

# Expanding choice through online contraception: a theory of change to inform service development and evaluation

Emma Rezel-Potts <sup>1</sup>, Caroline Free,<sup>2</sup> Jonathan Syred,<sup>1</sup> Paula Baraitser<sup>1</sup>

<sup>1</sup>School of Population Health & Environmental Sciences, King's College London, London, UK

<sup>2</sup>Department of Population Health, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK

## Correspondence to

Dr Emma Rezel-Potts, School of Population Health & Environmental Sciences, Addison House, Guy's Campus, King's College London, London, SE1 1UL, UK; emma.c.rezel@kcl.ac.uk

Received 18 December 2018

Revised 23 August 2019

Accepted 2 October 2019

Published Online First

1 November 2019

## ABSTRACT

**Background** This study presents the theory of change underpinning an intervention to provide online contraceptive care in an inner London area with high rates of unplanned pregnancy. It aims to suggest attributes of an effective service and to identify key questions for its evaluation.

**Methods** Thematic analysis of an online sexual and reproductive health programme funding application and 21 semi-structured interviews with a purposive sample of stakeholders selected to provide expertise in contraception and online health.

**Results** A theory of change model summarised the positive processes of change which could be initiated through increased access to contraceptive supplies, online information and remote interaction and support. Stakeholders predicted that perceptions of convenience and anonymity of online access would vary across the target population. They stressed the importance of trusting service-users' capabilities for autonomous contraceptive decision-making, but expressed concerns that online access could be detrimental for those requiring more complex care. Concerns were alleviated by the prospect of responsive support through text messaging and phone calls, and when the online service was positioned as part of a broader system of provision including physical services.

**Conclusions** This study has revealed priority areas for the ongoing development of an online contraception service and pertinent evaluation questions. Evaluative research should test assumptions within the theory of change model, exploring the characteristics and circumstances of those preferring online access over existing services and the value of convenience, anonymity, autonomous access and responsive support in executing effective contraceptive choices within a new landscape of contraceptive delivery.

## Key messages

- ▶ A theory of change approach investigating stakeholder views has shaped the evaluation of an intervention which provides online clinical assessment and free, home-delivered oral contraception.
- ▶ Online services could improve contraceptive uptake and continuation by providing enhanced options for access to contraceptive supplies and information and remote interaction and support.
- ▶ Research should explore the characteristics and circumstances of online service-users and the value of convenience, anonymity, autonomous access and responsive support in executing effective contraceptive choices.

## BACKGROUND

One in six pregnancies in Britain is unplanned.<sup>1</sup> Unplanned pregnancy is associated with adverse health, economic, social and psychological outcomes for women and children.<sup>2</sup> It disproportionately affects young women<sup>3</sup> and those with higher levels of socioeconomic deprivation.<sup>1 4 5</sup> Unplanned pregnancy can be reduced through better access to contraceptive information and supplies.<sup>6 7</sup> While access to contraceptive services in Britain is free of charge, barriers to service use include delays in obtaining appointments,<sup>8</sup> and long waiting times.<sup>9</sup> Increased ownership of internet-enabled devices positions e- health technologies as strategies to reduce these barriers.<sup>10</sup> However, online services that provide information, clinical assessment and home delivery of



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**To cite:** Rezel-Potts E, Free C, Syred J, et al. *BMJ Sex Reprod Health* 2020;**46**:108–115.

contraception are currently only accessible as paid-for services. This limits their use among those who are most at risk of unplanned pregnancy. To date such services have not been included in public health strategies to reduce unplanned pregnancies. This formative study uses a theory of change approach to articulate the processes of change which could be initiated by an intervention that offers online information and clinical assessment with combined and progestogen-only oral contraceptives sent home, free of charge. This work aims to inform the development of an effective online contraceptive service and to identify key questions for its evaluation.<sup>11 12</sup>

## METHODS

We studied the development of an online contraceptive service, known as 'SH:24', currently available in two inner London Boroughs with high rates of unplanned pregnancy. This service was planned to offer:

- ▶ a facility to collect medical history and biometric data such as blood pressure
- ▶ a clinical assessment of eligibility for hormonal contraception based on this history and contraceptive supplies posted home.

