

**Manuscript version: Author's Accepted Manuscript**

The version presented in WRAP is the author's accepted manuscript and may differ from the published version or Version of Record.

**Persistent WRAP URL:**

<http://wrap.warwick.ac.uk/124520>

**How to cite:**

Please refer to published version for the most recent bibliographic citation information. If a published version is known of, the repository item page linked to above, will contain details on accessing it.

**Copyright and reuse:**

The Warwick Research Archive Portal (WRAP) makes this work by researchers of the University of Warwick available open access under the following conditions.

Copyright © and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable the material made available in WRAP has been checked for eligibility before being made available.

Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

**Publisher's statement:**

Please refer to the repository item page, publisher's statement section, for further information.

For more information, please contact the WRAP Team at: [wrap@warwick.ac.uk](mailto:wrap@warwick.ac.uk).

## **Clinical and practical issues around dressing use in primary abdominal wounds: a qualitative study of healthcare professionals' and patients' views**

acknowledgment, conflict of interest statement

### **Authors:**

Christel McMullan<sup>4</sup>, Jane Blazeby<sup>2,3</sup>, Jenny L Donovan<sup>2,7</sup>, Leila Rooshenas<sup>2</sup>, Daisy Elliott<sup>2</sup>, Jonathan Mathers<sup>4</sup>

on behalf of the Bluebelle Study Group\*

\*The Bluebelle Study Group consists of the following sub-groups:

**Bluebelle grant co-applicants:** Lazaros Andronis<sup>1</sup>, Jane Blazeby<sup>2,3</sup>, Natalie Blencowe<sup>2,3</sup>, Melanie Calvert<sup>4,5</sup>, Joanna Coast<sup>2,7</sup>, Jenny L Donovan<sup>2,7</sup>, Tim Draycott<sup>6</sup>, Rachael Goberman-Hill<sup>8</sup>, Robert Longman<sup>3</sup>, Laura Magill<sup>9</sup>, Jonathan Mathers<sup>4,5</sup>, Thomas Pinkney<sup>5,10</sup>, Barnaby C Reeves<sup>11</sup>, Chris A Rogers<sup>11</sup>, Leila Rooshenas<sup>2</sup>, Andrew Torrance<sup>4</sup>, Nicky J Welton<sup>2</sup>, Mark Woodward<sup>3</sup>, Trudie Young<sup>12</sup>

**Other members of the Bluebelle Study Group:** Jo Chambers<sup>3</sup>, Daisy Elliott<sup>2</sup>, Louise Flintoff<sup>3</sup>, Kelly Hollier<sup>13</sup>, Susan Hughes<sup>14</sup>, Rhiannon Macefield<sup>2</sup>, Christel McMullan<sup>4</sup>, Anne Pullyblank<sup>14</sup>, Catherine Simmonds<sup>14</sup>, Clementine Skilton<sup>14</sup>, David Tyrrell<sup>13</sup>

1. Division of Health Sciences, University of Warwick, Coventry, UK
2. Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK
3. University Hospitals Bristol NHS Foundation Trust, Bristol, UK
4. Institute of Applied Health Research, University of Birmingham, Birmingham, UK
5. Centre for Patient Reported Outcomes Research, University of Birmingham, UK
6. North Bristol NHS Trust, Bristol, UK
7. NIHR Collaboration for Leadership in Applied Health Research and Care West at University Hospitals Bristol NHS Trust, Bristol, UK
8. Musculoskeletal Research Unit, School of Clinical Sciences, University of Bristol, UK
9. Birmingham Clinical Trials Unit, University of Birmingham, UK
10. Academic Department of Surgery, Queen Elizabeth Hospital, University of Birmingham, UK
11. Clinical Trials and Evaluation Unit, School of Clinical Sciences, University of Bristol, Bristol, UK
12. Welsh Wound Innovation Centre, Rhodfa Marics, Ynysmaerdy, Pontyclun, Rhondda Cynon Taf, Wales, UK
13. University Hospitals Birmingham NHS Foundation Trust, UK
14. North Bristol NHS Trust

## **Abstract**

Primary surgical abdominal wounds are usually covered with a dressing. However, little is known about practical issues and costs around these dressings. This study aimed to provide an in-depth description of patients' and healthcare professionals' (HCPs) perspectives on the clinical and practical issues associated with standard and novel dressing (glue-as-a-dressing) use on primary surgical wounds, and to establish whether and how their experience compares with these perspectives. During semi-structured interviews, patients and HCPs discussed their positive experience of glue-as-a-dressing and no dressing around six themes: wound contamination and infection, wound healing, wound care, physical protection afforded by simple dressings, potential psychological impact of an exposed wound, and ability to carry out everyday tasks. Current views on the practice of dressings for primary abdominal wounds are influenced by ingrained clinical practice. These views can be challenged when exposed to novel dressing strategies or as new evidence of the clinical effect of dressing strategies emerges.

**Keywords:** Feasibility studies; qualitative methods; wound dressings; exposed wounds; glue;

## **Acknowledgements**

The Bluebelle team are grateful to all of the patient and professional research participants who made this study possible.

## **Competing interests**

None declared

1

## 2 **Introduction**

3 Abdominal surgical procedures are amongst the most common operations performed (Eurostat,  
4 2014). At the end of most procedures the wound is closed and the healing process begins (Dumville  
5 et al, 2016). The next step, recommended by the National Institute for Health and Care Excellence  
6 (NICE), is to cover the wound with a dressing, despite insufficient evidence to demonstrate that  
7 dressings reduce surgical site infection (SSI) (NICE, 2008). A recent survey undertaken as part of the  
8 Bluebelle feasibility study (NIHR HTA 12/200/04) found that 68% of primary abdominal wounds were  
9 covered with simple adhesive dressings, 27.4% of wounds had tissue adhesive applied over closed  
10 skin (termed 'glue-as-a-dressing' here), and 3.6% of wounds did not have a dressing (Bluebelle Study  
11 Group, 2016a). The remaining 1.0% of wounds were covered with advanced dressings.

