in 70% ethanol (n=1228)
Outcomes	Incidence of infection Infection in hospital or after discharge Umbilical cord separation
How are the findings relevant to the decision problem?	The study assesses aspects of safety and efficacy of the DACC technology in newborns, The study population is not directly comparable with the indication of post-surgical wounds. There was no difference in infection of the umbilical stump (omphalitis) between the dressings and rates were very low in both groups (<1%). There was no difference in all infections (including non-SSIs infection) between the dressings.
Does this evidence support any of the claimed benefits for the technology? If so, which?	Only indirectly
Will any information from this study be used in the economic model?	No
What are the limitations of this evidence?	The indication is different from the one which is the main subject of the scope. Umbilical cord infection is not directly comparable to surgical site infection.
How was the study funded?	None stated

Stanirowski 2016a [8]	
Aims of the study	Randomised trial to assess the efficacy of dressings impregnated with dialkylcarbamoyl chloride (Sorbact) in the prevention of incisional surgical site infections in patients undergoing caesarean section.
Location	Poland
Sample size	Sorbact Surgical =81 Standard surgical dressing = 81
Outcomes	• Development of superficial or deep surgical site infection within 14 days after caesarean section • Number with surgical site infection and wound dehiscence • Number with surgical site infection who required systemic antibiotic treatment. • Number with surgical site infection who required hospital admission. • Number with surgical site infection who required surgical intervention.

Stanirowski 2016a [8]	
	• Time of wound infection occurrence
How are the findings relevant to the decision problem?	The study is directly relevant to the scope. The study assesses Sorbact Surgical (non- UK equivalent to Leukomed Sorbact) compared with standard post-surgical dressings as a means of reducing the incidence of surgical site infection. The study shows a lower incidence of SSI in the Sorbact Surgical group (2.8% vs. 9.8%), and a smaller number of women requiring systemic antibiotics. There was no difference in dehiscence or in the number of women requiring hospital readmission
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence directly supports the claimed benefits of Sorbact Surgical: the study supports the hypothesis that using Sorbact Surgical reduces the incidence of SSI. By inference, a lower incidence of SSI should lead to lower costs and an improvement in the quality of life of patients
Will any information from this study be used in the economic model?	Yes. The evidence on SSI incidence is used, with other evidence, to develop a cost-effectiveness model
What are the limitations of this evidence?	The evidence is from a well-designed RCT with large sample size. The fact that it was not carried out in the UK may be a limitation, although the results are expected to be generalisable
How was the study funded?	No funding stated. The authors declare no conflict of interest

Stanirowski 2016b [9]	
Aims of the study	Randomised trial to evaluate the efficacy and cost-effectiveness of dialkylcarbamoyl chloride impregnated dressings (Sorbact) to prevent surgical site infection in women undergoing caesarean section.
Location	Poland
Sample size	Sorbact Surgical = 296 Standard surgical dressing = 290
Outcomes	• Proportion with surgical site infection within 14 days post-surgery • Proportion with surgical site infection and wound dehiscence • Time of primary hospitalisation defined as period from the day of surgery to discharge. • Time of additional hospitalisation defined as period from the first surgical site infection symptoms to treatment completion and discharge from the hospital (when surgical site infection developed during primary hospitalisation and was the main reason for prolonged stay in the hospital), or from day one of re-admission because of surgical site infection until treatment completion and discharge from the hospital (when primary hospitalisation was finished). • Readmissions to hospital due to surgical site infection following caesarean section. • Proportion with antibiotic treatment due to surgical site infection following caesarean section. • Costs
How are the findings relevant to the decision problem?	The study is directly relevant to the scope. The study assesses Sorbact Surgical (non-UK equivalent to Leukomed Sorbact) compared with standard post-surgical dressings as a means of reducing the incidence of surgical site infection. The study shows a lower incidence of SSI with Sorbact Surgical (1.8% vs. 5.2%), a smaller proportion of patients requiring systemic antibiotics, and a smaller proportion of patients requiring hospital readmission. Total costs to the hospital were lower in the Sorbact group (€1,065 vs. €5,775)

Stanirowski 2016b [9]	
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence directly supports the claimed benefits of Sorbact Surgical: The study supports the hypothesis that using Sorbact Surgical reduces the risk of SSI. The study also demonstrates lower costs to the hospital as a result of fewer cases of infection. By inference a lower incidence of SSI would be expected to lead an improvement in the quality of life of patients
Will any information from this study be used in the economic model?	Yes. The evidence from this study and other sources is used to develop a cost-effectiveness model
What are the limitations of this evidence?	The study is a well-designed RCT with large sample size. The fact it was not carried out in the UK may be a limitation, although the results are expected to be generalisable.
How was the study funded?	No funding stated. The authors declare no conflicts of interest

Totty 2019 [16]	
Aims of the study	A pilot study to assess the methods and feasibility of conducting a definitive randomised clinical study of DACC-coated dressings for the primary prevention of surgical site infection.
Location	UK
Sample size	Leukomed Sorbact = 74 Standard surgical dressing = 70
Outcomes	Incidence of surgical site infection (SSI) within 30 days of surgery. Measured by total ASEPSIS score ≥ 21 or as defined by the CDC definition of SSI. • Satisfactory healing within 30 days of surgery. Measured by total ASEPSIS score ≤ 10. • The incidence of SSI at 30 and 90 days for implant patients only. Measured by total ASEPSIS score ≥ 21 or SSI as defined by CDC definitions. Secondary outcomes reported in the 'Methods' section of the paper were: 1. The incidence of SSI at 90 days for implant patients only 2. Satisfactory healing at 30 days post-surgery for implant and non-implant patients. 3. Satisfactory healing at 90 days post-surgery for implant patients only.
How are the findings relevant to the decision problem?	The evidence from this study is directly relevant to the scope. The study assesses the effectiveness of Leukomed Sorbact compared with standard surgical dressings as a means to prevent infection following clean or clean-contaminated vascular surgery. Infection rates were lower in the Leukomed Sorbact group (16% vs. 26%). The rate of SSI in the sub-group of patients having implant surgery was also lower in the Leukomed Sorbact group (7.7% vs. 24%). Fewer patients in the Sorbact group required antibiotics. There was no difference in healing between the intervention and control.
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence directly supports the claimed benefits of Leukomed Sorbact: the study supports the hypothesis that using Sorbact reduces the incidence of SSI. By inference, a lower incidence of SSI should lead to lower costs and an improvement in the quality of life of patients
Will any information from this study be used in the economic model?	No
What are the limitations of this evidence?	This is a well-designed RCT carried out in the UK. The fact that it was carried out in a single centre may be a limitation.
How was the study funded?	The authors declare that BSN Medical (Hull) provided the intervention dressing for this study. The company had no input into trial design, conduct, analysis, or dissemination.

Lee 2018 [12]	
Aims of the study	Retrospective cohort study to assess whether dialkylcarbamoyl chloride (Sorbact) combined with chlorhexidine acetate-soaked paraffin gauze at skin graft donor sites would lead to shorter wound healing times, and lower infection rates when compared with foam dressings.
Location	Korea
Sample size	Sorbact Compress = 20 Standard surgical dressing = 40
Outcomes	• Wound healing time (postoperative days from donor harvesting to complete healing) • Infection rates (wound demonstrating at least one of: erythema, localised warmth of the surrounding skin, foul odour, yellow or green exudate, and a wound healing time of >14 postoperative days) • Wound size
How are the findings relevant to the decision problem?	The evidence from this study is indirectly relevant to the scope. The study assesses the effectiveness of Sorbact Compress in combination, rather than singly, and is concerned with skin grafts. However, the study includes evidence of infection at the graft site. Time to graft healing was shorter in the Sorbact group and the rate of infection was also lower: 2/20 (10%) vs. 15/40 (38%).
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence supports the hypothesis that the DACC technology is effective in preventing skin infection.
Will any information from this study be used in the economic model?	No
What are the limitations of this evidence?	The fact that the study was not randomised and was not carried out in the UK may be a limitation.
How was the study funded?	None declared

Nielsen 2012 [10]	
Aims of the study	Prospective cohort study to compare outcomes between polyhexanide-containing biocellulose dressings (Suprasorb X) and dialkylcarbamoyl chloride containing hydrophobic dressings (Cutisorb Sorbact) for secondary-intention surgical wounds.
Location	Denmark
Sample size	Suprasorb X = 30 Cutisorb Sorbact = 30
Outcomes	• Increase in pain during dressing change 1 day after surgery • Dressing adherence to the wound bed. • Use of saline for removal of dressing. • General anaesthesia for dressing removal (for pain score >3). • Adequate absorption. • Maceration of peri-wound skin.
How are the findings relevant to the decision problem?	The evidence from this study is not directly relevant to the scope. The study assesses pain on dressing removal following surgery, on a scale from 1 to 5, where 5 is an “unbearable increase in pain. Pain was rated worse in the Sorbact group (mean score 2.37 vs. 1.4 for Suprasorb X).

Nielsen 2012 [10]	
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence is not relevant to the claimed benefits
Will any information from this study be used in the economic model?	No
What are the limitations of this evidence?	The fact that the study was not randomised and was not carried out in the UK may be a limitation.
How was the study funded?	None declared

Bua 2017 [13]	
Aims of the study	Prospective cohort study to assess the impact of dialkylcarbamoyl chloride-coated postoperative dressings (Leukomed Sorbact) on the incidence of surgical site infection in patients undergoing nonimplant vascular surgery
Location	UK
Sample size	Leukomed Sorbact = 100 Standard surgical dressing = 100
Outcomes	Presence of surgical site infection (ASEPSIS wound score ≥21) Satisfactory healing (ASEPSIS wound score ≤10).
How are the findings relevant to the decision problem?	The evidence from this study is directly relevant to the scope. The study assesses the effectiveness of Leukomed Sorbact compared with standard surgical dressings as a means to prevent infection following clean or clean-contaminated vascular surgery. Infection rates were lower in the Leukomed Sorbact group at day 5-7 (1% vs. 10%) and at day 30 (9.1% vs 10%). The readmission rate was lower in the Leukomed Sorbact group (7.1% vs. 10%) and fewer patients required antibiotics.
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence directly supports the claimed benefits of Leukomed Sorbact: the study supports the hypothesis that using Leukomed Sorbact reduces the incidence of SSI and reduces the rate of readmission and use of antibiotics. By inference, a lower incidence of SSI should lead to an improvement in the quality of life of patients
Will any information from this study be used in the economic model?	No
What are the limitations of this evidence?	This is a well-designed RCT carried out in the UK. The fact that it was carried out in a single centre may be a limitation.
How was the study funded?	The authors declare that BSN Medical (Hull) provided the intervention dressing for this study. The company had no input into trial design, conduct, analysis, or dissemination.

Romain 2020 [18]	
Aims of the study	Randomised trial to compare wound healing with dialkylcarbamoyl chloride (DACC)-coated dressings (Sorbact) versus alginate dressings, in patients undergoing pilonidal sinus excision.
Location	France
Sample size	DACC (Sorbact) dressing = 120 Alginate dressing = 126
Outcomes	Wound healing after 75 days Local wound condition Patient assessment of the dressing Pain score evaluated on a visual analogue scale (VAS)
How are the findings relevant to the decision problem?	The evidence from this study is directly relevant to the safety and efficacy of DACC (Sorbact) technology. In the per protocol population, the proportion healed at 75 days was significantly higher in the DACC group (67.8% vs. 60%). There was no difference between the dressings in terms of pain or wound characteristics.
Does this evidence support any of the claimed benefits for the technology? If so, which?	The evidence supports the claim that the DACC (Sorbact) technology is safe and effective. There is no evidence from this study on the impact of Sorbact on post-surgical infection.
Will any information from this study be used in the economic model?	No
What are the limitations of this evidence?	This is a well-designed RCT. The fact that it does not directly address surgical site infection is a limitation.
How was the study funded?	No funding was received for the study. ABIGO Medical provided the DACC dressings.

6 Adverse events

Describe any adverse events and outcomes associated with the technology in national regulatory databases such as those maintained by the MHRA and FDA (Maude). Please provide links and references.

The search described in Appendix A was not limited by study design or outcomes. One set of searches was conducted to identify all evidence relating to the eligible interventions. This included evidence on adverse events. The adverse events detailed relate to the use of DACC (Sorbact) technology across all indications.

The information resources searched included MAUDE (Manufacturer and User Facility Device Experience), a database which includes reports of adverse events arising from the use of medical devices. The full list of sources and full details of search strategies (including search date, result numbers and strategies in full) are provided in Appendix A. A supplementary search of the MAUDE database was carried out in March 2020.

Five entries were identified on MAUDE relating to three separate incidents. An adverse incident notification has recently been received from the MHRA; this is currently under investigation.

https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/results.cfm

14/09/2016: A female patient who underwent total knee replacement was treated with Leukomed sorbact dressing at her surgical site. About a month later, she was reported to have developed a chemical burn with eschar on the entire surgical site.

31/07/2018: An epidermal inflammatory reaction and enlargement of ulcerous lesions was observed after 21 days of treatment of a venous ulcer with sorbact gel applied daily. A burning sensation and pain were also reported. The inflammatory reaction was initially amplified and then stopped once the sorbact gel was discontinued.

25/09/2019: A female patient with fungal infection was treated with Sorbact Absorption dressing. Two days after the beginning of the treatment, appearance of a cutaneous reaction: erythema, heat and edema under the dressing and on the thighs. After removal of the dressing and management the reaction disappeared after a few days.

11/03/2020: We have recently received an adverse incident notification from the MHRA on Cutimed Sorbact Ribbon Gauze. Redness, itching and pain were reported. This is currently under investigation.

Describe any adverse events and outcomes associated with the technology in the clinical evidence.

Adverse events described in the clinical evidence relating to the use of Sorbact dressings are as follows:

- Coldwell and Curtin 2014 [37]: Product: Leukomed Sorbact
  Two hypersensitivity reactions to the adhesive in 55 treated patients.
- Dumet et al 2016 [38] Cutimed Sorbact ribbon gauze
  One allergic reaction in 10 treated patients.
- Brambilla et al 2015 [39] Product: Cutimed Sorbact
  One reaction to the wound dressing in 63 treated patients.
- Kleintjes et al 2017 [40] Product: Cutimed Sorbact
  Minor bleedings at removal of dressing in 5 patients out of 27 treated.
- Corazza et al 2018 [41]: Product: Cutimed Sorbact
  One case with contact dermatitis
- Nielsen et al 2012 [10]: Cutisorb Sorbact
  Increase in incidence of maceration of peri-wound skin using Cutisorb Sorbact (17%) compared to Suprasorb X (6%) dressing. Difference was not statistically significant (p=0.228)

Post Market Surveillance
Safety-related complaints from the Abigo Post-Market Surveillance system are few, frequently related to local skin irritation reactions to the adhesive and non-serious.

From 2008 to 2019 approximately 90 cases relevant for the products in question have been recorded in the Abigo vigilance system. For the period 2016-2018 this corresponds to an adverse event rate of 3.5 adverse events/1,000,000 sold products. The relation of the event to the device was unclear in several of the cases.

There have been no recorded adverse events in the BSN Medical GmbH Quality system for the Sorbact technology.

7 Evidence synthesis and meta-analysis

Although evidence synthesis and meta-analyses are not necessary for a submission, they are encouraged if data are available to support such an approach.

If an evidence synthesis is not considered appropriate, please instead complete the section on qualitative review.

If a quantitative evidence synthesis is appropriate, describe the methods used. Include a rationale for the studies selected.

Evidence synthesis was not possible because the studies differed so widely in population, indication and in the specific type of DACC dressing used

Qualitative review

Please only complete this section if a quantitative evidence synthesis is not appropriate.

Explain why a quantitative review is not appropriate and instead provide a qualitative review. This review should summarise the overall results of the individual studies with reference to their critical appraisal.

This section provides a summary of the results which are most relevant to the decision problem and the economic analysis.

Table 6: Summary of study results relating to surgical infection

		Surgical site infection rate			
		Intervention	Comparator	Relative risk reduction	95% CI p-value
Meberg 1990 [11]	Umbilical care of newborn Infection up to 6 weeks after the birth	Sorbact dressing 198/1213 (16.3%)	Umbilical disinfection with 0.5% chlorhexidine in 70% ethanol 179/1228 (14.6%)	-	95% CI not reported p>0.05

Stanirowski 2016a [8]	Women undergoing caesarean section. Surgical site infection at 14 days.	Sorbact Surgical dressing 2/71 (2.8%)	Standard surgical dressing 7/71 (9.8%)	71.4%	95% CI not reported p=0.08
Stanirowski 2016b [9]	Women undergoing caesarean section. Surgical site infection at 14 days.	Sorbact Surgical dressing 5/272 (1.8%)	Standard surgical dressing 14/271 (5.2%)	65.4%	95% CI not reported p=0.04
Bua 2017 [13]	Patients undergoing clean or clean-contaminated vascular surgery. Surgical site infection at 5-7 days. Surgical site infection by 30 days.	Leukomed Sorbact dressing 1/100 (1%) 10/100 (10%)	Standard surgical dressing 10/100 (10%) 19/100 (19%)	 90.0% 47.4%	 95% CI 0.01 to 0.072; p=0.005 95% CI not reported; p=0.11
Lee 2018 [12]	Skin graft donor sites Wound infection rate	Sorbact Compress combined with chlorhexidine acetate-soaked paraffin gauze Thick skin graft 1/10 (10%) Thin skin graft 1/10 (10%)	Foam dressings Thick skin graft 10/31 (32%) Thin skin graft 5/9 (56%)	 68.8% 82.1%	 95% CI not reported p=0.167 95% CI not reported p=0.033
Totty 2019 [16]	Patients undergoing clean or clean-contaminated vascular surgery. Surgical site infection by 30 days.	Leukomed Sorbact dressing 12/74 (16.2%)	Standard surgical dressing 18/70 (25.7%)	 36.9% Odds ratio 0.559	 95% CI on odds ratio 0.247-1.267 p=0.161

8 Summary and interpretation of clinical evidence

Summarise the main clinical evidence, highlighting the clinical benefit and any risks relating to adverse events from the technology.

The published clinical evidence is consistent with the expectation that use of Leukomed Sorbact rather than a standard post-operative dressing is likely to lead to a reduction in the incidence of surgical site infection (SSI). The relative risk reduction in these studies ranges from 36.9% [16] to 90% [13]. The benefit for patients is primarily in terms of avoidance of pain, uncertainty and delayed discharge. In some circumstances surgical infection may require readmission and reoperation. For the NHS the primary benefit of a reduction in the incidence of avoidable infections will be to free-up inpatient resources to treat additional patients and/or reduce waiting times.

One RCT (n=2441) of umbilical care for newborn infants up to 6 weeks of age reported no statistically significant difference between daily Sorbact dressing and daily umbilical disinfection in the incidence of omphalitis (infection of the umbilical cord) on the overall incidence of infection [11]. Three additional RCTs have shown lower rates of infection with Sorbact compared with standard dressings in patients following surgery [8][9][16]. A pilot RCT (n=142) comparing Sorbact with standard surgical dressings in women undergoing caesarean section [8] reported a lower rate of SSI at 14 days in the Sorbact group (2.8% vs. 9.8%; p=0.08). Significantly fewer women required systemic antibiotics (0% vs. 7.0%; p=0.03). A subsequent RCT (n=543) in a similar population [9] reported a significantly lower rate of SSI in the Sorbact group (1.8% vs. 5.2%; p=0.04). Fewer women required systemic antibiotics (0% vs. 1.5%; p=0.13) and fewer required readmission because of SSI (0% vs. 1.1%; p=0.24). A pilot RCT (n=144) comparing Sorbact with standard post-operative dressings in patients undergoing clean or clean-contaminated vascular surgery [16] compared rates of SSI at 30 days post-surgery. The relative risk reduction in the Sorbact group was 36.9% (16% vs. 26%, OR 0.264; p=0.161). In a sub-group undergoing implant surgery there was no difference in the rates of SSI between the intervention and control groups. An RCT (n=246) compared wound healing in patients undergoing pilonidal sinus excision between wounds dressed with a DACC (Sorbact) dressing or an alginate [18]. The proportion healed at 75 days was significantly higher in the DACC group (75.7% vs. 60.0%; p,0.023) and there was no difference between the dressings in terms of pain or wound characteristics.

One prospective cohort study in patients undergoing non-implant vascular surgery recorded significantly lower rates of SSI at 5-7 days post-surgery with Sorbact than with standard surgical dressings [13]: 1% vs. 10%; p=0.01. The overall incidence of SSI at 30 days was 10% vs.19%; p=0.11. This study also reported a smaller number of patients requiring antibiotics at day 5-7, and a smaller number requiring readmission. One other small cohort study compared Sorbact combined with chlorhexidine acetate-soaked paraffin gauze with foam dressings on skin graft donor sites in terms of wound healing time and infection [12]. The population was sub-divided into thin and thick skin grafts. Wound healing times were significantly shorter in the Sorbact group for thin grafts (10 days vs. 18 days; p=0.013) and thick grafts (9.5 days vs. 12 days; p=0.049). Rates of wound infection were significantly lower in the Sorbact group for thin grafts (10% vs. 55.6%; p=0.033). The difference in the infection rate for thick skin grafts was not statistically significant (10% vs. 32.3%; p=0.167). One other small study [10] comparing Sorbact with a polyhexanide-containing biocellulose dressing (Surpasorb X) in patients with surgical wounds healing by secondary intention did not include any information on differences in rates of surgical site infection

[redacted]

There are no significant risks associated with the use of the technology. Only three adverse events for Leukomed or Cutimed Sorbact have been reported to national competent authorities since 2010 (Section 6 above). None resulted in any permanent or serious adverse effect on patients. Events reported in the literature mostly relate to local skin irritation reactions to the adhesive and are non-serious. *Briefly discuss the relevance of the evidence base to the scope. This should focus on the claimed benefits described in the scope and the quality and quantity of the included studies.*

Six published studies provide evidence directly related to the scope, two are UK studies. These studies provide evidence of the effectiveness of Leukomed Sorbact as a means of reducing infection following clean or clean-contaminated surgery. The comparator in each case is a standard surgical dressing. There are no studies which compare Sorbact with NPWT.

[redacted]

Identify any factors which might be different between the patients in the submitted studies and patients having routine care in the UK NHS.

Clinical practice may differ in other healthcare systems but it is unlikely that underlying rates of SSI or the effectiveness of the DACC (Sorbact) technology in reducing SSI risks will be such that the results are not applicable to the UK. At least two of the published [13][16] and one of the unpublished studies [19] were carried out in the UK NHS.

Describe any criteria that would be used in clinical practice to select patients for whom the technology would be most appropriate.

Based on the mode of action of the dialkylcarbamoyl chloride-impregnated dressing, the most likely patient group to benefit from Leukomed Sorbact will be patients undergoing clean or clean-contaminated surgery. Benefits have been demonstrated in non-implant vascular surgery and caesarean section. Comparable benefits would be expected in other similar surgery types.

Briefly summarise the strengths and limitations of the clinical evidence for the technology.

The evidence base for Leukomed Sorbact is still developing, and most of the best quality studies are in two surgical areas: caesarean section and vascular surgery. Three of the available studies were carried out in the NHS. [13][16][19]. There have been four RCTs examining the effect of Sorbact on rates of post-surgical infection. One RCT in newborn infants [11] showed no significant difference between Sorbact and control in rates of umbilical cord infection. Three further RCTs [8][9][16] and two observational studies [12][13] show a consistent reduction in SSI incidence with Sorbact compared with standard surgical dressings. Not all the results are statistically significant at the conventional 5% level, but the observed effect sizes in these studies are clinically and economically meaningful. Two of the RCTs [8][16] were pilot trials which were not powered to detect a difference in SSI rates, but rather to test the feasibility of conducting a larger study. Both showed a positive treatment effect. A large RCT in women undergoing caesarean section [9] provides the best quality evidence. This study showed a statistically significant reduction in SSI incidence with Sorbact compared with standard surgical dressings, and a reduction in healthcare resource use. One important UK evaluation study demonstrates the value of Sorbact as part of a comprehensive programme to prevent surgical infections in maternity services [19].

9 References

1. University of Hull. DACC in the reduction of surgical site infection. Identifier: NCT02992951. In: ClinicalTrials.gov [internet]. Bethesda: US National Library of Medicine: 2017. Available from https://ClinicalTrials.gov/show/NCT02992951.

2. Totty JP, Harwood AE, Cai PL, Hitchman LH, Smith GE, Chetter IC. Assessing the effectiveness of dialkylcarbamoylchloride (DACC) - coated post-operative dressings versus standard care in the prevention of surgical site infection in clean or clean-contiminated vascular surgery (the DRESSINg trial): Study protocol for a pilot feasibility randomised controlled trial. Pilot Feasibility Study 2019; 5: 11.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6337832/

3. BSN Medical GmbH. Observational study of clinical performance of a sterile, bacteria-binding, super-absorbent wound dressing. Identifier: NCT02662218. In: ClinicalTrials.gov [internet]. Bethesda: US National Library of Medicine: 2016. Available from https://ClinicalTrials.gov/show/NCT02662218.

4. University Hospital Strasbourg. Sorbact TM: effect of a microbial binding dressing on wound healing after pilonidal sinus excision. Identifier: NCT02011802. In: ClinicalTrials.gov [internet]. Bethesda: US National Library of Medicine: 2013. Available from https://ClinicalTrials.gov/show/NCT02011802.

5. Medical University of Warsaw. Study to evaluate DACC dressings for the prevention of surgical site infections in women undergoing caesarean section. Identifier: NCT02168023. In: ClinicalTrials.gov [internet]. Bethesda: US National Library of Medicine: 2014. Available from https://ClinicalTrials.gov/show/NCT02168023.

6. NCT03887299. Antimicrobial Dressing Versus Standard Dressing in Obese Women Undergoing Cesarean Delivery. In; 2019.

7. ISRCTN14126613. Dressing of diabetic foot ulcers; infection deterrent (DRUID). Identifier: ISRCTN14126613. In: ISRCTN Registry [internet]. London: BioMed Central Limited: 2019. Available from http://isrctn.com/ISRCTN14126613.

8. Stanirowski PJ, Kociszewska A, Cendrowski K, Sawicki W. Dialkylcarbamoyl chloride-impregnated dressing for the prevention of surgical site infection in women undergoing cesarean section: a pilot study. Arch Med Sci. 2016;12(2):1-7.

