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Delivery of a multi-focus public health intervention in the paediatric emergency department: a feasibility and acceptability pilot study

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ABSTRACT

Objective The objective was to see if it was feasible and acceptable to deliver a brief public health intervention as part of an attendance at the paediatric emergency department (PED).

Design A feasibility and acceptability pilot design was used as there is no previous work done in this clinical area, population or using this approach in children and young people (CYP). Quantitative and qualitative data were collected. Follow-up was at 1 week and 1, 3 and 6 months.

Setting This pilot took place in a single PED in Greater Manchester, England.

Participants Participants were CYP (under 16 years old) and their parents/carers, attending the PED during a 2-week recruitment period in September 2019.

Interventions The intervention was a brief conversation with a Consultant in Paediatric Public Health Medicine, using Screening, Brief Intervention and Referral to Treatment. The intervention focused on vaccination, dental health, household smoking and frequent attendance.

Primary and secondary outcome measures The primary outcome measure was information to support the effective development of a larger-scale study. Secondary outcomes were measures of health, again intended to provide additional information prior to a larger study.

Results Thirty CYP were recruited from 29 households. Sixty per cent of CYP triggered at least one screening question, most commonly household smoking and dental health. It was not possible to accurately assess frequent attendance and 97% of parents/carers stated that they thought their child or young person was fully vaccinated for their age, which is likely to be an over-estimate.

Conclusions It is feasible to deliver a brief public health intervention in the PED and such an approach is acceptable to a variety of stakeholders including CYP, parents/carers and nursing staff. The pilot revealed issues around data quality and access. Future work will focus on vaccination and dental health.

Strengths and limitations of this study

- This pilot study is the first of its kind in the UK, designed to assess the feasibility and acceptable of delivering a public health focused Screening, Brief Intervention and Referral to Treatment for children and young people attending a paediatric emergency department.
- The study design enabled participation from children, young people, parents and carers in the refinement of all aspects of the work.
- Data access and quality issues were limitations of the study, particularly self-reported vaccination status (in the absence of a viable alternative source of data).

INTRODUCTION

In the UK, emergency department attendances have increased markedly over the last decade and in 2019/2020 (1 April 2019 to 31 March 2020), in England alone, there were more than 25 million attendances[1] for a population of 56 million.[2] This pattern is mirrored globally, with increasing demand driven by a combination of factors, including an ageing population.[3] However, children and young people (CYP) are also attending in greater numbers while, in the UK, their overall health and well-being continues to lag behind other high-income countries.[4] While the SARS-CoV-2/COVID-19 pandemic has had a profound impact on paediatric emergency department (PED) attendances among CYP,[5] it is likely that UK numbers will return to baseline during the postpandemic recovery.

Those under 16 years old are more susceptible to the impacts of the full spectrum of health and social inequalities, such as poverty and lack of access to green spaces.[6] The pandemic has resulted in widened inequalities as a result of disrupted services, for example, health and education.[7 8] CYP who attend hospital are, by definition, less well than those who do not need to attend. However, as well as the reason for attendance, they may also be more likely to have other healthcare needs.[9]

While other work seeks to redirect CYP who attend the PED to other, potentially more

appropriate sources of care (often in the community), PED attendance may offer an opportunity to improve health and well-being. Patients often spend several hours in the PED, waiting to be seen, waiting for medication to work and so on. This 'fallow' time could be used for one or more public health-style interventions designed to improve health and well-being and, ultimately, prevent future avoidable attendance. For example, the National Institute of Health and Care Excellence recommends that all interactions with healthcare providers should include checking that a child's routine vaccinations are up-to-date, with signposting to services offered if needed.[10] Vaccination coverage in the UK lags behind other European countries for some vaccines[11] and in 2019 it lost 'measles free status', meaning that there was free-circulating measles virus in populations and that coverage was below the 95% target uptake for MMR (the measles, mumps, and rubella vaccine) needed for measles-related herd immunity.[12 13] Similarly, CYP in England experience growing dental health inequalities, with those from more socioeconomically deprived areas having higher levels of decayed, missing or filled teeth. Children with tooth decay may have pain, poor growth and miss school as a result.[14] The pandemic has had a profound impact on delivery of routine community dental services, compounding these dental inequalities further.[15] The health of the children of Greater Manchester is below the national average for many metrics[16] and while PED attendances increase year-on-year, public health budgets across England continue to be cut, resulting in a reduction in community-based services.[17 18] While secondary care offers an opportunity to improve child health via preventative approaches, there are only a relatively small number of projects around the country that aim to do so, for example, violence reduction programmes.[19] In the face of increasing attendances to the PED and decreasing services elsewhere, emergency medicine is currently well-placed to support an innovative approach to deliver public health interventions that may ultimately reduce future hospital attendances with a preventable element.