12

13 Most wound dressing research focuses on the association with risk and cost of SSI (NICE, 2008;  
14 Smyth et al, 2008; Borkar & Khubalkar, 2011) despite well-known uncertainties around whether  
15 dressings are needed at all (Dumville et al, 2016; Blazeby et al, 2016). In their systematic review of  
16 dressing use and SSIs, Dumville et al. (2016) recommended that the views of HCPs and patients  
17 should be considered in decisions that concern dressing strategies. Such decisions about the use of  
18 post-surgical wound dressings may require the consideration of practical as well as clinical and cost-  
19 related issues (Blazeby et al, 2016).

20

21 Some existing qualitative research has explored patients' perspectives on specific and specialised  
22 wound dressing types used in open and chronic wounds (Kelly et al, 2016; Fagerdhal et al, 2013;  
23 Abbotts, 2010). Very little is known, however, about patients' perspectives about having their  
24 wound covered with common wound dressings. Patients' views on exposed wounds have been  
25 described qualitatively, but only after early removal of a dressing (Meylan & Tschantz, 2001).

26 Although a small number of patients found dressing removal uncomfortable and reported not liking

27 the sight of their undressed wounds, these findings lack detailed information about patients' views  
28 on dressed and undressed wounds. Other than research conducted in the context of the Bluebelle  
29 study (Elliott et al, 2017), we are not aware of any in-depth research that has examined HCPs' and  
30 patients' views on the practical and clinical issues associated with routine post-surgical dressing use,  
31 novel dressing strategies (e.g. glue-as-a-dressing), and no dressing use (Elliott et al, 2017; Bluebelle  
32 Study Group et al, 2016b).

33

#### 34 **Aim**

35 The aims of this article are to (i) provide an in-depth description of HCPs' and patients' perspectives  
36 on the clinical and practical issues associated with post-surgical wound dressing use, and (ii)  
37 establish how experience of novel dressing strategies (including no dressing use) compares with  
38 these perspectives.

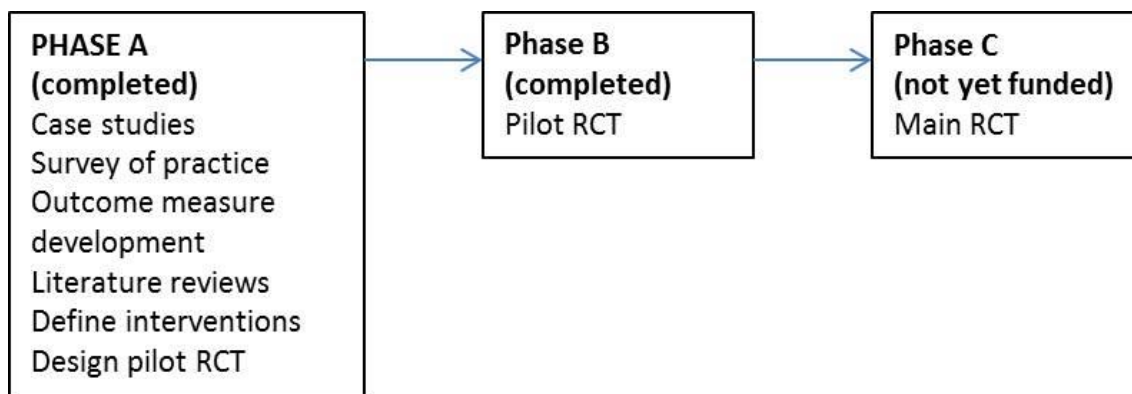
39

#### 40 **Methods**

41 Qualitative data were collected as part of the Bluebelle feasibility study to explore the perspectives  
42 of patients and HCPs on post-surgical dressing use (Figure 1 & Box 1). Semi-structured interviews  
43 were conducted in the three NHS University Teaching hospitals and three district general hospitals in  
44 the South West and the West Midlands regions of England, focusing on gastrointestinal (GI) and  
45 obstetric surgery. Ethical approval for this work was granted by the Camden and King's Cross  
46 Research Ethics Committee (14/LR/0640) on the 10<sup>th</sup> April 2014.

47

48



*Figure 1 – Overall structure of the Bluebelle study*

49

50

**Box 1 – Description of the Bluebelle study**

51

Bluebelle was designed to investigate the feasibility and acceptability of conducting a randomised controlled trial (RCT) of post-surgical dressing use that included a no dressing group. Bluebelle was conducted in two phases: Phase A consisted of preparatory qualitative research exploring HCPs’ and patients’ perspectives on wound dressing use and practice, as well as their views regarding the proposed trial (Bluebelle Study Group et al, 2017\_14). Findings from Phase A informed Phase B, an external pilot RCT, allocating patients to one of three groups: simple dressing, glue-as-a-dressing, or no dressing (Fig 1) (The Bluebelle Study Group et al, 2017\_15). Qualitative data were collected during both Phase A and Phase B.

52

53

54

55

56

57

58

**59 Sampling and recruitment**

60 For the qualitative interviews in Phase A and B the research team recruited HCPs working in

61 upper/lower GI and obstetric surgery, including surgeons, nurses, research nurses, and midwives.

62 Eligible patients in Phase A were aged 18 years or over and had recently undergone, or were due to

63 undergo abdominal surgery. Patients in Phase B were 16 or over and had recently undergone

64 elective or unplanned abdominal or obstetric surgery. The qualitative research team used purposive

65 sampling for both phases to ensure a diverse range of patients were included, according to age,

66 gender, type of surgery, and in Phase B according to dressing allocation. In Phase B, the sample was

67 weighted toward patients who were allocated to receive either glue-as-a-dressing or no dressing in

68 order to explore the experience of these dressing strategies. Written informed consent was provided  
 69 before each interview.

70

71 **Data collection**

72 One-to-one semi-structured interviews were conducted face to face or via telephone by CM, LR, DE  
 73 and JM. Face-to-face interviews took place on hospital premises or in participants’ homes.

