Acceptability and feasibility of strategies to promote healthy dietary choices in UK secondary school canteens: a qualitative study

Marie Murphy1,2*, Daniel Mensah1, Elena Mylona1 and Oyinlola Oyebode1

Abstract
Objective: To explore the acceptability and feasibility of choice architecture strategies for dietary change in UK secondary school canteens from the perspectives of pupils, school staff and catering providers through qualitative focus groups and interviews.

Results: Three focus groups with adolescents (n = 15; mean age 13.7 years; standard deviation 1.9) and eight interviews with school staff and caterers recruited from one school and catering provider in Coventry UK were undertaken. The most acceptable choice architecture strategies for intervening to drive healthy dietary choices are those that make use of proximity and positioning, on the basis that convenience was one of the main drivers for food/drink selections. Acknowledging adolescents’ desire for autonomy and for food to be familiar and predictable was considered important in enhancing acceptability. Challenges to the feasibility of nudge strategies included concerns about behavioural issues, increased food waste, and a decline in uptake of canteen purchases. The design of food choice architecture interventions for secondary school settings should consider the specific characteristics of this age group and setting to ensure successful implementation.

Keywords: Choice architecture, Diet, Adolescents, Schools, Qualitative

Introduction
This research aimed to qualitatively explore the acceptability and feasibility of food choice architecture in a secondary school canteen, from the perspectives of pupils, staff and caterers. The objectives were to investigate:

1. Perspectives on choice architecture
2. Influences upon pupils’ food choices in their school canteen
3. Opportunities and challenges facing schools in creating a healthy school canteen
4. Attitudes towards specific nudge strategies and healthy eating messages

Background
Choice architecture (also known as ‘nudge’) is a behaviour change approach in which proximal physical micro-environments are altered to cue healthier behaviour [1]. Choice architecture may prove an effective means of changing dietary behaviours in adolescents in secondary schools given its effectiveness in other school and university settings [2]. However there is a lack of literature on attitudes towards nudge strategies despite the importance of attitudes in planning and evaluating interventions, including their acceptability, feasibility, economic viability, and theoretical underpinnings [3].
Main text

Materials and methods
This qualitative research consisted of focus groups (FGs) with pupils aged 11–18 years; and interviews with school staff, recruited from one secondary school in Coventry, UK. A school teacher invited potential participants and distributed information sheets (including aims of the study and reason for doing the research). The teacher was asked to invite adolescents representative of school demographics (age, sex, ethnicity, socioeconomic status) and staff participants in senior leadership, catering and pastoral roles. All those invited agreed to participate, however one adolescent did not have parental consent so was unable to take part.

Participants completed a questionnaire to collect demographic data (e.g. postcode, ethnicity, gender, age, job role). FGs and interviews were held on the school site, except for three telephone interviews (with staff). The facilitator (MM) used a semi-structured topic guide (developed by the authors; Additional file 1), and a second researcher (DM) took notes (during face-to-face data collection only). MM is a female Research Fellow with formal training and several years' experience in qualitative research methods. Card-sorting activities were used to understand attitudes towards specific nudge strategies (see Table 3) and healthy eating messages (Additional file 2). The research was guided by constructivist and pragmatic orientations.

Data analysis
FGs and interviews were audio recorded, transcribed then anonymised. All data were analysed using thematic framework analysis [4] in NVivo v12. Exploratory inductive double-coding of a sample of transcripts was undertaken (MM, OO and DM) followed by a meeting to agree a coding framework, to enhance the trustworthiness of the findings. All transcripts were included in the analysis, with data saturation achieved. One staff participant checked the findings to enhance the credibility of the findings.

Results
Fifteen adolescents participated in three FGs (mean age = 13.7 years; standard deviation = 1.9; 53% female; 60% from Black and minority ethnic groups; 33% living in the top three deciles for deprivation), consisting of 4–6 participants and an average duration of 60 min (range: 56–64 min). Interviews were conducted with eight staff members, consisting of six school staff and two catering staff (75% female; 37.5% aged 35–44 years), with an average duration of 42 min (range: 29–55 min). Table 1 displays participant characteristics.

A summary of the results of thematic analysis related to study objectives 1–3 is provided, with example quotes provided in Table 2. Table 3 presents a summary of findings relating to objective 4. The coding tree is provided in Additional file 3.