Screening, Brief Intervention and Referral to Treatment (SBIRT) is a public health approach to the delivery of early intervention and treatment services.[20] Similar to the NHS' Making Every Contact Count, SBIRT developed from the work of D'Onofrio and colleagues at Yale, who have shown it to be an effective approach to managing patients with drug and alcohol use disorders in the adult ED.[21 22] Other recent studies have shown it can be used for other conditions, such as smoking cessation (see D'Onofrio *et al*[23] for overview) and improved follow-up care for asthma.[24] While almost all published work has focused on adults, a small number of studies have shown its potential use in younger age groups.[25 26] A recent study in the USA showed that the SBIRT approach could be used successfully in the PED for parental smoking cessation.[27]

This pilot study aimed to adopt/adapt the SBIRT approach for use in the PED with CYP and their accompanying parents/carers. Any future intervention would be delivered in a setting already under considerable pressures of time, space and staffing, therefore a feasibility and acceptability pilot model was used.

By focussing on four areas of health that are a particular issue for CYP living in areas of higher socioeconomic deprivation—vaccination, dental health, household smoking and frequent attendance—this pilot aimed to begin a process of improving child health that, if successful, could have a long term impact.

METHODS

Consent

Age-banded participant information sheets and consent forms were provided, with CYP encouraged to participate in the consent process in an age-appropriate way. Those competent to consent for themselves could solo sign for participation, those not yet competent could cosign with their parent/carer (either by writing their name or making a mark of their choosing) and younger children were asked if they wanted to colour in a teddy bear picture while consent was given on their behalf.

Setting

This pilot was carried out in the PED of a large District General Hospital in Greater Manchester, in the North West of England. CYP in Manchester have lower than average levels of health and well-being, more than a quarter (27.1%) are in low-income households, and 1 in 100 of them live in care.[16] By 2 years of age only 88% of children in Manchester have received a first dose of the MMR vaccine and by the age of 5 years, 43% have at least one decayed, missing or filled tooth.[16]

Participants

Potential participants were CYP (less than 16 years old) and their parents/carers attending during a 2-week period from 5 September 2019, on days where RI was onsite and able to deliver the intervention. Recruitment was carried out between the hours of 09:00 and 17:00 on weekdays. Potential participants were identified by looking at the live patient list on the department's computer system and then approached by RI as long as they did not have one of the exclusion criteria (seriously ill or injured or not accompanied by someone legally able to give consent and not able to consent for self). Owing to resource constraints within the pilot, it was necessary to also exclude those requiring a translator for the primary PED consultation.

As this was a pilot, a sample size calculation was not carried out and a target for recruitment set at 30 'units' of recruitment, with each unit made up of at least one child or young person plus at least one parent or carer. This number was chosen as it was anticipated that, using the mixed methods approach outlined here, this would provide sufficient information for a meaningful reflection of the acceptability and feasibility of the intervention

and provide sufficient information to inform the design of a larger scale trial.

Patient and public involvement

The feasibility and acceptability pilot enabled participation from children, young people, parents and carers in the refinement of all aspects of the work, prior to any formal assessment of the effectiveness of the intervention via a full-scale study. Patients or the public were not involved in the reporting or dissemination plans of the research.