Prior to intervention development we analysed the programme funding application for this service and interviewed 21 purposively selected local and national stakeholders, chosen to represent a wide range of relevant views (table 1). The first 14 interviews considered online services for both contraception and sexually transmitted infections (STIs) (box 1). Only the data on contraception from these interviews were used for this analysis. The final seven interviews used a topic guide developed from the analysis of the initial 14 interviews and funding application and focused on the contraceptive service only (box 2). All data were collected and analysed at a formative stage of the development of the intervention, before the service had been launched and before intervention components were established.

The interview process described the components of the planned service and asked participants to reflect on possible outcomes, the mechanisms of action through which these might occur, and the assumptions that underpinned these predictions. The semi-structured interview format allowed unanticipated topics to emerge in relation to participants' areas of expertise. Interviews were recorded and fully transcribed. Ethical approval for this research was granted by King's College London research ethics committee (Ref: BDM/13/14–42).

### Patient and public involvement

We captured a diverse range of views from those engrained within contraceptive provision for the target population, generating an evaluation that reflects their predictions and assumptions. While the study sample includes only three service-users of existing sexual and reproductive health (SRH) services in the boroughs

(table 1) it should be noted that ongoing research by the authors to evaluate the online service recruits only local contraceptive-users. Furthermore, the online service is being developed using a process of human-centred design including focus groups with more than 100 women and repeated testing with potential service-users.

## ANALYSIS

We completed a three-stage inductive, qualitative analysis using a framework approach<sup>13</sup> with the qualitative analysis software NVivo (NVivo; QSR International Pty Ltd, Version 10, 2012). In stage one the programme funding application was read and re-read to establish the components of the planned intervention and an initial thematic framework describing possible outcome and mechanisms. In stage two all data on the online contraceptive service from the first 14 interviews were analysed by ER and PB, initially coding using the thematic framework from stage one, followed by inductive analysis to generate more complex process diagrams that described the outcomes of the intervention and the processes through which they could be achieved. The themes emerging from this analysis were refined in the final seven interviews that focused on the contraceptive service only. In stage three a final thematic analysis was completed for all three data sources followed by indexing and charting of the data to refine themes from earlier stages of analysis. At each stage we aimed to identify the important elements of the intervention and describe all possible outcomes and the assumptions underpinning these processes of change.

## RESULTS

Figure 1 depicts stakeholder predictions that the online service might reduce unplanned pregnancy by improving contraceptive continuation and uptake through increasing the convenience, anonymity and autonomy of access to contraceptive supplies in addition to enabling more responsive provider-support (figure 1).

Stakeholders predicted that the costs and benefits of the intervention would be variable between users and also identified unintended outcomes or risks. The positive processes of change from inputs to outcomes illustrated in figure 1 were underpinned by assumptions which are critically analysed below.

### Assumption One: Online contraception increases access according to perceptions of convenience and anonymity

Online contraceptive services were not felt to be equally convenient for all potential users. Stakeholders described their value for those who might be time poor, already knowledgeable, comfortable with technology and valuing rapid access.