Theme 1. Autonomy and informed decisions
Staff felt a nudge approach would be appropriate in a secondary school setting because adolescents had little knowledge of nutrition/healthy food choices, so needed to be supported to make the right choices. There was a conflict in adolescents, between a desire to make informed decisions for themselves, and acknowledgement that they sometimes need to be “tricked” into making healthy choices. Both adults and adolescents referred to the idea of being “tricked” ambivalently. The line appeared to be drawn differently depending on the child's age, with a belief (from staff) in the need for increasing autonomy in decision-making for older adolescents.

Theme 2. Value for money
Adolescents and staff agreed that pricing was usually an important factor in children's lunch choices. Young people want to feel full after lunch, and will opt to get more food (quantity) for the same price when possible. Adolescents felt healthy food was more expensive, which discouraged healthy selections.

Theme 3. Food and drink presentation
Presentation was viewed as influential upon food choices for adolescents. Food needs to look appealing and ingredients need to be visible in dishes/on packaging to avoid any unwanted surprises in their meal.

Theme 4. Adolescents’ taste preferences and valuing of predictability
For adolescents, taste was prioritised. ‘Unhealthy food’ e.g. pizza (in adolescents’ descriptions) was viewed as more flavoursome, and there was high demand for these types of foods. Adolescents and staff agreed that healthy food would be more appealing if it tasted better. Caterers felt that in order to create appealing meals for adolescents, the healthiness of dishes had to be compromised to some extent.

Adolescents were viewed by adults as being reluctant to try new foods, which was echoed by adolescents reporting that they felt it was a high-risk option to try something new. Staff also felt that school was a setting in which adolescents could broaden their tastes but this contrasted with pupils’ expectations that a canteen should provide familiar, preferred foods.
Table 1  Adolescent and staff participant characteristics

| Adolescent participants |   |   |   |   |
|-------------------------|---|---|---|---|
| ID | Age | IMD decile | Gender | Ethnic group aggregated | Focus group |
| A1 | 13  | 1     | Female | Not White British       | Focus Group 1 |
| A2 | 13  | 6     | Male   | White British           | Focus Group 1 |
| A3 | 13  | 2     | Female | Not White British       | Focus Group 1 |
| A4 | 13  | 4     | Female | Not White British       | Focus Group 1 |
| A5 | 12  | 7     | Female | White British           | Focus Group 1 |
| A6 | 16  | 7     | Female | Not White British       | Focus Group 2 |
| A7 | 17  | 7     | Male   | White British           | Focus Group 2 |
| A8 | 18  | 4     | Male   | Not White British       | Focus Group 2 |
| A9 | 14  | 2     | Female | Not White British       | Focus Group 2 |
| A10| 14  | 7     | Male   | White British           | Focus Group 2 |
| A11| 14  | 8     | Male   | White British           | Focus Group 2 |
| A12| 12  | 4     | Male   | Not White British       | Focus Group 3 |
| A13| 12  | 5     | Male   | White British           | Focus Group 3 |
| A14| 12  | 2     | Female | Not White British       | Focus Group 3 |
| A15| 12  | 1     | Female | Not White British       | Focus Group 3 |

| Staff participants |   |   |   |
|-------------------|---|---|---|
| ID | Age | Gender | Role |
| C1 | 35–44 | Female | Catering staff |
| C2 | 35–44 | Female | Catering staff |
| S1 | 25–34 | Female | School staff |
| S2 | 45–54 | Male   | School staff |
| S3 | 25–34 | Female | School staff |
| S4 | 45–54 | Female | School staff |
| S5 | 55–64 | Male   | School staff |
| S6 | 45–54 | Female | School staff |

*IMD decile of home postcode. 1 = most deprived decile

Theme 5. Lunchtime is about more than just food
Adolescents viewed lunchtime primarily as a time to spend with friends, with eating as a secondary activity. This view appeared to drive adolescents’ beliefs and behaviours around purchasing habits, e.g. the desire for speed and convenience (the so-called “grab and go culture”); and the negative views of the canteen as a space to be in.