Interventions

The intervention was a brief conversation with a Consultant in Paediatric Public Health Medicine (RI). However, the intervention was designed to be flexible in terms of who could deliver it, for example, a suitably trained allied health professional; adaptable in terms of what other elements may be added in future depending on local need and services; and with the potential to be scaled-up for example, extending to other settings.

In order to prevent disruption to the 'normal business' of the department, participants were only recruited after they had been placed in a cubicle and were waiting, for example, to see a clinician. This also ensured that there was somewhere private to speak to participants.

The intervention was in several parts and followed the SBIRT approach. The first part was 'screening' and involved a public health 'history' being taken from the CYP and parent/carer, including questions about the make-up of the household, the vaccination status of any CYP in the household (with a focus on the participating child), engagement with routine dental services and household smoking (data relating to frequent attendance were extracted separately—see below). These four foci were chosen for reasons of importance to the local population, practicality (three of them have well-established, free, accessible, community-based programmes and systems to address them) and resource constraints within the pilot project. A wide range of other things could be considered for inclusion in future work, for example, obesity, mental health, substance use disorders, food insecurity and so on but were beyond the scope of this feasibility and acceptability pilot.

The 'brief intervention' and 'referral to treatment' then depended on the answers in the 'screening' part of the intervention:

- If any CYP had not completed their age-appropriate vaccine schedule, then a discussion was tailored to the reasons for this, for example, vaccination hesitancy, and signposting and information provided. If agreed with the parent/carer, this was then followed up with a letter sent to the GP asking them to arrange 'catch-up' vaccination.
- If there was not routine dental attendance, then information was given that included: a re-emphasis that all dental care for children is free, 'first tooth first visit' and support on how to find a dentist, for example, via 111.
- If the CYP stated that they smoked, then a brief negotiation approach was used to highlight services they could access when ready. If a household member reported smoking, then prior knowledge of sources of support for them was confirmed, along with the positive benefits for them and their household, should they feel ready to address their smoking.
- If the CYP was identified as a 'frequent attender' (see below), then a discussion was had with their parent/carer around reasons for attendance.

If at 'screening' no triggers were identified, then positive reinforcement of existing activity was carried out and an opportunity offered to ask questions.

Follow-up was at 1 week, 1 month, 3 months and 6 months, and completed the week before the global pandemic of SARS-CoV-2/COVID-19 was declared, so the study was not affected by the subsequent disruption of normal healthcare and dental services. An attempt was made to contact all participants in 1 week regardless of whether or not their screening questions had triggered the brief intervention. After that, if at follow-up there were no outstanding screening triggers, participants were thanked and discharged from the pilot (see figure 1).

Outcomes

The primary outcome of the pilot was successful development of a 'package' to inform a larger study that included:

- An intervention adapted based on the input of the pilot participants.
- An assessment of the feasibility of implementing such an intervention.
- An overview of acceptability from both the participant and departmental perspectives.

Secondary outcomes were measures of health outcomes in participants and households, intended to provide additional information for refinement prior to a larger study. These health outcomes were measured across the follow-up period and were: number of catch-up vaccinations given, number of dental appointments arranged and attended, number of new attempts to stop smoking, and number of repeat PED attendances.

Other data collection

Data relating to frequent attendances were obtained from the 'CAS card' for each CYP—a paper record that clinicians fill in during a consultation and which states at the top the total number of PED attendances to date, at the hospital, by that individual (it does not include any information about attendances elsewhere). A frequent attender was defined as a CYP with four or more attendances per year.[28]

Qualitative data were collected via conversations with CYP and their parents/carers about how they felt about being asked about wider health issues during a PED attendance, feedback on the content and form of the participant information sheets and consent forms, and any other