Original research

**Table 1** Description of sample

| Participant number                           | Stakeholder type  | Level of involvement   | Further relevant characteristics  |
|--|---|--|---|
| Secondary data source: initial 14 interviews |   |  |   |
| 1  | Public Health Executive   | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Involved in commissioning at a senior level within the target area for several years</li> </ul>              |
| 2  | Director of an Academic Health Science Centre                           | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Involved in non-SRH digital health services development</li> </ul>   |
| 3  | Healthcare Commissioner   | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Senior commissioner within target area</li> </ul>  |
| 4  | Senior Manager within Clinical Services                                 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Involved in provider management in NHS Trust within target area</li> </ul>                                   |
| 5  | Senior Manager within Clinical Services                                 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Male</li> <li>▶ Involved in provider management in NHS Trust within target area</li> </ul>                                     |
| 6  | Senior Manager within Clinical Services                                 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Male</li> <li>▶ Involved in technical infrastructure of clinical services</li> </ul>   |
| 7  | Senior Nurse in SRH Services  | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> </ul>  |
| 8  | Senior Consultant in SRH Services                                       | Direct, internal to programme  | <ul style="list-style-type: none"> <li>▶ Male</li> <li>▶ Involved in the development of various digital and online SRH services including this programme</li> </ul>     |
| 9  | GP within target area   | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ SRH lead</li> </ul>  |
| 10   | Client Support Worker   | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Male</li> </ul>  |
| 11   | Service-users of local SRH services and potential service-user of SH:24 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Male</li> <li>▶ MSM</li> </ul>   |
| 12   | Service-users of local SRH services and potential service-user of SH:24 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ BAME</li> <li>▶ Local resident</li> </ul>  |
| 13   | Service-users of local SRH services and potential service-user of SH:24 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ BAME</li> <li>▶ Local resident</li> </ul>  |
| 14   | Service-users of local SRH services and potential service-user of SH:24 | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ BAME</li> <li>▶ Local resident</li> </ul>  |
| Primary data: supplementary sample           |   |  |   |
| 15   | Developer of online SRH services for target population                  | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Previously worked for a national provider of online health services</li> </ul>                               |
| 16   | Public Health Registrar working within target area                      | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Contraceptive service-user</li> <li>▶ Previous involvement in pharmacy provision of contraception</li> </ul> |
| 17   | Senior Manager of SRH services for target population                    | Some limited direct involvement through seat on board of external stakeholders | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Member of board of external stakeholders of online service</li> </ul>  |
| 18   | Senior outreach worker in target population                             | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> </ul>  |
| 19   | Senior Contraceptive Nurse  | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Previous involvement in online SRH services</li> <li>▶ Reproductive health researcher</li> </ul>             |
| 20   | Reproductive Health Consultant  | Indirect, external to programme  | <ul style="list-style-type: none"> <li>▶ Male</li> <li>▶ Consultant for private, online contraceptive service</li> </ul>  |
| 21   | Public Health Registrar and researcher of online health                 | Direct involvement with programme through research activities                  | <ul style="list-style-type: none"> <li>▶ Female</li> <li>▶ Safeguarding expert</li> </ul>   |

BAME, black, Asian and minority ethnic; GP, general practitioner; NHS, National Health Service; SRH, sexual and reproductive health.

**Box 1 Interview guide for initial 14 interviews with online services stakeholders**

- ▶ Could you please start by telling me how such a service might have an impact on the health of the population of Lambeth and Southwark? (*Prompt for multiple impacts and list these as outputs on the diagram*)
  - If we do x then y will result because...
  - Document links between inputs and outputs using process mapping and keep asking "and then what happens?"
- ▶ Taking each impact individually and repeat the following questions for each one – summarising the answers on the diagram as you do so:
  - What things would need to be in place for this impact to happen? (*List inputs on diagram*)
  - If these things (inputs) were in place how would they cause the impact that you have described?
  - What assumptions have you made in describing this link between the inputs and the impacts?
  - What things could prevent these inputs leading to the impact that you have described?
  - What things might help them to happen as you have described?
- ▶ The links between inputs and impacts that you have described above, would they be linked in the same way for all of the different populations in Lambeth and Southwark?
  - Prompt specifically for young people, BAME groups, MSM, people from your community, "someone like you"
- ▶ What external influences (outside the scope of the project) might be important in influencing whether the project had the impacts that you have described?
- ▶ Questions for defining programme theory:
  - Aim
  - Target Population
  - In what ways/in what settings will the programme operate?
  - What are the prevailing theories about why it will work?

BAME, black, Asian and minority ethnic; MSM, men who have sex with men

Increasing access to people who are switched on, they know what they want...are very knowledgeable, don't like waiting, don't like queuing, don't like coming to a walk-in service because they have to wait 2 hours... [Senior Contraceptive Nurse]

These suggested preferences and priorities of potential service-users were thought to depend on their use of existing services and the type of method accessed. For example, online services may offer no advantage of convenience for users of existing services who are established on their method and value the routine and