74 The interview schedules were informed by the research objectives of the Bluebelle feasibility study  
 75 (Bluebelle Study Group et al, 2016b) and evolved as data collection progressed. Interviews during  
 76 Phase A of the study focused on HCPs’ perspectives on wound dressing use and practice and  
 77 patients’ experiences of wound dressing use, as well as hypothetical perspectives on the use of no  
 78 dressing within the pilot trial. Further interviews were carried out during Phase A to investigate  
 79 participants’ views around the use of glue-as-a-dressing. Phase B interviews aimed to explore HCPs’  
 80 and patients’ actual experience of the use of simple dressings, glue-as-a dressing and no dressing  
 81 within the pilot trial. **An example of wounds covered with glue-as-a-dressing and a simple dressing  
 82 can be seen in pictures 1 and 2.**

83 A total of 106 HCPs and 88 patients were interviewed. The breakdown of HCPs and patients  
 84 interviewed in Phase A and Phase B is shown in tables 1-3. Procedures were wide ranging and  
 85 included hernia repair, colectomy, recto-anal surgery, gallbladder removal, liver surgery, and  
 86 caesarean sections.

87

STAFF	Upper / Lower Gastro-intestinal Surgery					Obstetric surgery		
	Consultant surgeon	Registrar	Ward nurse	Theatre staff	Research nurse	Consultant Surgeon	Registrar	Midwife
<b>Understanding wound dressing practice (Phase A)</b>	25	11	23	n/a	n/a	7	7	15
<b>Pilot trial</b>	1	2	4	4	4	0	0	3

---

(Phase B)

---

88

<b>PATIENTS</b>	<b>Upper / Lower Gastro-intestinal Surgery</b>	<b>Obstetric surgery</b>
<b>Understanding wound dressing practice (Phase A)</b>	44	7
<b>Pilot trial (Phase B)</b>	30	7

89

<b>PATIENTS (Pilot trial - Phase B)</b>	<b>Upper / Lower Gastro-intestinal Surgery</b>	<b>Obstetric surgery</b>
<b>Simple Dressing</b>	4	1
<b>No dressing</b>	15	3
<b>Glue-as-a-dressing</b>	11	3

90

## 91 **Analysis**

92 Interviews were audio-recorded and transcribed verbatim. Data were analysed thematically using  
93 NVivo10, guided by the constant comparison method (Glaser & Strauss, 1967). A sample of interview  
94 transcripts was coded independently by two researchers to help develop an initial coding  
95 framework. Each transcript was then read several times. Some codes were developed *a-priori*,  
96 based on the topic guide. More codes were subsequently developed inductively. These codes were  
97 then reviewed and indexed into broader categories. The research team met on a regular basis to  
98 discuss the coding frame, data interpretation, and whether the topic guide needed to be adapted in  
99 light of the emerging findings.

100

## 101 **Findings**

102

### 103 **Themes emerging from Phase A interviews**



104 During Phase A interviews six core themes were identified as integral to HCPs' and patients'  
105 perspectives on the purposes and practice of wound dressings in GI and obstetric surgery: wound  
106 contamination and infection, wound healing, wound care, physical protection afforded by simple  
107 dressings, potential psychological impact of an exposed wound, and carrying out everyday tasks.

108

109 **1. Wound contamination and infection**

110 It was clear, during the initial interviews, that a consensus about the role of simple dressings in SSI  
111 prevention did not exist, despite SSI being a key topic for discussion in relation to dressing use.

112 Some nurses posited a role for simple dressings in preventing infection as they provide a physical  
113 barrier against the external environment, such as the hospital environment or patients picking at  
114 their wound, which otherwise could contaminate it, thereby causing infection (quote 1).

115 When SSI prevention was discussed as a reason for simple dressing use it was suggested,  
116 predominantly by surgeons, that this mechanism of SSI prevention was only a purported or  
117 theoretical role of simple dressings. These participants questioned the notion that dressings prevent  
118 infection via wound contamination. Indeed, some went further to suggest that dressing use might  
119 actually cause infection, for instance by keeping the wound area moist and providing an  
120 environment that promoted the growth of 'bugs' (quote 2).

121 Further demonstrating the complexity of this issue and perhaps the uncertainty surrounding it,  
122 surgeons offered different explanations at different points of Phase A interviews. Others suggested  
123 scenarios where they felt that the risk of SSIs associated with contamination of the post-surgical  
124 wound was higher without the use of some form of dressing. Examples included wounds near  
125 caesarean sections (the theatre environment following the delivery of a baby was considered as  
126 'messy') and stomas, where glue-as-a-dressing was used to protect the wound from contamination  
127 from the ostomy, resulting in lower infection rates and perhaps providing advantages over simple  
128 dressings (quote 3).

129 The specific post-surgical events following delivery of a baby were a further reason for obstetric  
130 professionals' concern about leaving wounds undressed. Mothers' attention was thought to be  
131 concentrated on their newborn babies, not on keeping their wound clean. This, according to some,  
132 made these women especially in need of a dressing (quote 4).

133 Some patients also demonstrated uncertainty around the role of simple dressings in SSI, and  
134 whether or not it would be best to leave a wound open to the air (quote 5).

135

## 136 **2. Wound healing**

137 There was a lack of consensus from HCPs regarding whether or not simple dressings promoted  
138 wound healing. Some believed that they contributed to wound healing by maintaining warmth  
139 around the wound site by not disturbing the wound and avoiding lifting the dressing too often  
140 (quote 6).

141 In addition, nurses felt that simple dressings would help the wound healing process by absorbing any  
142 exudate or sweat (quote 7).

143 However, some HCPs and patients disagreed with this idea, suggesting that simple dressings slowed  
144 down the wound healing process by preventing the wound from drying (quote 8).

145 Similar to discussions concerning the role of dressings in SSIs it was clear that many HCPs were  
146 uncertain about the relationship between dressing use and wound healing. Again, some  
147 interviewees expressed this doubt and when probed further challenged their own earlier statements  
148 about the impact of wound dressings on wound healing (quote 9).

149

## 150 **3. Wound care**

151 The main concerns regarding post-operative wound care were the ability to manage exudate and the  
152 identification of wound infections.

153 Several HCPs and patients felt that simple dressings should be used to absorb exudate, avoiding the  
154 possibility of leaky undressed wounds soiling their clothes or bedding (quote 10).

155 Some HCP interviewees were also concerned that glue-as-a-dressing could delay the detection and  
156 management of SSIs, as they would prevent leakage associated with infection (quote 11):  
157 Other interviewees, however, said that infection could be detected through other ways, such as the  
158 redness of the skin, the level of pain, swelling, fever, and a raised pulse rate.