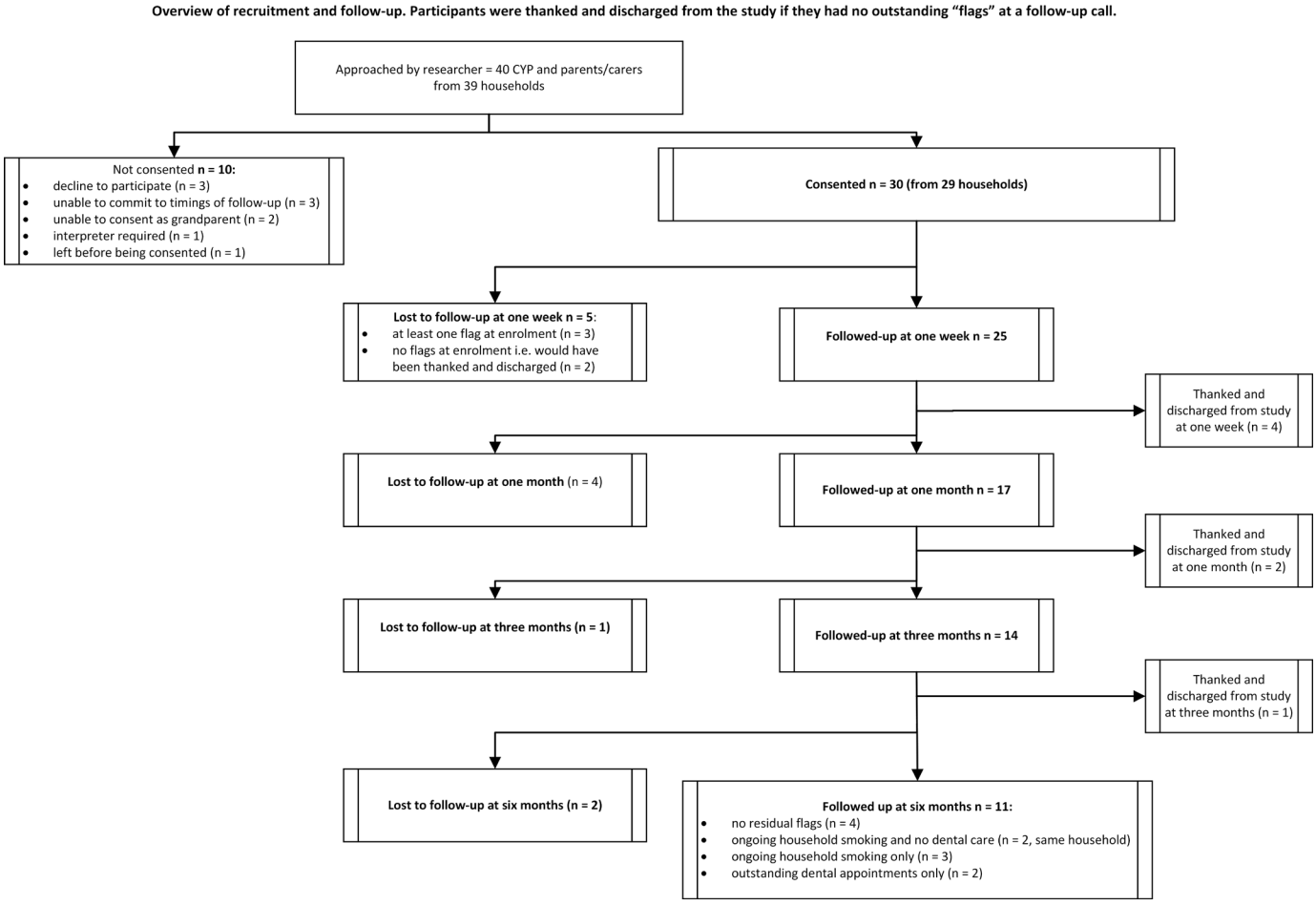

Figure 1 Overview of recruitment and follow-up for pilot study. Participants were thanked and discharged from the study if they had no outstanding 'flags' at a follow-up call. CYP, children and young people.

input they wanted to provide. The main researcher (RI) also kept a field diary. These data were thematically analysed to identify modifications to the feasibility and acceptability of the approach for key stakeholders. There was a particular focus on ways in which CYP could be more involved in future research in this area, for example, feedback on consent processes, language used in participant information sheets and so on.

