

Bristol and Cardiff PHIRST**Proposal for evaluating the London Borough of Hammersmith and Fulham's (LBHF) Universal Free School Meals (UFSM) provision in two secondary schools****V1****Overview of the intervention to be evaluated and contextual information:**

The focus of this study will be evaluating the provision of universal free school meals (UFSM) to secondary school-aged students in the London Borough of Hammersmith and Fulham (LBHF) local authority.

The study is funded by the National Institute for Health Research (NIHR) and will be undertaken by the Bristol and Cardiff Public Health Intervention Responsive Studies Team (PHIRST).

A survey published by the Greater London Authority in June 2019 found that around one in six parents in London have children living with low food security. Food insecurity was greater among parents with more than one child, and among those who were black, disabled, single parents, and/or were unemployed or had an income in the lowest quintile (<https://data.london.gov.uk/dataset/food-security-2019>).

UFSM is being implemented by LBHF schools using s106 resources (developer/planning obligations under Section 106 of the Town and Country Planning Act 1990). Woodlane High School is a secondary special school with approximately 100 students while Fulham Cross Academy is a secondary school that has recently changed from boys-only to co-ed with approximately 400 students. The local authority has been implementing UFSM in both schools since January 2020 (approximately ten weeks before the COVID-19 school closure) and is currently funded until the end of the 2020/21 school year, although there are plans to fund the provision for a further two years if possible.

In England, free school meals are currently provided for all children in reception up to and including year two. In addition, children of all ages in full time education are eligible for free school meals if their parents/carers are in receipt of state benefits such as Universal Credit although the eligibility threshold is high (household income must be less than £7,400 pa). To our knowledge, no other local authority in England is providing universal free school meals to secondary-school aged children.

UFSM is one element of range of activities funded by the local authority to address child hunger. Other interventions also being implemented in the Borough (but not subject to this evaluation) include universal free breakfast in all primary schools, and support to galvanise schools, parents, businesses and social innovators to develop new solutions to food poverty. The overarching goal of the local authority is to ensure that no child is too hungry to learn. Food poverty and food insecurity are growing issues nationally, and for Hammersmith and Fulham. Levels of child and family poverty are high in the borough and food poverty is amongst the most damaging impacts of this, with consequences for children's ability to learn and their wider health and wellbeing.

A logic model for UFSM has been developed (Appendix 1). It is hoped that UFSM will increase the proportion of children eating lunch, through the reduction of stigma associated with free school meals and easier access to them. Short-term intended outcomes include a reduction in hunger, more

students eating a healthier lunch, improved family finances, and improved student behaviour in school. Longer term outcomes may include improvements in diet, weight, and mental health.

Review of existing evidence:

The provision of universal free school meals to secondary school-aged children is a novel and untested intervention in the UK, as to date universal school meal provision has been limited to younger children. In 2015 Scotland moved from a means tested system for Free School Meals (FSM) to a universal system for children aged 4-8 years. In England, Universal Infant Free School Meals (UIFSM) have been in place since September 2014, providing all children in state funded schools in reception, Year 1 and Year 2 with a free lunch. The evaluation of the free school meals pilot in England found evidence of increased take-up of school meals, which led to a shift in the types of food that pupils ate at lunchtime, away from foods typically associated with packed lunches towards those associated with hot meals (DfE 2013). Children in the universal pilot areas were less likely to report eating crisps at least once a day than children in comparison areas. Furthermore, the intervention had a significant positive impact on attainment for primary school pupils at Key Stages 1 and 2, with improvements in attainment tending to be strongest amongst pupils from less affluent families (DfE 2013).

There is some evidence of the impact of providing universal free school meals from other countries. In the USA, schools serving children aged 5-17 years with at least 40% of pupils eligible for free meals under the Supplemental Nutrition Assistance Program (SNAP), may access funding for universal provision of breakfast and lunch to all pupils regardless of eligibility under the Community Eligibility Provision (CEP). CEP was intended to remove income barriers, stigma, and the logistical and administrative roadblocks of eligibility determination that siphon time and resources away from the provision of meals. A recent summary of the published evidence for CEP reports that there is strong evidence of increased meal participation rates, promising evidence for weight outcomes, food security, disciplinary referrals, and on-time grade promotion; and mixed evidence of impacts for test scores and attendance. Benefits are experienced by students both previously eligible and ineligible for free or reduced-price meals (Hecht et al, 2020). In Norway, a pilot programme serving a universal free school lunch for one year at elementary school increased children's intake of healthy foods, especially among children with lower socio-economic status (Vik et al 2019). In Japan, where UFSM has been in place since 1947, there is evidence that universal school lunch programmes are effective in at least partially reducing the gap in fruit and vegetable intake across parental socio-economic status. Longitudinal survey data showed that children whose mothers were less educated had greater reliance on school lunch for their vegetable intake, and children with lower household income had more contribution from school lunch to their fruit intake (Yamaguchi et al 2018). A South Korean study suggests that UFSM can decrease the likelihood of behavioural incidents amongst students (Altindag et al 2019). It is important to highlight that evidence of the impact of universal lunch provision on school pupils is less well researched than universal free breakfasts, is particularly less well understood for older age groups, and there are no studies conducted in a UK secondary-school context.

