Bradford Teaching Hospitals NHS
NHS Foundation Trust

RESEARCH PROTOCOL

The effectiveness of a whole-systems intervention (Join Us: Move Play, JUMP) implemented at the neighbourhood level in increasing childrens (age 5-11 years) accelerometer measured physical activity: a quasi-experimental non-equivalent groups design

Version 1.0

01/05/2021

AUTHORS

Daniel D Bingham, Jennifer Hall, Amanda Seims, Sufyan Abid Dogra, Brian Kelly, Andy Daly-Smith and Sally E Barber

Research protocol

The effectiveness of a whole-systems intervention (Join Us: Move Play, JUMP) implemented at the neighbourhood level in increasing childrens (age 5-11 years) accelerometer measured physical activity: a quasi-experimental non-equivalent groups design

1. Daniel D Bingham[1,2]
2. Jennifer Hall[1,2]
3. Amanda Seims[1,2]
4. Sufyan Abid Dogra[1,2]
5. Brian Kelly[2]
6. Andy Daly-Smith[1,2,3]
7. Sally E Barber[1,2]

1- Bradford Institute for Health Research, Bradford Teaching Hospitals NHS Foundation Trust, Bradford Royal Infirmary, Duckworth Lane, Bradford, BD9 6RJ, UK

2 -Faculties of Life Sciences and Health Studies, University of Bradford, Richmond Road, Bradford, BD7 1DP, UK

3 -Centre for Applied Education Research, Wolfson Centre for Applied Health Research, Bradford Royal Infirmary, West Yorkshire, UK

[1]Bradford Institute for Health Research, Bradford Teaching Hospitals Foundation Trust, Bradford, UK

Abbreviated title: JU:MP programme evaluation

Corresponding authors:

Chief/principle Investigators and co-ordinators: Dr Daniel Bingham and Dr Sally Barber

Address: Bradford Institute of Health Research, Bradford Royal Infirmary, Duckworth Lane, Bradford, BD9 6RJ

Email: daniel.bingham@bthft.nhs.uk

Telephone: 01274 38 3696

ACRONYMS

BiB	Born in Bradford
BMI	Body Mass Index
PE	Physical education
SDQ	Strengths and difficulties questionnaire
JU:MP	Join Us : Move and Play
LDP	Local Delivery Pilot(s)
CAPL	Canadian Assessment of physical literacy
SOPLAY	System for Observing Play and Leisure Activity in Youth

Contents

1 Abstract

Join Us: Move Play is a programme funded by Sport England and the National Lottery aiming to increase the habitual physical activity levels of Bradford children, aged 5-14, living in the Bradford Sport England Local Delivery pilot area. The Bradford Sport England Local Delivery area is an area of different ethnicities, high levels of poverty, health inequalities and high levels of inactivity. The JU:MP programme is aiming to change the whole system of LDP area into one which promotes and see an actual change in children's physical activity by 2024. Born in Bradford is a large public health and applied health research project which is respected locally in Bradford and globally. A JU:MP research team based within Born in Bradford, will be responsible for the evaluation of the JU:MP project. The evaluation of JU:MP will be split into three evaluation packages, a) population level evaluation utilising the Born in Bradford Cohort, b) a neighbourhood evaluation utilising schools which will include a pilot phase and trial phase, and c) individual project evaluations. The primary aim of the JU:MP research is to investigate the effectiveness and impact of the JU:MP programme. The research outlined in the protocol will only focus on the research and evaluation of the effectiveness of the JU:MP project, using a quasi-experimental design. The research questions of the research outlined in this protocol are:

Q1. Primary objective – to assess the effectiveness of JU:MP, a whole-system physical activity intervention for children aged 5-11 years old, upon increasing moderate to vigorous physical activity after 24 months and 36 months of intervention.

Secondary objectives:

Q2. To assess the cost-effectiveness of JU:MP programme.

Q3. To explore moderators and mediators of JU:MP intervention effects.

Q4. To examine the wider child health effects of JU:MP upon (BMI, SDQ, waist circumference, other intensities

Q5. To assess the fidelity and acceptability of JUMP to children and parents/carers.

2 Background and rationale

2.1 Physical activity-current context

Physical activity is an umbrella term for all human movement while awake which results in significant energy expenditure – metabolically this is anything above sitting and reclining behaviour (sedentary behaviour)(1). Examples of everyday physical activities are walking, running, cycling, exercise (planned structure physical activity), active play, and sporting activities. High levels of physical activity daily, especially moderate-to- vigorous intensities (i.e. getting out of breath and sweating) is very beneficial for the physical, emotional and social development of young people (e.g.)(2, 3), and also preventive for the early onset of disease and disorder (e.g. type II diabetes and obesity, risk markers of cardiovascular disorder)(4-6). Such importance is enhanced when considering physical activity behaviours track through childhood into adulthood(7, 8), and establishing new behaviours have greater efficacy of becoming habits when learnt during childhood, particularly the first ten years of life (9, 10). The Departments for Health of the four devolved UK nations, along with the World Health organisation recommend all children aged 5 to 18 years of age should engage in 1) moderate to vigorous intensity physical activity (MVPA) for at least 60 minutes and up to several hours every day; 2) vigorous intensity activities, including those that strengthen muscle and bone, at least three days a week; and 3) should minimise the amount of time spent being sedentary (sitting) for extended periods (11). Since the review of the evidence informing government guidance, more recent evidence has shown that benefits for young people of engaging in daily physical activity can occur in even lighter intensity activity (12) or by increasing daily amounts of MVPA by an average of 10 minutes (13). This is positive news for public health bodies and practitioners whom are currently aiming to combat the levels of inactivity in places like Bradford in the north of England which have low levels of objective daily physical activity, with recent data of children aged 7-10 from being average daily levels of 42.7 (SD=24.1)minutes (unpublished Born in Bradford data-contact authors for more information).