Theme 6. Canteen-based barriers to a healthy school lunch
Lunch service was considered too short in duration to enable healthy choices, and adolescents felt their choices were often rushed and poorly thought-out. The canteen was viewed as an unappealing space—hectic and crowded, with too many teachers present (observing; disciplining), and too little space for all pupils to have a sit-down meal. Another barrier was the competing demands upon caterers to balance the provision of healthy food with other factors e.g. minimising waste; profitability. Although the canteen was seen as part of the school ‘community’, with a moral purpose to provide healthy lunches to pupils, staff acknowledged that it was primarily a business, and needed to be viable. Healthy food items were viewed by some staff as less profitable, mainly because of low take-up and high levels of waste.

Theme 7. Competing influences
Staff felt that other, broader factors had a larger influence on adolescents’ diets than the school setting e.g. home; society.

It was felt that one consequence of providing fewer ‘unhealthy’ options at school (e.g. cakes, cookies, pizza) was that customer numbers would decline as pupils sought these items from off-site outlets. For staff, the canteen was considered preferable to off-site outlets, since there was some degree of control over the nutritional content and purchasing of less healthy items on the school site.

The School Food Standards (SFS) were influential in restricting the sale of ‘non-compliant’ items e.g. sugary
| Theme                          | Adolescent quotes                                                                 | Staff quotes                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Autonomy and informed decisions | “And it's gotta be all about choice, you've gotta choose. It's, but then a bit of subconscious influences around, like, putting the healthy stuff closer to you but you've gotta choose what you want” A10  
“No because if there's no, like, if there's no unhealthy stuff wouldn't people just bring unhealthy stuff from, from, like, home?” A12  
“You could, like, almost kind of, like, lie and say, like, that they're sweet potato chips and then, like, people, like, but it's actually carrots. And then people end up actually liking it and then they get more” A13 | “I think that there are, you know, there are lots of misconceptions about what makes something healthy and what makes something nutritious. And I think sometimes kids have, you know, bad ideas, they've been told things that are incorrect about nutrition” C2  
“They'd see straight through it [nudge] and wouldn't buy it.” C1 |
| Value                         | “You could just buy the cakes rather than wasting money on, like, a salad.” A11     | “Well kids love them [fruit] for 10p. They're not gonna pay 25p for it but they'll pay 10p. And I'm like… if I give fruit away with every meal then maybe they would eat healthier in that respect.” C1 |
| Presentation                  | “I think, like the healthy food looked nicer then people would, like, give it a try.” A9  
“If you're gonna buy something you should know what's inside and you should have a clear view on it.” A7 | n/a  
“[Pupils] aren't particularly interested in the nutritional value of what they're eating, it's more about is it food that they want to enjoy?…” S5  
“[A healthy lunch] means that they that the children eat, because it doesn't matter how healthy and nutritious I make something, if they don't eat it it's not nutritious because they're not eating it.” C2 |
| Adolescents' taste preferences and valuing of predictability | “When they taste nice it helps because you just kind of like you want to eat it, you're not eating it 'cause you have to” A14  
“You know, like, if you bring something from home it's something you like. ‘Cause you don't know necessarily what you're gonna get in the canteen. But you know what you're gonna bring in from home” A10 | “One, they don't want to sit down. It depends on what their friends are doing as well. They don't want to miss out on their social time. They don't want to miss out in case they go up, some of their friends go up to the fields and they start a game of football and they're going to be late and they're going to miss out on half of the game. I think, I think time is a, is a lot to do with them not eating a healthy meal.” S4  
“Okay, maybe I should have this 'cause everyone else has it.” And it'll kind of, like, make you, like, not want to be as healthy.” A4 |
| Lunchtime is about more than just food | “I think, people want to get into the canteen, have their, like, get their food and then go out so they can have an actual lunchtime. And if they walk in and pasta and the fruit is next to them, or whatever, the healthy food is next to them, I think they'll be more inclined to go for that”. A10 | “Right now, those dining halls are so crammed and so small, that's why the kids won't eat in there, that's why they want to grab and go and go to the next thing. They don't have the time to sit and eat and they don't have an environment that they want to sit and eat in.” C2  
“it is an ongoing concern that students who come to school and will, will take food, and it's not just because I think they're, they're, you know, they're inherently wanting to thieve, I think it's just that they, they either lack the self-regulation and/or they're hungry.” S5  
“The problem is that you try to do it, you take them away [“treat” foods], then the kids don't buy anything and so therefore they lose money and it's not viable and, you know” C2 |
| Canteen-based barriers to a healthy school lunch | “One, it's like really busy and there's like loads of people just getting their food. Like it's kind of cramped sometimes.” A8  
“…now our canteen is, like, people don't, aren't really responsible. And say if, like, there'll probably be theft. And then setting up cafe style and, like, add toppings to your salad, that'll probably just get really messy and people will be really careless.” A1 | “The new guidelines aren't like that, so they're interpretative, so, you know, I might interpret them slightly differently than someone else, and they might interpret them slightly different to someone else. And then we all get told off by the same person who's interpreted them slightly differently. And at the moment there's no regulation and there's no one to give the definitive interpretation of those” C2 |
| Competing influences          | “Because then you've got people surrounding you as well with, like, again, food from the canteen. They will have, like, sometimes they'll have less healthier snacks than you, and then it'll make you feel like, “Okay, maybe I should have this 'cause everyone else has it.” And it'll kind of, like, make you, like, not want to be as healthy.” A4 | “The new guidelines aren't like that, so they're interpretative, so, you know, I might interpret them slightly differently than someone else, and they might interpret them slightly different to someone else. And then we all get told off by the same person who's interpreted them slightly differently. And at the moment there's no regulation and there's no one to give the definitive interpretation of those” C2 |
drinks. However, the SFS were viewed as open to interpretation, making implementation a challenge. The SFS did not appear as influential in the sixth form setting, since non-compliant items were available to buy in sixth-form-only spaces. This was considered appropriate since older teens are more able to make responsible choices and need to be exposed to such food environments to prepare them for the outside world.