Key evaluation aim, objectives, and research questions

The aims of the evaluation are to: a) determine the impact of the universal free school meals pilot on students and their families; and b) determine whether universal free school meal provision is feasible, and a good use of resources to address student hunger.

The study will examine whether the logic model that we have developed with the local authority and stakeholders for the intervention is valid, including the change mechanisms through which the proposed outputs and outcomes are achieved (or not).

The research questions are:

- R1. Is UFSM feasible in a secondary school context?
- R2. What is the impact of UFSM on students, including uptake of school lunch, hunger, school attendance and behaviour, and food consumption?
- R3. What is the perceived impact of UFSM on family finance and food security?
- R4. What are the mechanisms through which student and family outcomes are achieved, as perceived by students, carers, and school staff?
- R5. What are the enablers and barriers to the effective implementation of UFSM in secondary schools?
- R6. Could UFSM in secondary schools be a cost-effective approach to addressing student hunger?

Where feasible, R2 and R3 will include sub-group analyses of data to explore differential impact across socio-economic status, ethnicity, age and gender.

Methods

The study will utilise a mixed-method, quasi-experimental design¹, undertaking a quantitative survey of students in two intervention and two comparison schools, and using qualitative data collection methods in intervention schools with additional data collection from other schools in the borough. Figure 1 below gives an overview of methods.

Please note that in light of the ongoing COVID-19 pandemic and social-distancing requirements and likely travel restrictions, the study has been designed to reduce face-to-face contact between the study team and LBHF participants. Qualitative data collection will be done online or by telephone; we have also included plans to involve and train school students as co-researchers to allow observational data to be collected in schools. Student surveys will be administered by school staff and we will work with them to reduce the administrative burden as far as possible (e.g. using co-design methods to keep the student self-report survey short and accessible; and using an accessible platform that students can access via laptop or mobile phone).

¹ A quasi experimental design refers to intervention studies where allocation to group is not randomised