9. Stanirowski PJ, Bizon M, Cendrowski K, Sawicki W. Randomized controlled trial evaluating dialkylcarbamoyl chloride impregnated dressings for the prevention of surgical site infections in adult women undergoing cesarean section. Surg Infect (Larchmt). 2016;17(4):427-35.

10. Nielsen AM, Andriessen A. Prospective cohort study on surgical wounds comparing a polyhexanide-containing biocellulose dressing with a dialkyl-carbamoyl-chloride- containing hydrophobic dressing. Adv Skin Wound Care. 2012;25(9):409-13.

11. Meberg A, Schoyen R. Hydrophobic material in routine umibilical cord care and prevention of infections in newborn infants. Scand J Infect Dis. 1990;22(6):729-33.

12. Lee JW, Park SH, Suh IS, Jeong HS. A comparison between DACC with chlorhexidine acetate-soaked paraffin gauze and foam dressing for skin graft donor sites. J Wound Care. 2018;27(1):28-35.

13. Bua N, Smith GE, Totty JP, Pan D, Wallace T, Carradice D*, et al.* Dialkylcarbamoyl chloride dressings in the prevention of surgical site infections after nonimplant vascular surgery. Ann Vasc Surg. 2017;44:387-92.

14. Ab AM. BSN Medical Inc. leukomed sorbact dressing, wound, drug. 2017. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/detail.cfm?mdrfoi__id=6449224&pc=FRO.

15. Ab AM. Abigo medical AB leukomed sorbact. 2017. Available from: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/detail.cfm?mdrfoi__id=7351851&pc=FRO.

16. Totty JP, Hitchman LH, Cai PL, Harwood AE, Wallace T, Carradice D*, et al.* A pilot feasibility randomised clinical trial comparing dialkylcarbamoylchloride-coated dressings versus standard care for the primary prevention of surgical site infection. Int Wound J. 2019:1-8.

17. Stanirowski PJ, Davies H, McMaster J, Mealing S, Sawicki W, Cendrowski K*, et al.* Cost-effectiveness of a bacterial-binding dressing to prevent surgical site infection following caesarean section. J Wound Care. 2019;28(4):222-28.

18. Romain B, Mielcarek M, Delhorme JB, Meyer N, Brigand C, Rohr S on behalf of the SORKYSA group. Dialkylcarbamoyl chloride-coated *versus* alginate dressings after pilonidal sinus excision: a randomised clinical trial (SORKYSA study). BMJ Open 2020:Feb 4.

[redacted]

20. Gheorghe A, Moran G, Duffy H, et al. Health utility values associated with surgical site infection: a systematic review. Value Health, 2015;18:1126-37 (QOL impact of SSI on patients)

21. Badia JM, Casey AL, Petrosillo N, et al. Impact of surgical site infection on healthcare costs and patient outcomes: a systematic review in six European countries. J Hosp Infect, 2017;96:1-15 (resource costs of SSI to the NHS)

22. Kirkland K. Briggs PJ and Trivette S. The impact of surgical site infections in the 1990s: Attributable mortality, excess length of hospitalisation and extra costs. Journal of Infection Control 1999; Vol 20; 11725-730

23. Tanner J et al Patient experiences of surgical site infection Journal of Infection Prevention September 2012 Vol 13 No 5

24. Jenks PJ, Laurent M, et al. (2014). Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. J Hosp Infect;86:24-33 (cost for economic model)

25. HM Government Tackling antimicrobial resistance 2019-2021 The UK's five year national action plan

26. R Cooper et al Non-antibiotic antimicrobial interventions and antimicrobial stewardship in wound care Journal of Wound Care Vol 27 No 6 June 2018

27. Finley PJ, Unprecedented silver resistance in clinically isolated Enterobacteriaceae: major implications for burn and wound management Antimicrobial Agents and Chemotherapy August 2015 Volume 59 Number 8

28. Lipsky BA et al Antimicrobial stewardship in wound care: a Position Paper from the British Society for Antimicrobial Chemotherapy and European Wound Management Association J Antimicrob Chemother 2016; 71: 3026–3035 doi:10.1093/jac/dkw287 Advance Access publication 25 July 2016

29. Paul Chadwick, Karen Ousey Bacterial-binding dressings in the management of wound healing and infection prevention: a narrative review Journal of Wound Care Vol 28 No 6 June 2019

30. Troughton R, Birgand g, Johnson AP, et al. Mapping national surveillance of surgical site infections in England: needs and priorities. Journal of Hospital Infection 2018 100(4):378-385

31. Cutting K et al Safe bioburden management A clinical review of DACC technology. An educational supplement in association with BSN medical Journal of Wound Care Vol 24, No 5, May 2015

32. Ljungh A, Yanagisawa N, Wadstrom T Using the principle of hydrophobic interaction to bind and remove wound bacteria Journal of Wound Care VOL 15 , No 4, April 2006

33. Ljungh, A., Wadstrom, T. Growth conditions influence expression of cell surface hydrophobicity of staphylococci and other wound infection pathogens. Microbiol Immunol 1995; 39: 10, 753–757.

34. Ronner AC, Curtin J, Karami N Adhesion of methicillin-resistant Staphylococcus aureus to DACC coated dressings Journal of Wound Care Vol 23, No 10, October 2014

35. In vitro evaluation of the antibacterial activity of Sorbact Compress according to JIS L 1902:2008 against a defined microorganism panel Data on File

36. Cilberti M, De Lara F, Serra G, Tafuro F, Iazzdtta M, Filosa A, Scognamiglio R, Cilberti G, Veneri MR The Effect of a Bacteria- and Fungi binding Mesh Dressing on the Bacterial Load of Pressure Ulcers Treated With Negative Pressure Wound Therapy: A Pilot Study Wounds 2016;28(11):408-420. Epub 2016 August 15.

37. Coldwell J, Curtin J. Management of the surgical site post local skin excision using a bacteria and fungi binding dressing in the primary care setting - an observational study. *Poster Abigo Medical AB data on file.* 2014.

38. Brambilla R, Aloisi D, Weingard I, et al. VERUM - A European approach for successful venouslegulcer healing. *Wound Heal South Africa.* 2015;8:34-38.

39. Dumet A, Leroux A, Pelletier V, Verin E, Dieu B. Fungal wound: Medico-economic study of a medicine versus a dressing. *CPC2016.* 2016.

40. Kleintjes W, Boggenpoel A, Diango K. A prospective descriptive study of Cutimed Sorbact used as a skin substitute for the treatment of partial thickness burn wounds. 2017;10:12-16.

41. Corazza M, Amendolagine G, Cristofaro D, Bernardi T, Borghi A. Contact dermatitis caused by dialkylcarbamoyl compounds in a medication used for chronic wounds. *Contact Dermatitis.* 2018;79(3):182-183.

10 Appendices

Appendix A: Search strategy for clinical evidence

Describe the process and methods used to identify and select the studies relevant to the technology. Include searches for published studies, abstracts and ongoing studies in separate tables as appropriate. See section 2 of the user guide for full details of how to complete this section.

10.1 Search strategy

One set of searches was conducted to identify evidence on clinical efficacy, safety and cost-effectiveness. The searches were conducted between 03/06/19 and 05/06/19. A supplementary search of PubMed and MAUDE was carried out on 01/03/20. A strategy was developed to search MEDLINE (Ovid interface) using a combination of subject indexing terms and free text search terms in the title, abstract and authors' keyword heading word fields.

The search strategy was designed to be sensitive to retrieve records about Sorbact wound dressings by using three different approaches:

- Searches for Sorbact-specific terms and product names
- Searches for records with the Medical Subject Headings (MeSH) 'Bandages/' combined with 'Carbamates/'
- Searches for general terms: antiseptic or bacteria binding dressings.

Animal studies were removed from MEDLINE using a standard approach. The strategy was not limited by date or study design. The following databases and information resources were searched. The service provider, interface or URL are shown in parentheses following the resource name.

- MEDLINE, MEDLINE In-Process, MEDLINE Daily and Epub Ahead of Print (Ovid SP)
- Embase (Ovid SP)
- Cochrane Database of Systematic Reviews (CDSR) (Cochrane Library)
- Cochrane Central Register of Controlled Trials (CENTRAL) (Cochrane Library)
- Database of Abstracts of Reviews of Effects (DARE) (CRD website)
- Health Technology Assessment Database (HTA Database) (CRD website)
- NHS Economic Evaluation Database (NHS EED) (CRD website)
- Conference Proceedings Citation Index – Science (CPCI) (Web of Science)
- Econlit (Ovid SP)
- WHO International Clinical Trials Registry Portal (ICTRP) (http://apps.who.int/trialsearch/)
- ClinicalTrials.gov (https://clinicaltrials.gov)
- Be Part of Research (https://bepartofresearch.nihr.ac.uk/)
- Cost Effectiveness Analysis Registry (CEA Registry) (https://research.tufts-nemc.org/cear4/)
- FDA webpages (http://www.fda.gov/)

- MAUDE – Manufacturer and User Facility Device Experience (https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm)

The complete search strategies used, including all the search terms: textwords (free text), subject index headings (for example, MeSH) and the relationship between the search terms (for example, Boolean) are provided in Tables A2-A16. Systematic reviews identified by the searches were also checked, to identify further relevant studies.

10.2 Unpublished studies

Evidence available only in conference abstract form was identified via searches of Embase and Conference Proceedings Citation Index – Science, which specifically index this type of document. The MEDLINE strategy was translated and run in three trials register resources (ClinicalTrials.gov, WHO International Clinical Trials Registry Platform (ICTRP) and the UK Be Part of Research website). Medical device reports of device-associated adverse events were also identified from the MAUDE (Manufacturer and User Facility Device Experience) database. The US Food and Drug Administration (FDA) website was searched for relevant documents.

10.3 Study selection

Table A1 shows the eligibility criteria used to select studies. The same criteria were used to identify unpublished studies.

Table A1: Inclusion and exclusion criteria used to identify relevant studies.

	Inclusion Criteria	Exclusion Criteria
Population	Patients of any age who are at risk of developing any post-operative surgical site infection (SSI)	Patients with chronic wounds
Intervention	Sorbact or dialkycarbamoyl chloride (DACC) impregnated dressings for the prevention of surgical site infection Any Sorbact dressing for the prevention, treatment and management of surgical site infection. Variants of and references to Sorbact dressings may include: • Sorbact • Leukomed Sorbact • Cutimed Sorbact • Dialkycarbomoyl choloride (DACC) • Antiseptic dressing • Bacteria-binding dressing Any combination dressings which include a Sorbact dressing (e.g. Cutimed Sorbact plus adhesive cover film)	
Comparators	Any other standard surgical dressing, including (but not limited to): • Superabsorbent/absorbent dressings • Foam dressings • Hydrofiber®/hydrofibre dressings • Gelling fibre/fiber dressings • Alginate dressings • Silicone adherent dressings • Non-adherent dressings • Hydrocolloid dressings	

	• Silver-impregnated dressings • Iodine-impregnated dressings • Chlorhexidine or polyhexamethylene biguanide (PHMB), Octenidine, ROS (enzyme alginogel and hydrogen peroxide) based antimicrobial dressings • Non-antimicrobial dressings • Antiseptic dressings • Bacteria-binding dressings	
Outcomes	**Clinical effects and safety outcomes:** • Number/percentage of patients with SSI • Number/percentage of patients with SSI-associated wound dehiscence • Number/percentage of patients requiring systemic antibiotics • Length of the primary and any secondary SSI-attributable hospitalisation • Readmissions to hospital due to SSI • Level of patient satisfaction • Level of pain and discomfort • Impact on quality of life • Ease of use of product • Dressing-related adverse events **Economic outcomes:** • Resource use (including courses of antibiotics) and total costs • Summary health outcomes such as QALYs • Cost-effectiveness ratios (ICERs)	

Study design	**Clinical effects and safety**
	• Comparative studies, retrospective or prospective
	• Single arm studies, retrospective or prospective
	
	Studies published as abstracts or conference presentations only will be eligible for inclusion in the review if data are recorded.
	
	Systematic reviews will be checked as a source for references for primary studies.
	
	Economic
	• Economic evaluations:
	  ○ Cost-effectiveness analyses
	  ○ Cost-utility analyses
	  ○ Cost-benefit analyses
	  ○ Cost-minimization analyses
	• HTAs published by NICE
		• Editorials, letters etc.
		• Case reports and case series of fewer than 10 participants will not be eligible

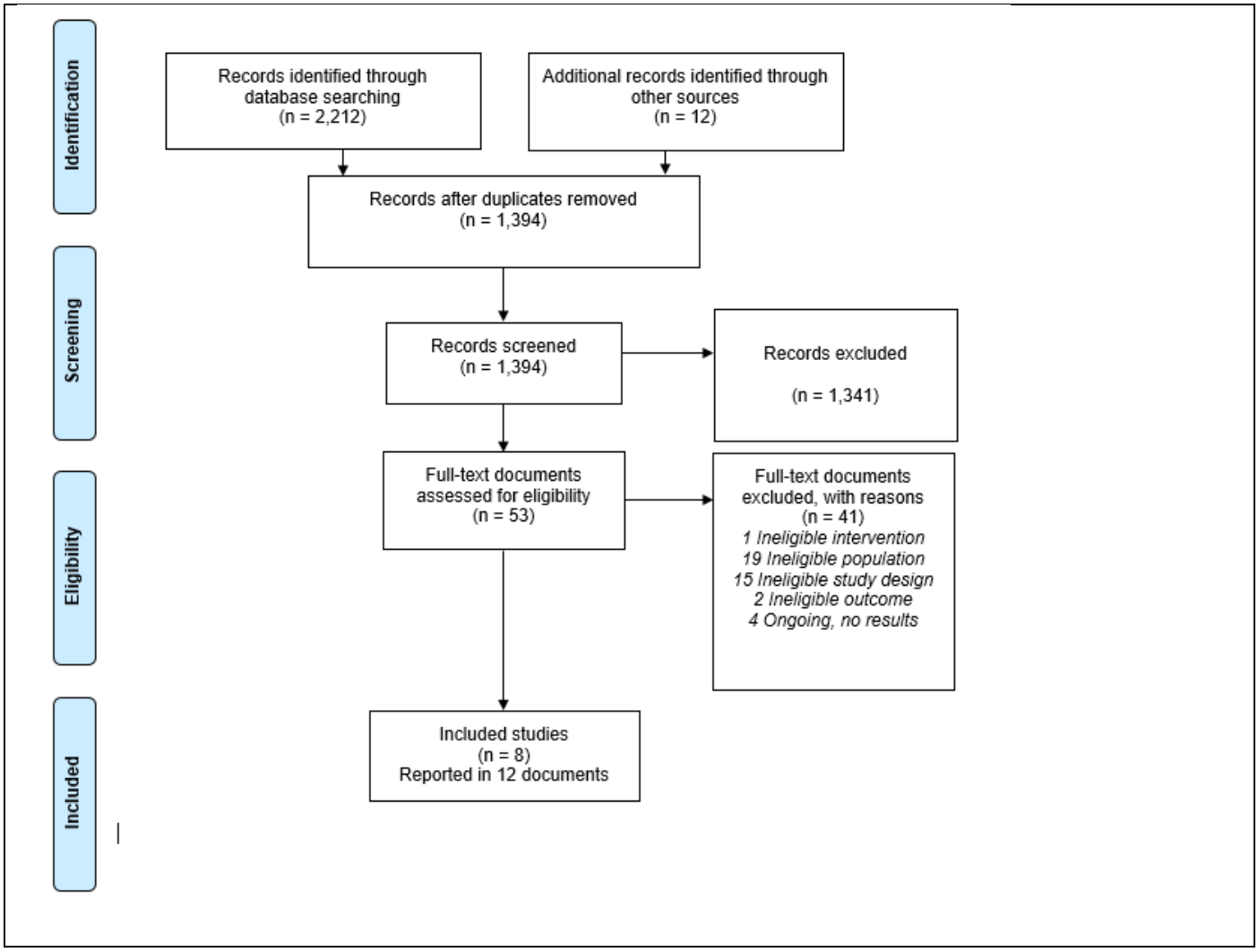
Limits	English language studies	Studies not in English

10.4 Results

The searches were conducted on 1,394 records screened for relevance, based on information in their title and abstract, by two reviewers independently. A third reviewer was involved in the case of disagreements. 1,341 records were excluded based on the title and abstract screening and 53

full-text reports were assessed for relevance against the pre-defined eligibility criteria. 41 of the 53 full-text records were excluded and 12 records, reporting on 8 studies were included in the review (PRISMA diagram below). One additional published paper was identified in the March 2020 update and one unpublished study was identified from company information.

The numbers of published studies included and excluded at each stage is shown in the PRISMA diagram.



10.5 Structured abstract for unpublished studies

Table A.2: Source: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

Interface / URL: OvidSP
Database coverage dates: 1946 to May 31, 2019
Search date: 03/06/19
Retrieved records: 825
Search strategy:

1 "Dialkylcarbamoyl chloride".ti,ab,kf. (8)
2 Dialkyl carbamoyl chloride.ti,ab,kf. (5)
3 Dialkylcarbamoylchloride.ti,ab,kf. (3)
4 dacc.ti,ab,kf. (693)
5 (dacc$ adj3 coat$).ti,ab,kf. (8)
6 sorbact$.ti,ab,kf. (22)
7 leukomed$.ti,ab,kf. (3)
8 cutimed$.ti,ab,kf. (19)
9 (hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kf. (25)
10 or/1-9 (736)
11 Bandages/ (16368)
12 Carbamates/ (11647)
13 11 and 12 (3)
14 (antiseptic adj3 dressing$1).ti,ab,kf. (115)
15 ((bacteria$ adj4 bind$) and dressing$1).ti,ab,kf. (20)
16 or/10,13-15 (859)
17 exp Animals/ not Humans/ (4585086)
18 16 not 17 (827)
19 remove duplicates from 18 (825)

Table A.3: Source: Embase

Interface / URL: OvidSP
Database coverage dates: 1974 to 2019 May 31
Search date: 03/06/19
Retrieved records: 1128
Search strategy:

1 "Dialkylcarbamoyl chloride".ti,ab,kw. (8)
2 Dialkyl carbamoyl chloride.ti,ab,kw. (7)
3 Dialkylcarbamoylchloride.ti,ab,kw. (3)
4 dacc.ti,ab,kw. (1038)
5 (dacc$ adj3 coat$).ti,ab,kw. (13)
6 sorbact$.ti,ab,kw. (31)
7 leukomed$.ti,ab,kw. (5)
8 cutimed$.ti,ab,kw. (30)
9 (hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kw. (30)

10 or/1-9 (1094)
11 bandage/ (9699)
12 carbamic acid derivative/ (6771)
13 11 and 12 (4)
14 (antiseptic adj3 dressing$1).ti,ab,kw. (124)
15 ((bacteria$ adj4 bind$) and dressing$1).ti,ab,kw. (21)
16 or/10,13-15 (1229)
17 (animal/ or animal experiment/ or animal model/ or animal tissue/ or nonhuman/) not exp human/ (5751371)
18 16 not 17 (1145)
19 remove duplicates from 18 (1128)

Table A.4: Source: Econlit

Interface / URL: OvidSP
Database coverage dates: 1886 to May 23, 2019
Search date: 03/06/19
Retrieved records: 2
Search strategy:

1 "Dialkylcarbamoyl chloride".ti,ab,kw,hw. (0)
2 Dialkyl carbamoyl chloride.ti,ab,kw,hw. (0)
3 Dialkylcarbamoylchloride.ti,ab,kw,hw. (0)
4 dacc.ti,ab,kw,hw. (2)
5 (dacc$ adj3 coat$).ti,ab,kw,hw. (0)
6 sorbact$.ti,ab,kw,hw. (0)
7 leukomed$.ti,ab,kw,hw. (0)
8 cutimed$.ti,ab,kw,hw. (0)
9 (hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kw,hw. (0)
10 (bandage$ and carbamate$).ti,ab,kw,hw. (0)
11 (antiseptic adj3 dressing$1).ti,ab,kw,hw. (0)
12 ((bacteria$ adj4 bind$) and dressing$1).ti,ab,kw,hw. (0)
13 or/1-12 (2)
14 remove duplicates from 13 (2)

Table A.5: Source: Cochrane Central Register of Controlled Trials Issue 6 of 12, June 2019

Interface / URL: Cochrane Library / Wiley Interscience
Database coverage dates: Information not found
Search date: 03/06/19
Retrieved records: 129
Search strategy:

#1 "Dialkylcarbamoyl chloride" 8
#2 "Dialkyl carbamoyl chloride" 1
#3 Dialkylcarbamoylchloride 3
#4 dacc 102

#5 (dacc* near/3 coat*) 3
#6 sorbact* 21
#7 leukomed* 2
#8 cutimed* 16
#9 hydrophob* near/4 (dressing* or bandage*) 5
#10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 126
#11 [mh ^Bandages] 1614
#12 [mh ^Carbamates] 480
#13 #11 and #12 1
#14 (antiseptic near/3 dressing*) 30
#15 (bacteria* near/4 bind*) and dressing* 7
#16 #10 or #13 or #14 or #15 159
#17 #10 or #13 or #14 or #15 in Trials 129

Table A.6: Source: Cochrane Database of Systematic Reviews Issue 6 of 12, June 2019

Interface / URL: Cochrane Library / Wiley Interscience
Database coverage dates: Information not found
Search date: 03/06/19
Retrieved records: 3
Search strategy:

#1 "Dialkylcarbamoyl chloride":ti,ab,kw 7
#2 "Dialkyl carbamoyl chloride":ti,ab,kw 1
#3 Dialkylcarbamoylchloride:ti,ab,kw 2
#4 dacc:ti,ab,kw 83
#5 (dacc* near/3 coat*):ti,ab,kw 3
#6 sorbact*:ti,ab,kw 9
#7 leukomed*:ti,ab,kw 2
#8 cutimed*:ti,ab,kw 2
#9 hydrophob* near/4 (dressing* or bandage*):ti,ab,kw3
#10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 91
#11 [mh ^Bandages] 1614
#12 [mh ^Carbamates] 480
#13 #11 and #12 1
#14 (antiseptic near/3 dressing*):ti,ab,kw 20
#15 (bacteria* near/4 bind*) and dressing*:ti,ab,kw 5
#16 #10 or #13 or #14 or #15 113
#17 #10 or #13 or #14 or #15 in Cochrane Reviews, Cochrane Protocols 3

Table A.7: Source: Conference Proceedings Citation Index- Science (CPCI-S)

Interface / URL: Web of Science
Database coverage dates: 1990 - present
Search date: 05/06/19
Retrieved records: 48
Search strategy:

Indexes=CPCI-S Timespan=All years

# 14	48	#13 OR #12 OR #11 OR #10
# 13	1	TS=(bacteria* NEAR/4 bind*) AND TS=dressing*
# 12	2	TS=("antiseptic" NEAR/3 dressing*)
# 11	0	TS=(bandage* AND carbamate*)
# 10	45	#9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
# 9	1	TS=(hydrophob* NEAR/4 (dressing* or bandage*))
# 8	0	TS=cutimed*
# 7	0	TS=leukomed*
# 6	0	TS=sorbact*
# 5	0	TS=(dacc* NEAR/3 coat*)
# 4	44	TS="dacc"
# 3	0	TS="Dialkylcarbamoylchloride"
# 2	0	TS="Dialkyl carbamoyl chloride"
# 1	0	TS="Dialkylcarbamoyl chloride"

Table A.8: Source: ClinicalTrials.gov

Interface / URL: https://clinicaltrials.gov/

Database coverage dates: Information not found. ClinicalTrials.gov was created as a result of the Food and Drug Administration Modernization Act of 1997 (FDAMA). Site was made available to the public in February 2000.

Search date: 04/06/19

Retrieved records: 46

Search strategy:

The following terms were searched on using the expert interface:

Dialkylcarbamoyl chloride OR Dialkyl carbamoyl chloride OR Dialkylcarbamoylchloride OR DACC OR sorbact OR leukomed OR cutimed OR hydrophobic dressing OR hydrophobic bandage OR antiseptic dressing OR bacteria binding dressing = 46 studies found

Table A.9: Source: WHO International Clinical Trials Registry Platform (WHO ICTRP)

Interface / URL: http://apps.who.int/trialsearch/

Database coverage dates: Information not found. Data sets from data providers are updated every Friday evening according to a schedule, with different update dates for different providers. The most recent updates were carried in 27 May 2019; the oldest updates were carried out in 14 January 2019.

Search date: 04/06/19

Retrieved records: 14

Search strategy:

The basic search interface was used at: http://apps.who.int/trialsearch/.

The following terms were searched on. No filter options were selected.

Dialkylcarbamoyl chloride OR Dialkyl carbamoyl chloride OR Dialkylcarbamoylchloride OR DACC OR sorbact OR leukomed OR cutimed OR hydrophobic dressing OR hydrophobic dressings OR hydrophobic bandage OR hydrophobic bandages OR antiseptic dressing OR antiseptic dressings OR bacteria binding dressing OR bacteria binding dressings = 14 (14 records for 14 trials found)

Table A.10: Source: Be Part of Research
Interface / URL: https://bepartofresearch.nihr.ac.uk/
Database coverage dates: Information not found
Search date: 04/06/19
Retrieved records: 4
Search strategy:

Studies were sought using the homepage search interface. The following terms were searched on separately, with terms entered in the 'keyword' search box and 'Search for study' selected. No filters were applied (the default filter 'recruiting' was de-selected). The results were screened by information specialist for within-resource duplicates and records for two studies were downloaded.