159 **Box 2 – Quotes from participants**

Quote 1

*From my experience I would say a wound dressing is to protect the wound, and basically it's to prevent infection, that's what I would believe it to do from my nursing practice and midwifery. The whole reason they have a dressing is to protect that area from, you know, foreign bodies and bacteria and the environment (Midwife, Phase A)*

Quote 2

*I would imagine that if the skin flora can get under the dressing then all the dressing does is keep a nice warm moist growbag environment for whatever bugs are there (Obstetric surgeon, Phase A)*

Quote 3

*I like the idea that it's nice and sealed, particularly when we make stomas [...] The great thing about the superglue is that it glues it shut so it feels like it's sealed away from the muck (Registrar, General surgery, Phase A)*

Quote 4

*Especially when they're preoccupied with their babies and the last thing on their mind is hmm looking after their wound site (Midwife, Phase A)*

Quote 5

*It may do [prevent infection], but if it's left and you haven't got anything on and it was...to the air, it may do, I don't know. But otherwise, it's probably best without the dressing on and left how it is (Patient, Phase A)*

Quote 6

*We try and not disturb open wounds too frequently [...] Every time you take a dressing off, the natural body heat drops. So the temperature around that wound bed drops when you remove a dressing, because you're opening it to the air (Nurse, General surgery, Phase A)*

Quote 7

*When there's an overhang then it gets sweaty and wet and that's probably not conducive to the wound healing (Midwife, Phase A)*

Quote 8

*By having it [the wound] open [in the air] earlier would it mean it would heal quicker, or by having a dressing on, is it going to make the dressing, is the dressing going to keep it like moist and soft where it's not going to heal so quick? (Patient, Phase A)*

Quote 9

*I think specifically related to C-sections I would answer that, you know, they're (simple dressings) used again to, I keep reiterating: promote healing, prevent infection*

*[Later during the interview]*

*I don't think in terms of promoting healing [...] I don't think a wound dressing by itself can necessarily speed up healing. I don't know, it's interesting to (see) (Midwife, Phase A)*

Quote 10

*The day after, two days after, that's fine, I don't mind not having a dressing but straight after surgery, especially because it's leaking blood and all the rest of it, I would want it covered. It would worry me (Patient, Phase A)*

Quote 11

*If there is sufficient amount of pressure I suppose underneath that wound then that could probably*

**Box 3 – Quotes from participants**Quote 12

*Because your wound when it's new is very sensitive so if it brushes against something then in theory it might protect it. And some of our wounds are very big, particularly in my speciality, we're talking about things all across the abdomen, so our patients' pain issues are very important (General surgery registrar, Phase A)*

Quote 13

*When I'm sat up the wound is kind of tucked under because of my belly so big the wound actually pushes against my legs hmm so when I stand up I can feel the hmm the wound and when I'm hot as well peeling away from my legs. If I didn't have a dressing on it I think, I think the stitches would like stick to my leg and it would hurt a lot more (Obstetric patient, Phase A)*

Quote 14

*I mean that's just my bias view but you know when you do a ward round and you take the dressing off to have a look at the wound for example they are always very anxious about having the wound exposed and they're you know very keen for the wound to be dressed and covered up quite quickly (General surgeon, Phase A)*

Quote 15

*Maybe if I did not have a dressing [...] maybe I would have been a little more, I would say a little more careful and more concerned about how I did things around my daily chores, like having a shower or going to the toilet and stuff like that (Patient, Phase A)*

Quote 16

*I think it dried quicker [...] because the air was going to it [...] it healed quicker (Patient, no dressing, Phase B)*

Quote 17

*If we have got things like oozing or redness or something that doesn't look quite right, we are spotting it earlier (Nurse, general surgery, Phase B)*

Quote 18

*I'm just making sure I be careful at night time and [...] I'm making sure I'm wearing sort of tops and um so I don't knock it or rub myself or when I roll I don't pull (Patient, no dressing, Phase B)*

Quote 19

*Well that's where, that sort of having the baby stomach is actually a bit of help in that as well because then it just tends to keep everything away from... [clothes] (Obstetric patient, no dressing, Phase B)*

Quote 20

*Um... to be honest, it didn't really bother me, um, it didn't affect me in any way being able to see it [my wound] (Patient, no dressing, Phase B)  
I've been quite pleased with it actually, it's, it's quite neat (Patient, glue-as-a-dressing, Phase B)*

Quote 21

*It gave me a bit of confidence because the more I can see the more then I feel I'm in control and therefore I know what's going on with my body (Patient, glue-as-a-dressing, Phase B)*

Quote 22

*It was completely straightforward you know. I got home from hospital on... So I got there in the evening, the following day I had a shower and you know my wounds were absolutely fine, I had not, not an ounce of [...] bother or trouble (Patient, no dressing, Phase B)*

161

162 **4. *Physical protection afforded by simple dressings***

163 Both HCPs and patients in Phase A thought that simple dressings provide protection for the wound  
164 from physical trauma and from the wound closure catching on clothes. While patients expressed  
165 concern at the thought of an undressed wound leaving them vulnerable to knocks, HCPs suggested  
166 that this was partly mitigated by the use of simple dressings (quote 12).

167 Interviewees, especially in obstetrics, also expressed some concern that the wound closure (sutures,  
168 staples, clips) on an undressed wound would catch on clothes. Indeed, interviewees in obstetrics  
169 seemed to be more concerned about the prospect of leaving wounds undressed during the Phase A  
170 interviews. For example, the following obstetric patient was concerned that her stitches would stick  
171 to her legs if she did not have a dressing, which eventually would be more painful for her (quote 13).

172

173 **5. *The potential psychological impact of an exposed wound***

174 Seeing the wound was a potential issue raised by several HCPs and patients during the Phase A  
175 interviews, especially in the case of undressed wounds. Despite the fact that a small minority of  
176 nurses believed that seeing an undressed wound could help patients come to terms quicker with  
177 their wounds, some HCPs thought that seeing an undressed wound would lead to psychological  
178 discomfort for patients who may be concerned by the appearance, which could look 'messy'.

179 Several patients believed that they would not be comfortable seeing their wound, which according  
180 to some of the HCPs could lead to some anxiety among patients (quote 14).