Caterers viewed themselves as the driving force behind making healthy choices available to schools. There appeared to be no external incentive for schools to provide a healthy lunch to adolescents, other than the school’s own values/approach, which catering found to vary widely across schools.

**Attitudes towards specific nudge strategies and healthy eating messages**

Views regarding specific nudge strategies are summarised in Table 3, categorised by type. The most feasible and appealing strategies were within the “position”, “presentation” and “information” domains, with students additionally finding “availability” strategies appealing. The potential efficacy of some nudge strategies relying on presentation, information and positioning appeared to be reduced by the volume of pupils using the canteen in this school, reducing the visibility of, and obstructing access to, food counters and information. Many nudge strategies were considered unsuitable by both adolescents and staff because they provided additional opportunities for behavioural problems e.g. theft; mess.

The most appealing healthy eating messages were those that were short, factual and memorable. Messages focused on physical appearance or those that evoked feelings of guilt (e.g. “eat something good without feeling bad”) were unpopular, viewed as unfair or stigmatising by adolescents. Messages that were positive or focused on feeling good (e.g. “choose well, feel great”) were more appealing. Adolescents appeared to be influenced negatively by social pressure, and a reluctance to stand out/deviate from the norm, which discouraged healthy eating. For adolescents and staff, the motivation to eat healthily was that a healthy meal provides fuel for learning. This tended to be focused on the need for volume, to ‘fill’ pupils up, but also extended to nutrient density and a balance of food groups.

**Critical discussion**

This study adds to our knowledge of the perceived drivers of adolescent food choices in the school canteen: convenience, presentation and value for money. In addition, the findings highlight the perceived barriers to implementing nudge strategies imposed by the school canteen environment, e.g. short lunchbreaks; large volumes of customers; the need to achieve financial viability.

The current study identified position strategies (to make the healthy options the most convenient) as having high acceptability and feasibility. This supports other qualitative research in this age group [5]. Our study suggested that increased choice and availability of healthy items was highly acceptable to adolescents, supporting previous findings that the most effective interventions in increasing vegetable purchases/consumption were those where the variety was increased [6]. However, our findings provide some insight into the practicality of implementing such strategies. Caterers in the current study suggested that this approach would be a challenge to implement, due to the risk of increased waste and impact on financial viability. Two types of messaging appeared motivating for adolescents: messages that highlight how healthy choices support learning; and marketing strategies that focus on getting a large quantity of food for a low price.

The findings of this research have two potential uses in the design of future interventions: (1) identifying strategies that appear practically feasible to implement; and (2) building a theoretical underpinning for understanding why some strategies may be more effective than others in this population and setting, which will support the evaluation of any future intervention.