Dialkylcarbamoyl chloride: 1 study found
Dialkyl carbamoyl chloride: 0 studies found
Dialkylcarbamoylchloride: 1 study found
DACC: 0 (1 study found, excluded as duplicate)
sorbact: 0 (2 studies found, excluded as duplicates)
leukomed: 0 (1 study found, excluded as duplicate)
cutimed: 0 (1 study found, excluded as duplicate)
hydrophobic dressing: 0 (1 study found, excluded as duplicate)
hydrophobic dressings: 0 (1 study found, excluded as duplicate)
hydrophobic bandage: 0 studies found
hydrophobic bandages: 0 studies found
antiseptic dressing: 1 study found
antiseptic dressings: 0 (1 study found, excluded as duplicate)
bacteria binding dressing: = 1 (2 studies found, 1 excluded as duplicate)
bacteria binding dressings: 0 (1 study found, excluded as duplicate)

Table A.11: Source: Cost-Effectiveness Analysis Registry (CEA Registry)
Interface / URL: http://healtheconomics.tuftsmedicalcenter.org/cear2n/search/search.aspx
Database coverage dates: According to information on the site, the database contains studies "published from 1976 to 2017", though records for studies with a publication date of 2018 are found in the database.
Search date: 04/06/19
Retrieved records: 0
Search strategy:

The following searches were conducted separately using the basic search interface (default 'Methods' selected) at: http://healtheconomics.tuftsmedicalcenter.org/cear2n/search/search.aspx

Dialkylcarbamoyl chloride: 0 records

Dialkyl carbamoyl chloride: 0 records
Dialkylcarbamoylchloride: 0 records
DACC: 0 records
sorbact: 0 records
leukomed: 0 records
cutimed: 0 records
hydrophobic dressing: 0 records
hydrophobic dressings: 0 records
hydrophobic bandage: 0 records
hydrophobic bandages: 0 records
antiseptic dressing: 0 records
antiseptic dressings: 0 records
bacteria binding dressing: 0 records
bacteria binding dressings: 0 records

Table A.12: Source: FDA webpages
Interface / URL: http://www.fda.gov/
Database coverage dates: Information not found
Search date: 04/06/19
Retrieved records: 1

Search strategy:
FDA documents were sought using the default search option on the home page.
Search terms relating to dressings and bandages were searched as quoted phrases to reduce the number of irrelevant results relating to, for example, salad dressings and antiseptic hand rubs, that came up when terms were searched without quotes.
The results were screened by the information specialist – results judged to be clearly irrelevant were excluded.
Dialkylcarbamoyl chloride: 0 (1 result returned, excluded as irrelevant)
Dialkyl carbamoyl chloride: 0 (3 results returned, excluded as irrelevant)
Dialkylcarbamoylchloride: 0 (1 result returned, excluded as irrelevant)

DACC: 0 (3 results returned, excluded as irrelevant)
sorbact: 1 (1 result returned)
leukomed: 0
cutimed: 0
"hydrophobic dressing": 0
"hydrophobic dressings": 0
"hydrophobic bandage": 0
"hydrophobic bandages": 0
"antiseptic dressing": 0 (2 results returned, excluded as irrelevant)
"antiseptic dressings": 0 (2 results returned, excluded as irrelevant)
"bacteria binding dressing": 0
"bacteria binding dressings": 0

Table A.13: Source: MAUDE - Manufacturer and User Facility Device Experience
Interface / URL: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/search.CFM
Database coverage dates: "The searchable database data contains the last 10 year's data".
Search date: 04/06/19
Retrieved records: 2
Search strategy:

Medical Device Reports of device-associated adverse events were sought. Searches were run in Brand Name field. No date limits were applied.

Sorbact: 2
Cutimed: 0
Leukomed: 0 (2 results, excluded as within-resource duplicates)

Table A.14: Source: Health Technology Assessment (HTA) Database
Interface / URL: CRD Database
Database coverage dates: Information not found. From 31 March 2018, the HTA database remains available, but CRD are no longer adding new records to it. INAHTA will be taking over production and the next phase of the database development. Updating and addition of new records will resume on their new platform, when it is ready.
Search date: 04/06/19
Retrieved records: 1
Search strategy:

1	(Dialkylcarbamoyl chloride)	0
2	(Dialkyl carbamoyl chloride)	0
3	(Dialkylcarbamoylchloride)	0
4	(dacc)	0
5	(dacc* NEAR3 coat)	0
6	(coat* NEAR3 dacc*)	0
7	(sorbact*)	0
8	(leukomed*)	0
9	(cutimed*)	0
10	(hydrophob* NEAR4 (dressing* or bandage*))	0
11	((dressing* or bandage*) NEAR4 hydrophob*)	0
12	(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)	0
13	MeSH DESCRIPTOR bandages	199
14	MeSH DESCRIPTOR carbamates	22
15	(#13 AND #14)	0
16	(antiseptic NEAR3 dressing*)	8
17	(dressing* NEAR3 antiseptic)	4
18	((bacteria* NEAR4 bind*) and dressing*)	0
19	((bind* NEAR4 bacteria*) and dressing*)	0
20	#12 OR #15 OR #16 OR #17 OR #18 OR #19	10
21	* IN HTA	17351

22 (#20 AND #21) IN HTA 1

Table A.15: Source: NHS Economic Evaluation Database (NHS EED)

Interface / URL: CRD Database

Database coverage dates: Information not found. Bibliographic records were published on NHS EED until 31st March 2015. Searches of MEDLINE, Embase, CINAHL, PsycINFO and PubMed were continued until the end of the 2014.

Search date: 04/06/19

Retrieved records: 0

Search strategy:

1 (Dialkylcarbamoyl chloride) 0
2 (Dialkyl carbamoyl chloride) 0
3 (Dialkylcarbamoylchloride) 0
4 (dacc) 0
5 (dacc* NEAR3 coat) 0
6 (coat* NEAR3 dacc*) 0
7 (sorbact*) 0
8 (leukomed*) 0
9 (cutimed*) 0
10 (hydrophob* NEAR4 (dressing* or bandage*)) 0
11 ((dressing* or bandage*) NEAR4 hydrophob*) 0
12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11) 0
13 MeSH DESCRIPTOR bandages 199
14 MeSH DESCRIPTOR carbamates 22
15 (#13 AND #14) 0
16 (antiseptic NEAR3 dressing*) 8
17 (dressing* NEAR3 antiseptic) 4
18 ((bacteria* NEAR4 bind*) and dressing*) 0
19 ((bind* NEAR4 bacteria*) and dressing*) 0
20 #12 OR #15 OR #16 OR #17 OR #18 OR #19 10
21 * IN NHSEED17613
22 (#20 AND #21) IN NHSEED 0

Table A.16: Source: Database of Abstracts of Reviews of Effects (DARE)

Interface / URL: CRD Database

Database coverage dates: Bibliographic records were published on DARE until 31st March 2015. Searches of MEDLINE, Embase, CINAHL, PsycINFO and PubMed were continued until the end of the 2014.

Search date: 04/06/19

Retrieved records: 9

Search strategy:

1 (Dialkylcarbamoyl chloride) 0
2 (Dialkyl carbamoyl chloride) 0
3 (Dialkylcarbamoylchloride) 0

4 (dacc) 0
5 (dacc* NEAR3 coat) 0
6 (coat* NEAR3 dacc*) 0
7 (sorbact*) 0
8 (leukomed*) 0
9 (cutimed*) 0
10 (hydrophob* NEAR4 (dressing* or bandage*)) 0
11 ((dressing* or bandage*) NEAR4 hydrophob*) 0
12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11) 0
13 MeSH DESCRIPTOR bandages 199
14 MeSH DESCRIPTOR carbamates 22
15 (#13 AND #14) 0
16 (antiseptic NEAR3 dressing*) 8
17 (dressing* NEAR3 antiseptic) 4
18 ((bacteria* NEAR4 bind*) and dressing*) 0
19 ((bind* NEAR4 bacteria*) and dressing*) 0
20 #12 OR #15 OR #16 OR #17 OR #18 OR #19 10
21 * IN DARE 45418

22 (#20 AND #21) IN DARE 9

Appendix B: Search strategy for adverse events

The search described in Appendix A was not limited by study design or outcomes, and therefore also served to identify reports of adverse events. The searches included a search of MAUDE - Manufacturer and User Facility Device Experience for Medical Device Reports of device-associated adverse events. A supplementary search was carried out in March 2020.

Details of the complete search strategies are in Appendix A and Table A13.

Six published studies [10][37][38][39][40][41] contain information on an adverse event associated with Sorbact and the search of the MAUDE database identified three separate events from five reports. Details of adverse events are in Section 6.

Appendix C: Checklist of confidential information

Please see section 1 of the user guide for instructions on how to complete this section.

Does your submission of evidence contain any confidential information? (please check appropriate box):

No ☐ If no, please proceed to declaration (below)

Yes ☒ If yes, please complete the table below (insert or delete rows as necessary). Ensure that all relevant sections of your submission of evidence are clearly highlighted and underlined in your submission document, and match the information in the table. Please add the referenced confidential content (text, graphs, figures, illustrations, etc.) to which this applies.

Page	Nature of confidential information	Rationale for confidential status	Timeframe of confidentiality restriction
16, 22-23, 33, 41-42	☐ Commercial in confidence ☒ Academic in confidence	Academic research report awaiting publication	Until the paper is published. The timeframe is not known at this time.
Details	[redacted]		
#	☐ Commercial in confidence ☐ Academic in confidence	Enter text.	Enter text.
Details	Enter text.		

Confidential information declaration

I confirm that:

- all relevant data pertinent to the development of medical technology guidance (MTG) has been disclosed to NICE
- all confidential sections in the submission have been marked correctly
- if I have attached any publication or other information in support of this notification, I have obtained the appropriate permission or paid the appropriate copyright fee to enable my organisation to share this publication or information with NICE.

Please note that NICE does not accept any responsibility for the disclosure of confidential information through publication of documentation on our website that has not been correctly marked. If a completed checklist is not included then NICE will consider all information contained in your submission of evidence as not confidential.

Signed*: ** Must be Medical Director or equivalent*		**Date:**	11.03.2020
Print:	Paul Goodman	**Role / organisation:**	Commercial Director Essity Health & Medical Solutions UK & Ireland
Contact email:	paul.goodman@essity.com		

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical technologies guidance

MT496: Leukomed® Sorbact® for preventing surgical site infection

Company evidence submission

Part 2: Economic evidence

Company name	Essity- Health and Medical Solutions UK and Ireland
Submission date	9th April 2020
Contains confidential information	Yes – academic in confidence

Contents

1 Published and unpublished economic evidence

Identification and selection of studies

A single search was carried out to identify clinical and economic evidence. The search was carried out between 03/06/2019 and 05/06/2019 and updated in March 2020. Details of the search strategy and sources are in Appendix A. Two linked studies were identified which are relevant to an evaluation of the cost-effectiveness of Leukomed® Sorbact® compared with standard surgical dressings. Two unpublished studies [redacted] are relevant to the scope. The unpublished studies are discussed in Section 3. No published studies were found evaluating the cost-effectiveness of Sorbact[1] compared with NPWT.

Number of studies identified in a systematic search.		3
Number of studies identified as being relevant to the decision problem.		3
Of the relevant studies identified:	Number of published studies.	2
	Number of abstracts.	0
	Number of ongoing studies.	2

List of relevant studies

One study was a randomised controlled trial which compared Sorbact Surgical with a standard surgical dressing (Tegaderm™ + pad) in women undergoing caesarean-section (CS) in an acute hospital in Poland between June 2014 and April 2015 (Stanirowski 2016b). The primary outcome was the rate of surgical site infection (SSI), but the study also recorded resource use and costs. The trial recruited 543 women with rates of SSI at 14 days post-operatively of 1.84% (5/272) and 5.17% (14/271) (p=0.04) in the Sorbact and standard surgical dressing (SSD) groups, respectively. Attributable SSI costs included the costs of dressings, systemic antibiotics, ambulatory visits, additional hospitalisation and nursing care. Costs were calculated in Polish Zloty and converted to Euro at 2015 prices. The total cost of SSI prophylaxis and treatment was €5,775 and €1,065 in the SSD (n=271) and Sorbact (n=272) groups respectively, driven primarily by fewer women requiring systemic antibiotics and fewer inpatient bed-days.

[1] References to Sorbact refer to Leukomed Sorbact or Sorbact Surgical throughout.

A second linked study evaluated the cost-effectiveness of Sorbact compared with Tegaderm from the perspective of the NHS (Stanirowski 2019). UK unit costs at 2016/2017 prices were applied to the outcomes observed in the clinical study (Stanirowski 2016b) to estimate SSI costs based on resource use recorded in the trial. The total cost of SSI prophylaxis and treatment on this methodology was £13,271 and £6,717 for SSD (n=271) and Sorbact (n=272) groups, respectively. The study also calculated costs based on a published estimate of the cost per episode of SSI following caesarean section in an NHS hospital (Jenks 2014) inflated to 2016/17 prices (£3,976). On this basis total SSI costs were £55,999 and £23,818 for SSD and Sorbact groups respectively.

Table 1 Summary of relevant studies

Study name (year)	Location of study	Summary of model and comparators	Patient population	Costs	Outcomes	Results
Stanirowski 2016b	Poland	Costing alongside an RCT Intervention: Sorbact (n=272) Comparator: Standard surgical dressing (SSD, n=271)	Emergency or elective caesarean-section. Over 18 years. Mean age 31 years.	Cost of prophylaxis and treatment attributable to surgical site infection: dressings, systemic antibiotics, ambulatory visits, additional hospitalisation, and additional nursing care.	Rate of SSI: 1.84% (n=5) and 5.17% (n=14) for Sorbact and SSD groups, respectively (p=0.04)	Total cohort cost for the prophylaxis and treatment of SSI: €5775 and €1065 for SSD and Sorbact groups, respectively at 2015 prices
Stanirowski 2019	Cost-effectiveness analysis from UK perspective. Effectiveness and resource use data are taken directly from the underlying clinical trial (Stanirowski 2016b)	Decision analytic model (decision tree) with 14-day time horizon. Outcome was incidence of SSI Resource use data were taken from the Polish trial with UK unit costs (2017 prices). An alternative analysis applied a single episode cost for SSI following caesarean section from the literature (Jenks 2014) Intervention: Sorbact (n=272) Comparator: SSD (Tegaderm plus pad) (n=271)	Model population as the clinical trial. Emergency or elective caesarean-section. Over 18 years. Mean age 31 years.	Cost of prophylaxis and treatment attributable to surgical site infection: dressings, systemic antibiotics, ambulatory visits, additional hospitalisation, and additional nursing care.	Rate of SSI: 1.84% (n=5) and 5.17% (n=14) for Sorbact and SSD groups, respectively (p=0.04)	Based on resource use from the clinical trial (Stanirowski 2016b), the total cohort cost for the prophylaxis and treatment of SSI: £13,271 and £6,717 for SSD and Sorbact groups, respectively at 2016/17 prices In probability sensitivity analysis (PSA), 93% of iterations were cost- saving. Applying a single episode SSI cost, total cohort costs are £55,999 and £23,818 for SSD and Sorbact groups, respectively at 2016/17 prices.

2 Details of relevant studies

Table 2 Details of relevant studies

Stanirowski 2016b	
What are main differences in resource use and clinical outcomes between the technologies?	Clinical: difference in the incidence of surgical site infection (14/271=5.17%) vs. (5/272 = 1.84%) in favour of the intervention (Sorbact). Resource use difference: Fewer women requiring systemic antibiotics, shorter inpatient length of stay; more outpatient visits in the Sorbact group.
How are the findings relevant to the decision problem?	The study directly addresses the comparison between Sorbact and a standard post-surgical dressing in clean/clean-contaminated surgery
Does this evidence support any of the claimed benefits for the technology? If so, which?	Reduction in SSI risk Shorter inpatient length of stay Lower NHS system costs Better quality of life for patients by avoiding unnecessary post-operative complications
Will any information from this study be used in the economic model?	Yes. Evidence of relative risk reduction with Sorbact compared with standard post-surgical dressings
What cost analysis was done in the study? Please explain the results.	Yes. Costs of dressings, systemic antibiotics, hospitalisation, ambulatory visits and nurse time were recorded for 14 days post-operatively. Costs were estimated in Polish Zloty converted to Euro at 2015 prices. Total cohort costs were €5775 (Standard dressings n=271) and €1065 (Sorbact n=272).
What are the limitations of this evidence?	Although this is a large randomised controlled trial, the fact that it was not carried out in the NHS may be a limitation.
How was the study funded?	No funding source is stated. The authors report no conflict of interest relevant to the publication

Stanirowski 2019	
What are main differences in resource use and clinical outcomes between the technologies?	This study applies UK NHS unit costs to the clinical and resource use outcomes reported in the linked RCT (Stanirowski 2016b).
How are the findings relevant to the decision problem?	The study directly addresses the comparison between Sorbact and a standard post-surgical dressing from an NHS perspective.
Does this evidence support any of the claimed benefits for the technology? If so, which?	In particular this study supports the claim that use of Sorbact compared with a standard post-surgical dressing will be cost saving for the NHS
Will any information from this study be used in the economic model?	No
What cost analysis was done in the study? Please explain the results.	Applying UK unit costs at 2016/17 prices to the resource use observed in the RCT (Stanirowski) the total cost of SSI prophylaxis and treatment for a cohort of women was £13,271 (SSD, n=271) and £6,717 (Sorbact, n=272). Applying a single episode cost from the literature (Jenks 2014) inflated to 2016/17 prices for SSI following caesarean-section (£3,976), total costs were £55,999 (SSD) and £23,818 (Sorbact)
What are the limitations of this evidence?	The fact that the study is based on clinical outcomes from an RCT which was not carried out in the NHS may be a limitation
How was the study funded?	The study was initiated and funded by ABIGO Medical. The company had no input to the analysis and interpretation of results.

3 Economic model

Description

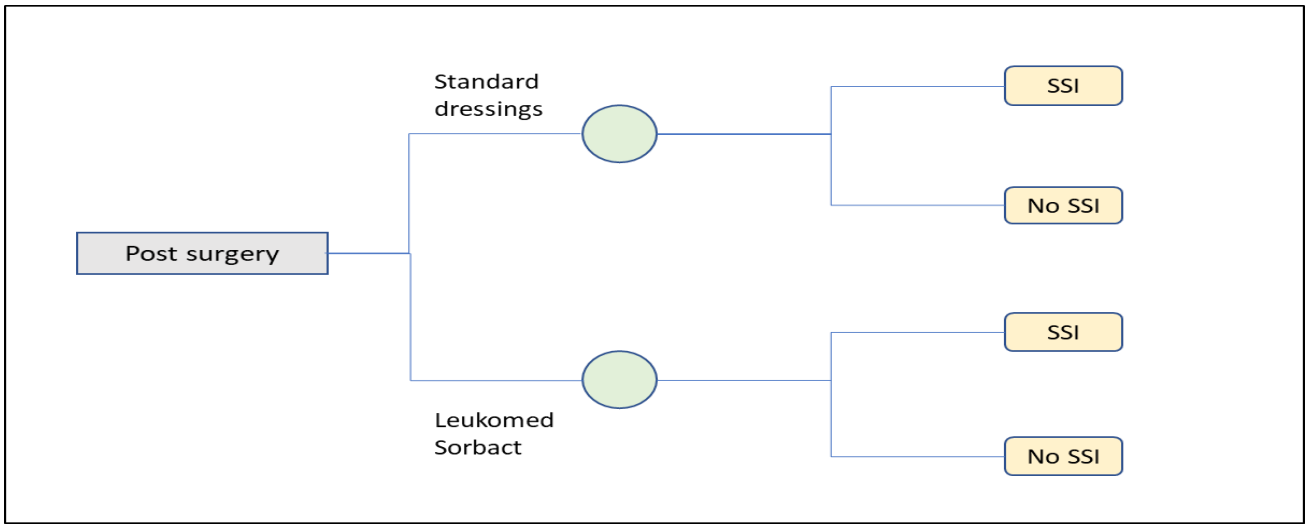
Patients

The model is generalisable to any patient group following clean/clean-contaminated surgery. Based on the available data the economic model is populated for three surgical groups: All surgical (representing clean/clean-contaminated procedures); caesarean-section; and vascular surgery

Technology and comparator

The technology is Leukomed Sorbact: a sterile, vapour-permeable adhesive film dressing. In line with the scope the comparator is a standard post-surgical dressing. No direct comparison has been possible between Sorbact and NPWT. This element of the scope is addressed outside the model.

Model structure



The economic model is a decision-analytic framework in which subjects enter a decision tree at the end of a surgical procedure when the incision is to be covered with an appropriate interactive dressing. The choice is between covering the incision with a standard post-surgical dressing or Leukomed Sorbact. The decision incurs costs for the initial dressing and any subsequent replacement dressings.

Outcomes are either surgical site infection (SSI) or no SSI. Developing SSI incurs the costs of excess inpatient length of stay, readmission for SSI and antibiotics. No SSI incurs no cost beyond the cost of

dressings. The primary endpoint is the incidence of SSI within 30 days of the procedure. Costs are incurred from the first occurrence of the infection to the end of the treatment episode. Cost-effectiveness is assessed in terms of the incremental cost per SSI avoided and the incremental cost per QALY gained.

Assumptions

Table 3: Assumptions in the economic model

Assumption	Justification
The intervention is a Leukomed Sorbact dressing, size 10cm x 25cm (NHSSC item Code ELY582). Prices are NHSSC prices ex. VAT	10cm x 25cm size is the best-selling size of Leukomed Sorbact in the NHS
The comparator dressing is Opsite™ Post-Op dressing, size 10cm x 25cm (NHSSC item code ELW092). Prices are NHSSC prices ex. VAT	Opsite™ Post-Op is the best-selling dressing in the NHS in the category of vapour-permeable adhesive film with absorbent pad sterile
Costs are estimated on the basis of one SSI episode only in the analysis period (no recurrence)	There are no data available about long term follow-up of patients who experience an SSI. Hence no data on possible recurrence.
The average number of dressings used is 1.25 per patient, and this is the same irrespective of the type of dressing	The suggested wear time for post-operative dressings is typically 5-7 days. The average of 1.25 is based on an RCT of women undergoing caesarean-section (Stanirowski 2016b)
Pre-intervention rates of SSI used in the analysis relate only to infections detected and treated during the initial inpatient episode or on readmission.	All of the published sources record this rate. Cases detected and treated entirely in the community after discharge are not included in surveillance reports.
The average SSI episode cost does not include the cost of treatment for cases detected and treated entirely in the community	For consistency with the definition of SSI rates

Clinical parameters

Baseline rates of SSI and the relative risk reduction/odds ratio associated with use of Leukomed Sorbact used in the modelling (Table 4) were derived from national SSI surveillance statistics for England and Wales and four of the studies identified in the review of clinical literature. Two RCTs relate to women undergoing caesarean-section, and two RCTs carried out in the UK relate to vascular surgery. Two of the six studies identified in the clinical literature review were excluded from the economic analysis on the basis that they were not relevant to surgical site infection. One excluded study reports rates of umbilical infection in newborn babies (Meberg 1990) and the other reports infection rates at skin graft donor sites (Lee 2018).

Public Health England carries out annual surveillance of SSI rates in English hospitals for a range of surgical specialties (PHE 2019). Patients are followed-up for 30 days postoperatively for non-implant procedures and one year for implant procedures. Hospitals are required to identify patients with SSI during their initial inpatient stay and patients being readmitted with SSI. Case finding outside the hospital is recommended but is optional and data derived from optional activities are not included in the reported figures. The 2019 annual report includes data from 201 NHS hospitals and 8 independent sector treatment centres for the period April 1st 2018 to March 31st 2019. Data from the English national surveillance is used in the model for the baseline risk of SSI for all surgical specialities and vascular surgery.

Jenks (2014) reports SSI rates for a range of specialties at a large NHS hospital between April 2010 and March 2012. The study also provides data on SSI-attributable postoperative length of stay and average episode costs. For all procedures the SSI incidence measured during the initial inpatient stay and on readmission, but excluding infection detected post-discharge, was 1.97% (282/14,300) (Jenks 2014, Table I). Because of its larger sample size and more contemporary date, the modelling assumes the SSI incidence from the English national surveillance (1.09%) for the combined surgical category (PHE 2019).

Two RCTs carried out in an English hospital report baseline SSI rates at 30 days of 19% and 25.7% for patients following non-implant vascular surgery (Bua 2017, Totty 2019). Infections were recorded during the initial inpatient phase and on readmission. Follow-up did not extend to infections detected and treated in the community. A study covering 140 English hospitals between October 1997 and June 2001 reported SSI incidence, mean attributable length of stay and episode costs for a range of surgical procedures (Coello 2005). The estimated incidence rate for vascular surgery was 7.7%. Jenks (2014) reports a rate of 2.99%. The base case modelling assumes a pre-intervention rate of 2.5% from the English national surveillance (PHE 2019). The higher rates observed in the RCTs are used in a scenario analysis.

Information on SSI rates following caesarean section (CS) is not available from the English national surveillance, but Public Health Wales provides information on rates of SSI following CS in the period January 1st 2016 to December 31st 2016 (PHW 2017). Data are collected from hospitals for a follow-up period up to 14 days after surgery. Case finding includes SSI developing during the inpatient stay, readmission with an SSI, and post-discharge in the community. Two RCTs report baseline rates of SSI in women undergoing CS of 9.8% and 5.2% (Stanirowski 2016a, b). Jenks (2014) reports a rate of 1.36% from a sample of 1837

procedures. The baseline incidence rate reported in the Welsh national surveillance (4.35%) is used in the modelling because it is from a contemporary UK source with a relatively large sample (7,051 procedures). Because the rate refers to SSI only up to 14 days it is likely most of the treatment will occur during the initial inpatient stay or on readmission.

Data on the relative risk reduction (RRR) associated with Sorbact is available from randomised trials in caesarean-section and vascular surgery. The modelling uses pooled rates from the two CS trials (RRR=67.2%, Odds Ratio=0.32) (Stanirowski 2016a, b), and pooled rates from the trials of vascular surgery (RRR=42.2%, Odds Ratio=0.52). No trial data are available for the all surgery group and for this group the base-case applies a RRR (50%) derived from pooling data from the four RCTs (Stanirowski 2016a, b; Bua 2017; Totty 2019).