**Box 2 Interview guide for supplementary sample of external stakeholders**

- ▶ Could we start off by hearing a little about your experience in or with contraceptive health services?
  - ▶ Do you have any knowledge or expertise around online health services in general?
  - ▶ This interview is about understanding the impact of online contraceptive health services on the population of Lambeth and Southwark. The service will allow people to access contraception from the NHS by logging onto a secure website, completing a risk assessment and ordering contraception. The types of contraception that could be available are:
    - Combined oral contraceptive pills
    - Progestogen-only contraceptive pills
    - The patch
    - Injectable contraception
    - Condoms
    - Advanced provision of emergency contraception
    - Retrospective provision of emergency contraception
    - Pregnancy tests
- These can be picked up from the clinic without having to see a health professional or they can be picked up from a pharmacy or sent to the person's home. Some aspects may need more physical interaction with services than others, for example, obtaining combined oral contraceptive pills would require providing a blood pressure measure. There will also be a support service in addition to the website offering interactive advice and links to existing services, for example, advice about the implant and where to go to get it.
- ▶ Could you tell me how internet-based contraception from SH:24 might have an impact on the health of the population of Lambeth and Southwark?
  - ▶ What assumptions have you made in describing this link between the inputs and the impacts?
  - ▶ What will be the negative and positive outcomes or impacts of an internet-based contraception service?
  - ▶ What things might help these outcomes happen as you have described?
  - ▶ In terms of the pathway between inputs and impacts that you have described, would this be the same for all the different groups and communities in Lambeth and Southwark?
  - ▶ What factors outside of the scope of SH:24 might be important in influencing whether the project has the impacts that you have described?

familiarity of regular visits, but may be highly convenient to those who are unable to get home from work in time for an appointment and who require repeat supplies.

...in a lot of services, people are getting a year's worth of contraception anyway...It's not massively

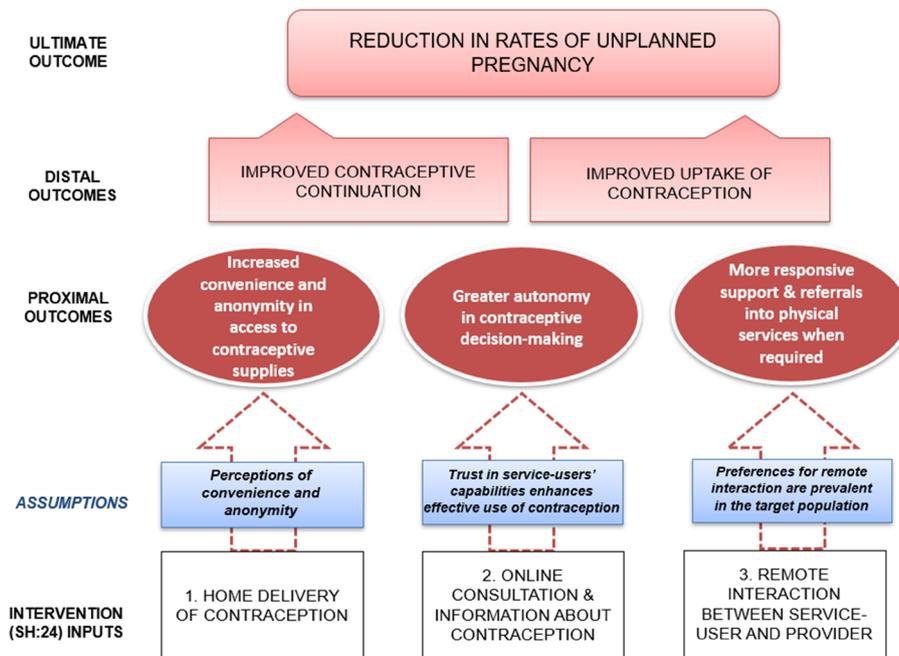


Figure 1 Theory of change conceptual model.

onerous for people to pop in once a year. [Senior Contraceptive Nurse]

Closely related to the concept of convenience was the assumption that online services would offer greater anonymity. However, this was dependent on the assumed perceptions of different service-users which were likely to be shaped by their individual circumstances. Some service-users may travel to attend SRH services outside of their local area for increased anonymity. Online services could remove the need to travel for those who prioritise anonymity, but packages delivered home or communications on phones or personal computers could still reveal service use. As with convenience, the importance of different types of anonymity were predicted to vary with time and person; those in coercive or controlling relationships with partners or family may not necessarily find online services more accessible than face-to-face attendance.