181

182 **6. *Carrying out everyday tasks***

183 Although HCPs did not raise the issue during the Phase A interviews, some patients thought that  
184 they would need to be more careful without a simple dressing when carrying out everyday tasks,  
185 such as having a shower or moving around. This was perhaps interrelated with thoughts about

186 perceptions regarding the physical and psychological protection afforded by simple dressings (quote  
187 15).

188

### 189 **How patients' experiences compare to their initial perceptions**

190 Overall, the main concerns raised by participants during the Phase A interviews were not confirmed  
191 in Phase B and the majority reported a positive experience of using glue-as-a-dressing or having  
192 exposed wounds.

193 No serious concerns relating to no dressing use and SSIs were reported by participants, even the  
194 obstetric ones. In addition, the idea that not using a wound dressing facilitated the process of wound  
195 healing by allowing the wound to dry was discussed several times both by patients and nurses  
196 (based on the understanding that no SSI was present) (quote 16).

197 HCPs and patients in Phase B were generally enthusiastic about wound care for an undressed wound  
198 or a wound covered with glue-as-a-dressing and appreciated the fact that in both cases there was no  
199 dressing to lift, re-apply or change. Some nurses suggested that undressed wounds allowed them to  
200 notice any issues faster than with a simple dressing (quote 17):

201 This also meant that that glue-as-a-dressing and undressed wounds were reportedly not intrusive for  
202 patients, making it easier to check for infection.

203 Patients and HCPs in Phase B did not report negative physical experiences of undressed wounds.

204 Patients also seemed content with the physical experience of glue-as-a-dressing, with several stating  
205 that they did not notice that they had glue on their wound. However, some patients with glue-as-a-  
206 dressing were aware of their wound and of a slight pulling sensation around it, implying that they  
207 had to be more careful around it, particularly at night (quote 18).

208 In order to avoid the wound closure catching on clothes, several patients with undressed wounds  
209 reported wearing loose clothing. One obstetric patient felt that her post-birth 'baby stomach' was  
210 an advantage as it provided some physical protection (quote 19).

211 Patients allocated to no dressing or glue-as-a-dressing did not find their wound 'messy' as  
212 mentioned by some participants in Phase A and felt at ease with seeing their wound (quote 20):  
213 In addition, some patients suggested that being able to view the wound had given them a feeling of  
214 control, increased their confidence in relation to it, and allowed them to check whether their wound  
215 was healing properly (quote 21)

216 Overall, patients with undressed wounds and glue-as-a-dressing felt that they were able to carry out  
217 everyday tasks including having a shower, walking, getting up, lying down, and that they were able  
218 to do so sooner than with a simple dressing (quote 22).

219 In the case of having a shower, it was the waterproof feature of glue-as-a-dressing that patients  
220 found to be a major advantage. Some explained this freedom of movement by the way glue-as-a-  
221 dressing stuck to the wound, enabling it to move with the contours of the body, therefore allowing  
222 patients to move freely.

223

## 224 **Discussion**

225 We have elicited and explored HCPs' and patients' views on the clinical and practical issues  
226 associated with wound dressing use in primary wounds following abdominal and obstetric surgery.  
227 We have also presented data showing how the experience of novel dressing strategies, in this case  
228 no dressing and glue-as-a-dressing, compare with these perspectives. Issues raised in the Phase A  
229 interviews related to the purpose and practice of wound dressings included concerns about wound  
230 contamination and infection; wound healing and wound care; the physical protection afforded by  
231 simple dressings; the potential for psychological impact resulting from exposed wounds; and the  
232 ability of patients to carry out everyday tasks. All of these were discussed by patients and staff in  
233 the exploratory work we undertook before our pilot trial, except the importance of being able to  
234 carry out everyday tasks following surgery, which was only raised as an issue by patients. During  
235 Phase B interviews it was clear that concerns raised during Phase A were not being confirmed by  
236 patients or staff. Rather, participants tended to discuss the advantages of the novel dressings used

237 instead. This work highlights the value of using qualitative research methods before and during an  
238 RCT to understand the acceptability and views of staff and patients about the trial interventions.  
239 To our knowledge, Bluebelle is the first study that has explored in-depth views of a range of HCPs,  
240 and of patients undergoing various GI and obstetrics procedures on having undressed wounds and  
241 views relating to immediate exposure (in the case of no dressing) of wounds (Elliott et al, 2017; The  
242 Bluebelle Study Group, 2016b), rather than early removal of wound dressings (Meylan & Tschantz,  
243 2001). Bluebelle is also the first study to describe perspectives on the use of glue-as-a-dressing.

244

245 Limitations include the relatively low number of HCPs who delivered the pilot trial during Phase B,  
246 who were therefore available for interview. We also had a relatively low number of patients  
247 undergoing obstetric surgery who took part in an interview. However, the views of staff and  
248 obstetric patients that did participate were consistent and we did not see any clear differences in  
249 the views expressed between upper or lower GI and obstetric surgery. Further confirmatory  
250 research in obstetrics and other surgical specialties to strengthen this finding may be warranted. In  
251 addition, we have not been able to follow patients longitudinally to examine whether views and  
252 concerns related to dressing strategy change based on actual experience of novel approaches. There  
253 is a possibility that some patients who had strong concerns that would predispose them to negative  
254 views concerning the experience of no dressing or glue-as-a-dressing may not have agreed to take  
255 part in the pilot trial.

256

257 Our study demonstrates that current views and practice are not necessarily a consequence of active  
258 reflection on the part of the HCPs. We have described how some interviewees during Phase A  
259 challenged their own (automatically and initially) proffered reasons for dressing use, such as for SSI  
260 prevention. Indeed HCPs' views about pertaining to the role of wound dressings in infection and  
261 healing demonstrated considerable uncertainty. Whilst they suggested potential mechanisms for  
262 these outcomes, they were often unable to state whether these were valid or not. These clinical



263 concerns may be of less importance to HCPs than practical issues such as wound care. During Phase  
264 A, simple dressings were thought to have a clear role to play in this, for example, by absorbing  
265 wound exudate. In the pilot trial (Phase B) a specific protocol to deal with exudate was  
266 implemented without compromising allocation to no dressing. Thus, although participants  
267 expressed certain concerns, these concerns did not become manifest. Indeed, HCP interviewees saw  
268 certain advantages with no dressing and glue-as-a-dressing in terms of ability to view the wound  
269 easily. Whilst patients did discuss these issues in Phase A, they were also concerned with practicality  
270 and everyday tasks. Again, during Phase B the patients we spoke to suggested that the novel  
271 dressing strategies were advantageous in these respects. During Phase A, whilst the potential  
272 benefits of seeing the wound was briefly mentioned, a majority of HCPs hypothesised that patients  
273 may not like to see the wound and we were interested to explore whether this was the case. We  
274 subsequently found that Phase B patients reported a feeling of control, confidence and reassurance  
275 in being able to do so. This shows that assumptions about patients on the part of the HCPs may not  
276 always be correct and can be challenged through discussion and qualitative research with patients.