Table 4 Clinical parameters used in the model

Parameter	Source	Standard surgical dressing	Leukomed Sorbact	Relative risk reduction Odds ratio	Values used in the model?
Rate of SSI in women undergoing caesarean-section at 14 days	Stanirowski 2016a	7/71 (9.8%)	2/71 (2.8%)	RRR=71.4% OR=0.26	
Rate of SSI in women undergoing caesarean-section at 14 days	Stanirowski 2016b	14/271 (5.2%)	5/272 (1.8%)	RRR=65.4% OR=0.34	
Caesarean-section: Pooled		21/342 (6.1%)	7/343 (2.0%)	RRR=67.2% OR=0.32	Yes
NHS Wales. Caesarean-section SSI rate at 14 days: All Wales 2016		4.35%			Yes
Rate of SSI in patients undergoing clean/clean-contaminated vascular surgery at 30 days	Bua 2017	19/100 (19%)	10/100 (10%)	RRR=47.4% OR=0.47	
Rate of SSI in patients undergoing clean/clean-contaminated vascular surgery at 30 days	Totty 2019	18/70 (25.7%)	12/74 (16.2%)	RRR=36.9% OR=0.56	
Vascular surgery: Pooled		37/170 (21.8%)	22/174 (12.6%)	RRR=42.2% OR=0.52	Yes
Pooled vascular surgery and caesarean section		58/512 (11.3%)	29/517 (5.6%)	RRR=0.50 OR=0.46	Yes
NHS hospitals in England April 2018-March 2019SSI rate at 30 days. Vascular surgery	NHS England	2.5%			Yes
NHS hospitals in England April 2018-March 2019 SSI rate at 30 days. All surgical categories	NHS England	1.09%			Yes

Other parameters in the model

Table 5 Other parameters in the model

Parameter	Description	Justification	Source
Time horizon	30 days for SSI incidence Time from onset to resolution of the infection for costs	There is no evidence available for follow-up beyond 30 days. Most studies record SSI rates at 14 days or 30 days.	Clinical literature review
Discount rate	NA	Because of the short (<1 year) time horizon of the analysis	
Perspective (NHS/PSS)	NHS/PSS	In line with the scope	
Cycle length	NA	Because this is a model structure with no time-dependent probabilities	
Probabilities	SSD probability = Probability of SSI within 30 days with standard surgical dressing and Sorbact probability = probability of SSI within 30 days with Leukomed Sorbact		Literature See Table 4
Health states	With SSI Without SSI	The driver of costs and patient outcomes is the presence or absence of SSI	
SSI episode costs	Cost per patient of resolving an episode of surgical site infection		Literature See Table 7

The probabilities in the model are the probabilities of developing SSI up to 30 days after the procedure. These probabilities are expected to differ between the intervention and control. In one of the approaches to estimating SSI episode costs in vascular surgery probabilities are assigned to inpatient readmission rates and the proportion of subjects requiring antibiotics observed in a UK clinical trial. These probabilities are expected to depend on the presence or absence of a surgical infection and are independent of the type of post-operative dressing used.

Health state utility

The presence of a post-surgical infection is expected to have a negative impact on quality of life. Gheorghe (2015) carried out a systematic review of the literature on utility values associated with SSI. Of the 28 included studies, 19 were from model-based economic evaluations, and nine were patient-level studies. Three studies reported EQ-5D utility values. One study derived values directly from patient-completed EQ-5D-3L questionnaires (Pinkney 2013) and two studies mapped to EQ-5D from SF-36 (Whitehouse 2002, Falavigna 2011). The utility decrement associated with SSI in these studies ranged from 0.102 to 0.124 (Table 6).

Table 6 Health state utility decrement associated with SSI

Study	Source	Population	HSU decrement	Timepoint
Whitehouse 2002	SF-26 mapped to EQ-5D	United States: orthopaedic surgery	SSI -0.102	At 1 year
Flavigna 2011	SF-36 mapped to EQ-5D	Brazil: lumbar arthrodesis	Deep wound infections -0.124	At median 22 months
Pinkney 2013	EQ-5D-3L completed by patients at 7 and 30 days	UK: Open abdominal surgery	Superficial SSI -0.12	At 30 days

Resource identification, measurement and valuation

Technology costs

Leukomed Sorbact is a sterile vapour-permeable adhesive film dressing with absorbent pad. The price is the NHS Supply Chain price ex. VAT at August 2019. The comparator is Opsite Post-Op (Smith & Nephew). In the period Q4 2018 to Q3 2019 Opsite Post-Op was the best-selling dressing in the category with 40% of total sales by value (NHS Supply Chain, June 2019). The price is the NHS Supply Chain price ex VAT (NHS Supply Chain, August 2019).

- The NHSSC price for Leukomed Sorbact 10cm x 25cm (item EY582) is £182.92 ex. VAT for a pack of 20 = £9.15 per dressing. This is the price used in the modelling
- [redacted] In order to compare like with like, this is the price used in the modelling. [redacted] This price is used in a sensitivity analysis

NHS and unit costs

There is no separate NHS tariff code for a surgical infection. The cost of an infection will generally be borne by the Trust within the standard HRG tariff. In this analysis the expected cost of a surgical site infection is estimated by combining estimates of the SSI-attributable length of stay with an estimate of the average NHS bed-day cost. The relevant bed-day cost is derived from the National Schedule of NHS Costs (NHS 2019) (codes WHO7C and WHO7D).

Resource use

A literature search identified two studies (Coello 2005, Jenks 2014) which are relevant to the scope, plus one unpublished study [redacted] The published studies report estimates of the SSI-attributable length of stay and episode costs for English hospitals covering vascular surgery, caesarean-section and a combination of all surgical procedures (Table 7).

The base-case considers three population groups: a combined group of all surgical specialties, caesarean-section and vascular surgery. The all surgery analysis uses the SSI-attributable episode cost from the study by Jenks (2014) inflated to 2018/19 prices (£5,708) using an NHS inflation index published by PSSRU (Curtis 2019). The vascular surgery analysis applies the episode costs from an unpublished UK study [redacted](£3,247). The caesarean-section analysis applies the episode cost from Jenks (2014) inflated to 2018/19 values (£4,048).

Jenks (2014) reports SSI rates for a range of specialties at a large NHS hospital between April 2010 and March 2012. The study also provides data on SSI-attributable postoperative length of stay and average episode costs. For all procedures, vascular surgery and caesarean section the median attributable length of stay was 10 days, 10 days and 4 days, respectively. SSI attributable costs were £5,239, £2,480 and £3,716 for all surgery, vascular and caesarean section, respectively. The price base is assumed to be 2012. A previous study analysed national surveillance data from 140 English hospitals in the period October 1997 to June 2001 for a range of surgical procedures, including vascular surgery but not caesarean section (Coello 2005). For vascular surgery the mean additional length of stay was 12.2 days and the mean episode cost was £3,545 at 2003 prices. Because the data are more contemporary and cover all the specialties of interest, the study by Jenks is preferred in the modelling.

[redacted]

[redacted]

A previous NICE appraisal adjusted the published estimates of episode cost reported in Jenks (2014) to allow for the fact that a proportion of SSI cases will be detected and treated in the community (NICE MTG 43, 2019). Estimates in Jenks (2014, Table III) and in the unpublished study [redacted] are hospital costs incurred in treating cases which were detected during the initial inpatient stay or on readmission. Hence costs incurred on cases detected and treated in the community after discharge are not accounted for. However, in this study the baseline rates of SSI derived from English and Welsh surveillance, and from the four RCTs all refer to cases detected only during the initial inpatient stay or on readmission. If cases which are detected and treated in the community post-discharge were included, the baseline incidence rates would be substantially higher. For this reason the analysis here is consistent because costs and incidence rates both refer to the same entity.

Table 7 Estimates of SSI episode cost

Source	Population	SSI-attributable length of stay	SSI episode cost	Episode cost at 2018/19 prices	Used in the modelling ?
[redacted] Local NHS acute hospital	Vascular surgery	Mean Δ = 9.72 days (95% ci 5.25-14.18)		£3,247 (95% ci £1,732 to £4,733)	Yes
Coello (2005) 140 English hospitals	Vascular surgery All	Mean Δ = 12.2 days (95% ci 9.8-15.0)	£3,545 2001 prices	£3,862	
	Vascular surgery Superficial incisional SSI	Mean Δ = 11.4 days (95% ci 8.8-14.3)	£3,313	£3,609	
	Vascular surgery Deep incisional SSI	Mean Δ = 18.4 days (95% ci 11.7-27.3)	£5,347	£5,825	
Jenks (2014) Local NHS acute hospital	Vascular surgery	Median Δ = 10 days	£2,480 2012 prices	£2,702	
	Caesarean-section	Median Δ = 4 days	£3,716	£4,048 (95% ci £975 to £5,344)	Yes
	All surgery	Median Δ = 10 days	£5,239	£5,708 (95% ci £5,035 to £7,320)	Yes

Implementation costs

The technology represents a direct replacement of one dressing with another dressing used within the current treatment pathway. No additional resources are required to implement the technology in the NHS. The change which is anticipated would result in fewer patients developing a healthcare-associated infection, with consequent savings in NHS resource use. Expected outcomes for patients will be improved to the extent that the risk of post-surgical complications is reduced. The expected impact on the NHS is to release resources which can be used to treat additional patients or to address other priorities.

Adverse event costs

No adverse events are included in the economic model

Miscellaneous costs

There are no additional costs not included in the model. The training required to implement the technology is minimal and what information is required about the product will be provided by the company. Other opportunities for resource savings or redirection of resources that have not been possible to quantify could include a saving in patient and carer transport costs where readmission is required for an infection, or delays in return to work when normal healing is delayed.

Results

Base-case

Results are presented for three population groups (Table 9). In each of the populations Sorbact is a dominant option compared with a standard surgical dressing. Table 8 summarises the parameters in the base-case.

Table 8 Base-case parameters (per 100)

	Baseline SSI rate (Table 4)	Sorbact Relative Risk Reduction (Table 4)	Sorbact SSI rate	SSI episode cost at 2018/19 prices (Table 7)
All surgery	1.09	50%	0.55	£5,708
Source	NHS England	Pooled RCT data		Jenks 2014
Vascular surgery	2.5	42%	1.45	£3,247
Source	NHS England	Pooled vascular surgery RCT data		UK study [redacted]
Caesarean-section	4.35	67%	1.44	£4,048
Source	NHS Wales	Pooled caesarean-section RCT data		Jenks 2014

For an all surgery population the base-case assumes the 1.09% SSI incidence recorded for all English hospitals in the national surveillance (PHE 2019) and a 50% relative risk reduction (RRR) derived from pooling data from the four RCTs (Bua 2017, Totty 2019, Stanirowski 2016 a,b). The episode cost is from the literature (Jenks 2014) inflated to 2018/19 prices (Table 7). Results (Table 9) show 0.55 SSI events avoided per 100 procedures and a cost saving of £20.56 per patient. Assuming a utility decrement of 0.12 lasting for 3 months, the net QALY gain is 0.02 per 100 procedures.

For the vascular surgery population the base-case assumes the 2.5% baseline SSI incidence reported for all English hospitals in the national surveillance (PHE 2019) and a relative risk reduction of 42%, which is the RRR observed in pooled data from two studies in an acute NHS hospital in England (Bua 2017, Totty 2019). The episode cost is from an unpublished analysis of patient-level data from an NHS trial [redacted] (Table 7). Results show 1.05 events avoided per 100 procedures and a net cost saving of £23.54 per patient. The net QALY gain is 0.03 per 100 procedures (Table 9).

In the absence of data for English hospitals, the base-case for the caesarean-section population assumes a 4.35% incidence based on national surveillance in Wales (PHW 2017) and a RRR of 67% derived by

pooling data from two RCTs (Stanirowski 2016a, b). The episode cost is from the literature (Jenks 2014) inflated to 2018/19 prices (Table 7). Results show 2.91 events avoided per 100 procedures and a net cost saving of £107.43 per patient. The net QALY gain is 0.09 per 100 procedures (Table 9).

Table 9 Base-case results per 100 (Sorbact-SSD)

	All surgery	Vascular surgery	Caesarean-section
Incremental dressing costs	+£1,055	+£1,055	+£1,055
Incremental SSI costs	-£3,111	-£3,409	-£11,798
Incremental total costs	**-£2,056**	**-£2,354**	**-£10,743**
SSI avoided	0.55	1.05	2.91
Incremental QALYs	+0.02	+0.03	+0.09

Scenario analysis

The main drivers of the results are the baseline rate of SSI, the efficacy of Sorbact compared with standard surgical dressings, and the SSI episode cost. Scenario analyses explore the effect of alternative assumptions about the baseline rates of SSI and the RRR. The choice of scenarios is determined by the literature (Table 4). The scenarios reflect the best available information and results are consistent with the expectation that a switch from standard dressings to Leukomed Sorbact will improve outcomes and reduce costs.

The effect of dressing prices and SSI episode costs are explored in a one-way sensitivity analysis

Scenario 1: All Surgery

The current estimate of the incidence rate in England (1.09%) is very low, and there are no alternative sources which would suggest a lower rate. Similarly, there are no studies providing data on the Sorbact RRR in this population.

The scenario varies the Sorbact RRR by +/- 25% from the base of 50%. The range is between 37.5% and 62.5%. Sorbact remains dominant at any RRR above 17%.

Scenario 1: All surgery results per 100 (Sorbact-SSD)				Breakeven
Baseline SSI rate	**1.09**			
Sorbact RRR	**37.5%**	**50%**	**62.5%**	**17%**
Incremental dressing costs	+£1,055	+£1,055	+£1,055	+£1,055
Incremental SSI costs	-£2,333	-£3,111	-£3,889	-£1,058
Incremental total costs	**-£1,278**	**-£2,056**	**-£2,834**	**-£3.00**
SSI avoided	0.41	0.55	0.68	0.19
Incremental QALYs	+0.013	+0.017	+0.021	+0.006

Scenario 2: Vascular surgery

There is an alternative source for the baseline rate of SSI and the RRR in this population: pooled data from two studies carried out in the NHS in England (Bua 2017, Totty 2019). The baseline rate of SSI (21.8%) is considerably higher than the rate reported in the English national surveillance (2.5%). The RRR is 42% taken directly from the trials. In this scenario the number of cases avoided is 9.2 per 100 procedures and the net cost saving is £288 per patient.

In the English national surveillance, the current SSI rate is 2.5% (PHE 2019). In this scenario the RRR is varied by +/- 25% around the base of 42%. The number of cases avoided is between 0.79 and 1.58 per 100, and net cost savings vary between £15.0 and £40.6 per patient. Sorbact is cost saving at any RRR above 13%

Scenario 2: Vascular surgery results per 100 (Sorbact-SSD)					**Breakeven**
Sorbact RRR	**Pooled Bua 2017 & Totty 2019**	**English national surveillance baseline rate (PHE 2019)**			
Baseline SSI rate	**21.8**	**2.5**			
RRR	**42%**	**31.5%**	**42%**	**63%**	**13%**
Incremental dressing costs	+£1,055	+£1,055	+£1,055	+£1,055	+£1,055
Incremental SSI costs	-£29,871	-£2,557	-£3,409	-£5,114	-£1,055
Incremental total costs	**-£28,816**	**-£1,502**	**-£2,354**	**-£4,059**	**£0.00**
SSI avoided	9.2	0.79	1.05	1.58	0.33
Incremental QALYs	+0.29	+0.024	+0.033	+0.049	+0.01

Scenario 3: Caesarean-section

In this population there is an alternative source for the base rate of SSI and the RRR: pooled data from two RCTs carried out in Poland (Stanirowski 2016a,b). In these studies the pre-intervention rate of SSI (6.1%) is broadly comparable with the rate reported in Wales (4.35%). The RRR is taken directly from the trials (67.2%). In this scenario the number of cases avoided is 4.09 per 100 procedures and the net cost saving to the NHS is £154 per patient.

In the Welsh national surveillance, the recorded SSI rate is 4.35% (PHW 2017). In this variant the RRR is varied by +/- 25% around the base of 67%. The number of cases avoided is between 2.19 and 3.64 per 100, and net cost savings vary between £78 and £137 per patient. Sorbact is cost saving at any RRR above 6%.

Scenario 3: Caesarean-section results per 100 (Sorbact-SSD)					
	Pooled (Stanirowski 2016a, b)	**Welsh national surveillance baseline rate (PHW 2017)**			**Breakeven**
Baseline SSI rate	6.1%	4.35%			
RRR	**67%**	**50.25%**	**67%**	**83.75%**	**6%**

Incremental dressing costs	+£1,055	+£1,055	+£1,055	+£1,055	+£1,055
Incremental SSI costs	-£16,544	-£8,848	-£11,798	-£14,747	-£1,057
Incremental total costs	**-£15,489**	**-£7,793**	**-£10,743**	**-£13,692**	**-£2.0**
SSI avoided	4.09	2.19	2.91	3.64	0.26
Incremental QALYs	+0.13	+0.07	+0.09	+0.11	+0.008

Sensitivity analysis

Patient outcomes are impacted by the baseline rate of SSI and the RRR associated with a switch to Sorbact. The main driver of cost savings is the SSI episode cost. The first univariate sensitivity analysis (SA) varies the base case episode cost within the 95% confidence interval of the central estimate (Table 7).

Table 10: Sensitivity analysis SSI Episode costs			
Population	**Base-case**	**95% ci Low**	**95% ci High**
All surgery	£5,708	£5,035	£7,320
Vascular surgery	£3,247	£1,732	£4,733
Caesarean-section	£4,048	£975	£5,344

Table 11: Sorbact incremental cost (per 100)				
Population	**Base-case**	**95% ci Low**	**95% ci High**	**Breakeven Episode cost**
All surgery	-£2,056	-£1,689	-£2,934	£2,000
Vascular surgery	-£2,354	-£764	-£3,915	£1,000
Caesarean-section	-£10,743	-£1,764	-£14,520	£350

The second SA varies dressing prices by -50% (SSD) and +100% (Sorbact)

Table 12: Sensitivity analysis dressing costs Sorbact incremental cost (per 100)				
Population	**Base-case**	[redacted]	**Sorbact +100% (£18.30)**	**Both**
All surgery	-£2,056	[redacted]	-£912	[redacted]
Vascular surgery	-£2,354	[redacted]	-£1,211	[redacted]
Caesarean-section	-£10,743	[redacted]	-£9,599	[redacted]

Summary

The overall rate of surgical site infection in English hospitals is 1.09 cases per 100 procedures (PHE 2019). This is very low compared with other evidence from the literature. Nonetheless, the cost analysis shows that even reducing SSI cases by as little as 1 in 200 procedures, Leukomed Sorbact is expected to be cost

saving. The additional dressing cost is £10.55 per procedure and the net saving is £20.56 (Table 9). The cost saving comes from a reduction in bed-days, readmission and the use of antibiotics. Evidence for vascular surgery and caesarean-section procedures confirms the expectation that Sorbact is a dominant option compared with standard dressings.

Other things being equal, the net cost saving increases with the baseline SSI risk and with the size of the risk reduction. The scenario analyses explore a plausible range of assumptions about baseline risk and the RRR from the published literature. The expectation that Sorbact is a dominant option is robust to any of the modelled scenarios. The breakeven RRR ranges from 6% (caesarean-section) to 17% (All surgery combined) compared with a rate from pooled RCT data of 50%.

The magnitude of the expected cost saving is sensitive to the episode cost. The assumed episode cost is varied in a sensitivity analysis within a range determined by the 95% confidence interval of the central estimate. The incremental cost varies between -£1,689 and -£2,934 (All surgery); -£764 and -£3,915 (vascular surgery); -£1,764 and -£14,520 (caesarean-section). The breakeven episode cost varies from £350 to £2,000. Varying the dressing cost also changes the magnitude of the expected cost saving but does not change the overall conclusion.

Negative pressure wound therapy

The scope for this appraisal includes negative pressure wound therapy (NPWT) as a comparator. This comparison is not included in the main analysis primarily because there are no published studies which directly compare the two dressings.

PICO™ (Smith and Nephew) is a single-use negative pressure wound therapy system consisting of a sterile pump and an adhesive dressing. It is intended for use on surgical incisions with low or moderate levels of exudate. The NICE appraisal of PICO compared with a standard wound dressing for preventing surgical site infection (NICE MTG43 2019) recommends that PICO should be considered as an option for closed surgical incisions in people who are at high risk of developing infection. The analysis carried out by the External Assessment Centre (EAC) suggests that PICO provides additional clinical benefits at a similar overall cost compared with standard dressings.

The evidence base for PICO includes eight RCTs which compared PICO with standard dressings in patients with closed surgical incisions. All these studies recruited patients with a high risk of developing infection. Pooled estimates from the eight studies showed a significant reduction in SSI with PICO (Odds Ratio = 0.51). Two of the RCTs involved women undergoing caesarean-section (CS). Chaboyer (2014) recruited 92 obese women undergoing elective CS randomised to receive PICO or a standard post-surgical dressing. The total number of SSIs was 12/43 with standard care (27.9%) and 10/44 with PICO (22.7%), RRR = 18.6%. A study involving five hospitals in Denmark randomised 876 obese women (BMI ≥ 30 kg/m^2) to receive PICO or standard post-operative dressings after CS. The number of SSIs was 41/444 standard

care (9.2%) and 20/432 (4.6%) with PICO, RRR = 50%. For reference, the pooled relative risk reduction in the two CS studies involving Sorbact vs. standard dressings was 67.2% in a population with an average BMI in the study group of 23.9 kg/m^2 (95% ci = 16.3-47.7). Approximately 10% of the study group had a BMI ≥ 30 kg/m^2.

Leukomed Sorbact is indicated for use on any post-surgical incision and not only those at high risk of developing infection. For this reason, PICO is not a relevant comparator for Leukomed Sorbact except in the sub-set of patients and/or procedures judged to be at high risk. The evidence base for Sorbact includes four RCTs, two of which were carried out in the NHS. In none of these trials was recruitment limited by an assessment of SSI risk.

An important difference between PICO and Leukomed Sorbact is the price. PICO is sold in a pack containing a single-use pump and two dressings.

[redacted]The price for two Sorbact, dressings 10cm^2 x 25cm^2 is £18.30 (ex. VAT).

[redacted]f the results of this limited evaluation are replicable elsewhere, the cost difference suggests that Leukomed Sorbact could be a cost-effective alternative to PICO.

Validation

The economic model has been quality-checked by an independent reviewer. Clinical assumptions and the conclusions of the cost analysis have been validated by current NHS Leukomed Sorbact users. The names of clinical experts have been supplied separately.

4 Summary and interpretation of economic evidence

Describe the main findings from the economic evidence and cost model. Explain any potential cost savings and the reasons for them

Evidence supports the case for Leukomed Sorbact as an option for closed surgical incisions. There is strong support for the expectation that these dressings lead to improved patient outcomes at reduced cost to the NHS.

There are two published studies of relevance to the scope. One is a cost analysis alongside a clinical trial carried out in a Polish hospital, and one is an adaptation of the outcomes observed in that trial to reflect UK costs. Both studies show a reduction in the incidence of surgical site infections and a reduction in costs to the healthcare system.

The *de novo* cost model applies conservative estimates of baseline risk, risk reduction and episode costs derived from UK sources to a model comparing Leukomed Sorbact with the post-operative dressing most commonly used in the NHS. Estimates of the relative risk reduction are taken from pooled data from four randomised controlled trials, two of which were carried out in the NHS. The model is applied to a population group aggregating all surgical specialties and to two sub-groups: vascular surgery and caesarean section.

The modelling shows a reduction in SSI incidence, a reduction in cost to the NHS and a small QALY gain in all the population groups. The driver of cost savings is a reduction in resources required to treat infection, namely post-operative bed-days, bed-days on readmission with an infection, and antibiotics. The SSI-attributable length of stay in English hospitals varies between 4 days (caesarean-section) and 12.2 days (vascular surgery). Despite the fact that post-surgical infection may have an important impact on quality of life and/or return to work, the QALY gain is small because of the typically short duration of an infection.

Results are robust to plausible values of all the key parameters in the model. The breakeven values of episode cost (£350 to £2,000 depending on the type of surgery) and relative risk reduction (6% to 17%) are substantially lower than the lowest contemporary episode cost estimate (£3,200) and the lowest RRR reported in the literature (36.9%).

PICO (Smith & Nephew) is recommended by NICE as an option for closed surgical incisions in patients and/or procedures judged to be at high risk of infection (NICE MTG43). Given the substantial price difference between PICO and Sorbact, so long as outcomes are similar, Sorbact offers a very cost-effective alternative.

Briefly discuss the relevance of the evidence base to the scope.

The evidence is directly relevant to a comparison of Leukomed Sorbact and standard post-operative dressings. No direct comparison is possible with NPWT. This part of the scope is addressed outside of the economic model.

Briefly discuss if the results are consistent with the published literature. If they are not, explain why and justify why the results in the submission be favoured over those in the published literature.

The published economic literature is limited to two studies. Both studies show significant cost savings with Leukomed Sorbact arising from a reduction in the incidence of surgical site infection. The results of the *de novo* cost modelling are consistent with the published literature.

Describe if the cost analysis is relevant to all patient groups and NHS settings in England that could potentially use the technology as identified in the scope.

The results of the cost analysis are relevant to any patient with a closed surgical incision expected to have low or moderate levels of exudate.

Briefly summarise the strengths and limitations of the cost analysis, and how these might affect the results.

The evidence base includes four well-designed randomised controlled trials, two of which were carried out in the NHS. The cost model applies episode cost and the baseline risk of SSI from UK sources. The episode cost for vascular surgery was derived from patient-level analysis of data from a UK clinical study.

Estimates of baseline risk, the relative risk reduction, and episode costs are all subject to uncertainty, but the cost analysis applies conservative values in all cases and results are very robust to a range of plausible alternative values.

The case for Sorbact will be strengthened as evidence becomes available for additional surgical specialities. Nonetheless, the mode of action of Sorbact is well-defined and there is good reason to believe that results from the current studies will be generalisable to other similar procedures.

Detail any further analyses that could be done to improve the reliability of the results.

None at present

5 References

Please include all references below using NICE's standard referencing style.

Bua N, Smith GE, Totty JP, et al. Dialkylcarbamoyl chloride dressings in the prevention of surgical site infections after nonimplant vascular surgery. *Ann vasc Surg* 2017; 44:387-392

Chaboyer W, Anderson V, Webster J, et al. Negative pressure wound therapy on surgical site infections in women undergoing elective caesarean sections: a pilot RCT. *Healthcare* (Basel) 2014;2(4):417-28.