**Conclusions**

The study suggests that the general idea of ‘nudging’ for dietary change in a school canteen is acceptable to secondary school pupils, school staff and caterers, but that any choice architecture intervention implemented in a secondary school needs to be tailored to this age group and the setting to maximise successful implementation.

**Limitations**

These findings come from a limited number of participants all recruited from one school, so may not generalise to other schools. FGs incorporated pupils across mixed age groups, which may have impacted on the findings e.g. 13–15 year olds were generally less active in discussion when older pupils were present; and 11–13 year olds were generally the most enthused by the strategies proposed. Despite achieving a diverse sample, there may be some sampling bias due to pupils being selected by a teacher. We were only able to test a limited number of specific strategies, and have attempted to say something about intervention types more generally. Additional testing of a wider range of specific strategies within each of the most promising ‘categories’ of intervention types is needed. On this basis, the current study is a starting point for qualitatively exploring acceptability and feasibility.
### Table 3  
Summary of adolescent and staff participant views relating to each intervention strategy, organised by intervention category

| Category      | Strategy                                                                 | Adolescent views (appeal)                                                                 | Staff views (feasibility)                                                                 |
|---------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Availability  | Wider choice of salads/vegetable dishes                                   | Adolescents value choice                                                                  | Report high demand for wide choice                                                      |
|               | Ban on sales of unhealthy snacks and drinks within school canteen         | Removes choice/autonomy (viewed negatively)                                               | Some cynicism about pupils purchasing salads                                             |
|               |                                                                           | Belief that teens need sugary foods for energy boost                                      | Concern about increased food waste                                                      |
|               |                                                                           | Pupils would purchase banned foods elsewhere                                             | Easily implemented in canteen                                                          |
| Position      | Wider choice of salads/vegetable dishes                                   | Adolescents value choice                                                                  | Concern about increased food waste                                                      |
|               | Ban on sales of unhealthy snacks and drinks within school canteen         | Removes choice/autonomy (viewed negatively)                                               | Staff views (feasibility)                                                              |
|               |                                                                           | Belief that teens need sugary foods for energy boost                                      | Concern about increased food waste                                                      |
|               |                                                                           | Pupils would purchase banned foods elsewhere                                             | Easily implemented in canteen                                                          |
|               | Unhealthy snacks placed behind till, available upon request only         | Viewed as likely to be effective because ‘Out of sight, is out of mind’                   | Concerns about lack of space behind tills                                               |
|               | Fridge reorganisation (healthier drinks more prominent)                   | Viewed as likely to be effective because ‘Out of sight, is out of mind’                   | Potential consequence is increased desirability of hidden food items                   |
| Functionality | Colour coded serving utensils (to indicate whether to have large or small amounts of each dish depending on calorie content) | Viewed as helpful and instructive                                                          | Already in place to some extent so easy to implement                                   |
|               | Express/self-service till for healthy food items only                     | Viewed as likely to be effective as adolescents value speed                                | Low cost to implement                                                                  |
|               |                                                                           | Concerns about behavioural issues (i.e. theft)                                           | However, would slow service down                                                       |
|               | Pre-ordering of lunchtime meal                                           | Viewed negatively as removes opportunity for spontaneity                                  | High initial cost outlay for infrastructural changes                                    |
|               |                                                                           | However, adolescents believed it allows for more considered/rational choices              | Expect high levels of pupil buy-in as suits their desire for speed                     |
|               | ‘Cash for cookies’ (treat foods cannot be purchased using pre-paid cards) | Viewed as fundamentally unfair to specific groups of pupils e.g. children from low income families | Concerns about high volume of customers removing the ‘express’ nature of the strategy    |
|               |                                                                           | Adolescents expect this would encourage unhealthy purchases as cash purchases are unmonitored by parents (as opposed to cashless systems) | Requires a large amount of space                                                       |
|               |                                                                           | Adolescents had concerns about carrying cash (i.e. theft)                                 | Administrative cost in re-introducing cash-based system too high                       |
|               |                                                                           | Administrative cost in re-introducing cash-based system too high                         | Would lead to a loss of valuable data about purchases via the cashless system          |
### Table 3 (continued)