277

278 On the whole, participants were positive about their experience of glue-as-a-dressing. Glue-as-a-  
279 dressing sits in between simple (non-transparent) dressings and undressed wounds, providing the  
280 advantages of being able to view the wound that were detailed by HCPs and patients, whilst offering  
281 some covering to the wound. Other advantages include the absence of need for multiple  
282 applications or for assistance to remove a dressing. Previous research evaluating transparent wound  
283 dressings has also shown perceived benefits associated with being able to monitor the wound more  
284 easily (Stephen-Hayes et al, 2014).

285

## 286 **Conclusions**

287

288 We have described the views of professionals and patients about the purpose and practice of wound  
289 dressings in primary post-surgical wounds. Findings suggest that views are embedded and ingrained  
290 clinical practice. Healthcare professionals and patients may start to challenge these views when  
291 they are exposed to the experience of novel dressing strategies, as in the Bluebelle study pilot trial,  
292 or as new evidence of the clinical effect of dressing strategies emerges, such as their role in wound  
293 infection and healing. Further research is required to explore the association between dressing use  
294 and the issues of concern to staff and patients, and to establish the association and underlying  
295 mechanisms of effects for the clinical and practical issues identified here, including those of  
296 psychological and practical relevance to patients. The Bluebelle study has demonstrated that there  
297 can be value in understanding the views of HCPs to enable those views to be discussed and  
298 challenged where appropriate.

299

### 300 **Key points**

- 301 • Six themes emerged from the interviews: wound contamination and infection; wound  
302 healing; wound care; physical protection afforded by simple dressings; potential  
303 psychological impact of an exposed wound; and ability to carry out everyday tasks.
- 304 • Overall, participants were positive about their experience of glue-as-a-dressing and the  
305 option of no dressing.
- 306 • Current views on wound dressing practice are not necessarily a consequence of active  
307 reflection on the part of the HCPs and views are part of embedded and ingrained clinical  
308 practice.
- 309 • These views can be challenged when they are exposed to the experience of novel dressing  
310 strategies within a randomised trial, or as new evidence of the clinical effect of dressing  
311 strategies emerges.

312

### 313 **Reflective questions**

314 • What is the association between dressing use and issues of concern to staff and patients?

315 • Do these findings apply to other surgical specialties?

316

317

318

319 **Contributions**

320 All authors have read and commented on the final version of the article.

321

322 **Funding acknowledgement**

323 The Bluebelle study is funded by the National Institute for Health Research (NIHR) Health Technology  
324 Assessment (HTA) Programme (HTA - 12/200/04) and will be published in full in the HTA journal  
325 series.

326 This report presents independent research commissioned by the NIHR. The views and opinions  
327 expressed by authors in this publication are those of the authors and do not necessarily reflect those  
328 of the NHS, the NIHR, MRC, CCF, NETSCC, the HTA programme or the Department of Health.

329 The views and opinions expressed by the interviewees in this publication are those of the  
330 interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, MRC,  
331 CCF, NETSCC, the HTA programme or the Department of Health.

332 The Bluebelle study was undertaken with the support of the MRC ConDuCT-II Hub (**C**ollaboration and  
333 **i**nnovation for **D**ifficult and **C**omplex randomised controlled **T**rials In **I**nvasive procedures -  
334 MR/K025643/1)'.  
335  
336  
337