[redacted]

Coello R, Charlett A, Wilson J, et al. Adverse impact of surgical site infections in English hospitals. *Journal of hospital Infection* 2005; 60:93-103

Curtis LA, Burns A. Unit Costs of Health and Social care. PSSRU, Kent, 2019. https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-2019/

Falavigna A, Righesso O, Traynelis VC, et al. Effect of deep wound infection following lumber arthrodesis for degenerative disc disease on long term outcome: a prospective study. *J. Neurosurg Spine* 2011; 15:399-404

Gheorghe A, Moran G, Duffy H, et al. Health utility values associated with surgical site infection: A systematic review. *Value in Health* 2015; 18:1126-1137

Hyldig N, Vinter CA, Kruse M, et al. Prophylactic incisional negative pressure wound therapy reduces the risk of surgical site infection after caesarean section in obese women: A pragmatic randomised clinical trial. *BJOG* 2018. doi:10.1111/1471-0528.15413 [Epub ahead of print].

Jenks PJ, Laurent M, McQuarry S, Watkins R. Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. *Journal of Hospital Infection* 2014; 86:24-33

Lee JW, Park SH, Suh IS, Jeong HS. A comparison between DACC with chlorhexidine acetate-soaked paraffin gauze and foam dressing for skin graft donor sites. *J Wound Care.* 2018;27(1):28-35.

Meberg A, Schoyen R. Hydrophobic material in routine umibilical cord care and prevention of infections in newborn infants. *Scand J Infect Dis*. 1990;22(6):729-33.

National Schedule of NHS Costs 2018/19. https://improvement.nhs.uk/resources/national-cost-collection/

NHS Supply Chain Product and transaction database, June 2019. Supplied by Health Data Analytics

NHS Supply Chain Price Ranking Sheets, August 2019. Supplied by Tower 3

NICE. PICO negative pressure wound dressings for closed surgical incisions. National Institute for Health and Care Excellence, Medical Technology Guidance (MTG43), May 2019

PHE 2019: Surveillance of Surgical Site Infection in NHS Hospitals in England, April 2018 to March 2019. Public Health England. December 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/854182/SSI_Annual_Report_2018_19.pdf

PHW 2017: Caesarean-Section Surgical Site Infection Surveillance. Annual Report All Wales.

http://www2.nphs.wales.nhs.uk:8080/WHAIPDocs.nsf/3dc04669c9e1eaa880257062003b246b/5b9c050161b4474080258211003 59f6f/$FILE/2016%20All%20Wales%20SSI%20Annual%20Report%20-%20V1.pdf

Pinkney TD, Calvert M, Bartlett DC, et al. Impact of wound edge protection devices on surgical site infection after laparotomy: Multicentre randomised controlled trial (ROSSINI trial). BMJ 2013;347: f4305

Stanirowski PJ, Kociszewska A, Cendrowski K, Sawicki W. Dialkylcarbamoly chloride-impregnated dressing for the prevention of surgical site infection in women undergoing caesarean section: A pilot study. *Arch Med Sci* 2016a 12(5):1036-1042

Stanirowski PJ, Bizon M, Cendrowski K, Sawicki W. Randomized controlled trial evaluating dialkylcarbamoyl chloride-impregnated dressings for the prevention of surgical site infections in adult women undergoing caesarean section. *Surg Infect* 2016b 17(4):427-35

Stanirowski PJ, Davies H, McMaster J, et al. Cost-effectiveness of a bacterial-binding dressing to prevent surgical sire infection following caesarean section. *Journal of Wound Care* 2019;28(4):222-228

Totty JP, Hitchman LH, Cai PI, et al. A pilot randomised clinical trial comparing dialkycarbamoylchloride-coated dressings versus standard care for the primary prevention of surgical site infection. *Int Wound J*. 2019;16(4):883-890

Whitehouse JD, Friedman ND, Kirkland KB, et al. The impact of surgical-site infections following orthopaedic surgery at a community hospital and a university hospital: adverse quality of life, excess length of stay, and extra cost. *Infect Control Hosp Epidemiol* 2002; 23:183-9.

[redacted]

6 Appendices

Appendix A: Search strategy for economic evidence

Date search conducted:	03/06/2019-05/06/2019 Updated 17/03/20
Date span of search:	No date limit was applied

List the complete search strategies used, including all the search terms: textwords (free text), subject index headings (for example, MeSH) and the relationship between the search terms (for example, Boolean). List the databases that were searched.

The following databases and information resources were searched. The service provider, interface or URL are shown in parentheses following the resource name.

- MEDLINE, MEDLINE In-Process, MEDLINE Daily and Epub Ahead of Print (Ovid SP)
- Embase (Ovid SP)
- Cochrane Database of Systematic Reviews (CDSR) (Cochrane Library)
- Cochrane Central Register of Controlled Trials (CENTRAL) (Cochrane Library)
- Database of Abstracts of Reviews of Effects (DARE) (CRD website)
- Health Technology Assessment Database (HTA Database) (CRD website)
- NHS Economic Evaluation Database (NHS EED) (CRD website)
- Conference Proceedings Citation Index – Science (CPCI) (Web of Science)
- Econlit (Ovid SP)
- WHO International Clinical Trials Registry Portal (ICTRP) (http://apps.who.int/trialsearch/)
- ClinicalTrials.gov (https://clinicaltrials.gov)
- Be Part of Research (https://bepartofresearch.nihr.ac.uk/)
- Cost Effectiveness Analysis Registry (CEA Registry) (https://research.tufts-nemc.org/cear4/)

The complete search strategies used, including all the search terms: textwords (free text), subject index headings (for example, MeSH) and the relationship between the search terms (for example, Boolean) are provided in Tables A1-A15. Systematic reviews identified by the searches were also checked, to identify further relevant studies.

Evidence available only in conference abstract form was identified via searches of Embase and Conference Proceedings Citation Index – Science, which specifically index this type of document. The MEDLINE strategy was translated and run in three trials register resources (ClinicalTrials.gov, WHO International Clinical Trials Registry Platform (ICTRP) and the UK Be Part of Research website). The US Food and Drug Administration (FDA) website was searched for relevant documents.

Brief details of any additional searches, such as searches of company or professional organisation databases (include a description of each database):

Systematic reviews that were identified by the searches were checked for any relevant studies.

Inclusion and exclusion criteria:

Inclusion criteria	
Population	Patients of any age who are at risk of developing any post-operative surgical site infection (SSI).
Interventions	Sorbact or dialkycarbamoyl chloride (DACC) impregnated dressings for the prevention of surgical site infection Any Sorbact dressing for the prevention, treatment and management of surgical site infection. Variants of, and references to, Sorbact dressings might include: • Sorbact • Leukomed Sorbact • Cutimed Sorbact • Dialkycarbomoyl choloride (DACC) • Antiseptic dressing • Bacteria-binding dressing Any combination dressings which include a Sorbact dressing (e.g. Cutimed Sorbact plus adhesive cover film).
Outcomes	• Resource use (including courses of antibiotics) and total costs • Summary health outcomes such as QALYs • Cost-effectiveness ratios (ICERs)

Study design	• Economic evaluations:
	  ○ Cost-effectiveness analyses
	  ○ Cost-utility analyses
	  ○ Cost-benefit analyses
	  ○ Cost-minimization analyses
	• HTAs published by NICE

Language restrictions	English language studies
Search dates	No date limit was applied
Exclusion criteria	
Population	Patients with chronic wounds
Interventions	Studies that do not evaluate Sorbact or DACC impregnated dressings for the prevention of surgical site infection.
Outcomes	N/A
Study design	Any study design that is not listed in the inclusion criteria.
Language restrictions	Studies not published in English
Search dates	N/A

Enter text.

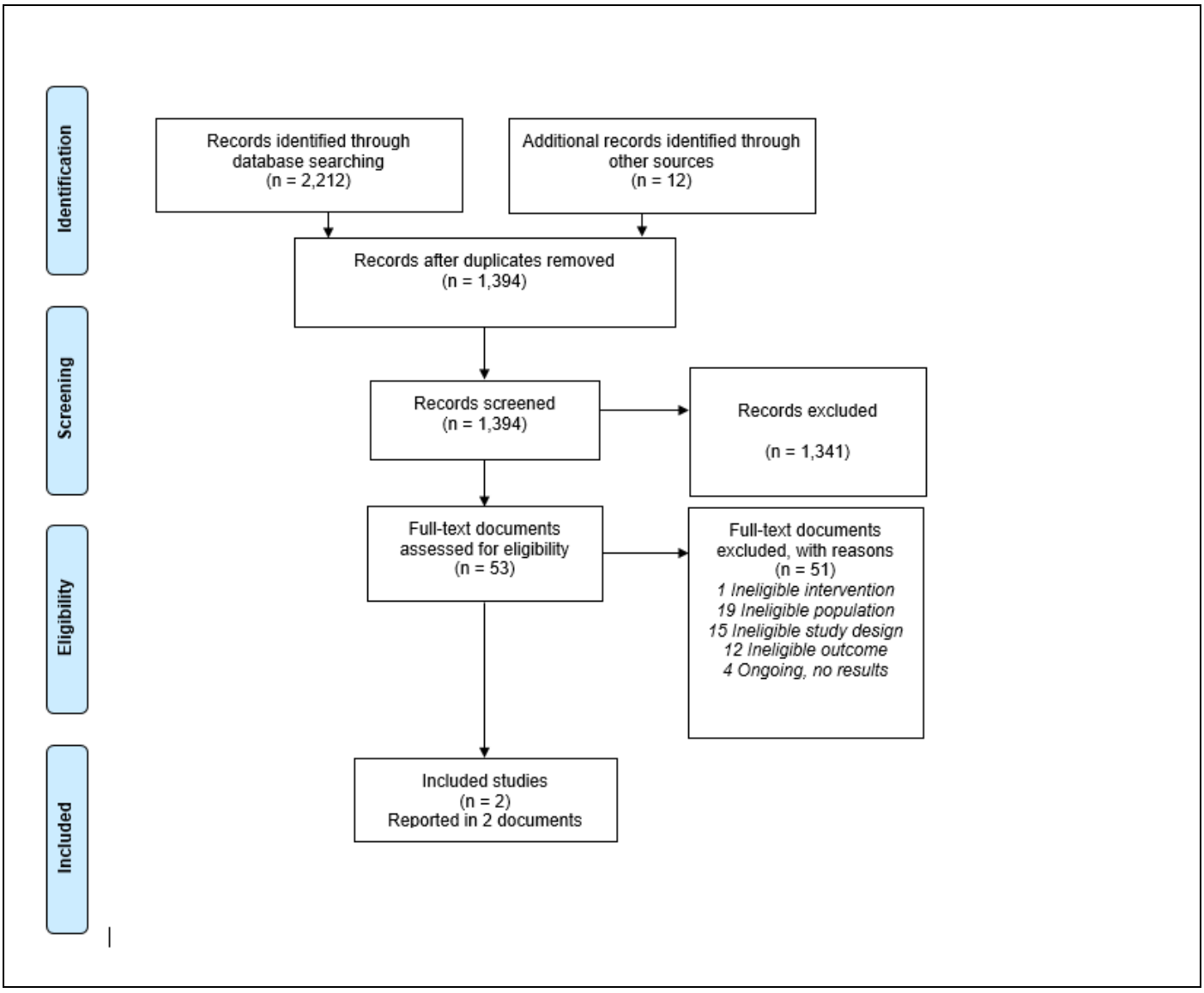
Data abstraction strategy:
One search was conducted to identify clinical and economic evidence. Study selection was conducted at the same time as study selection for the clinical review. 1,394 records were screened for relevance, based on information in their titles and abstracts, by two reviewers independently. Disagreements were resolved by a third reviewer. 1,341 records were excluded based on the title and abstract screening and 53 full-text reports were assessed for relevance against the pre-defined eligibility criteria. 51 full-text records were excluded, meaning that from an economic evidence perspective, there were 2 included studies.

Excluded studies

There were no excluded studies

Published studies

Report the numbers of published studies included and excluded at each stage in an appropriate format (e.g. PRISMA flow diagram).



Structured abstracts for unpublished studies

Details of the unpublished studies are given in the submission (Section 3).

[redacted]

A.1: Source: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

Interface / URL: OvidSP
Database coverage dates: 1946 to May 31, 2019
Search date: 03/06/19
Retrieved records: 825
Search strategy:

1 "Dialkylcarbamoyl chloride".ti,ab,kf. (8)
2 Dialkyl carbamoyl chloride.ti,ab,kf. (5)
3 Dialkylcarbamoylchloride.ti,ab,kf. (3)
4 dacc.ti,ab,kf. (693)
5 (dacc$ adj3 coat$).ti,ab,kf. (8)
6 sorbact$.ti,ab,kf. (22)
7 leukomed$.ti,ab,kf. (3)
8 cutimed$.ti,ab,kf. (19)
9 (hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kf. (25)
10 or/1-9 (736)
11 Bandages/ (16368)
12 Carbamates/ (11647)
13 11 and 12 (3)
14 (antiseptic adj3 dressing$1).ti,ab,kf. (115)
15 ((bacteria$ adj4 bind$) and dressing$1).ti,ab,kf. (20)
16 or/10,13-15 (859)
17 exp Animals/ not Humans/ (4585086)
18 16 not 17 (827)
19 remove duplicates from 18 (825)

A.2: Source: Embase

Interface / URL: OvidSP
Database coverage dates: 1974 to 2019 May 31
Search date: 03/06/19
Retrieved records: 1128
Search strategy:

1 "Dialkylcarbamoyl chloride".ti,ab,kw. (8)
2 Dialkyl carbamoyl chloride.ti,ab,kw. (7)
3 Dialkylcarbamoylchloride.ti,ab,kw. (3)
4 dacc.ti,ab,kw. (1038)
5 (dacc$ adj3 coat$).ti,ab,kw. (13)
6 sorbact$.ti,ab,kw. (31)
7 leukomed$.ti,ab,kw. (5)
8 cutimed$.ti,ab,kw. (30)
9 (hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kw. (30)
10 or/1-9 (1094)
11 bandage/ (9699)
12 carbamic acid derivative/ (6771)
13 11 and 12 (4)
14 (antiseptic adj3 dressing$1).ti,ab,kw. (124)
15 ((bacteria$ adj4 bind$) and dressing$1).ti,ab,kw. (21)
16 or/10,13-15 (1229)

17 (animal/ or animal experiment/ or animal model/ or animal tissue/ or nonhuman/) not exp human/ (5751371)
18 16 not 17 (1145)
19 remove duplicates from 18 (1128)

A.3: Source: Econlit
Interface / URL: OvidSP
Database coverage dates: 1886 to May 23, 2019
Search date: 03/06/19
Retrieved records: 2
Search strategy:

1 "Dialkylcarbamoyl chloride".ti,ab,kw,hw. (0)
2 Dialkyl carbamoyl chloride.ti,ab,kw,hw. (0)
3 Dialkylcarbamoylchloride.ti,ab,kw,hw. (0)
4 dacc.ti,ab,kw,hw. (2)
5 (dacc$ adj3 coat$).ti,ab,kw,hw. (0)
6 sorbact$.ti,ab,kw,hw. (0)
7 leukomed$.ti,ab,kw,hw. (0)
8 cutimed$.ti,ab,kw,hw. (0)
9 (hydrophob$ adj4 (dressing$1 or bandage$)).ti,ab,kw,hw. (0)
10 (bandage$ and carbamate$).ti,ab,kw,hw. (0)
11 (antiseptic adj3 dressing$1).ti,ab,kw,hw. (0)
12 ((bacteria$ adj4 bind$) and dressing$1).ti,ab,kw,hw. (0)
13 or/1-12 (2)
14 remove duplicates from 13 (2)

A.4: Source: Cochrane Central Register of Controlled Trials Issue 6 of 12, June 2019
Interface / URL: Cochrane Library / Wiley Interscience
Database coverage dates: Information not found
Search date: 03/06/19
Retrieved records: 129
Search strategy:

#1 "Dialkylcarbamoyl chloride" 8
#2 "Dialkyl carbamoyl chloride" 1
#3 Dialkylcarbamoylchloride 3
#4 dacc 102
#5 (dacc* near/3 coat*) 3
#6 sorbact* 21
#7 leukomed* 2
#8 cutimed* 16
#9 hydrophob* near/4 (dressing* or bandage*) 5
#10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 126
#11 [mh ^Bandages] 1614
#12 [mh ^Carbamates] 480
#13 #11 and #12 1
#14 (antiseptic near/3 dressing*) 30
#15 (bacteria* near/4 bind*) and dressing* 7
#16 #10 or #13 or #14 or #15 159
#17 #10 or #13 or #14 or #15 in Trials 129

A.5: Source: Cochrane Database of Systematic Reviews Issue 6 of 12, June 2019
Interface / URL: Cochrane Library / Wiley Interscience
Database coverage dates: Information not found
Search date: 03/06/19
Retrieved records: 3
Search strategy:

#1	"Dialkylcarbamoyl chloride":ti,ab,kw	7
#2	"Dialkyl carbamoyl chloride":ti,ab,kw	1
#3	Dialkylcarbamoylchloride:ti,ab,kw	2
#4	dacc:ti,ab,kw	83
#5	(dacc* near/3 coat*):ti,ab,kw	3
#6	sorbact*:ti,ab,kw	9
#7	leukomed*:ti,ab,kw	2
#8	cutimed*:ti,ab,kw	2
#9	hydrophob* near/4 (dressing* or bandage*):ti,ab,kw	3
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9	91
#11	[mh ^Bandages]	1614
#12	[mh ^Carbamates]	480
#13	#11 and #12	1
#14	(antiseptic near/3 dressing*):ti,ab,kw	20
#15	(bacteria* near/4 bind*) and dressing*:ti,ab,kw	5
#16	#10 or #13 or #14 or #15	113
#17	#10 or #13 or #14 or #15 in Cochrane Reviews, Cochrane Protocols	3

A.6: Source: Conference Proceedings Citation Index- Science (CPCI-S)
Interface / URL: Web of Science
Database coverage dates: 1990 - present
Search date: 05/06/19
Retrieved records: 48
Search strategy:

Indexes=CPCI-S Timespan=All years

# 14	48	#13 OR #12 OR #11 OR #10
# 13	1	TS=(bacteria* NEAR/4 bind*) AND TS=dressing*
# 12	2	TS=("antiseptic" NEAR/3 dressing*)
# 11	0	TS=(bandage* AND carbamate*)
# 10	45	#9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
# 9	1	TS=(hydrophob* NEAR/4 (dressing* or bandage*))
# 8	0	TS=cutimed*
# 7	0	TS=leukomed*
# 6	0	TS=sorbact*
# 5	0	TS=(dacc* NEAR/3 coat*)
# 4	44	TS="dacc"
# 3	0	TS="Dialkylcarbamoylchloride"
# 2	0	TS="Dialkyl carbamoyl chloride"
# 1	0	TS="Dialkylcarbamoyl chloride"

A.7: Source: ClinicalTrials.gov
Interface / URL: https://clinicaltrials.gov/
Database coverage dates: Information not found. ClinicalTrials.gov was created as a result of the Food and Drug Administration Modernization Act of 1997 (FDAMA). Site was made available to the public in February 2000.

Search date: 04/06/19
Retrieved records: 46
Search strategy:

The following terms were searched on using the expert interface:

Dialkylcarbamoyl chloride OR Dialkyl carbamoyl chloride OR Dialkylcarbamoylchloride OR DACC OR sorbact OR leukomed OR cutimed OR hydrophobic dressing OR hydrophobic bandage OR antiseptic dressing OR bacteria binding dressing = 46 studies found

A.8: Source: WHO International Clinical Trials Registry Platform (WHO ICTRP)
Interface / URL: http://apps.who.int/trialsearch/
Database coverage dates: Information not found. Data sets from data providers are updated every Friday evening according to a schedule, with different update dates for different providers. The most recent updates were carried in 27 May 2019; the oldest updates were carried out in 14 January 2019.
Search date: 04/06/19
Retrieved records: 14
Search strategy:

The basic search interface was used at: http://apps.who.int/trialsearch/.

The following terms were searched on. No filter options were selected.

Dialkylcarbamoyl chloride OR Dialkyl carbamoyl chloride OR Dialkylcarbamoylchloride OR DACC OR sorbact OR leukomed OR cutimed OR hydrophobic dressing OR hydrophobic dressings OR hydrophobic bandage OR hydrophobic bandages OR antiseptic dressing OR antiseptic dressings OR bacteria binding dressing OR bacteria binding dressings = 14 (14 records for 14 trials found)

A.9: Source: Be Part of Research
Interface / URL: https://bepartofresearch.nihr.ac.uk/
Database coverage dates: Information not found
Search date: 04/06/19
Retrieved records: 4
Search strategy:

Studies were sought using the homepage search interface. The following terms were searched on separately, with terms entered in the 'keyword' search box and 'Search for study' selected. No filters were applied (the default filter 'recruiting' was de-selected). The results were screened by information specialist for within-resource duplicates and records for two studies were downloaded.

Dialkylcarbamoyl chloride: 1 study found
Dialkyl carbamoyl chloride: 0 studies found
Dialkylcarbamoylchloride: 1 study found
DACC: 0 (1 study found, excluded as duplicate)
sorbact: 0 (2 studies found, excluded as duplicates)
leukomed: 0 (1 study found, excluded as duplicate)
cutimed: 0 (1 study found, excluded as duplicate)
hydrophobic dressing: 0 (1 study found, excluded as duplicate)
hydrophobic dressings: 0 (1 study found, excluded as duplicate)
hydrophobic bandage: 0 studies found
hydrophobic bandages: 0 studies found
antiseptic dressing: 1 study found

antiseptic dressings: 0 (1 study found, excluded as duplicate)
bacteria binding dressing: = 1 (2 studies found, 1 excluded as duplicate)
bacteria binding dressings: 0 (1 study found, excluded as duplicate)

A.10: Source: Cost-Effectiveness Analysis Registry (CEA Registry)
Interface / URL: http://healtheconomics.tuftsmedicalcenter.org/cear2n/search/search.aspx
Database coverage dates: According to information on the site, the database contains studies "published from 1976 to 2017", though records for studies with a publication date of 2018 are found in the database.
Search date: 04/06/19
Retrieved records: 0
Search strategy:

The following searches were conducted separately using the basic search interface (default 'Methods' selected) at: http://healtheconomics.tuftsmedicalcenter.org/cear2n/search/search.aspx

Dialkylcarbamoyl chloride: 0 records
Dialkyl carbamoyl chloride: 0 records
Dialkylcarbamoylchloride: 0 records
DACC: 0 records
sorbact: 0 records
leukomed: 0 records
cutimed: 0 records
hydrophobic dressing: 0 records
hydrophobic dressings: 0 records
hydrophobic bandage: 0 records
hydrophobic bandages: 0 records
antiseptic dressing: 0 records
antiseptic dressings: 0 records
bacteria binding dressing: 0 records
bacteria binding dressings: 0 records

A.11: Source: FDA webpages
Interface / URL: http://www.fda.gov/
Database coverage dates: Information not found
Search date: 04/06/19
Retrieved records: 1

Search strategy:
FDA documents were sought using the default search option on the home page.
Search terms relating to dressings and bandages were searched as quoted phrases to reduce the number of irrelevant results relating to, for example, salad dressings and antiseptic hand rubs, that came up when terms were searched without quotes.
The results were screened by the information specialist – results judged to be clearly irrelevant were excluded.
Dialkylcarbamoyl chloride: 0 (1 result returned, excluded as irrelevant)
Dialkyl carbamoyl chloride: 0 (3 results returned, excluded as irrelevant)
Dialkylcarbamoylchloride: 0 (1 result returned, excluded as irrelevant)

DACC: 0 (3 results returned, excluded as irrelevant)
sorbact: 1 (1 result returned)
leukomed: 0
cutimed: 0

"hydrophobic dressing": 0
"hydrophobic dressings": 0
"hydrophobic bandage": 0
"hydrophobic bandages": 0
"antiseptic dressing": 0 (2 results returned, excluded as irrelevant)
"antiseptic dressings": 0 (2 results returned, excluded as irrelevant)
"bacteria binding dressing": 0
"bacteria binding dressings": 0

A.12: Source: MAUDE - Manufacturer and User Facility Device Experience
Interface / URL: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/search.CFM
Database coverage dates: "The searchable database data contains the last 10 year's data".
Search date: 04/06/19
Retrieved records: 2
Search strategy:

Medical Device Reports of device-associated adverse events were sought. Searches were run in Brand Name field. No date limits were applied.