| Category | Strategy | Adolescent views (appeal) | Staff views (feasibility) |
|----------|----------|---------------------------|--------------------------|
| Presentation | Pre-chopped fruits and vegetables | Viewed as visually appealing and on-trend | Viewed as an economical use of left-over produce |
| | Salad toppings station | Viewed positively as adolescents value choice | Expect high levels of pupil buy-in |
| | Concerns about behavioural issues (i.e. mess) | Some cynicism about pupils purchasing salads | Concerns about a high volume of pupils using it |
| | Dining room decoration to improve ambience | Would create a more visually appealing environment for eating | Requires only an initial cost outlay, so relatively inexpensive to implement |
| | Café style set-up (food service) to improve presentation/appeal of food purchasing environment | Appealing aesthetic, creates an inviting purchasing environment | Viewed as appealing to young people |
| | Concerns over behavioural issues if foods were presented so openly (i.e. theft) | Viewed positively as mimics out-of-school environment | Concerns over behavioural issues if foods were presented so openly (i.e. theft) |
| | Guided floor markings e.g. footprints to healthy food/drink items | Viewed as fun | Dining room too crowded so wouldn't be visible |
| | However, dining room too crowded so wouldn't be visible | Viewed as more appropriate for primary school children | |
| Size | Smaller plates (to make portion sizes appear larger) | Concerned about hunger due to smaller portion sizes | Low cost so inexpensive to implement |
| | Viewed as too manipulative | Concerned about student resistance as pupils would not want smaller portion sizes | |
| Information | Simple traffic light label scheme | Adolescents value the opportunity for more informed decision-making | Scheme would need to be supported by education/curriculum learning |
| | However, adolescents prioritise taste | Concerns about maintaining an accurate database of nutritional information for all dishes | |
| | Promotional posters to encourage healthy eating | Adolescents value the opportunity for more informed decision-making | Low cost so inexpensive to implement |
| | Adolescents expect reduced impact/visibility over time | | |
| Pupil taste tests of new healthy dishes | ‘Try before you buy’ approach viewed as reducing risk of wasting money on disliked dishes | Viewed as appealing to pupils | Easy to organise |
| | Provides greater autonomy to adolescents to make informed choice based on taste preference | | |
| Nutritional information available on mobile app (e.g. nutritional content of dishes at point of purchase; and/or post-purchase individualised report of nutritional intake) | Viewed as increasing autonomy through self-monitoring of purchases | Would work well within existing cashless payment system (has this functionality) |
| | However, adolescents critical of the potential additional screen time required | Expect high levels of parent buy-in | Mixed views on expected levels of pupil buy-in |
| | Adolescents reported potential for negative peer-peer competitive consumption as an unintended consequence | | |
| Social media promotion of healthy dishes | Disliked the potential for dishonest visual representations of dishes | Reluctance to open up food provision to pupils’ feedback over online platform (potential for abuse) | |
| Verbal prompt from lunch staff to add fruits/vegetables | Adolescents felt this added unnecessary pressure to select certain items, which may not be eaten/wasted | Concerns about increasing pupils’ social media use | Considered easy to implement as can be built into normal conversations with pupils with no additional resources required |

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*Pre-paid cards/systems are commonly used in UK school canteens operating a cashless system/school. Parents/guardians pre-load cards with money for in-school purchases (for those receiving Free School Meals, their entitlement is also pre-loaded)*
Abbreviations
FG: Focus group; IMD: Index of multiple deprivation; SFS: School Food Standards.

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s13104-021-05778-3.

Additional file 1. Semi-structured topic guides for focus groups and interviews
Additional file 2. Summary of messages tested in focus groups with adolescents
Additional file 3. Coding tree for thematic analysis

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Authors’ contributions
MM and OO developed the study protocol. MM and DM carried out data collection. EM contributed to transcription of interviews. MM, OO and DM carried out analysis. All authors reviewed the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials
The datasets generated and/or analysed during the current study are not publicly available as we do not have explicit participant consent to publish transcripts (which may contain identifiable data), but are available from the corresponding author in abridged and anonymised form on reasonable request.

Declarations
Ethics approval and consent to participate
Ethics approval was granted by the Biomedical and Scientific Research Ethics Committee at the University of Warwick (REGO-2019-2274). Written parental consent and verbal child assent was obtained for all child participants in the study. All adult participants provided written consent.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
1 Warwick Medical School, University of Warwick, Coventry CV4 7AL, UK. 2 Present Address: Murray Learning Centre, Institute of Applied Health Research, University of Birmingham, Birmingham B15 2TT, UK.

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