RESULTS

Participants

Thirty participants (from 29 households) were recruited from the 40 who were approached (75% response rate). Recruitment took place over 8 days during the 2-week period. Reasons for non-participation appear in figure 1. An additional child was not considered for recruitment as, on entering the cubicle, RI made an unexpected spot diagnosis requiring urgent action and therefore this was conveyed to the staff member caring for the child.

Half of all CYP participated in the consent process and five of them gave consent and chose to be followed up directly via their own mobile phones, having been judged to be competent to do so. Male participants were slightly over-represented in the sample (53.3%) and age at presentation (in completed years) ranged from 1 to 15. Seven children were preschool, 11 were in primary school and 12 young people were in high school. Forty percent of attendees had come with an illness and 60% with an injury.

'Screening' triggers

At enrolment (n = 30).

Nearly two-thirds (60%) of participants triggered at least one of the screening questions—most often household smoking and inadequate engagement with dental services.

Vaccination

Twenty-nine parents/carers reported that the child/young person they were attending with was up-to-date with their vaccinations (96.7%). One parent had deliberately not had their child vaccinated with MMR as they were sure it had played a role in an older sibling's autism. After the intervention they agreed to have a letter sent to their GP to arrange an appointment for vaccination.

Dental health

The dental questions ('Is the child registered with a dentist?' and 'Has the child seen a dentist in the previous

6 months?') followed by adaptive follow-up questions resulted in a wider than expected variety of responses which were then grouped into:

- Yes, registered (National Health Service (NHS) or private dentist) and attending regularly as per guidance=14.
- Yes, registered (NHS dentist) but last attended more than 6 months ago and no appointment booked=7.
- Not sure if registered and last attended more than a year ago=2.
- No, not registered=3.
- Never been to a dentist=4.

As the intention of the dental part of the study was to improve routine engagement with a dentist (every 6 months), for the purposes of follow-up, the data were aggregated so that 'yes' was participants who were regularly engaging with NHS or private providers (n=14, 46.7%) and 'no' was all other responses (n=16, 53.3%).

Household smoking

Eighteen (out of 29) households did not report any smokers (62.1%) and one of these was a parent who had recently quit (and remained an ex-smoker at the end of the study). Of the 11 households (12 participants) with at least one smoker living in them, one was a young person (who was also a secondary carer for one of the other participants).

Frequent attendance

The mean number of attendances per participant was 7.7 (range 1–36; median 5.5). Five CYP (13.3%) had attended more than ten times but unfortunately it was not possible to access all the records for each attendance during the intervention and this is a major weakness of the inclusion of frequent attendance in the pilot. However, four of these CYP were over the age of ten (so their attendances may well have been appropriate) and the fifth had an extensive history of asthma and anaphylaxis, so it was not possible to conclude that any of these were inappropriate attendances. Therefore, none of the participants were flagged as frequent attenders using the definition above of four attendances per year, as it was not possible to easily work out the timeframe for their total attendances.

Follow-up

Of the 30 CYP recruited at the start, 11 were followed up to 6 months (the end of the study) and of these, four would have been discharged had the study continued, as they had no residual triggers (ie, any earlier trigger had been addressed, e.g., by attending the dentist). Three participants still had household smoke exposure, two CYP from the same family had household smoke exposure and no dental care and two had outstanding dental appointments (one of whom had not been registered with a dentist at the start of the pilot).

During the study, seven participants had been discharged (at the point at which they had no residual triggers) and 12 (40%) were lost to follow-up. Figure 1 provides an overview of the numbers followed up, lost or discharged at each stage of the pilot.

Vaccination

The only child with reported incomplete vaccination did not receive her MMR during the study owing to a number of factors reported by her parent (illness, holiday) that meant appointments needed to be moved. At the 6-month follow-up her parent was still planning on attending a future appointment.

Dental health

Participants were followed up until they attended a dental appointment or reached the end of the study period. At 1 week there was an additional participant who had attended the dentist and one more was attending by 1 month. There was no change at 3 months and at the final follow-up point at 6 months an additional three participants were engaging with dental services.