Sorbact: 2
Cutimed: 0
Leukomed: 0 (2 results, excluded as within-resource duplicates)

A.13: Source: Health Technology Assessment (HTA) Database
Interface / URL: CRD Database
Database coverage dates: Information not found. From 31 March 2018, the HTA database remains available, but CRD are no longer adding new records to it. INAHTA will be taking over production and the next phase of the database development. Updating and addition of new records will resume on their new platform, when it is ready.
Search date: 04/06/19
Retrieved records: 1
Search strategy:

1	(Dialkylcarbamoyl chloride)	0
2	(Dialkyl carbamoyl chloride)	0
3	(Dialkylcarbamoylchloride)	0
4	(dacc)	0
5	(dacc* NEAR3 coat)	0
6	(coat* NEAR3 dacc*)	0
7	(sorbact*)	0
8	(leukomed*)	0
9	(cutimed*)	0
10	(hydrophob* NEAR4 (dressing* or bandage*))	0
11	((dressing* or bandage*) NEAR4 hydrophob*)	0
12	(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)	0
13	MeSH DESCRIPTOR bandages	199
14	MeSH DESCRIPTOR carbamates	22
15	(#13 AND #14)	0
16	(antiseptic NEAR3 dressing*)	8
17	(dressing* NEAR3 antiseptic)	4
18	((bacteria* NEAR4 bind*) and dressing*)	0
19	((bind* NEAR4 bacteria*) and dressing*)	0

20 #12 OR #15 OR #16 OR #17 OR #18 OR #19 10
21 * IN HTA 17351
22 (#20 AND #21) IN HTA 1

A.14: Source: NHS Economic Evaluation Database (NHS EED)
Interface / URL: CRD Database
Database coverage dates: Information not found. Bibliographic records were published on NHS EED until 31st March 2015. Searches of MEDLINE, Embase, CINAHL, PsycINFO and PubMed were continued until the end of the 2014.
Search date: 04/06/19
Retrieved records: 0
Search strategy:

1 (Dialkylcarbamoyl chloride) 0
2 (Dialkyl carbamoyl chloride) 0
3 (Dialkylcarbamoylchloride) 0
4 (dacc) 0
5 (dacc* NEAR3 coat) 0
6 (coat* NEAR3 dacc*) 0
7 (sorbact*) 0
8 (leukomed*) 0
9 (cutimed*) 0
10 (hydrophob* NEAR4 (dressing* or bandage*)) 0
11 ((dressing* or bandage*) NEAR4 hydrophob*) 0
12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11) 0
13 MeSH DESCRIPTOR bandages 199
14 MeSH DESCRIPTOR carbamates 22
15 (#13 AND #14) 0
16 (antiseptic NEAR3 dressing*) 8
17 (dressing* NEAR3 antiseptic) 4
18 ((bacteria* NEAR4 bind*) and dressing*) 0
19 ((bind* NEAR4 bacteria*) and dressing*) 0
20 #12 OR #15 OR #16 OR #17 OR #18 OR #19 10
21 * IN NHSEED17613
22 (#20 AND #21) IN NHSEED 0

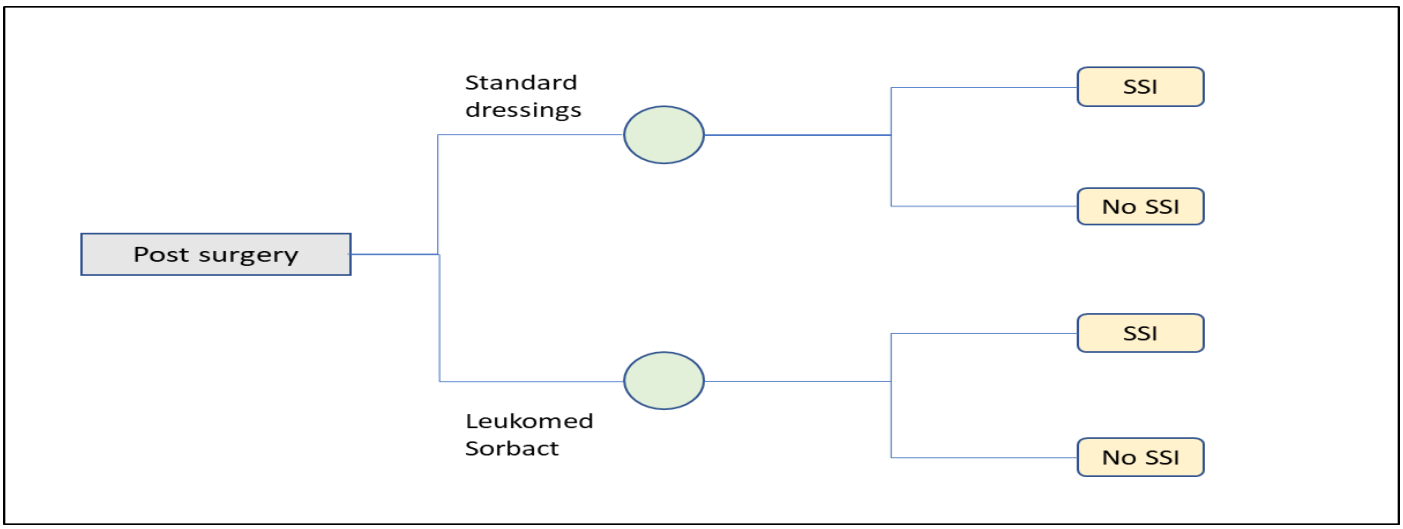
A.15: Source: Database of Abstracts of Reviews of Effects (DARE)
Interface / URL: CRD Database
Database coverage dates: Bibliographic records were published on DARE until 31st March 2015. Searches of MEDLINE, Embase, CINAHL, PsycINFO and PubMed were continued until the end of the 2014.
Search date: 04/06/19
Retrieved records: 9
Search strategy:

1 (Dialkylcarbamoyl chloride) 0
2 (Dialkyl carbamoyl chloride) 0
3 (Dialkylcarbamoylchloride) 0
4 (dacc) 0
5 (dacc* NEAR3 coat) 0
6 (coat* NEAR3 dacc*) 0
7 (sorbact*) 0
8 (leukomed*) 0

9	(cutimed*)	0
10	(hydrophob* NEAR4 (dressing* or bandage*))	0
11	((dressing* or bandage*) NEAR4 hydrophob*)	0
12	(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)	0
13	MeSH DESCRIPTOR bandages	199
14	MeSH DESCRIPTOR carbamates	22
15	(#13 AND #14)	0
16	(antiseptic NEAR3 dressing*)	8
17	(dressing* NEAR3 antiseptic)	4
18	((bacteria* NEAR4 bind*) and dressing*)	0
19	((bind* NEAR4 bacteria*) and dressing*)	0
20	#12 OR #15 OR #16 OR #17 OR #18 OR #19	10
21	* IN DARE	45418
22	(#20 AND #21) IN DARE	9

Appendix B: Model structure

Please provide a diagram of the structure of your economic model.



Appendix C: Checklist of confidential information

Please see section 1 of the user guide for instructions on how to complete this section.

Does your submission of evidence contain any confidential information? (please check appropriate box):

No	☐	If no, please proceed to declaration (below)
Yes	☒	If yes, please complete the table below (insert or delete rows as necessary). Ensure that all relevant sections of your submission of evidence are clearly highlighted and underlined in your submission document, and match the information provided in the table. Please add the referenced confidential content (text, graphs, figures, illustrations, etc.) to which this applies.

Page	Nature of confidential information	Rationale for confidential status	Timeframe of confidentiality restriction
#	☐ Commercial in confidence ☒ Academic in confidence	([redacted]	UFN
Details	References are highlighted in the text. Pages 3, 14 (3 occurrences) ; 15 (3 occurrences), 17 (2 occurrences), 30, and 27		
#	☐ Commercial in confidence ☒ Academic in confidence	[redacted]	UFN
Details	References are highlighted in the text. Pages 3, 23 and 26		

Confidential information declaration

I confirm that:

- all relevant data pertinent to the development of medical technology guidance (MTG) has been disclosed to NICE
- all confidential sections in the submission have been marked correctly
- if I have attached any publication or other information in support of this notification, I have obtained the appropriate permission or paid the appropriate copyright fee to enable my organisation to share this publication or information with NICE.

Please note that NICE does not accept any responsibility for the disclosure of confidential information through publication of documentation on our website that has not been correctly marked. If a completed checklist is not included, then NICE will consider all information contained in your submission of evidence as not confidential.

Signed*: ** Must be Medical Director or equivalent*		**Date:**	09.04.2020
Print:	Paul Goodman	**Role / organisation:**	Commercial Director HMS – UK & Ireland
Contact email:	Paul.Goodman@essity.com		

NICE National Institute for Health and Care Excellence

Medical technologies guidance

Collated expert questionnaires

Technology name & indication: Click here to enter text.

Experts & declarations of interest (DOI)

Expert #1	Dr Thirumagal Bavanathan, Consultant obstetrician and gynaecologist, Wye Valley NHS Trust,
	DOI: None
Expert #2	Mr Joshua P Totty, Core Surgical Trainee, Health Education Yorkshire and Humber,
	DOI: Yes

Type of interest *	Description of interest	Relevant dates	
		Interest arose	Interest ceased
Direct - financial	I have received honoraria from BSN Medical (now a part of Essity) for the presentation of research study results at national and international conferences.		
Non-financial professional	I was the principle investigator and lead author on research used to inform this MedTech evaluation (Totty et al 2019), and a named author on another (Bua et al 2017).	**January 2017**	**January 2019**

Expert #3	Ms Lucy Woodhouse, Lead Tissue Viability Nurse, Wye Valley Trust,
	DOI: None
Expert #4	Mr George Smith, Senior Lecturer and Honorary Consultant Vascular Surgeon, Academic Vascular Surgery Unit, Hull and York Medical School1st Floor, Hull Royal Infirmary,

	DOI: Yes

Type of interest *	Description of interest	Relevant dates	
		Interest arose	Interest ceased
Direct - financial	Speakers Fees from Essity	**2015**	**ongoing**

Expert #5	Linda C Clarke, Senior Midwife/ LW Coordinator, Wrightington wigan and Leigh NHS Foundation Trust,
	DOI: None

How NICE uses this information: the advice and views given in these questionnaires are used by the NICE medical technologies advisory committee (MTAC) to assist them in making their draft guidance recommendations on a technology. It may be passed to third parties associated with NICE work in accordance with the Data Protection Act 2018 and data sharing guidance issued by the Information Commissioner's Office. Expert advice and views represent an individual's opinion and not that of their employer, professional society or a consensus view (unless indicated). Consent has been sought from each expert to publish their views on the NICE website.

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1. **Please describe your level of experience with the technology, for example: Are you familiar with the technology? Have you used it? Are you currently using it? Have you been involved in any research or development on this technology? Do you know how widely used this technology is in the NHS?**

Expert #1	We introduced Leukomed Sorbact technology dressings in July 2018 after attending various meetings where the other NHS trusts have presented their finding which showed improvement in infection rates post operatively. Before introducing this technology, Tegaderm was used for less than BMI 40 patients and PICO dressings for over BMI 40 following Caesarean section. We introduced Leukomed to start with all emergency Caesarean sections under the BMI 40 and elective Caesareans between BMI 30-40. Tegaderm is still in use for BMI less than 30 and elective procedures to manage cost implications. We still follow the similar protocol and also planned to extend Leukomed to BMI 40-45 in future I didn't involve in any development of this technology To my knowledge many trusts using this dressings, but unable to give exact information
Expert #2	I am familiar with this technology, as a study of this technology and its use in vascular surgery formed the majority of my doctoral thesis, which was awarded in January 2020. I performed a systematic review of the literature examining its use in treating and preventing wound infections (Totty 2016, Journal of Wound Care), participated in a cohort study examining its use in non-implant vascular surgery (Bua 2017, Annals of Vascular Surgery), and designed and ran a pilot randomised controlled trial examining its use in reducing SSI in Vascular Surgery (Totty 2019, International Wound Journal). As part of the pilot randomised controlled trial, I was responsible for, at differing times, application of the dressing, removal of the dressing and training of other HCP's in the use of the dressing. The technology is not currently widely used in the NHS, however to my knowledge several individual centres have carried out small product evaluations or are interested in taking part in larger clinical studies, in specialities including vascular surgery, cardiothoracic surgery, and orthopaedic surgery. At present I do not use it in day to day practice, predominantly because the hospital trust that I work for does not carry it as stock.
Expert #3	Yes I am familiar with the technology. It is on our Wound Care Formulary and on our Surgical Management Maternity Pathway for our C.Section ladies. I haven't been involved in any research or development but use it both in a professional capacity as a TVN and personal capacity as I had it on following my 3rd C.Section with great results.

	From discussions with other TVN colleagues it seems to be getting listed on more Wound Care Formularies and being used increasingly in Vascular and Maternity.
Expert #4	I have experience of Leukomed dressings in both my clinical and academic work. I have undertaken a systematic review of the literature regarding evidence for it's use in post surgical wounds and have led several small trials with the technology as the intervention. I continue to work on funding future trials with wider scope to further evaluate the potential benefits of the dressings use for incision management. I have delivered several lectures on the results of these activities to varied audiences. Clinically I have been using the dressing for over three years and I am in the process of discussing the wider use of the technology in other departments at my place of work. I am not aware of the levels of wider use in the NHS, but interest in the technology has always been high when I have been invited to deliver lectures on the topic.
Expert #5	Yes. Having attended a conference in Windsor re Sepsis in maternity care I was very interested in the use of the wound dressings. The new technology suggested we may be able to reduce the incidence of wound infections following LUSCS due to the bacteria-binding layer in the dressing which physically traps and binds bacteria to the dressing surface and stops bacteria from reproducing. Yes , we currently use the dressing for ladies who have a BMI between 30 and 50 We carried out a product evaluation exercise with theatre staff, postnatal ward staff and community midwives to monitor the impact of Leukomed Sorbact on the signs and symptoms of infection. We also monitored patient experience of the dressing with a patient satisfaction questionnaire. . This involved liaison with the tissue viability nurse for the Trust who assisted in the development of wound care pathway. It was also discussed with consultant obstetricians and head of governance and midwifery to seek approval . No

2. Has the technology been superseded or replaced?

Expert #1	I am not aware but it showed significant improvements

Expert #2	This technology has not been superseded or replaced, however may benefit the same patients as single-use negative pressure dressings (PICO), and so direct competition exists between the two, even though they have different modes of action.
Expert #3	No. It is being used as a step up from standard film and pad post-op dressings or as an alternative to Negative Pressure Wound Therapy in some cases.
Expert #4	Not to my knowledge
Expert #5	No further changes since introducing the new wound care pathway from using PICO dressings to Leukomed Sorbact dressings for women with a BMI >35 to 50, provided no other comorbidities exist which could affect wound healing.

Current management

3. How innovative is this technology, compared to the current standard of care? Is it a minor variation or a novel concept/design?

Expert #1	It showed significant improvement in the infection rate compare to standard dressings
Expert #2	The technology is novel relative to other products on the market, as the active part of the product (DACC) does not impregnate the wound, has shown no evidence of antimicrobial resistance, and to date has only one published adverse reaction. Other active dressings, with the most common being silver, have shown evidence of resistance and adverse reaction, in the literature.
Expert #3	I feel it's quite unique in its design/mechanism of action, it doesn't donate anything to the wound so therefore no risk of antimicrobial resistance as with other antimicrobial dressings such as silver.
Expert #4	Novel concept of binding and trapping bacteria locally to dressing in order to prevent ingress into newly formed surgical wounds.
Expert #5	Innovative. I hadn't had any experience of dressings with bacteria-binding or layers until I attended the conference

4. Are you aware of any other competing or alternative technologies available to the NHS which have a similar function/mode of action to the notified technology? If so, how do these products differ from the technology described in the briefing?

Expert #1	I am not aware of other similar technology- Sorbact

	We use PICO dressing for over BMI 40
Expert #2	No products, to my knowledge, work via hydrophobic interaction to bind organisms at the wound surface. Other dressing products are available that claim to reduce the incidence of SSI when used as primary prevention. Products include single use negative pressure devices, silver impregnated dressings and iodine impregnated dressings. To date, no evidence exists that directly compares DACC-coated dressings to other antimicrobial dressing technologies for the purposes of preventing SSI.
Expert #3	I'm not aware of any other dressing that works in the same way.
Expert #4	No other dressings use hydrophobic binding to trap bacteria as far as I am aware.
Expert #5	I am not aware of any other products with this function/ mode of action . We have changed from using PICO dressings which are negative pressure dressings. Dressings are attached to a battery system which sucks any exudate from wound (Vacuum system). These are still used for ladies with BMI greater than 50 or ladies with comorbidities such as diabetes which affects wound healing.

Potential patient benefits

5. What do you consider to be the potential benefits to patients from using this technology?

Expert #1	Yes definitely. Reduced infection rate reduces pressure on NHS services and improve patient satisfaction, less admissions.
Expert #2	This product, according to currently available evidence, shows promise in reducing SSI when used as a primary preventative measure. In Totty et al (2019) they showed a 36% relative risk reduction in SSI. If used to target patients at an increased risk of SSI (such as higher BMI, vasculopaths, diabetics), or those where SSI may be catastrophic (surgeries involving an implant such as vascular prostheses or joint prostheses), such a reduction may prevent lengthy stays in hospital, lengthy courses of antibiotics, readmission or extra visits to outpatient departments, dressing changes, and opportunity costs to patients.
Expert #3	The benefits to the patient are: the reduced risk of SSI, it's a dressing with no attachments so there is no requirement for the patient to have to check anything or carry anything around as with NPWT. Waterproof so the patient can shower. No risk of building up a

	resistance. May mean the patient doesn't need antibiotics for a wound infection. Reduced risk of wound dehiscence through infection under the suture line.
Expert #4	Potential to manage local bio-burden around newly incised surgical wounds without the use of antimicrobials or antibiotics
Expert #5	The patients find the dressing comfortable and have had no issues with the dressings. Patients who have had PICO dressings sometimes feel uncomfortable with the battery packs and the buzzing of the battery packs. Patient questionnaires were completed when Leukomed Sorbact were first introduced and response was good

6. Are there any groups of people who would particularly benefit from this technology?

Expert #1	Yes, emergency caesarean sections and high body mass index patients over BMI 30
Expert #2	This technology could potentially benefit any patient undergoing surgery. However, certain subgroups who are at an increased risk of SSI may benefit more than others. This includes: • High BMI • Diabetes mellitus • Smokers • Vasculopaths (such as peripheral vascular disease) Evidence exists to support its use in patients undergoing vascular surgery, adult females undergoing caeserian section, patients undergoing pilonidal sinus excision, and as a primary wound dressing in split-thickness skin graft donor sites.
Expert #3	Low to Moderate risk C.Section i.e. Ladies with BMI under 45 with minimal additional risk factors such as poorly controlled diabetes, immune disorders, radiotherapy etc.
Expert #4	Higher risk surgical patients for SSI (obese, smokers, diabetics, frail, incisions in the groin, etc)
Expert #5	Women with raised BMI in pregnancy requiring LUSCS who have NO comorbidities which can affect wound healing

7. Does this technology have the potential to change the current pathway or clinical outcomes? Could it lead, for example, to improved outcomes, fewer hospital visits or less invasive treatment?

Expert #1	Yes. It improved outcomes, thereby reduced the pressure on NHS resources
Expert #2	With a significant reduction in SSI rates, this technology may lead to reduced inpatient stays in hospital, reduced courses of antibiotics, reduced rates of readmission or extra visits to outpatient departments, reduced dressing changes, reduced resource use in primary care, and reduced opportunity costs to patients.
Expert #3	Yes. I introduced this on the maternity pathway and since the introduction of the pathway we have seen a reduction in our SSI's in C.Sections. This obviously has an impact on potential readmissions for IV Antibiotics or further intervention in the future – wound debridement and NPWT.
Expert #4	If potential suggested in early clinical trials is borne out in larger trials then the use of the dressing could prevent a significant number of surgical site infections without risk of promoting bacterial resistance. This could prevent a significant burden of morbidity and even mortality. Resource use post-surgery could also be reduced by avoiding preventable infection. This has been shown to be cost effective in analysis of data from a polish trial of it's use in post caesarean women and a similar analysis is planned for data from our own trial in vascular patients.
Expert #5	We have changed our clinical pathway for wound care following LUSCS. There has been no increase in the postnatal LUSCS wound infection rate which could be attributed to the change of dressing. All wound infections returning to hospital are datixed and investigated. The dressings are less invasive than PICO which require attachment to battery packs.

Potential system impact

8. What do you consider to be the potential benefits to the health or care system from using this technology?

Expert #1	Improve patient care, reduce hospital bed occupancy, reduce burden to NHS resources

Expert #2	Whilst the technology comes with an increased initial cost burden, reducing SSI rates could lead to reduced inpatient days, reduced readmission rates, reduced outpatient visits and reduced primary care resource use. This may lead to a reduced overall cost, more inpatient beds available, and reduced burden on primary care services.
Expert #3	Reduction in SSI's, improved healing rates, reduction in readmissions due to wound dehiscence and infection, reduction in antibiotic usage. Improved Quality of Life for the patient.
Expert #4	Potential to reduce complications of surgery and thus overall resource use in the healthcare system.
Expert #5	Freedom of movement for the patients. Potential to reduce wound infections following LUSCS Significant cost saving to NHS which can be utilised for other innovations.

9. Considering the care pathway as a whole, including initial capital and possible future costs avoided, is the technology likely to cost more or less than current standard care, or about the same?

Expert #1	Cost less generally as it reduces infection post operatively
Expert #2	A cost-effectiveness study (Stanirowski 2019) taken from an earlier RCT (Stanirowski 2016) suggested that there may be around a 50% cost saving per-patient by using DACC coated dressings, when the costs of each SSI were taken into account. This may be replicable in other surgical specialities, particularly where SSI is common (such as vascular surgery) or costly. This cost effectiveness may not be the case in specialties where SSI are relatively rare (Such as orthopaedic joint replacement) or have relatively fewer complications (such as dermatological surgery).
Expert #3	It will cost more than a standard film and pad dressing however we are still using this (opsite) on low risk patients with a BMI of less than 30 and no other risk factors. We are using Leukomed where NPWT (Pico) was being used in some cases which means a cost reduction. Considering the cost savings through reduction in admissions and antibiotics etc it would be an overall reduction in cost.
Expert #4	Costs of the use of the dressing will be higher (in the order of 10s of pounds per case) than standard care as used at present in most units. This is likely to be offset by savings in management of infective complications (infrequent in many populations in the order of 1000s or even 10,000s of pounds when they occur).
Expert #5	Significantly less. PICO dressings are currently £129-60 per dressing. Leukomed Sorbact costs £10-98 per dressing.

	There is still a place for using PICO dressings as previously stated but their usage is much reduced.

10. What do you consider to be the resource impact from adopting this technology? Could it, for example, change the number or type of staff needed, the need for other equipment, or effect a shift in the care setting such as from inpatient to outpatient, or secondary to primary care?

Expert #1	No significant changes needed from the current practice other than education and identification
Expert #2	There is unlikely to be a significant impact upon immediate resource use by adopting this technology. However, a reduction in rates of SSI may lead to reduced inpatient days, reduced need for long term NPWT in wounds that have dehisced and are left to heal by secondary intention, reduced contact with outpatient or primary care services, or reduced need for district nurse visits for dressing changes.
Expert #3	No resource impact
Expert #4	No changes would be foreseen to staffing or equipment to implement the technologies use. Overall pressures on resources needed to manage complications will be lowered if fewer such complications are seen.
Expert #5	The Leukomed Sorbact are much easier to apply than the PICO . There is no need to set up battery packs and explain care to the patients or for staff to check or change battery packs and this saves a little time. Women were discharged home with PICOs which impacted on the community care as they had to carry on with the battery checks etc.

11. Are any changes to facilities or infrastructure, or any specific training needed in order to use the technology?

Expert #1	Education - Leukomed needs to be removed in day 5 different to Tegederm which stays for 48 hrs. Needed to inform community team as well. We flagged it up with orange wrist band at the beginning of introduction to increase awareness.
Expert #2	None to my knowledge. This is a direct replacement for other primary wound coverings used following surgery, which are already applied. Minimal, if any, training would be needed for staff applying or changing the dressing. To my knowledge, no specific storage conditions are needed for the technology, and so it could be stored in existing facilities.

Expert #3	Training on when to use it if it is being introduced for a certain patient group or criteria (BMI) but it's a simple dressing to apply.
Expert #4	No
Expert #5	Prior to implementation we held workshops with hospital and community staff as well as the obstetric teams to describe the technology and the care pathways to be used. We had the full support of the consultant obstetricians within the unit

12. Are you aware of any safety concerns or regulatory issues surrounding this technology?

Expert #1	No
Expert #2	To my knowledge, only a single case report exists of a contact dermatitis caused by the DACC technology (Corazza, M, Amendolagine, G, Cristofaro, D, Bernardi, T, Borghi, A. Contact dermatitis caused by dialkylcarbamoyl compounds in a medication used for chronic wounds. Contact Dermatitis. 2018; 79: 182– 183. https://doi.org/10.1111/cod.13019) No other adverse or allergic reactions have been reported or published to date.
Expert #3	No
Expert #4	No. Systematic review of the literature suggested safe use in all populations tested (including children and breast feeding women)
Expert #5	No

General advice

13. Please add any further comments on your particular experiences or knowledge of the technology, or experiences within your organisation.

Expert #1	Infection rate improved significantly after the introduction of Leukomed. Local audit showed that the infection rate reduced to 25% after introduction of Leukomed to the comparable group of patients

Expert #2	I worked with this technology for two years during the conduct of a randomised controlled trial and preparation of a doctoral thesis. In my experience it is an easy to use technology that, when used appropriately, shows promise in the prevention of SSI in primarily closed wounds
Expert #3	Everyone is happy (staff and Patients) – its simple to apply and patients like that its waterproof. My personal experience is that a
Expert #4	Simple technology to introduce to practice as requires no additional steps in procedures or specialist training.
Expert #5	We have had good results with the dressing. A small study was carried out with questionnaires for theatre, postnatal ward and community staff. We also had a patient satisfaction questionnaire which was well received and the patients liked the dressing.

Other considerations

14. Approximately how many people each year would be eligible for intervention with this technology, either as an estimated number, or a proportion of the target population?

Expert #1	May be around 610 women out of 879 used Leukomed as per guidance in our trust, ie nearly 70 % over 18 months. This is just an estimation calculated from the information from Badger net.
Expert #2	Around 7 million operations are undertaken a year within the NHS (T. E. F. Abbott et al. Frequency of surgical treatment and related hospital procedures in the UK: a national ecological study using hospital episode statistics, BJA: Volume 119, Issue 2, August 2017, Pages 249–257, https://doi.org/10.1093/bja/aex137). All patients undergoing surgical procedures may, in theory, be eligible for treatment with this technology. However, a more pragmatic approach, where those at higher risk are treated, may be a more suitable implementation of the technology. A full strategy would need to be developed in order to estimate the effects of such a targeted strategy.
Expert #3	I'm unsure. We only use it on C.Section ladies with BMI higher than 30 and with some risk factors. The Trust performs approx. 580 C.Sections a year but some of these would have opsite on (the low risk, low BMI ones) and some would have Pico (BMI over 45 and high risk factors)

Expert #4	If considering use in all post-surgical patients this could be in the region of 10m per year in the NHS. This number would be considerable less if targeting use to higher risk surgical groups with known high rates of surgical site infection.
Expert #5	Between 21st June 2018 and 21st June 2019 there were 210 women who fitted the criteria to use this dressing with a BMI between 30 and 50. This was out of a total of 733 LUSCS (28.6% of women having LUSCS) Between April 2019 to the current date we have used 160 dressings

15. Would this technology replace or be an addition to the current standard of care?

Expert #1	It will be an addition
Expert #2	Depending on the implementation strategy, this technology may replace current standard of care in either all patients undergoing surgical treatment, or a smaller subset of those undergoing surgery.
Expert #3	It would be an addition
Expert #4	Replacement for current standard of care
Expert #5	This technology has replaced the previous standard of care (i.e. PICO) for women with raised BMI (>35 – 50) but no other comorbidities having LUSCS

16. Are there any issues with the usability or practical aspects of the technology?

Expert #1	No
Expert #2	None to my knowledge
Expert #3	No
Expert #4	No

Expert #5	No the product is easy to use and stays in place for seven days. Only changed if soaked with exudate.