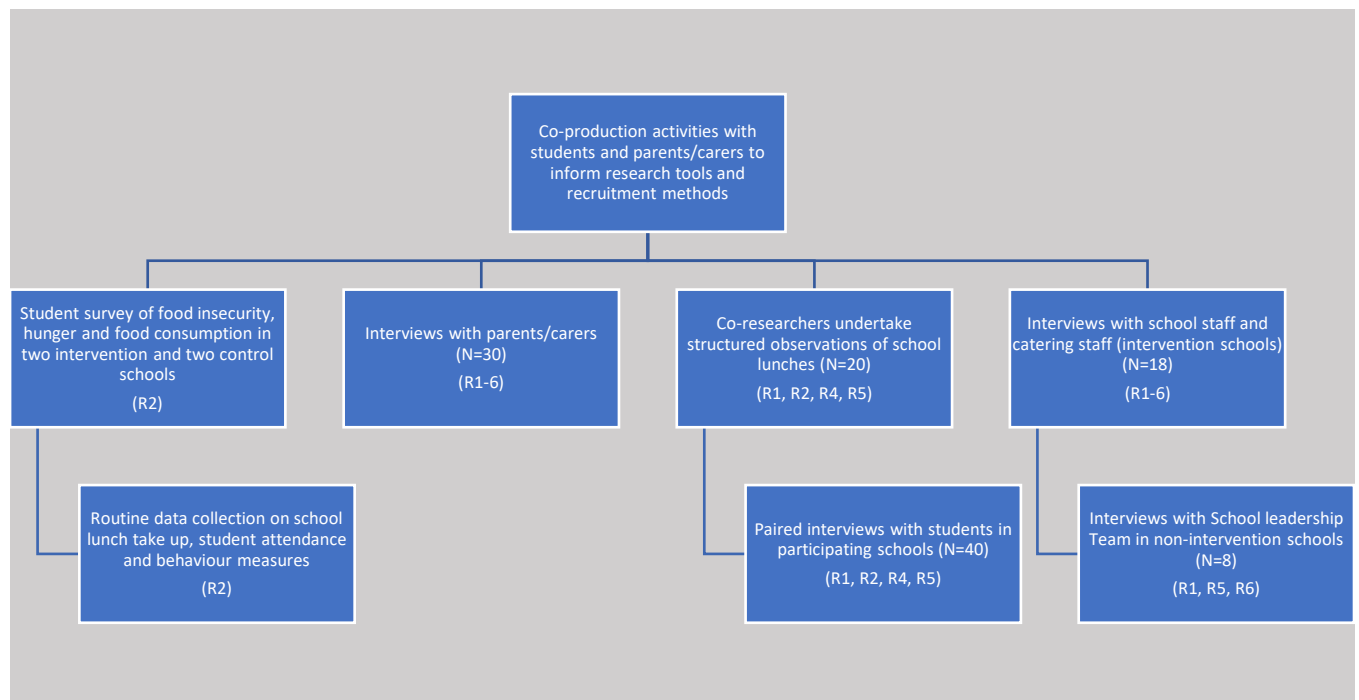


Figure 1: Overview of methods and research questions addressed

Co-production activity

LBHF have been fully involved in the development of this proposal. In particular, the logic model was developed in partnership with the Commissioning Transformation Lead in Children's Services, who is the lead for this intervention, and consulted and amended with colleagues from LBHF public health team, children and adult services. The group also jointly agreed the research questions and timescales. The research team at the University of Bristol have led on the methodology development, also in consultation with partners in LBHF, including with intervention schools, to ensure that the proposed study is feasible. The research team will meet fortnightly with LBHF partners throughout the course of the study.

We are also working with LBHF to undertake initial co-production work with the key stakeholders affected by the intervention. Co-production with students and parents/carers who live in LBHF and attend participating schools will ensure that the research tools are relevant, inclusive, accessible and therefore more likely to elicit data that informs the research questions.

In each of the intervention schools, we will recruit a group of 5-10 students to participate in up to two hour-long sessions (delivered remotely by the research team with support from a member of school staff on site). The purpose of the sessions will be to involve the students in the co-production of the following: recruitment strategies, materials and topic guides for qualitative work with students; development of an observation schedule for school lunchtimes, which will be undertaken by students and may likely involve photo-diaries; and wording of items in the quantitative survey.

Similarly, we will work with school staff and LBHF co-production champions to recruit a small group of parents/carers to co-produce recruitment strategies, materials, and topic guides for qualitative data collection. We anticipate that the session will last for one hour and take place online. LBHF has two staff members who lead on co-production activities for the borough who can support the research team in identifying and recruiting parents and carers. To avoid excluding parents and carers

without online access, they may be consulted in other ways, including through telephone meetings with the research team with draft materials sent in advance. We will work with LBHF co-production colleagues to ensure an inclusive participation strategy.

All students and parents/carers involved in co-production activities will be offered a £15 voucher as a thank you for their contribution.

Finally, the research team will consult with the school leadership team in the two intervention and two comparator schools to develop a survey methodology that limits the administrative burden on school staff. This will include identifying data collection methods (online via school computers or student mobile phones; paper-based etc); length of survey (time for completion) and timetable for completion in schools that limits disruption to the school curriculum.

Qualitative data collection

Stakeholder interviews in intervention schools

The impact and feasibility of UFSM on student outcomes (R1 and R2) will be examined through qualitative interviews with students, their parents/carers, school staff and catering staff in the schools implementing UFSM. These interviews will also explore the perceived impact of UFSM on family finance and food security (R3); how UFSM influences student and family-based outcomes (R4); and the enablers and barriers to the effective implementation of UFSM (R5).

Parents/Carers: We will recruit up to 20 parents/carers from Fulham Cross and 10 from Woodlane to participate in an in-depth qualitative interview with the lead researcher. Sampling will be purposive and criteria will include: a) eligibility for free school meals (FSM) under the national scheme; b) household food security; c) ethnicity of child. Parents will be recruited by sending out detailed participant information sheets and a pre-interview questionnaire (to provide information required for the sampling criteria) to parents attached to each school (the participating secondary schools are relatively small, with approximately 400 students on roll at Fulham Cross and 100 at Woodlane). Parents will be invited to return the questionnaire and contact details directly to the research team if they agree to participate. We will work with schools and parents/carers during the co-production activity to determine if the research information sheets and questionnaires should also be available in other languages and will provide them if so.