Household smoking

Participants were followed up until their household was smoke-free or if they reached the end of the study period. Of the 12 participants exposed to smoke (in 11 households) at enrolment, four were known to remain in smoking households at the end of the study (although one parent was considering stopping smoking but felt it was not the right time), seven had been lost (of which two had previously reported cutting down on smoking), and one household was newly smoke-free (for more than 3 months but remained in the study due to continuing dental need).

Frequent attendance

As outlined above, no participant was judged to trigger this at screening.

Qualitative data

Children and young people

CYP were interested in getting involved in the study and the consent process. They felt it was important to check things like going to the dentist and they provided some insightful feedback into the study design, for example, suggesting that the information sheets and consent forms be printed on coloured paper to support people with dyslexia, and a suggestion that rather than use the hospital switchboard, the study team have a mobile phone so that people (young people and parents/carers) could put the number into their own phone at recruitment and then they would know who was calling them.

Parents and carers

Parents and carers were broadly supportive of the approach used in the pilot and they were comfortable being asked about health-related topics that were not directly related to the reason for presentation. The information sheets and consent form were felt by several parents/carers to be too formal and complicated, and on a number of occasions, when checking understanding

prior to consent, they asked the meaning of one or more words that appeared. On these occasions, the participant information sheet that had been prepared for young people was also provided, and the feedback about this was more positive, with several parents/carers suggesting that a future study could just have that for all non-primary readers.

Most of those who were not able to participate in the study also gave feedback to say that they would have participated if the follow-up calls were outside of the working day (ethical approval stated the calls would only be between 09:00 and 17:00, Monday to Friday).

Staff

Staff were extremely enthusiastic about the study and reported that they did not find it got in the way of the day-to-day workings of the PED, even when it was busy. Nursing staff in particular were very invested in the idea behind the study and felt that emergency departments should do more to support the prevention approach to caring for CYP.

Field diary

During the recruitment phase of the study, the field diary reflected the positivity with which the CYP and parents/carers responded to the intervention and also the enthusiasm of the nursing staff in the department. Issues around the inflexibility of the recruitment times were also noted and the need for a study mobile phone to facilitate follow-up with having to be within the hospital. Other observations included that it was easier to be in the department and deliver several interventions one after the other. With regard to the data collection, it became clear very quickly that the inclusion of the frequent attenders was not going to be meaningful within the current design. Also, the very wide range of responses to the dental 'screening' and follow-up was unexpected and implications for a future large-scale study were noted. CYP were keen to be involved in the consent process and the colouring sheet for the very young children was popular.

Follow-up calls were well-received on the whole, some participants were very excited to share progress that they felt they had made for example, giving up smoking, and often parents/carers would comment that the call itself had reminded them to take some action (most frequently related to making a dental appointment). This last observation has implications for future study design in that the follow-up may have formed part of the intervention.

A final observation from the field diary was that it was difficult on occasion to just deliver the intervention without getting involved further, for example, giving preventative advice in the case of a dog bite.

DISCUSSION

Principal findings

This pilot has demonstrated that it is feasible and acceptable to deliver a brief public health intervention to CYP and their parents and carers, within a routine PED attendance. The pilot intervention could be refined to remove the frequent attendance (not possible to access the data in real-time as need to look at each attendance to judge whether or not it is 'appropriate' for the PED and no programme exists to refer frequent attenders to, in contrast to the other elements). The follow-up calls at 1 week, and 1, 3 and 6 months should be considered part of the intervention and this should be taken into account when planning an intervention study. The dental outcome measures should be honed and elements of the intervention adapted to ensure greater clarity—this could be done via a codesign process with CYP as they provided valuable insights during the pilot. The issue of over-estimation of vaccination coverage by parent/carer recall should be considered a real possibility and future research should seek to address this data quality issue.