17. Are you aware of any issues which would prevent (or have prevented) this technology being adopted in your organisation or across the wider NHS?

Expert #1	No
Expert #2	The major inhibiting factor to date for wider implementation of this technology has been 1) a large increase in initial cost over standard practice and 2) a lack of level one or two evidence that shows a significant benefit over standard practice. The latter point is slowly being addressed.
Expert #3	No
Expert #4	No
Expert #5	No . I feel this product could be widely used in obstetric units nationally

18. Are you aware of any further evidence for the technology that is not included in this briefing?

Expert #1	No
Expert #2	Since the publication of the Medtech Innovation Briefing, the following evidence has been published concerning the use of DACC-coated wound dressings for all indications: Romain B, Mielcarek M, Delhorme JB, et al. Dialkylcarbamoyl chloride-coated versus alginate dressings after pilonidal sinus excision: a randomized clinical trial (SORKYSA study) [published online ahead of print, 2020 Feb 4]. BJS Open. 2020;10.1002/bjs5.50259. doi:10.1002/bjs5.50259 Dwiyana RF, Gondokaryono SP, Rahardja JI, Arline Diana I, Yogya Y, Gunawan H. Clinical efficacy of dialkylcarbamoylchloride-coated cotton acetate dressing versus combination of normal saline dressing and 2% mupirocin ointment in infected wounds of epidermolysis bullosa. Dermatol Ther. 2019;32(5):e13047. doi:10.1111/dth.13047

	The study by Romain et al is particularly of interest, as it is a well conducted, multi-centred randomised controlled trial undertaken in France.
Expert #3	No
Expert #4	No
Expert #5	No

19. Are you aware of any further ongoing research or locally collected data (e.g. audit) on this technology? Please indicate if you would be able/willing to share this data with NICE. Any information you provide will be considered in confidence within the NICE process and will not be shared or published.

Expert #1	I have done an audit locally for 2018 and 2019 cases and willing to share
Expert #2	No current, or active, research or audit is underway locally to my knowledge.
Expert #3	No
Expert #4	Cost analysis of data from Totty et al is in progress to consider cost efficacy in vascular surgery population. Essity funding this work so should be shared with NICE if available at the time of their submission.
Expert #5	We have locally collected data of product evaluation. Copy attached

20. Is there any research that you feel would be needed to address uncertainties in the evidence base?

Expert #1	Not to my knowledge

Expert #2	A fully powered randomised controlled trial directly comparing DACC with standard care, +/- with another dressing technology such as PICO dressings, in either all surgical wounds, or in high risk wounds, should be undertaken to address uncertainties within the evidence base. Any study undertaken should also include resource use and a cost effectiveness analysis.
Expert #3	No
Expert #4	Larger clinical trial would be helpful to confirm findings suggested by pilot feasibility work to date.
Expert #5	Ongoing research is always beneficial and I am unaware of any further research for use of this product in maternity care.

Declaration of interests

Description of Interest	Date Interest arose	Date Interest ceased

Please see over the page information on how to complete the above boxes

The information you provide on this form will be used to assess if you have any potential conflicts of interest, we ask for this information to comply with our organisational policies.

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I confirm that the information provided above is complete and correct. I acknowledge that any changes in these declarations during the course of my work with NICE, must be notified to NICE as soon as is practicable and no later than 28 days after the interest arises. I am aware that if I do not make full, accurate and timely declarations this may result in potential disciplinary action if there has been a deliberate breach of the policy.

I do / do not [delete as applicable] give my consent for this information to be published on the registers that NICE holds. If consent is NOT given, please give reasons below: (please note this will be agreed in exceptional cases only).

Reason for non-disclosure: Enter text here.

Signed (employee): Enter text here. **Date:** Enter text here.

HOW TO COMPLETE THE DECLARATION OF INTEREST FORM

Name & role: Insert your name, your role and employer within the NHS.

Description of Interest: Provide a description of the interest that is being declared. This should contain enough information to be meaningful to enable a reasonable person with no prior knowledge to be able to read this and understand the nature of the interest.

Types of interest:

Financial interests - where a person gets direct financial benefit.

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- holding office or a position of authority in a professional organisation such as a Royal College, a university, charity, advocacy group or any other organisation in the health, public health or care sector
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Indirect interests - where there is, or could be perceived to be, an opportunity for a third party closely associated with the board member or employee to benefit.

A benefit may arise from both a gain or avoidance of a loss.

Relevant Dates: Detail here when the interest arose and, if relevant, when it ceased.

NICE National Institute for Health and Care Excellence

External Assessment Centre correspondence log

MT496 Leukomed Sorbact

The purpose of this log is to show where the External Assessment Centre relied in their assessment of the topic on information or evidence not included in the company's original submission. This is normally where the External Assessment Centre:

a) become aware of additional relevant evidence not submitted by the company;
b) needs to check "real world" assumptions with NICE's expert advisers, or;
c) needs to ask the company for additional information or data not included in the original submission, or;
d) needs to correspond with an organisation or individual outside of NICE

These events are recorded in the table to ensure that all information relevant to the assessment of the topic is captured. The table is shared with the NICE medical technologies advisory committee (MTAC) as part of the committee documentation, and is published on the NICE website at public consultation.

#	Date	Who / Purpose	Question/request	Response received
X.	*XX/XX/XXXX*	*Who was contacted? (if an expert, include clinical area of expertise)* *Why were they contacted? (keep this brief)*	*Insert question here. If multiple questions, please break these down and enter them as new rows*	*Only include significant correspondence and attach additional documents/graphics/tables in Appendix 1, citing question number*
1.	26/03/2020	**Manufacturer** Initial questions	1. There is a range of products outlined in the submission. We will proceed to assess the products named in the scope (therefore include Leukomed Sorbact and Sorbact Surgical [as the latter is a different name for the same product],	No, there is no reason to include other products.

			and exclude the Cutimed range of products). Please advise if there are specific reasons to include other products.	
2.			2. Can you clarify how the composition of Cutimed products differs from Leukomed? For example, is a key difference to feature an adhesive film (as in Leukomed and Surgical) vs gauze? Is Cutimed intended for open wounds?	There are various different Cutimed products; Each has a different composition to Leukomed Sorbact. The only common feature that Leukomed Sorbact and Cutimed products share is that they all feature a dialkyl carbamoyl chloride coated wound contact layer. Cutimed products are primarily designed for use on open, chronic wounds such as leg ulcers, or dehisced surgical wounds. Leukomed Sorbact is indicated and promoted for the prevention of SSI in closed surgical wounds
3.			3. We are assuming that Leukomed is categorised as a non-active dressing. Is this correct?	The term active when used in connection with dressings tends to imply that the dressing contains a pharmacological or chemical agent that is released to the wound. Leukomed Sorbact does not contain a pharmacological or chemical agent but is a bacteria-binding dressing that works via a purely physical mode of action and so would not be termed an active dressing in this respect.

4.			4. In section 2 “The technology”, under the claimed benefits table, there are a number of additional references given that aren’t included in the list of relevant studies (for example Badia et al. 2017, Tanner et al. 2017). To clarify, these studies (not included in the relevant studies list) do not specifically assess Leukomed Sorbact as an intervention, and are included more broadly to highlight the impact of surgical site infections or the benefits of dressings. Is this correct?	Yes this is correct, the references were included to highlight the impact of surgical site infection, the benefits of dressings and the need for non-antibiotic infection prevention measures that will not exacerbate the problems with bacterial resistance
5.			5. You provide a reference for the following unpublished paper: “Taylor L, Mills E, George S, Seckam A. A reduction in the surgical site infection (SSI) rate for women birthing by caesarean section in Aneurin Bevan University Health Board. 2020. Unpublished” Can we please have a copy of this study, which we can treat as academic in confidence?	A copy was provided as part of the submission to be treated as academic in confidence, please find the manuscript attached. This has been submitted to JWC
6.			6. The Romain et al. 2020 study states the intervention as “Sorbact dressings”. We note that pilonidal sinus excision results in an open wound that gets treated over a few weeks. Given the intended use of Leukomed Sorbact is for closed wounds,	This study was not carried out on Leukomed Sorbact; we believe the product in this study to be Cutimed Sorbact ribbon gauze

			we assume the technologies in this study are from the Cutimed range. Is this correct?	
7.			7. Would the potential intended population need to be stratified for risk of SSI? Do you anticipate that the technology would significantly benefit people with low or moderate risk for SSIs?	Leukomed Sorbact can be used on all post-operative wounds at risk of infection; there is no definitive advice we can give regarding the difference in benefits that this technology will offer to patients at low, moderate or high risk of SSI. The evidence for Leukomed Sorbact does not distinguish patients by risk stratification
8.			8. Is the technology intended for both adults and children?	Yes. Leukomed Sorbact can be safely used on both children and adults
9.			9. Is there a quantification of low to moderate wound exudate?	The amount of wound exudate can vary by patient and wound. There is no objective, standardised clinical measure of what constitutes a low or moderate amount of exudate. This is really based on the subjective assessment and experience of the treating clinician.
10.			10. Would you anticipate a difference in impact of the technology on superficial versus deep surgical site infections?	The Sorbact bacteria-binding technology works by contact with bacteria present within the wound and on the surrounding skin. We anticipate that it will have a significant impact on preventing and managing superficial SSI's; we have no

				evidence to demonstrate the impact this technology may have on microorganisms in the deeper tissue layers that can lead to deep incisional SSI's.
11.			11. As per the intended use in the MIB and the submission, we will look at populations with clean or clean contaminated post-surgical closed wounds. Have you included lacerations, cuts, abrasions, or minor burns (as per IFU) in your definition of clean or clean-contaminated closed wounds?	We have only included closed surgical wounds in this definition
12.	17/04/2020	**Manufacturer** Additional question	12. What is the **intended** wear time for Leukomed Sorbact? Our current understanding from the IFU and letter from the Essity Regulatory Affairs Director is: "The dressing should be changed at least twice a week, but may be worn continuously for a maximum time of 7 days". What would be the ideal or average wear time?	The recommendation to change Leukomed Sorbact twice weekly on the IFU is in the process of being changed to state that Leukomed Sorbact may be left in place for up to 7 days if clinical conditions allow. The new IFU is not available yet as it is in the artwork approval process, hence including the signed statement from the Director of Regulatory Affairs with regard to the 7 day wear time. We would recommend an average wear time for the dressing of between 5-7 days.
13.	06/07/2020	**Expert – Mr George Smith (Senior Lecturer and Honorary Consultant Vascular Surgeon)** **Initial questions**	1) We have noted NICE (NG125) and WHO guidelines on preventing SSIs. Are there other guidelines relevant to the use of Leukomed Sorbact?	These are the most relevant for the UK

14.			2) How is SSI defined in the UK? For example ASEPSIS score and CDC definitions. Are there others?	Not in common use
15.			3) Are the protocols for preventing SSI standardised across the UK?	Not at this time – specialty and unit dependent despite national guidance
16.			4) How are superficial versus deep SSIs defined? E.g. WUWHS consensus document notes if it occurs 30 days post-surgery. Is the temporal nature of an SSI what characterises it as superficial/deep, or are there more factors?	Superficial SSI occur in the superficial tissues within 30 days / deep infections occur in the deep tissues and can occur either early (within 30 days) or late (within 90 days) as defined in CDC documentation
17.			5) What would be an adequate follow up time for assessing effectiveness of a surgical dressing?	Minimum 30 days – longer periods required for certain procedure types as per CDC definitions
18.			6) How are active/interactive dressings defined versus passive dressings? What is typically used as standard in the NHS? Are there any particular considerations for dressings in vascular surgery or caesarean sections?	Loosely! Any dressing which provides an action other than protection of the wound from the external environment could be defined as being active. Pad and film “inactive/passive” dressings are the current standard for the majority of NHS procedures Both are high risk groups for SSI but routine practice throughout majority of NHS would be to use passive dressings as above. Evidence is

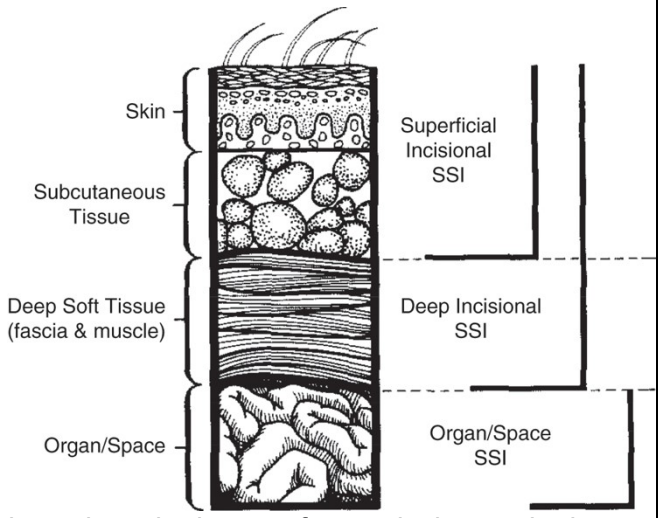
				building for the increased use of active dressings in the highest risk patients within these groups.
19.			7) We are trying to understand how a surgical patient would potentially be categorised in terms of level of risk for an SSI. What are the typical patient characteristics which would classify a patient as higher risk for SSI?	BMI, Diabetes, smoking, malnutrition and poor perfusion/ oxygenation of tissues are the most widely used to stratify patients – the factors influencing SSI risk also include the site and complexity of the surgery, peri-operative conditions (patient warming, antibiotics use, etc)
20.			8) The evidence comes from studies in women who have undergone caesarean section and vascular surgery patients. a. Stanirowski 2016a notes that depending on the definition and the observational period, surgical site infection (SSI) occurs in about 1.8%–9.8% of all CS patients. Does this seem typical of NHS populations? What would be typical baseline rate of SSI in vascular surgery patients? Does this vary by type of surgery? b. Are women undergoing caesarean section typically treated as moderate or high risk? Does this vary by whether the surgery was planned or emergency? c. Are people undergoing certain types of vascular surgery inherently more at risk of SSI?	No – NHS rates and rates in trials that specifically seek SSI as a primary outcome are between 10 and 20%. Similarly when SSI is the primary outcome in trails the rate for vascular surgery is circa 25% Typically treated as low risk but again this is unit dependant. Many units practice using different care bundles for those with specific risk factors such as obesity and diabetes. Groin surgery and amputations considered elevated risk but overall risks depend upon many other factors (as above) than surgery type alone.

			For example would the following be classed as surgeries with inherently higher risks: major limb amputation, limb revascularisation, open varicose vein surgery, lower limb arterial surgery, open abdominal surgery.	
21.			9) In vascular surgery, would wound closure method affect SSI rate?	Potential effect in all surgery types but no level one evidence to support this.
22.			10) Several reported outcomes in the literature were below the standard statistical significance margin of 5%, however, the manufacturer of the dressing still considered that these results were clinically and economically meaningful. What are your thoughts on these results; is it common for clinical outcomes to be judged as meaningful below these thresholds within wound care in general? (Studies: Totty et al. 2019, Bua et al. 2017)	The majority of wound care is bereft of statistically significant data! There have been relatively few robust RCTS in any aspect of wound care but more is thankfully in progress. The Bua data was significantly different within the first week only and all differences were seen within the first week post surgery. Overall rates were not significant at 30 days. Totty et al was not powered for statistical significance as it was a pilot study. This did show a non significant difference that would support the completion of a wider study which was the primary goal of this feasibility project.
23.			11) Are guidelines for wound dressings likely to be similar in UK and Poland?	WHO guidelines are international so would apply in both countries.

24.			12) Are there potential adverse events that could result from the use of Leukomed Sorbact? Is it possible the dressing could lead to a chemical burn?	Systematic review of the existing evidence for DACC suggested no reports of adverse effects of any sort. I am not aware of any subsequent data that has suggested any problems and have seen no evidence of problems from 4 years of personal experience with the dressings.
25.			13) Would adoption of the technology require a significant change in the current care pathway? E.g. frequency of dressing change? Are there any additional human factors that should be considered?	In general this would be a straight swap forexisting dressings that are used throughout the NHS
26.			14) The technology is indicated for people with low to moderate levels of exudate. How are levels of exudate defined? Is this quantified? In general is there a typical level of exudate expected in CS or vascular populations? How variable is this? What factors would cause it to vary?	Most post-surgical wounds would be expected to be low exudate wounds requiring only a thin pad and film. Oedema in the lower limbs does have a significant effect on post operative exudate in vascular surgery.
27.			15) How generalisable are results? E.g. would the results from CS or vascular patients be generalizable to other surgical populations?	Relatively consistent effects across trials in both specialties would suggest that effects may be generalisable but both procedures/ procedure types have relatively high rates of SSI and similar effects would be less likely in procedures where SSI are very rare (elective orthopaedic surgery for example).

28.			16) What do you see as the main innovation/benefit of Leukomed Sorbact vs standard comparators (if any)? Are there particular populations who would benefit most?	No other dressings act by hydrophobic binding to attract bacteria to the dressing material. The theoretical advantage is one of bioburden control without recourse to antimicrobials or antibiotics. Populations likely to benefit would be those where poor healing might be predicted and SSI may result due primarily to ingress of bacteria from the skin surface. SSI due to deep infection are less likely to be preventable with a dressing applied post closure as the bacterial implantation is likely to have occurred during the procedure and will be beyond the reach of the binding properties of the dressing.
29.			17) Do you predict any challenges with its use?	We have seen no challenges in 4 years of clinical use.
30.			18) What are the average number of dressings required in a week?	Per average patient we would use one dressing in theatre and a subsequent dressing applied after a wound review at 48-72 hours. In most cases the dressings will then be removed 48-72 hours later and the wound left open to the air. In cases of increased exudate load or if concerns exist requiring earlier wound review this number would be greater due to additional dressing changes required.
31.			19) Could you provide some clarity on the baseline SSI rates, especially for Caesarean section? The one used currently is from Wales.	Baseline rates rely on method of surveillance used. If units are not actively seeking SSI then the only SSI identified will be those that are readmitted or occur during hospital stay. Many SSI are managed in community or for tertiary

				services like vascular these can be re-admitted to satellite units and not always capture in data
32.	06/07/2020	**Expert – Mr Joshua Totty (Core Surgical Trainee Doctoral Candidate)** **Initial questions**	1) We have noted NICE (NG125) and WHO guidelines on preventing SSIs. Are there other guidelines relevant to the use of Leukomed Sorbact?	To my knowledge, no other guidelines are in use that specifically mention Leukomed Sorbact (LS). The European Wound Management Association (EWMA) have also recently produced guidance on the prevention and management of SSI (Stryja et al., 2020).
33.			2) How is SSI defined in the UK? For example ASEPSIS score and CDC definitions. Are there others?	No clear definition of SSI is used universally in the UK. For the purposes of research, the CDC definitions (Centres for Disease Control and Prevention (CDC), 2017), and ASEPSIS tools (Wilson et al., 1986) are commonly used. A group in Bristol, funded by an NIHR HTA grant, have developed a new tool for capturing SSI events in research, but this is derived largely from ASEPSIS scoring and the CDC definition (Macefield et al., 2017). In clinical practice, SSI is normally diagnosed using CDC criteria.
34.			3) Are the protocols for preventing SSI standardised across the UK?	The only protocol which is UK wide that I am aware of is the NICE guidance on preventing SSI (National Institute for Health and Care Excellence, 2019). Individual departments or institutions may have in-house protocols or bundles which are aimed at preventing SSI.

35.			4) How are superficial versus deep SSIs defined? E.g. WUWHS consensus document notes if it occurs 30 days post-surgery. Is the temporal nature of an SSI what characterises it as superficial/deep, or are there more factors?	Superficial and deep infection relate to the tissue layer that is infected, not the time to event. The CDC definition is sub-divided into superficial and deep SSI (Centres for Disease Control and Prevention (CDC), 2017). The below diagram  shows how the layers of a surgical wound relate to the definition of SSI.
36.			5) What would be an adequate follow up time for assessing effectiveness of a surgical dressing?	For assessing a dressing with regards to the prevention of SSI, the follow-up time has to incorporate the definition of SSI used. Using the CDC definitions mentioned above, SSI occurs where there is an infection within 30 days, or within 90 days when a prosthetic implant is used (such as a vascular graft, orthopaedic prosthesis etc). Any observation of SSI events must therefore go past that 30/90 day window. For cost effectiveness, there is more to consider. To get an accurate measure of cost

				effectiveness, data must be captured on health related quality of life (HRQoL) and resource use. The management of an SSI may extend past that 30/90 day window, so data collection must go past that point. In research trials that I have conducted, we have collected data for 6 months after the index procedure (Totty et al., 2019a). This has seemed the best compromise of timely production of results and adequate data collection.
37.			6) How are active/interactive dressings defined versus passive dressings? What is typically used as standard in the NHS? Are there any particular considerations for dressings in vascular surgery or caesarean sections?	This is a complex question due to the sheer volume of dressing products available on the market. I have copied a segment of my research thesis below (Appendix 1) which provides greater detail. Note this does not include reference to DACC coated dressings. A 'standard' post-surgical dressing may be considered to be a non-active pad-and-film dressing, either a vapour-permeable film (Such as Opsite Post-Op, Smith and Nephew) or a woven cotton adhesive film (such as Mepore, Mölnlycke) with a wound contact woven cotton pad. However most surgeons or departments will have individual preferences. In terms of special considerations, these patient groups are very different. Vascular surgery, particularly on the lower limbs, may lead to wounds that have a higher than average level of exudate, which would need to be considered, though this is normally later in the recovery period that this develops due to reperfusion related oedema. In both groups, anatomical considerations must be made. Vascular surgery

<table>
<tr><td></td><td></td><td></td><td></td><td>often involves the groin, which can be a difficult area to apply a dressing. Caeserian section involves a Pfannensteil incision, which post-partum often falls into a skin crease, again making it hard to apply a dressing.</td></tr>
<tr><td>38.</td><td></td><td></td><td>7) We are trying to understand how a surgical patient would potentially be categorised in terms of level of risk for an SSI. What are the typical patient characteristics which would classify a patient as higher risk for SSI?</td><td>An extensive systematic review of 57 studies characterised the risk factors associated with SSI (Korol et al., 2013) finding that co-morbidities were consistently associated with SSI, the most common being diabetes mellitus. If a patient has multiple co-morbidities this was associated with an estimated odds ratio for SSI of 6.1 [95% CI: 1.3-28.9] in all major surgeries. The below table outlines factors that increase the risk of SSI in patients undergoing vascular surgery, however most of these factors apply to all surgical specialties.