338

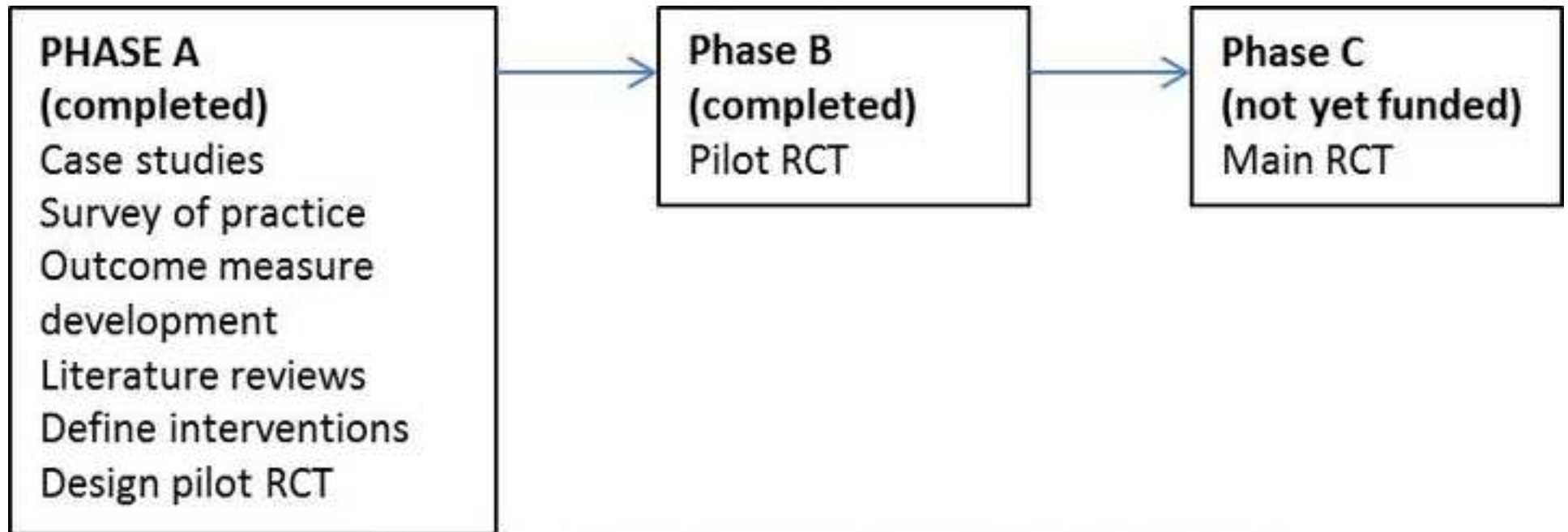
339 **References**

- 340 1. Eurostat. Surgical operations and procedures performed in hospitals. 2014 [26/06/17];  
341 Available from: [http://ec.europa.eu/eurostat/statistics-](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Tab1_Surgical_operations_and_procedures_performed_in_hospitals_%E2%80%94_top_10_procedures_group_1_2014.png)  
342 [explained/index.php/File:Tab1\\_Surgical\\_operations\\_and\\_procedures\\_performed\\_in\\_hospitals\\_%E2](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Tab1_Surgical_operations_and_procedures_performed_in_hospitals_%E2%80%94_top_10_procedures_group_1_2014.png)  
343 [%80%94\\_top\\_10\\_procedures\\_group\\_1\\_2014.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Tab1_Surgical_operations_and_procedures_performed_in_hospitals_%E2%80%94_top_10_procedures_group_1_2014.png).
- 344 2. Dumville JC, Gray TA, Walter CJ, Sharp CA, Page T, Macefield R, et al. Dressings for the  
345 prevention of surgical site infection. *Cochrane Database Syst Rev*. 2016;12:CD003091.
- 346 3. NICE. Surgical site infections: prevention and  
347 treatment. 2008 [updated Feb 2017/03/2017]; Available from:  
348 [https://www.nice.org.uk/guidance/cg74/resources/surgical-site-infections-prevention-and-](https://www.nice.org.uk/guidance/cg74/resources/surgical-site-infections-prevention-and-treatment-975628422853)  
349 [treatment-975628422853](https://www.nice.org.uk/guidance/cg74/resources/surgical-site-infections-prevention-and-treatment-975628422853).
- 350 4. Severn and Peninsula Audit and Research Collaborative for Surgeons (SPARCS) and West  
351 Midlands Research Collaborative (WMRC) on behalf of the Bluebelle Study Group, Andronis L,  
352 Calvert M, et al. Feasibility work to inform the design of a randomized clinical trial of wound  
353 dressings in elective and unplanned abdominal surgery. *The British Journal of Surgery*.  
354 2016a;103(12):1738-1744. doi:10.1002/bjs.10274.
- 355 6. Smyth ET, McIlvenny G, Enstone JE, Emmerson AM, Humphreys H, Fitzpatrick F, et al. Four  
356 country healthcare associated infection prevalence survey 2006: overview of the results. *J Hosp*  
357 *Infect*. 2008;69(3):230-48.
- 358 7. Borkar NB, Khubalkar MV. Are postoperative dressings necessary? *J Wound Care*.  
359 2011;20(6):301.
- 360 8. Blazeby J, Bluebelle Study Group. Do dressings prevent infection of closed primary wounds  
361 after surgery? *Bmj*. 2016;353:i2270.
- 362 9. Kelly J, Fearn, N. & Heller-Murphy, S. Patients views on anti-microbial dressings in chronic  
363 wounds. *Br J Nurs*. 2016;25:S6-S13.

- 364 10. Fagerdahl AM, Bostrom L, Ottosson C, Ulfvarson J. Patients' experience of advanced wound  
365 treatment-a qualitative study. *Wounds*. 2013;25(8):205-11.
- 366 11. Abbotts J. Patients' views on topical negative pressure: 'effective but smelly'. *Br J Nurs*.  
367 2010;19(20):S37-41.
- 368 12. Meylan G & Tschantz P. [Surgical wounds with or without dressings. Prospective  
369 comparative study]. *Annales de chirurgie*. 2001;126(5):459-62. Pansement ou absence de  
370 pansement sur les plaies operatoires. Etude prospective comparative.
- 371 13. Elliott, D. and Bluebelle Study Group. Developing outcome measures assessing wound  
372 management and patient experience: a mixed methods study. *BMJ Open*. 2017;7(11): e016155.
- 373 14. The Bluebelle Study Group tS, Peninsula A, Research Collaborative for S, the West Midlands  
374 Research C. Bluebelle study (phase A): a mixed-methods feasibility study to inform an RCT of surgical  
375 wound dressing strategies. *BMJ open*. 2016b;6(9):e012635.
- 376 15. The Bluebelle Study Group, Reeves BC, Andronis L, et al. A mixed-methods feasibility and  
377 external pilot study to inform a large pragmatic randomised controlled trial of the effects of surgical  
378 wound dressing strategies on surgical site infections (Bluebelle Phase B): study protocol for a  
379 randomised controlled trial. *Trials*. 2017;18:401. doi:10.1186/s13063-017-2102-5.
- 380 16. Glaser BG, Strauss AL. *The Discovery of Grounded Theory: Strategies for Qualitative*  
381 *Research*. New York: Aldine De Gruyter; 1967.
- 382 17. Stephen-Haynes J, Callaghan R, Wibaux A, Johnson P, Carty N. Clinical evaluation of a thin  
383 absorbent skin adhesive dressing for wound management. *Journal of Wound Care*. 2014;23(11):532,  
384 4, 6 passim.