Definitions of hunger and food insecurity used by The Trussell Trust in their recent 'State of Hunger' report include household food insecurity as '*a household-level economic and social condition of limited or uncertain access to adequate food*' and hunger as a '*range of experiences falling under severe or moderate household food insecurity*', measured by the USDA Household Food Security Survey Module (HFSSM) scoring system (Trussell Trust 2019; USDA 2019). The HFSSM is used to measure self-reported experiences of food insecurity in the US and Canada, and has also been used in the UK (e.g. the Low Income Diet and Nutrition Survey; Born in Bradford cohort study). It asks 18 questions about food affordability, hunger and meal-skipping for both adult and children in the household (for full details see <https://enuf.org.uk/measurement-household-food-insecurity>) and provides a rating of food security on a 4-point scale.

We will explore the HFSSM during co-production activities and ask parents/carers about the clarity of items. If appropriate, we will ask parents/carers to complete this scale as part of the pre-interview questionnaire sent out as part of the qualitative recruitment strategy.

Interviews will be carried out online where possible, and by telephone if not. We will work with a translation service if a parent requests to be interviewed in their first language where this is not English. These interviews will explore the acceptability of UFSM amongst parents and address research questions 1-5. The recruitment materials and topic guides will be co-produced with parents and carers, and interviews designed to last up to one hour. We anticipate the following topics will be covered, and this list may be augmented by co-production work with parents/carers:

- background information about the family
- food insecurity
- school lunch arrangements prior to Jan 2020 (and reasons for uptake of school lunch or not)
- communications about UFSM
- uptake (or not) of UFSM, and reasons
- child and carer perceptions of UFSM including quality, choice, and lunchtime arrangements
- perceptions of impact on child including diet, hunger, eating habits, behaviour, health
- impact on family (finance, time preparing food, other impacts)
- unintended consequences of UFSM
- differential impact of FSM and UFSM

We are mindful that some topics may be sensitive for parents and carers, for example exploring any stigma associated with FSM, and particular challenges faced by carers of children with additional needs. The co-production work with parents/carers prior to recruitment will address these areas and we will be guided by parents and carers on how best to minimise any negative impacts of the study.

Parents/carers who participate in the qualitative interviews will be offered a £30 voucher as a thank you for their time and input.

School staff: Up to six participants will be recruited from the two intervention schools to participate in an in-depth qualitative interview. Participants will include at least one member of the senior leadership team (either the head or deputy); teachers (including those with pastoral support responsibilities as part of their role) and staff whose duties include lunchtime supervision. These categories may overlap. Recruitment will be undertaken in consultation with the senior leadership team and detailed information materials (participant information sheets) prepared for school staff. Participation will be voluntary. Interviews will last up to one hour and again will likely be online at a time of the participants' choosing. Cost for teacher cover will be reimbursed where this is needed (at a cost of £100 per interview).

A topic guide will be developed that explores the following areas:

- demographics of school students and perceptions of school lunch uptake;
- FSM, and student school diet and hunger pre Jan 2020;
- initial perception of UFSL in secondary schools;
- preparation for implementation;
- uptake and perceived reasons for uptake amongst students and carers;
- perceived impact on students including hunger, behaviour, stigma reduction and/or bullying, attendance and any other unintended consequences;
- comparison between UFSM and national FSM scheme;
- impact on how school lunch is delivered and managed;
- consequences for school staff; and
- barriers and enablers of effective implementation of UFSL.

In addition, school staff will be asked to consider alternative approaches to addressing student hunger and family food insecurity beyond UFSM. In order to address R6, staff will be asked to consider whether UFSM is a cost-effective approach for reducing student hunger, what the indicators of effectiveness would be, and whether other alternative methods should be considered. This is discussed in more detail in a later section of the proposal.