Strengths and weaknesses of the study

The method of translating an established model—SBIRT—into a different setting and population in the UK is a strength of this work, with only one study (from the USA) having used this approach previously (and published after this work was undertaken). The pilot approach is another strength and has resulted in valuable information that can be used to improve all aspects of the work, prior to any full-scale study. Weaknesses include that the pilot used England's only PED-based Consultant in Paediatric Public Health Medicine to deliver the intervention and follow-up and this may have had an impact on aspects of the study. Access to data was a real weakness of the study—the frequent attenders' data quality issue meant that nobody was identified as triggering this screening question. It is almost certain that the self-reported data relating to vaccination were inaccurate and the inability to verify vaccination status during a consultation is a barrier. There were a number of logistical weaknesses that could be addressed in a full-scale study, for example, ethical approval was for recruitment and follow-up only between 09:00 and 17:00 Monday to Friday and a number of the parents/carers who did not participate stated that their reason was that they would not be able to receive the follow-up calls during the working day.

Meaning of the study and implications

This pilot study has demonstrated that while it is feasible and acceptable to deliver a public health intervention, that intervention should be adapted. The frequent attendance is complex and, unlike other aspects of the pilot, there is no way to 'refer to treatment' (the 'RT' of SBIRT). A decision has been made, therefore, that this will be removed for the next stage of this work. Likewise for household smoking, it was often the case that at least one household smoker was not in attendance, so the intervention could not be delivered directly to them. An unexpected result was participants' willingness to

engage in a conversation around dental health and a lack of pre-existing knowledge, combined with considerable need among CYP, means that this is a key part of any future study. The apparent almost complete vaccination coverage among participants is likely to be an artefact and warrants further exploration as it's unlikely that the CYP attending the PED have higher-than-average levels of vaccination. SBIRT is an existing model that could be further adapted and adopted within the ED to target a wider range of age groups and conditions. The feasibility and acceptability of the approach used in this pilot is positive and warrants further exploration. As many PED attendances may have a preventable element, this approach of embedding public health in routine healthcare interactions may be another way that the issue of ever-increasing numbers of hospital attendances could be ameliorated.

Future research

Rather than leading to the development of a single large-scale study using SBIRT, the challenges outlined above mean that the intervention will be divided up. The dental part of the study requires very little detailed recall for 'screening' and is very amenable to the approach used in this pilot (of 'brief intervention') and there is a well-developed system for CYP to be 'referred for treatment' (completing SBIRT). The intention is, therefore, to develop a dental-focused intervention, in partnership with colleagues working in community and hospital dentistry, and codeveloped and codesigned with CYP. However, at the time of writing this has been put on hold as routine dental services are severely disrupted by the pandemic—although when normal business resumes the unmet dental need of CYP is likely to be higher than ever.

The likely over-estimation of vaccination coverage among parents/carers in this pilot means that more work is needed to redesign the 'screening' part of the intervention for this element. A future study will therefore look at the accuracy of parent/carer recall of vaccination and compare vaccination coverage in the population of PED attenders to their peers. As it is not currently possible for hospital-based clinicians to routinely access other sources of vaccination data, for example, primary care records, other work will look at barriers/facilitators to provision of accurate vaccination data during a PED consultation. This would facilitate the development of a robust way of accurately identifying under-vaccinated CYP easily during a PED, before revisiting what intervention might be delivered in the case of identification of someone not up-to-date with their age-appropriate vaccinations.

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Contributors RI conceived of the study, applied for the funding, was involved in the ethics application process, undertook the fieldwork, was involved in all stages of the preparation of this manuscript, and is guarantor author. RE led on the ethics application process, took part in discussions around coding of anonymised data and was involved in all stages of the preparation of this manuscript.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval Full prospective ethical approval was obtained from Lancaster University and the NHS (IRAS 214887, May 2018). Age-banded participant information sheets and consent forms were provided, with CYP encouraged to participate in the consent process in an age-appropriate way. Those competent to consent for themselves could solo sign for participation, those not yet competent could cosign with their parent/carer (either by writing their name or making a mark of their choosing), and younger children were asked if they wanted to colour in a teddy bear picture while consent was given on their behalf.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information. Relevant data are available in the main text.

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