Surgery and patient related risk factors for SSI in Vascular Surgery (Homer-Vanniasinkam, 2007)

<table>
<tr><th>Surgery Related</th><th>Patient Related</th></tr>
<tr><td>Delayed surgery
Long procedure
Presence of a groin incision</td><td>Advanced age
Renal insufficiency
Diabetes</td></tr>
</table>
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				Post-operative seroma or haematoma 'Re-do' surgery Undermining skin edges Use of prosthetic graft material	Distal skin necrosis or gangrene Female gender Malnutrition Obesity Pre-operative use of aspirin Rest pain
39.			8) The evidence comes from studies in women who have undergone caesarean section and vascular surgery patients. a. Stanirowski 2016a notes that depending on the definition and the observational period, surgical site infection (SSI) occurs in about 1.8%–9.8% of all CS patients. Does this seem typical of NHS populations? What would be typical baseline rate of SSI in vascular surgery patients? Does this vary by type of surgery? b. Are women undergoing caesarean section typically treated as moderate or high risk? Does this vary by whether the surgery was planned or emergency? c. Are people undergoing certain types of vascular surgery inherently more at risk of SSI?	Infection rates vary by type and anatomical location of surgery. Most published rates of SSI underestimate the true incidence, as SSI occuring in primary care may not be reported in secondary care figures. Surveillance data is often very difficult data to collect and therefore underreporting is common. Table I in the paper by Troughton *et al. (2018)* shows an infection rate of 10% in patients undergoing CS. Within vascular surgery, there is significant variation. For example, SSI rates following open varicose vein surgery have been reported between 1.5% and 24% (Hirsemann et al., 2005, Hayden and Holdsworth, 2001) and figures from SSI surveillance demonstrated a high rate of SSI in patients undergoing lower limb amputation (13.1%) (Elgohari and S. Thelwall, 2014). In one study, infection rates following major lower limb amputation were found to be as high as 22.5% (Sadat et al., 2008). A large study of trends in vascular surgery estimated an infection rate of		

				For example would the following be classed as surgeries with inherently higher risks: major limb amputation, limb revascularisation, open varicose vein surgery, lower limb arterial surgery, open abdominal surgery.	just over 3% (Nowygrod et al., 2006) in lower limb revascularisation surgery, however a randomised controlled trial carried out in 2012 found an overall SSI rate of 22.1% after the same procedures (Turtiainen et al., 2012) I am not an obstetrician and do not perform CS routinely, so I am unable to confidently answer that question. Patients undergoing different types of vascular surgery are at differing risks of SSI. The table presented in response to question 7 outlines some of these differences. In general, those undergoing limb revascularisation are at the highest risk due to groin incisions, poor tissue perfusion, and presence of comorbidities. Lower limb amputation is also a high risk due to poor tissue perfusion and comorbid conditions. The study I completed for my doctoral thesis showed, in regression analysis, vascular surgery below the groin was significantly associated with an increased risk of SSI (Totty et al., 2019b).
40.			9)	In vascular surgery, would wound closure method affect SSI rate?	Following a quick literature search, I am unable to find any evidence of studies investigating methods of wound closure and the impact on SSI in vascular surgery. It is generally accepted that good surgical technique with apposition of the skin edges reduces the risk of SSI. Evidence for one closure method over another is conflicting. A Cochrane review of staples vs suture for vein harvest in cardiothoracic surgery showed no

				favour to either closure method (Biancari and Tiozzo, 2010). A systematic review and meta-analysis of studies in caesarean section favoured sutures over staples (Clay et al., 2011). A systematic review and meta-analysis of studies in orthopaedic surgery also favoured sutures over staples (Krishnan et al., 2019).
41.			10) Several reported outcomes in the literature were below the standard statistical significance margin of 5%, however, the manufacturer of the dressing still considered that these results were clinically and economically meaningful. What are your thoughts on these results; is it common for clinical outcomes to be judged as meaningful below these thresholds within wound care in general? (Studies: Totty et al. 2019, Bua et al. 2017)	There is a distinction to be made between clinical and statistical significance, and although current convention is that a significance margin of 5% is accepted and outside of that is not, there is a move away from this school of thinking in favour of assessing the clinical significance. Excessively large trials may find statistically significant results that have very little clinical significance, and trials that are small may find clinically significant results that do not reach the threshold for statistical significance (Bhardwaj et al., 2004, Ranganathan et al., 2015). In wound care in general, adequately powered randomised controlled trials are rare, and evidence is often limited to case series or, at best, observational studies. Having randomised studies examining wound care interventions is a relative novelty (Gottrup et al., 2010). The study by Totty *et al* (2019b) was a feasibility study and was not designed to answer the clinical question, therefore the lack of statistical significance of the result is not of relevance. However, we did find that there was a 36% relative risk reduction in SSI which could be seen to be clinically significant. Similarly, with *Bua et al*

				(2017), a statistically significant result was found at 7 days, but at 30 days the result was not statistically significant. However, the relative risk reduction of SSI at 30 days was 47% which could be seen to be clinically very significant.
42.			11) Are guidelines for wound dressings likely to be similar in UK and Poland?	I have little experience of wound care in Poland, however evidence suggests that wound care guidelines may differ slightly – predominantly because of the costs involved. In Poland, the patient is partly responsible for the costs of treatment and this may therefore impact upon the devices used to aid healing (Rybak and Stras, 2005).
43.			12) Are there potential adverse events that could result from the use of Leukomed Sorbact? Is it possible the dressing could lead to a chemical burn?	To date, only a single case report has been published in the literature of an adverse reaction to LS (Corazza et al., 2018). This outlines an individual with a contact dermatitis reaction.
44.			13) Would adoption of the technology require a significant change in the current care pathway? E.g. frequency of dressing change? Are there any additional human factors that should be considered?	No significant change would be required in the care pathway that I can consider. LS would act as a like-for-like replacement for standard practise. LS can stay in place for up to 7 days which does not differ from most products available on the market currently. Dressings should be changed within that 7 days regardless of the dressing type used in order to inspect the wound.
45.			14) The technology is indicated for people with low to moderate levels of exudate. How are levels of exudate defined? Is this quantified? In general is there a	There is a quantifiable definition of exudate though it is not commonly used. Mulder (1994) classified chronic wounds into four levels of exudative output – absent, minimal, moderate,

			typical level of exudate expected in CS or vascular populations? How variable is this? What factors would cause it to vary?	high, with associated values for output per 24 hours. In practice, it is not easy to measure volume of output of chronic or surgical wounds (Dealey et al., 2006). Vascular patients undergoing limb revascularisation surgery are at risk of reperfusion oedema, which can cause wounds to have high levels of exudate. Similarly, poor nutrition, cardiac failure, hypoalbuminaemia, venous incompetence and poor mobility may all increase levels of exudate, and are common in patients undergoing vascular surgery.
46.			15) How generalisable are results? E.g. would the results from CS or vascular patients be generalizable to other surgical populations?	Although CS and vascular patients do differ, they can be viewed as two ends of the same spectrum, with potentially young, healthy individuals at one end (CS) and elderly, multiply co-morbid patients at the other (Vascular). If LS is seen to benefit both groups of patients, it stands to reason that it may also benefit groups of patients who lie between the two, which would encompass most patients undergoing surgical procedures. However the only way to adequately validate this would be with fully powered randomised controlled trials in each individual patient group.
47.			16) What do you see as the main innovation/benefit of Leukomed Sorbact vs standard comparators (if any)? Are there particular populations who would benefit most?	The technology is novel relative to other products on the market, as the active part of the product (DACC) does not impregnate the wound, has shown no evidence of antimicrobial resistance, and to date has only one published adverse reaction. Other active dressings, with the most common being silver, have shown evidence of

				resistance and adverse reaction, in the literature (Hosny et al., 2019). It may be that populations who are the highest inherent risk of developing SSI (see Question 7) may benefit the most from its routine use.
48.			17) Do you predict any challenges with its use?	The predominant barrier to the use of LS is cost, in most cases, or a lack of knowledge of its availability in others. There are no specific challenges to its use routinely.
49.			18) What are the average number of dressings required in a week?	This will vary according to the operation performed, the length of the surgical wound, the level of exudate from the wound and the frequency of dressing changes necessitated by clinical review (eg if there are early signs of infection or if the patient becomes unwell and a source of infection is being looked for). Some patients may keep the same dressing for a week; some may require a dressing change every day.
50.			19) Could you provide some clarity on the baseline SSI rates, especially for Caesarean section? The one used currently is from Wales.	The answer to Question 8 also contains information regarding rates of SSI in the UK. Troughton et al. (2018) contains a table outlining reported rates of SSI in the UK in a number of specialties but as discussed, rates of SSI captured through surveillance have the potential to underestimate the true risk of SSI. They quote the risk of SSI in CS as being 10% when SSI out of secondary care is considered. Neumayer et al. (2007) describes a large observational study of over 163,000 patients undergoing vascular surgery in the USA and states an overall SSI rate

				of 4.3%. Multiple resources are available which provide estimates of rates of SSI.
51.	06/07/2020	**Expert – (Dr Thirumagal Bavananthan - Consultant Obstetrician and Gynaecologist)** **Initial questions**	1) We have noted NICE (NG125) and WHO guidelines on preventing SSIs. Are there other guidelines relevant to the use of Leukomed Sorbact?	Wounds UK- Best practice statement –discussing wound care after operation- recent one. 2 articles are published. "Dialkylcarbamoyl Chloride Dressings in the Prevention of Surgical Site Infections after Nonimplant Vascular Surgery"-Clinical Research " The Sorbact® Portfolio of Wound Dressings in the Management of Wound Healing and Prevention of Infection: A Narrative Review
52.			2) How is SSI defined in the UK? For example ASEPSIS score and CDC definitions. Are there others?	The CDC National Healthcare Safety Network (NHSN) Risk Index assesses a patient's risk of developing an SSI based on the presence of 3 key risk factors - (Surveillance of surgical site infections in NHS hospitals in England April 2018 to March 2019) Risk Index Data- A Risk Index comprising data obtained from three factors – ASA score, wound classification and duration of operation(Protocol for the Surveillance of Surgical Site Infection - Surgical Site Infection Surveillance Service) In the NNIS risk index, each operation is scored by the presence or absence of three risk factors at the time of surgery
53.			3) Are the protocols for preventing SSI standardised across the UK?	No, the SSI protocols are not standardised across UK, but mostly use NICE guidance

54.			4) How are superficial versus deep SSIs defined? E.g. WUWHS consensus document notes if it occurs 30 days post-surgery. Is the temporal nature of an SSI what characterises it as superficial/deep, or are there more factors?	**Superficial Incisional Surgical Site Infection** – skin or subcutaneous tissue is involved, occurs within 30 days postoperatively, and must fulfill one of the following additional criteria: • purulent drainage from incision with or without diagnostic laboratory testing (culture) • isolated organisms from aseptically obtained fluid or tissue culture in incision • at least one sign or symptom of clinical infection: localized pain, edema, erythema, warmth *and* the superficial incision is deliberately opened by a surgeon (unless culture of incision is negative) • diagnosis of a superficial incisional SSI by a surgeon or attending physician **Deep Incisional Surgical Site Infection** – involves deep soft tissues such as fascia or muscle within incision, occurs within 30 days postoperatively without implant, occurs within 1 year if implant is in place and infection appears to be directly related to surgical procedure, and must fulfill one of the following additional criteria: • purulent drainage from incision but not from the organ/space of the site • dehiscence or deliberate opening by the surgeon from the deep incision when the patient has at least one of the following signs or symptoms of clinical infection (fever greater

				than 100.4°F, localized pain or edema, unless culture is negative) • abscess or other evidence of infection involving the deep incision is found during examination of incision, reoperation, or pathologic or radiologic exam • diagnosis of a deep incisional SSI by a surgeon or attending physician There are more factors involved
55.			5) What would be an adequate follow up time for assessing effectiveness of a surgical dressing?	Initial 4-7 days to assess effectiveness of dressing and effects upto 30 days
56.			6) How are active/interactive dressings defined versus passive dressings? What is typically used as standard in the NHS? Are there any particular considerations for dressings in vascular surgery or caesarean sections?	Wound dressings are sometimes described as passive, active, or interactive. While passive wound dressings simply serve a protective function, active dressings actually promote healing through the creation of a moist wound environment. Interactive wound dressings, on the other hand, not only create a moist wound environment but also interact with the wound bed components to further enhance wound healing. For example, interactive wound dressings may reduce colonization count, reduce the level of exudate, improve wound bed moisture retention, improve wound collagen matrix, remove cellular products or provide protection for the epithelializing bed. Bioactive dressings and is produced from biomaterials which play an important role in healing process. These dressings are known for

				their biocompatibility, biodegradability and non-toxic nature and are derived generally from natural tissues or artificial sources such as collagen , hyaluronic acid , chitosan , alginate and elastin. Polymers of these materials are used alone or in combination depending on the nature and type of wound. Biological dressings are sometimes incorporated with growth factors and antimicrobials to enhance wound healing process Typically used dressing in NHS are passive Caesarean section- negative wound pressure dressing if raised BMI , emergency LSCS use active dressing
57.			7) We are trying to understand how a surgical patient would potentially be categorised in terms of level of risk for an SSI. What are the typical patient characteristics which would classify a patient as higher risk for SSI?	Age, BMI , emergency , Diabetes, skin preparation , ASA, previous complications with infection, substance use, any factor reduce body immunity Wound classification Clean Clean contaminated Contaminated Dirty
58.			8) The evidence comes from studies in women who have undergone caesarean section and vascular surgery patients. a. Stanirowski 2016a notes that depending on the definition and the observational period, surgical site infection (SSI) occurs in	No information about vascular surgery but we have about 1.7% risk with CS wounds which was reduced to 0.8% after the use of Leukomed dressing- if you take the cohort before and after the leukomed, it actually reduced to quarter

			about 1.8%–9.8% of all CS patients. Does this seem typical of NHS populations? What would be typical baseline rate of SSI in vascular surgery patients? Does this vary by type of surgery? b. Are women undergoing caesarean section typically treated as moderate or high risk? Does this vary by whether the surgery was planned or emergency? c. Are people undergoing certain types of vascular surgery inherently more at risk of SSI? For example would the following be classed as surgeries with inherently higher risks: major limb amputation, limb revascularisation, open varicose vein surgery, lower limb arterial surgery, open abdominal surgery.	High Risk, yes SSI higher in Emergency procedures Don't Know
59.			9) In vascular surgery, would wound closure method affect SSI rate?	Don't know
60.			10) Several reported outcomes in the literature were below the standard statistical significance margin of 5%, however, the manufacturer of the dressing still considered that these results were clinically and economically meaningful. What are your thoughts on these results; is it common for clinical	It is useful to try if an intervention is beneficial as we have new technologies introduced recently. No long term data, but sufficient enough to introduce and monitor when seeing the benefit from other users

			outcomes to be judged as meaningful below these thresholds within wound care in general? (Studies: Totty et al. 2019, Bua et al. 2017)	
61.			11) Are guidelines for wound dressings likely to be similar in UK and Poland?	Don't know
62.			12) Are there potential adverse events that could result from the use of Leukomed Sorbact? Is it possible the dressing could lead to a chemical burn?	Noted redness in 2 cases in last 2 years. No major concerns
63.			13) Would adoption of the technology require a significant change in the current care pathway? E.g. frequency of dressing change? Are there any additional human factors that should be considered?	No. It is simple to apply and does not need any training
64.			14) The technology is indicated for people with low to moderate levels of exudate. How are levels of exudate defined? Is this quantified? In general is there a typical level of exudate expected in CS or vascular populations? How variable is this? What factors would cause it to vary?	A .Levels of exudate -1) none present-wound is dry 2) scant amount-wound is moist, no measurable amount of exudate on Dressing 3) Small or minimal amount on the dressing-exudate covers less than 25% on the bandage 4) Moderate amount-wound tissues are wet and exudate involves 25%-75% of bandage B. In general in CS there would be scant to minimal amount of exudate

				c. It is less likely to be variable but the factors that lead to increased wound infection like high BMI, sepsis, improper surgical technique can cause it to vary.
65.			15) How generalisable are results? E.g. would the results from CS or vascular patients be generalizable to other surgical populations?	We have used Leukomed in gynaecological surgery and have found it to be equally effective as in CS patients
66.			16) What do you see as the main innovation/benefit of Leukomed Sorbact vs standard comparators (if any)? Are there particular populations who would benefit most?	a)Main benefit is the decrease in wound infection. b)Patients prone to have increased wound infection post surgery like a.High BMI b.Previous Wound Infection c.Diabetes d.Septic patients In a systematic review of the maternal intrinsic risk factors associated with SSI following CS, obesity and chorioamnionitis were concluded to be common risk factors for the overall SSI, that is, incisional and organ/space together. Ethnicity is debatable as a risk factor for incisional SSI, as it is believed to be confounded by other risk factors like obesity, unhealthy diet during pregnancy and socioeconomic status.
67.			17) Do you predict any challenges with its use?	No
68.			18) What are the average number of dressings required in a week?	8 per week

69.			19) Could you provide some clarity on the baseline SSI rates, especially for Caesarean section? The one used currently is from Wales.	SSI is reported to be the most common hospital-associated infection in community hospital settings. Moreover, in a recent well-designed multicentre study in England, SSI was estimated to be just under 10% and the readmission rate due to SSI following CS was 0.6%. (Wloch C, Wilson J, Lamagni T, et al. Risk factors for surgical site infection following caesarean section in England: results from a multicentre cohort study. BJOG 2012;119:1324–33. doi:10.1111/j.1471-0528.2012.03452.)
70.	06/07/2020	**Expert – (Ms. Lucy Woodhouse - Lead Tissue Viability Nurse)** **Initial questions**	1) We have noted NICE (NG125) and WHO guidelines on preventing SSIs. Are there other guidelines relevant to the use of Leukomed Sorbact?	Yes - EWMA 2020 guidelines document on SSI and the Wounds UK Best Practice document on SSI: EWMA doc (attached) Stryja J, Sandy-Hodgetts k, Collier M, et al (2020) Surgical site infection prevention and managing surgical site infection across health care sectors. *J Wound Care* **29(Suppl 2b):** S1–S6g Wounds UK (2020) Best Practice Statement: Post-operative wound care – reducing the risk of surgical site infection. Wounds UK, London. www.wounds-uk.com
71.			2) How is SSI defined in the UK? For example ASEPSIS score and CDC definitions. Are there others?	Not that I am aware of – these are the only 2 I know about
72.			3) Are the protocols for preventing SSI standardised across the UK?	I think there will be some local variations, but most will tend to be based around NICE SSI prevention guidance.

73.			4) How are superficial versus deep SSIs defined? E.g. WUWHS consensus document notes if it occurs 30 days post-surgery. Is the temporal nature of an SSI what characterises it as superficial/deep, or are there more factors?	We would use the CDC definitions of superficial incisional, deep incisional or organ space infection.
74.			5) What would be an adequate follow up time for assessing effectiveness of a surgical dressing?	**SSI** is monitored for between 14 and 30 days based on national surveillance protocols in different parts of the UK. Assessing the effectiveness of a surgical dressing needs to be in line with this.
75.			6) How are active/interactive dressings defined versus passive dressings? What is typically used as standard in the NHS? Are there any particular considerations for dressings in vascular surgery or caesarean sections?	I understand passive products to include traditional "dry" dressings such as gauze and tulle dressings; these don't provide a moist wound healing environment. Interactive dressings are normally regarded as "moist wound healing dressings" such as films, foams, hydrogels and hydrocolloids NICE SSI prevention guidelines (2019) recommends that an interactive dressing (i.e. a moist wound healing dressing) is used to cover the incision site at the end of surgery Important characteristics for a dressing after caesarean surgery include: reducing the risk of infection; protecting the wound against external contamination, being comfortable for the patient, allowing freedom of movement, allowing the patient to wash or shower with the dressing in place. Consideration of the patient's Quality of Life is so important especially for a young new mum who has just had a baby – they need to be able to get on with life and possibly breast feed

				etc so a dressing that they don't have to worry about, showerproof etc is so important.
76.			7) We are trying to understand how a surgical patient would potentially be categorised in terms of level of risk for an SSI. What are the typical patient characteristics which would classify a patient as higher risk for SSI?	A full patient assessment is required to classify the level of risk as these include patient and procedure related factors. In terms of patient factors, a high BMI, poorly controlled diabetes, previous C sections can result in CS patients becoming high risk. Within our own Trust, the following factors are taken into account when classifying the level of risk (see attached pathway) • Obesity is BMI >30 in line with current NHS Classification of Obesity • Prior surgery (previous C section with complications) • Poorly controlled diabetes • Prior surgery (previous C section with complications) • Radiation therapy or chemotherapy • Immune system disorders (e.g. acquired immune deficiency syndrome, malignancy) • Inappropriate antibiotic prophylaxis, particularly in acute wounds • Protein-energy malnutrition • Alcohol, smoking and drug abuse • Conditions associated with hypoxia and / or poor tissue perfusion (e.g. anaemia, cardiac or

				respiratory disease, arterial or vascular disease, renal impairment, rheumatoid arthritis, shock)
77.			8) The evidence comes from studies in women who have undergone caesarean section and vascular surgery patients. a. Stanirowski 2016a notes that depending on the definition and the observational period, surgical site infection (SSI) occurs in about 1.8%–9.8% of all CS patients. Does this seem typical of NHS populations? What would be typical baseline rate of SSI in vascular surgery patients? Does this vary by type of surgery? b. Are women undergoing caesarean section typically treated as moderate or high risk? Does this vary by whether the surgery was planned or emergency? c. Are people undergoing certain types of vascular surgery inherently more at risk of SSI? For example would the following be classed as surgeries with inherently higher risks: major limb amputation, limb revascularisation, open varicose vein surgery, lower limb arterial surgery, open abdominal surgery.	Re: SSI rates for caesarean sections, yes this is typical. In my Trust our SSI rate was 2.9% in 2018 then 1.7% in 2019 as the pathway for dressings in Maternity became more embedded. Since the introduction of Leukomed Sorbact and a change in the pathway this year we have had no reported SSI's. The Public Health Wales data (2018) which shows an SSI rate of 4.02% for CS and the Troughton data which shows an infection rate of 10% for CS based on surveillance of English hospitals. Think it shows a similar spectrum I can't comment on Vascular rates as this is not my speciality and therefore have no information on this. The level of risk depends on the patient and their assessment. Yes, emergency procedures are known to carry a higher SSI risk. Unable to comment as not my speciality

78.			9) In vascular surgery, would wound closure method affect SSI rate?	Unable to comment as not my speciality
			10) Several reported outcomes in the literature were below the standard statistical significance margin of 5%, however, the manufacturer of the dressing still considered that these results were clinically and economically meaningful. What are your thoughts on these results; is it common for clinical outcomes to be judged as meaningful below these thresholds within wound care in general? (Studies: Totty et al. 2019, Bua et al. 2017)	I feel that the threshold of 5% significance is arbitrary and just indicates the degree of uncertainty surrounding the evidence - all clinical evidence has a degree of uncertainty associated with it as it doesn't reflect the real-world situation. The fact that reported outcomes have not achieved statistical significance does not invalidate the clinical benefits and value which the dressing offers in clinical practice. In wound care, it's important to balance any uncertainty surrounding the clinical evidence with practical experiences of the product in the real-world scenario, the impact it has on patient considerations and the potential budget impact.
79.			11) Are guidelines for wound dressings likely to be similar in UK and Poland?	I am unsure on this?
80.			12) Are there potential adverse events that could result from the use of Leukomed Sorbact? Is it possible the dressing could lead to a chemical burn?	We haven't seen any experience of this or any adverse reactions to date. I would think it was highly unlikely due to the way in which Sorbact works. There is no interactive ingredients as such that would cause a reaction.
81.			13) Would adoption of the technology require a significant change in the current care pathway? E.g. frequency of dressing change? Are there any additional human factors that should be considered?	No, we already use LS as part of our current care pathway. When we changed, some training was required to familiarise users with a new dressing but there were no other significant changes required. Essity supported us with this. We've

				found it works well here and my experience with LS as a patient as well as a TVN has been a good one.
82.			14) The technology is indicated for people with low to moderate levels of exudate. How are levels of exudate defined? Is this quantified? In general is there a typical level of exudate expected in CS or vascular populations? How variable is this? What factors would cause it to vary?	Levels of exudate are generally based on clinician experience; I'm not aware of any standardised scale for measuring this. The level of exudate varies according to the individual patient; it would typically be low to moderate for CS patients. Infection can lead to higher levels of exudate being present.
83.			15) How generalisable are results? E.g. would the results from CS or vascular patients be generalizable to other surgical populations?	Sorbact works by controlling and removing bacteria at the wound surface; this is a recognised source of SSI. Given this, I would expect that these results would be replicated in clean/clean contaminated wounds in other surgical specialities.
84.			16) What do you see as the main innovation/benefit of Leukomed Sorbact vs standard comparators (if any)? Are there particular populations who would benefit most?	We have indicated Leukomed Sorbact for patients with a BMI ≤45 with increased risk factors (see attached pathway). The main benefit of Leukomed Sorbact is that the dressing supports prevention of SSI which is beneficial to patients, financial budgets and nursing resource. We have also had reports of improved QOL for the patient.
85.			17) Do you predict any challenges with its use?	No

86.			18) What are the average number of dressings required in a week?	Typically once a week sometimes twice
87.			19) Could you provide some clarity on the baseline SSI rates, especially for Caesarean section? The one used currently is from Wales.	Wales have surveillance data on CS, England does not
88.	16/07/2020	**Manufacturer** **Additional question**	1) The submission describes a study in a poster presentation that found 2 hypersensitivity reactions to the adhesive in 55 treated patients (Coldwell J, Curtin J. Management of the surgical site post local skin excision using a bacteria and fungi binding dressing in the primary care setting - an observational study. Poster Abigo Medical AB data on file. 2014). Could we see a copy of the poster?	See appendix 1.

Insert more rows as necessary

Appendix 1.

During correspondence with the company and experts, additional information is sometimes included as file attachments, graphics and tables. Any questions that included additional information of this kind is added below in relation to the relevant question/answer:

Company call - minutes:

MT496 Leukomed Sorbact_Sponsor TC

File attachments/additional information from Mr Joshua Totty:

Questions to clinicians 02.07.202(

File attachments/additional information from question 88 (company):

Poster - Jon Coldwell - Managen

NICE National Institute for Health and Care Excellence

National Institute for Health and Care Excellence
Centre for Health Technology Evaluation

Pro-forma Response

External Assessment Centre Report factual check

Leukomed Sorbact

Please find enclosed the assessment report prepared for this assessment by the External Assessment Centre (EAC).

You are asked to check the assessment report from KiTec to ensure there are no factual inaccuracies contained within it. If you do identify any factual inaccuracies you must inform NICE by 12pm, **31 July** using the below proforma comments table. All your comments on factual inaccuracies will receive a response from the EAC and when appropriate, will be amended in the EAC report. This table, including EAC responses will be presented to the Medical Technologies Advisory Committee and will subsequently be published on the NICE website with the Assessment report.

28 July

NICE National Institute for Health and Care Excellence

Issue 1

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Section 2 Para 3 (pg. 13) The dressing should be changed at least twice a week, but may be worn continuously for a maximum time of 7 days if clinical conditions allow.	The dressing change frequency depends on exudate levels and the overall condition of the wound and surrounding skin. Should the clinical condition allow, the dressing can be left in place for up to 7 days.	At the time of submission we provided the IFU for Leukomed Sorbact, together with a letter from the Director of Regulatory Affairs explaining that the wear time statement for Leukomed Sorbact is in the process of being changed in the IFU from stating that the dressing should be changed at least twice a week to a statement saying that it could be left in place for up to 7 days, if the clinical condition allows.	KG – thank you. We have amended to "The frequency of dressing change depends on the wound status (including exudate level and presence of infection), and overall condition of surrounding skin. Should the clinical condition allow, the dressing can be left in place for up to 7 days."

Issue 2

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Section 2 Para 2 (pg.13) Organisms that are not hydrophobic will not be bound or removed from the wound	We would respectfully request that this statement is removed.	There is no direct evidence to support this statement with the result that it is not factually accurate. The impact of Leukomed Sorbact on any non-hydrophobic organisms has not been the subject of investigation.	KG – thank you, we have removed the statement from the report. Just to note that this statement is included in the Leukomed Sorbact IFU.

NICE National Institute for Health and Care Excellence

Issue 3

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Section 2, Para 5, (pg.14) Leukomed Sorbact has been CE marked as a class IIb device since December 2019	Leukomed Sorbact has been CE marked as a class 11b device since June 2014	The date of 2019 stated in Essity's clinical submission is incorrect. This was due to a typo. It should have stated 2014 as per the Leukomed Sorbact MIB	KG – thank you. This has been amended in the AR.

Issue 4

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Section 9.3, para 1 (pg. 53)	Cost saving for CS should read £107.43 rather than £117.98 Cost saving for vascular surgery should read £17.82 rather than £15.49	Consistency with Table 7b (pg. 54). The figure of £117.98 is the difference in SSI treatment costs rather than the difference in total costs Same as above. Consistency with Table 7c (pg.55)	MK – the error has now been corrected in the report.

Issue 5

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Table 7c (pg. 55)	Column 6, SSI episode cost should read £67.55 rather than £667.55	Just a typo	MK – the error has now been corrected in the report.

Issue 6

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Additional results para 1 (pg.56)	Final sentence should read “Across scenarios, cost savings were at least £12.78, £15.02 and £77.93…” rather than £23.33 for all surgery.	See Table 9a and issue 7 below	MK – the error has now been corrected in the report.

NICE National Institute for Health and Care Excellence

Issue 7

Description of factual inaccuracy	Description of proposed amendment	Justification for amendment	EAC response
Table 9a, page 57	The figures in column 2 are incorrect. These are the differences in costs of SSI treatment rather than the difference in total costs. The figures should read (from the top): -£20.56 (base case); -£12.78; -£28.34	The figures are copied from the company submission (Scenario 1, pg. 19)	MK – the error has now been corrected in the report.