385

386



*Figure 1 – Overall structure of the Bluebelle study*

STAFF	Upper / Lower Gastro-intestinal Surgery					Obstetric surgery		
	Consultant surgeon	Registrar	Ward nurse	Theatre staff	Research nurse	Consultant Surgeon	Registrar	Midwife
<b>Understanding wound dressing practice (Phase A)</b>	25	11	23	n/a	n/a	7	7	15
<b>Pilot trial (Phase B)</b>	1	2	4	4	4	0	0	3

*Table 1 – Number of HCPs by surgical specialty*



<b>PATIENTS</b>	<b>Upper / Lower Gastro-intestinal Surgery</b>	<b>Obstetric surgery</b>
<b>Understanding wound dressing practice (Phase A)</b>	44	7
<b>Pilot trial (Phase B)</b>	30	7

*Table 2 – Number of patients by surgical specialty*

<b>PATIENTS (Pilot trial - Phase B)</b>	<b>Upper / Lower Gastro-intestinal Surgery</b>	<b>Obstetric surgery</b>
<b>Simple Dressing</b>	4	1
<b>No dressing</b>	15	3
<b>Glue-as-a-dressing</b>	11	3

*Table 3 – Number of patients in the external pilot RCT (Phase B) by surgical specialty and dressing allocation*

**Box 1 – Description of the Bluebelle study**

Bluebelle was designed to investigate the feasibility and acceptability of conducting a randomised controlled trial (RCT) of post-surgical dressing use that included a no dressing group. Bluebelle was conducted in two phases: Phase A consisted of preparatory qualitative research exploring HCPs' and patients' perspectives on wound dressing use and practice, as well as their views regarding the proposed trial (Bluebelle Study Group et al, 2017\_14). Findings from Phase A informed Phase B, an external pilot RCT, allocating patients to one of three groups: simple dressing, glue-as-a-dressing, or no dressing (Fig 1) (The Bluebelle Study Group et al, 2017\_15). Qualitative data were collected during both Phase A and Phase B.

**Box 2 – Quotes from participants**Quote 1

*From my experience I would say a wound dressing is to protect the wound, and basically it's to prevent infection, that's what I would believe it to do from my nursing practice and midwifery. The whole reason they have a dressing is to protect that area from, you know, foreign bodies and bacteria and the environment (Midwife, Phase A)*

Quote 2

*I would imagine that if the skin flora can get under the dressing then all the dressing does is keep a nice warm moist growbag environment for whatever bugs are there (Obstetric surgeon, Phase A)*

Quote 3

*I like the idea that it's nice and sealed, particularly when we make stomas [...] The great thing about the superglue is that it glues it shut so it feels like it's sealed away from the muck (Registrar, General surgery, Phase A)*

Quote 4

*Especially when they're preoccupied with their babies and the last thing on their mind is hmm looking after their wound site (Midwife, Phase A)*

Quote 5

*It may do [prevent infection], but if it's left and you haven't got anything on and it was...to the air, it may do, I don't know. But otherwise, it's probably best without the dressing on and left how it is (Patient, Phase A)*

Quote 6

*We try and not disturb open wounds too frequently [...] Every time you take a dressing off, the natural body heat drops. So the temperature around that wound bed drops when you remove a dressing, because you're opening it to the air (Nurse, General surgery, Phase A)*

Quote 7

*When there's an overhang then it gets sweaty and wet and that's probably not conducive to the wound healing (Midwife, Phase A)*

Quote 8

*By having it [the wound] open [in the air] earlier would it mean it would heal quicker, or by having a dressing on, is it going to make the dressing, is the dressing going to keep it like moist and soft where it's not going to heal so quick? (Patient, Phase A)*

Quote 9

*I think specifically related to C-sections I would answer that, you know, they're (simple dressings) used again to, I keep reiterating: promote healing, prevent infection*

*[Later during the interview]*

*I don't think in terms of promoting healing [...] I don't think a wound dressing by itself can necessarily speed up healing. I don't know, it's interesting to (see) (Midwife, Phase A)*

Quote 10

*The day after, two days after, that's fine, I don't mind not having a dressing but straight after surgery, especially because it's leaking blood and all the rest of it, I would want it covered. It would worry me (Patient, Phase A)*

Quote 11

*If there is sufficient amount of pressure I suppose underneath that wound then that could probably break through [...] I don't know whether that's may be more delayed [...] so is a wound infection diagnosed or picked up earlier with a dressing simply because there isn't say a sealant on the skin as there is with a glue (Registrar, General surgery, Phase A)*

**Box 3 – Quotes from participants**Quote 12

*Because your wound when it's new is very sensitive so if it brushes against something then in theory it might protect it. And some of our wounds are very big, particularly in my speciality, we're talking about things all across the abdomen, so our patients' pain issues are very important* (General surgery registrar, Phase A)

Quote 13

*When I'm sat up the wound is kind of tucked under because of my belly so big the wound actually pushes against my legs hmm so when I stand up I can feel the hmm the wound and when I'm hot as well peeling away from my legs. If I didn't have a dressing on it I think, I think the stitches would like stick to my leg and it would hurt a lot more* (Obstetric patient, Phase A)

Quote 14

*I mean that's just my bias view but you know when you do a ward round and you take the dressing off to have a look at the wound for example they are always very anxious about having the wound exposed and they're you know very keen for the wound to be dressed and covered up quite quickly* (General surgeon, Phase A)

Quote 15

*Maybe if I did not have a dressing [...] maybe I would have been a little more, I would say a little more careful and more concerned about how I did things around my daily chores, like having a shower or going to the toilet and stuff like that* (Patient, Phase A)

Quote 16

*I think it dried quicker [...] because the air was going to it [...] it healed quicker* (Patient, no dressing, Phase B)

Quote 17

*If we have got things like oozing or redness or something that doesn't look quite right, we are spotting it earlier* (Nurse, general surgery, Phase B)

Quote 18

*I'm just making sure I be careful at night time and [...] I'm making sure I'm wearing sort of tops and um so I don't knock it or rub myself or when I roll I don't pull* (Patient, no dressing, Phase B)

Quote 19

*Well that's where, that sort of having the baby stomach is actually a bit of help in that as well because then it just tends to keep everything away from... [clothes]* (Obstetric patient, no dressing, Phase B)

Quote 20

*Um... to be honest, it didn't really bother me, um, it didn't affect me in any way being able to see it [my wound]* (Patient, no dressing, Phase B)  
*I've been quite pleased with it actually, it's, it's quite neat* (Patient, glue-as-a-dressing, Phase B)

Quote 21

*It gave me a bit of confidence because the more I can see the more then I feel I'm in control and therefore I know what's going on with my body* (Patient, glue-as-a-dressing, Phase B)

Quote 22

*It was completely straightforward you know. I got home from hospital on... So I got there in the evening, the following day I had a shower and you know my wounds were absolutely fine, I had not, not an ounce of [...] bother or trouble* (Patient, no dressing, Phase B)