Catering staff: Where possible we will interview two staff in each participating school involved in the preparation and provision of school lunch (e.g. chefs and/or serving staff). Participation will be voluntary and at a convenient time, and again online or by telephone. Staff may choose to be interviewed individually or together. Topics to be covered will include background and length or time working in the school; preparation for the implementation of UFSM; impact of UFSM on catering staff; perceived impact of UFSM on student uptake, consumption, food choices, wastage, and snack consumption; and impact on delivery of school lunch. Catering staff who participate in the qualitative interviews will be offered a £30 voucher as a thank you for their time and input. In addition, we will invite the business or account manager from each catering company attached to the participating schools to take part in an interview. A similar range of topics will be covered and it is hoped that catering managers will have particular insight into the impact of UFSM on uptake, other food/snack purchases during school hours, menu choice, food intake and wastage, and comparisons with previous provision and FSM. Like senior school staff, the interviewee will be asked to consider whether UFSM is a cost-effective approach for reducing student hunger and whether other alternative methods should be considered.

Students: lunchtime observation and paired interviews

Structured observations of mealtimes have been undertaken in other studies of universal provision, most recently in an evaluation of UFSM for all children in Primaries 1 to 3 in Scotland (Eadie et al 2016). However, it is likely that COVID-19 restrictions will preclude the research team from undertaking direct observations in schools. We will therefore recruit a small group of students in each participating school as co-researchers to undertake structured observations on our behalf.

The data collection tools for this will be developed as part of the co-production work at the start of the study. We will work with students in each school to develop a structured observation schedule that students can use to record observations of the dining hall environment, layout of kitchens, serving areas, tables and seating arrangements, menu options, student food choices, perception of quality, serving and eating of meals, student behaviour during lunchtimes, food disposal, wastage and clean up. It is likely that students will use a range of methods to do this, including voice recording, photo-diaries, and written notes. We will work with students and school staff to develop a schedule that is accessible and feasible for students to record their observations over the course of one school week.

Once the schedule has been designed, we will recruit up to 10 students in each school to act as co-researchers. Information about the co-research work will be shared with students via paper information leaflets and a short video presentation by the research team. Participation will be voluntary, and we hope to recruit students across a range of year groups, gender, and ethnicity. Students will be trained in the data collection, including use of the tool, recording methods, ethics, in particular consent and confidentiality during data collection, and safe and secure transfer of data to the research team. It is likely that a member of school staff will be required to support some students with this. Training will occur online, over two sessions no longer than one hour long each. Students will then undertake the structured observations over the course of one school week.

The data from these observations, in particular the photographs taken, will be used to inform in-depth paired qualitative interviews with up to 20 students from each school. Sampling will be purposive, and criteria will include: a) eligibility for FSM using national criteria (using data provided by the school; b) year group; c) take-up of UFSM provision; and d) ethnicity. Information about the research, including that the research team will access information about students' FSM eligibility, will be shared with all students and carers in each school. Carers will be asked for consent for their child to participate and their child's data to be shared. Student participation in the interviews will be voluntary and they will be asked to let a member of school staff know if they would like to take part. The research team will also ensure that students are able to provide informed consent prior to the start of the interview. Students involved as co-researchers in the structured observations of lunches will not be precluded from participating in interviews.

The qualitative interviews will be paired (participants can nominate a friend to bring with them), and use participatory techniques, to reduce any power imbalance between the researcher and the interviewees. Again, these will take place online either at a time agreed with school staff that minimises disruption to learning, or outside of school time. Photos from the structured lunchtime observations will be used as a research tool. Photo-elicitation methods have been used successfully in interviews with adolescent students in other UK studies and shown to generate useful insights into teenagers' perceptions and experiences (e.g. Leonard and McKnight; Cremin et al 2010).

The topic guide will be informed by earlier co-production work with students but is likely to include the following areas:

- if relevant, school lunch arrangements prior to Jan 2020 (and reasons for uptake of school lunch or not)
- food preferences (e.g. healthy eaters, fussy eaters etc)
- pre- and post-school food consumption and snacking
- uptake (or not) of UFSM, and reasons
- perceptions of UFSM including quality, choice, and lunchtime arrangements
- influence of family, peers, and school staff on lunchtime habits
- perceptions of impact on diet, hunger, eating habits, behaviour, health
- other impacts of UFSM – time with friends, supervision at lunchtimes etc
- if appropriate, comparison with FSM provision and exploration of stigma
- unintended consequences of UFSM

Students will be provided with £15 voucher as a thank you for participation.

Qualitative interviews in non-intervention schools

Data to inform research questions 1, 5 and 6 will also be collated from non-participating secondary schools in the borough. Qualitative interviews will be undertaken with at least one member of the senior leadership team in up to eight other secondary schools. Staff from the schools will be asked their views on the UFSM pilot, in particular whether their school was approached to take part, (if appropriate) reasons for not taking part, and their perceptions of how the national FSM scheme is managed in their schools and its impact on student hunger and family food insecurity. Staff will also be asked about the feasibility of implementing UFSM in their school and its perceived impact on the school staff, students and families. Questions will be included about the perceived cost-effectiveness of UFSM, what the value of UFSM may be, and for alternative approaches to addressing student

hunger which they would consider if funding were available. These alternative approaches will feed into the economic assessment outlined later in the proposal.