I'm thinking about people whose time is being controlled, it's probably not going to help them get effective contraception because they probably won't be able to go and pick it up and if their time is being controlled then possibly their post is also monitored. [Public Health Registrar and researcher of online health]

The perceived trustworthiness of the service was considered important to foster the sense that any personal data inputted online would be as confidential as data provided in face-to-face services. This trust was predicted to come from experience of online services outside healthcare.

It's experience. How many times have I used my card online and how many times have I been defrauded? For me personally, the answer is never. So that gives

me the confidence to continue doing it... So, when someone says, 'how would you feel about putting in your details and ordering the pill?' I think, 'well yeah, great, I do that all the time'. [Developer of online SRH services for target population]

**Assumption Two: Trust in service-users' capabilities enhances autonomy in contraceptive decision-making and leads to more effective use of contraception**

The online consultation process would require service-users completing their own medical history and biometric measurements. Stakeholders pointed to the heightened level of trust that would have to be placed in the skills of online service-users to fulfil these requirements. It was recognised that the online service required a shift from traditional patterns of provider-led contraceptive provision to one that acknowledges the autonomy of the service-user and requires the development of trusting relationships.

...letting people be a bit more in charge of their own contraception. The idea that we trust you to put in your blood pressure check, we don't need to check it ourselves, you're an adult, you understand the risks. [Public Health Registrar]

Yet they also identified the risks of transferring more responsibility to service-users and questioned the ability or willingness of some users to effectively and safely take this on.

...[They] might not have good reading skills, they go on the website and then they misinterpret it. They're still at risk. [Service-user of local SRH services and potential service-user of SH:24]

There were concerns about the impact of online services on vulnerable users who might have additional

needs that would benefit from a face-to-face consultation rather than autonomous access.

There is the possibility, and you can't legislate for this, but a vulnerable young person, if they would have a face-to-face in a clinic, safeguarding aspects about their lives might emerge. Well in fact we know they frequently do. If they are accessing a remote service, that safeguarding element might be lost. [Senior Manager of SRH services for target population]

However, it was also recognised that many of these concerns would be negated by the availability of remote support from the clinical team.

### Assumption Three: Preferences for remote interaction are prevalent in the target population

Stakeholders predicted increasing public expectations of rapid support for questions arising after the clinical consultation. It was suggested that these expectations were cultivated through increased use of online retail, banking and similar services.

I think a lot of people want immediate access and they want to do it in their own way...from a computer at home or from their smart phone. They expect to be able to get that advice and they then expect to be able to make quite rapid decisions about what they do next. [Public Health Executive]

Remote interaction was also depicted as a low-risk stepping stone for first-time use of clinical services for those in the target population feeling apprehensive about physical attendance.

It would give the option to either pick up a phone and have that first conversation to admit to whatever the issue is. Maybe that's one way we can then say, Why don't you come in, and we can go through what needs to happen next, or talk to you, listen, and we can try and help as much as we can, give you options. [Client Support Worker]

Online services may increase service-user choice of service and time, place and mode of access, but may limit choice of contraceptive method to those that can be posted home – excluding those that require a clinical procedure.

...the big thing that's missing from this service, is long-acting reversible contraception. And potentially that's, you know, not giving users the complete range of contraception that's available. [Public Health Registrar]

Stakeholders felt that this risk was moderated when online services were considered to be integrated within wider systems of contraceptive care, for example, through the online providers referring service-users into face-to-face providers should they express interest or suitability for long-acting reversible contraception (LARC). They felt that the intervention's capacity for success in achieving positive health outcomes included

facilitating access across different types of services according to need.