Staff will be recruited via a letter and information about the study sent to the head teacher in each secondary school in LBHF, with support from senior leaders in education and public health in the local authority. Participation will be voluntary and school leaders will be invited to contact the research team if they wish to take part. Interviews will be online where possible and last no longer than an hour.

Quantitative data collection

The second research question, determining the impact of UFSM on student outcomes including school lunch uptake, hunger, school attendance and behaviour, and food consumption, will also be addressed using quantitative data collection methods. These will include a student survey, and analysis of routine data collected by LBHF secondary schools.

Student Survey

We will undertake a self-report survey of all secondary students in both intervention schools, and in two matched comparison schools, to assess student hunger, food insecurity and food consumption. In the absence of pre-intervention baseline data, it will be especially important to identify comparison schools matched on several measures. The comparison schools will be secondary schools within LBHF. In addition, we will seek schools with similar characteristics including school type (e.g. Academy, special school), proportion of students eligible for FSM, size, and socio-demographic variables of the pupils on roll. Intervention and comparison schools will be given a payment of £1000 as a thank you for their participation.

Information about the research study, and the survey, will be shared with all students and their parents/carers in advance. Parents and carers will have the opportunity to opt out of participation on their child's behalf by returning a 'decline to participate' slip back to the school. The research team will work with schools to ensure that student participation is voluntary, and consent to participate is informed. School staff will verbally explain information about the study to students prior to administration, offering students an opportunity to ask questions. Student consent will be part of the survey; students will be able to give or decline consent on electronic and paper versions of the survey (no questions will be asked of those who decline).

The survey will be designed to be accessible for students to self-complete (we will take particular care during the co-production activity to ensure accessibility for Woodlane students). Survey software will be used that allows self-completion via computer, iPad (or similar) or mobile telephone (Jisc online surveys and REDCAP support this), and paper versions will be available for those who need them. The survey will be administered to all students across the four secondary schools during school hours – we will consult with school leaders over the best way to achieve this (e.g. during PHSE lessons or other) and we will design a survey that takes no longer than 15 minutes to complete (this may take slightly longer for children with additional needs, and we will work with school staff to agree how best to support them while protecting anonymity).

Self-report measures of child food insecurity have been validated, including an adapted version of the USDA food security module described above (Connell et al 2004). Items include "Did you worry that food at home would run out before your family got money to buy more?"; "Has the size of your meals been cut because your family didn't have enough money for food?" and "Were you hungry

but didn't eat because your family didn't have enough food?" with a response set of 'a lot, sometimes, and never'. The scale is suitable for children over 12 years of age. The Child Food Security Assessment (CSFA) is a 5-item scale that has been validated for use with children as young as seven years (Fram et al 2013), and explores children's cognitive, emotional and physical awareness of food insecurity (Fram et al 2015). We will explore these and other options for measuring food insecurity and hunger, in partnership with students as part of the co-production activity.

The consumption of high fat food and snacks will be assessed using eight items from the Habits study (Wardle et al 2003). In addition, participants will be asked to report the number of weekdays that they eat lunch and consume sugar sweetened beverages.

Census/routine data on attendance and lunch take up

We will use routine data collated by LBHF on all secondary schools to examine pupil attendance rates, and lunch take-up, and behaviour pre-and post-January 2020. Data for all secondary schools in the borough will allow us to determine borough-wide trends and help understand how the introduction of UFSM in two secondary schools may have impacted these outcomes in intervention schools. LBHF Business Intelligence team collate DfE School census data. This is submitted three times per school year (January, May and October; May 2020 census data was **not** collected due to COVID-19).

Attendance: Attendance data is submitted for the previous term i.e. data submitted for October census will include student-level attendance for the previous summer term (April-August). Possible sessions and absence sessions are recorded, where one session is equal to half a day.

Owing to COVID-19 school closures, the last occasion attendance data was collated was Jan 2020 (i.e. for the August-December 2019) term. The last full academic year attendance data is available for is 2018/19. The next date on which attendance data will be submitted is Jan 2021 (for Aug-Dec 2020) however there may be some change in how data is collated owing to COVID-19. In Jan 2021 census, there are plans to collate attendance from schools again however there may be some changes in the way in which we collate due to Covid-19.