I would hope that it is something about the whole thing hanging together. About it not being, you know, a defined and beautiful project, but something that actually does make the other bits of the system sort of join in or change... that it makes sense as a whole... [Public Health Executive]

## DISCUSSION

Our analysis describes stakeholders' perspectives regarding the inputs and proximal outcomes through which an online contraceptive service could improve access to contraception and decrease unplanned pregnancy. These assume that online services offer convenience, anonymity, autonomy, continuous support and choice of service and predict the attributes of service users most likely to benefit from online services, while acknowledging that these are likely to change with time and circumstance. They predict the limitations of online contraceptive services and the importance of linking them to a wider contraceptive delivery system. Our results suggest that stakeholders believe an acceptable online contraceptive service would be accessible, discrete in its communication, trustworthy and able to provide responsive support and information that is easy to access and interpret. They emphasised that online access should be fully integrated within wider service provision.

Some recent studies support the potential for remote messaging interventions to improve contraceptive knowledge<sup>14</sup> and effective use of contraception.<sup>15–18</sup> One randomised controlled trial (RCT) assessed the effect of daily text messages on oral contraceptive pill (OCP) continuation among new OCP users from an urban family planning health centre in the USA.<sup>18</sup> At 6 months, effective OCP use was higher in the intervention than the control arm (64% (223/346) vs 54% (182/337), respectively;  $p=0.005$ ). Research on e-health SRH interventions in Britain has been focused on outcomes related to STIs, including a pilot RCT which reported that a safer sex intervention delivered by text message increased knowledge of and confidence in how to use condoms<sup>19</sup> and studies that indicate young people have preferences for online testing<sup>10 20</sup> and that testing becomes more accessible when delivered online.<sup>21</sup> The dearth of literature on online contraceptive interventions of this complexity and scale emphasises the importance of articulating a theory of change to drive an evaluation of online contraception.

The context-specific expertise of the sample has allowed exploration of the processes of change that could be initiated by this intervention within the target population. However, as many of their professional experiences were within face-to-face contraceptive services they may have been inclined towards a more

apprehensive outlook on the changes that could be imposed by online services. Conversely, participants may have presented a more positive attitude toward online services if they perceived the interviewers to be representatives of the intervention. As much as possible this was counteracted by interviewers encouraging participants to think through both positive and negative consequences of the intervention.

## CONCLUSIONS

Stakeholders consider online contraceptive services as having the potential to improve access to and continuation of contraception. They emphasise the benefits of convenience, anonymity and remote provider support while acknowledging that to truly expand contraceptive choices, online services should be positioned as part of a broader system of provision that includes physical services. The evaluation should test the assumptions in the theory of change model by investigating responses of the target population to the introduction of online contraception in terms of uptake and continuation, considering characteristics and circumstances of contraceptive users and how these influence their contraceptive choices within a new landscape of delivery.

**Acknowledgements** The authors thank Dr Vicki Spencer-Hughes for her contribution to the interviewing of initial participants.

**Contributors** PB conceived of the project. PB and CF are joint PhD supervisors for ER. ER designed the study protocol as part of her PhD with input from CF and PB. PB and JS constructed the topic guide and conducted the initial 14 interviews. ER and PB thematically analysed and generated process diagrams using the initial 14 interviews which were commented on by CF. ER generated the topic guide and conducted the interviews for the supplementary sample. ER carried out the final-stage analysis on the combined data. PB and CF verified the final codes and checked these against their own interpretations of the data. ER wrote the first draft of the manuscript with support from PB and CF. All authors edited the manuscript versions. All authors were involved in interpretation of the results, and read and commented on all drafts, giving final approval of the submitted version.

**Funding** This work was funded by Guy's and St Thomas' Charity via SH:24 (a not-for-profit community interest company).

**Competing interests** ER, the corresponding author, reports receiving a PhD studentship from Guy's and St Thomas' Charity via SH:24. PB and JS report grants from Guy's and St Thomas' Charity via SH:24 during the conduct of the study. CF reports receiving funding for her time from Guy's and St Thomas' Charity paid via SH:24. PB is also a director of SH:24.

**Patient consent for publication** Not required.

**Ethics approval** Ethical approval was obtained from King's College London research ethics committee (Ref: BDM/13/14-42). All participants were sent the approved participant information sheet and consent form prior to agreeing to be interviewed. All participants were interviewed in person by investigators. Written consents and permissions to record were obtained from the participants at the beginning of the interview.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available upon reasonable request.

## ORCID iD

Emma Rezel-Potts <http://orcid.org/0000-0003-2986-792X>

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