Lunch take up: Student and school-level data on lunch take up is recorded as a snapshot on census day, three times per school year. However, if there is a particular issue on that day then schools are allowed flexibility to utilise an appropriate day that would be considered 'normal' i.e. if on census day many pupils were sent home due to Covid 19 to self-isolate, they can use the date before the outbreak.

Behaviour:

Census data also records exclusions rates for students. However, data on lighter-touch measures taken to address student challenging behaviours (e.g. detentions) are not included. We will explore with school contacts what school-level data is available on student behaviour to determine and whether this can be made available to the research team.

Economic analysis

R6. Could UFSM in secondary schools be a cost-effective approach to addressing student hunger?

To answer the question of value for money, a full economic evaluation is required, with an appropriate threshold to determine cost-effectiveness. This is not possible with the data available; therefore, a cost-consequence (CCA) approach will be used. CCA presents costs and outcomes in a disaggregated form, so decision makers can make informed decisions using all the evidence available. This approach is increasingly favoured in public health research as there are usually several outcomes of interest and costs can be incurred by multiple providers or sectors. Cost estimates will be developed using bespoke cost questionnaires administered to school staff and caterers participating in the qualitative interviews and using the routine data. We will engage with LBHF (the payer) to determine the most informative analysis and presentation of the data. For example, preferences for cost per child or annual running cost, and their preferred outcomes (e.g. UFSL uptake). Costs will also be presented by category e.g. fixed costs (e.g. upgrading of equipment) and running costs. Due to the heterogeneity of the two schools receiving UFSL, the results will be presented separately, alongside the non-participating schools for comparison.

Secondly, the study will explore other possible interventions to address hunger and food insecurity amongst secondary school students in LBHF. Qualitative interviews with intervention school staff, and members of the senior leadership team in eight secondary schools not participating in the pilot, will explore respondents' perceptions on whether UFSL is feasible across all schools in the longer term. Secondly, we will ask respondents to consider other ways in which food insecurity might be addressed. Example alternatives may include subsidising school meal costs across a larger number of schools; changing the criteria for FSM eligibility making it accessible to more families 'on the cusp' of eligibility under the current national rules; or provision of school meals to FSM-eligible students during school holidays. We will engage with LBHF to determine the two preferred approaches, and for which we will generate cost estimates.

Analysis

All qualitative interviews will be fully transcribed, and we will work from these transcriptions during our thematic analysis. Following a review of the transcripts, we will develop a draft conceptual framework that includes the key themes and sub-themes that emerge from the data for each group of stakeholders (schools staff, students and parents/carers). These thematic frameworks will be used to code the data, assigning both verbatim and summarised excerpts of the transcript to one or more theme or sub-theme. The draft frameworks will be tested by members of the research team with a small number of transcripts and amended as necessary until the team are assured that the frameworks emerge from and 'fit' the data. That is to say, the thematic framework will be driven by and emerge from the data rather than the other way around. In this sense, the analysis will be 'grounded' in the data. At the same time, the framework will need to fit the study objectives and research questions (Ritchie 2003).

Once the analytical frameworks are finalised, we will adopt a systematic approach to data management, coding the transcripts into the framework using NVivo software. Once all the transcripts have been coded, the team will have a detailed and accessible overview of the data populating each theme and sub-theme from every respondent.

The quantitative data will be descriptive in nature. For all variables we will calculate the mean / standard deviation or proportions for intervention and comparison schools. In light of the quasi-experimental design and the small sample sizes differences in uptake of UFSM and secondary outcomes will be compared but considered exploratory. As such, we will report differences and the associated 95% confidence intervals, but no tests of statistical significance will be conducted, and p-values will not be reported.

Data management plan

The University of Bristol will be the data controller for this study.

The project will generate qualitative datasets in the form of interview and transcripts and observation notes. Online interviews will be audio recorded using the online platform (Zoom). Telephone interviews will be recorded with the use of encrypted digital Dictaphones. Audio files from interviews and focus groups will be uploaded to an access-restricted folder on the University of Bristol server, as soon as is reasonably possible following an interview. Once uploaded, they will be securely deleted from recorders.

Transcription will be undertaken by one of four external transcription companies which have been approved to process data subject to the Data Protection Act, for which the University is the data controller. They have entered into a formal "Personal Data Processing Agreement" drawn up by the Secretary's Office. The rest of the project team, including those who may become part of the team in the future, will also have access to the study's data and will be able to comment on data at the analysis stage. Access to data will be restricted to these individuals. To enable anonymity, transcripts will have a unique identifier embedded in the filename. This information will be replicated on a transcript cover sheet which will also include interview location and anonymised interviewee details.

Hard copies of transcripts, along with other project data, will not be left unattended at any time unless they are securely stored.

Quantitative survey data will be collected using the Jisc Online Surveys platform. Jisc operates an Information Security Management System (ISMS) and many of the processes and policies used to operate online surveys, and by Jisc staff, are part of the ISMS. Jisc provides several services that are certified to ISO 27001, including Online Surveys. All data is stored within Amazon Web Services (AWS), within the Republic of Ireland. Any transfer of data between Jisc and AWS are conducted over secure, encrypted, connections. Jisc endeavours to ensure that all data is securely erased, and any media securely destroyed once it is no longer required for the operation of the system. Due to the complex nature of a cloud-based environment, Jisc may be dependent on third parties to ensure this occurs. Where this is the case there will be a contract in place between Jisc and the third party.

A data sharing agreement will be set up between LBHF and the University of Bristol to enable the transfer of routine data. All data will be transferred over secure, encrypted connections.

All data analysis will take place password protected computers and on password protected laptops of the research team if they are working away from the University. No data will be stored on laptops but accessed via the University secure remote desktop.

In accordance with Research Councils UK guidance, all consent forms will be stored securely in electronic form or as locked paper copies for a period of 20 years. After 20 years, electronic documentation, and data will be destroyed via deletion from devices / servers; hard copies of study documentation will be destroyed by shredding and confidential waste disposal.

Anonymised qualitative and quantitative data will not be destroyed following completion of the study but kept available for future research in 'data.bris' the University's publicly accessible Research Data Repository.

Ethics and Governance

The study will be registered with the research governance team at the University of Bristol. The study will require institutional ethical approval which we will obtain from the University of Bristol's School for Policy Studies Ethics Committee. This ethics approval will ensure that issues of confidentiality, consent, anonymity, safeguarding and data management are appropriately addressed across all aspects of the research process including recruitment, data collection, analysis and dissemination. We anticipate the main areas of scrutiny will include the recruitment of young people both as participants and co-researchers, and the potentially sensitive nature of some of the topics to be explored during data collection (e.g. food security, family finance, FSM eligibility). In addition to scrutiny from the ethics committee we have consciously incorporated the involvement of local stakeholders as co-producers of our research tools to help minimise any negative consequences for participants. As the research involves qualitative data collections with young people below the age of 16 all core members of the team will have an enhanced DBS check.

Timeline and Milestones

The timeline outline below is subject to review, depending on the impact of the ongoing Covid19 restrictions, in particular school closures. The current plan is based on the assumption that schools are open to all students after the Easter holidays.

	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22
Proposal submission and sign off from NIHR, senior leaders at LBHF	X	X																
Ethics submission and approval	X	X	X	X	X													
Development of research tools (qual and quant), inc. staff consultation.	X	X	X	X	X													
Co-production workshops with CYP and carers		X	X	X	X	X												
Study start					X													
Recruit non-intervention schools						X												
Training co-researchers						X	X											
Qualitative - structured observation in schools by co-researchers								X	X		X	X						
Qualitative interviews with school staff, catering staff, parents/carers					X	X	X	X	X		X	X						
Qualitative data collection in non-intervention schools (teachers)							X	X										
Qualitative interviews with students								X	X		X	X	X					
Survey												X						
Routine data collection					X									X				
Qual data analysis					X	X	X	X	X	X	X	X	X	X				
Quant data analysis							X	X						X	X	X		
Economic data analysis														X	X	X		
Dissemination																X	X	X

Outputs

Outputs will include:

A final report for LBHF and NIHR and public friendly versions for Parents/Carers and children and young people. We will work with co-researchers in each intervention school to validate and refine the main findings from the research and ensure that they are presented in an accessible format. This will happen through focus groups with the co-researchers, supported by a graphic facilitator, during the Spring term of 2022.

A stakeholder workshop for representatives from participating schools to hear findings and discuss implications.

Academic papers:

- Impact of UFSM on household food insecurity, including economic analyses
- Process evaluation/feasibility of implementing UFSM in secondary schools as a strategy for addressing child hunger
- CYP perceptions of UFSM including co-researcher experience

Conference:

Presentation to London-based local government or Public Health England conference

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