Much effort has been made to combat levels of inactivity of young people around the globe (14, 15). But previous attempts of children and adolescents physical activity interventions have not been generally successful, especially in the medium to longer term (15, 16). Reasons for failure thus far is because of poor study designs, poor methodology and not considering the full complexity of physical activity, which is a behaviour with much variance and heterogeneity across different groups and populations (15, 16). Previous interventions have only generally considered discreet simple one-dimensional interventions (15, 16), and although it has 31 of years since McLeroy, Bibeau (17) proposed that physical activity is a behaviour which is impacted by every aspect of society from the

social to the physical environment, to individual personal traits, all interconnected; meaning to change such a complex behaviour is not just through individual motivation and desire but instead of seeking and actually changing every aspect of the socio-ecological model and wider system of society seeking and promoting more human movement. This way of thinking, although not deliberate but instead occurred organically, has actually occurred and worked in practice but with the behaviour of increasing inactivity and sedentary behaviour since the post-second world war years (18). The challenge to decrease physical inactivity and drastically increase physical activity of all members of society, but particularly children and young people (the period of life where the establishment of health behaviours are most likely going to occur), is only going to be met if future interventions and programmes have a systems thinking philosophy and fully embrace the whole socio-ecological model within intervention and programme planning (19).

2.2 Born in Bradford

Born in Bradford (BiB) is a prospective pregnancy/birth cohort based in Bradford, West Yorkshire, the 6th largest city in the UK. The study was established to examine how genetic, nutritional, environmental, behavioural and social factors affect health and development during childhood and into adult life, in a deprived multi-ethnic population. The socioeconomic and ethnic composition of the cohort are of exceptional value for research aimed at understanding complex paths leading to worse health, development and educational attainment for poor children and those of Pakistani origin, compared to children from other backgrounds. Understanding these inequalities and taking advantage of the detailed information collected, enable mechanistic insights into the development of key health and well-being outcomes relevant to all children. BiB is also an applied research project which utilizes the cohort participants and data to explore new hypothesis, develop and evaluate health and education interventions (https://borninbradford.nhs.uk/)(20-22).

2.3 Active Bradford

Active Bradford (http://www.activebradford.com/) is a partnership of organisations from across the Bradford District that are committed to working together to increase the number of people being active and playing sport in Bradford. Partner organisation include the University of Bradford, Bradford Metropolitan District Council, Bradford College, the NHS Care Trust and Clinical Commissioning Groups, Born in Bradford, Bradford City FC, Bradford Bulls RLFC, Bradford Disability Sport and Leisure, Yorkshire Sport Foundation, Sport England and other representatives of community sport. All of the partners help to develop and deliver a wide range of opportunities to be active. Working together organisation sof Active Bradford, collectively influence strategic plans, give

support to each other and other bodies and develop and collectively promote opportunities through on-going campaigns and events. For example, the Olympic Legacy 'Get Out Get Active' initiative which is led in Bradford by Bradford Disability Sport and Leisure is supported by the Active Bradford Partnership.

2.4 Bradford Local Delivery Pilot and Join Us: Move Play

Present in Figure 1 is the geographical area of the Bradford LDP. In response to the need for whole systems change, Sport England has funded 12 Local Delivery Pilots (LDPs) over a 5-year period (2019-2024), to take a whole systems, place-based approach to reduce physical inactivity and health inequalities. All of the selected pilot areas are characterised by high levels of deprivation, but target different populations (e.g. older people, whole communities), with the JU:MP programme being delivered in Northern areas of the City of Bradford, targeting children and young people aged 5-14 years. Bradford is the fourth largest metropolitan district in England, and home to more than half a million people. Twenty-four percent of its population is under the age of 16, making Bradford the 'youngest' city in the UK (Bradford Metropolitan District Council, 2020). Bradford is an ethnically diverse city - over 20% of the total district population, and over 40% of children and young people in Bradford, are of South Asian origin (Office for National Statistics, 2019). Bradford falls in the most deprived quintile of Index of Multiple Deprivation, with 60% of the population living in the poorest 20% of wards in England and Wales, and with 24% of children living in poverty (Bradford Metropolitan District Council, 2020). Bradford's average life expectancy and healthy life expectancy at birth is lower than the national average (Office for National Statistics, 2020). Unpublished data from the Born in Bradford cohort study indicates that, on average, children and young people in Bradford have lower levels of physical activity than the general UK population (Bird et al., 2019). Given the high childhood population in Bradford, and that there is an inverse association between physical activity levels and age during childhood (Farooq et al., 2018), the JU:MP programme is focused on reducing inactivity in the 27,000 children and young people aged 5-14, and their families residing in the LDP area. The programme comprises 15 work streams delivered across eight geographical neighbourhoods. A key characteristic of the JU:MP programme is that it is flexible and adaptive, and is co-designed with relevant local stakeholders (for example, key community leaders, school staff, religious leaders, residents etc.). At the same time, the programme is research-led and is being iteratively developed as a result of ongoing research and evaluation activity.

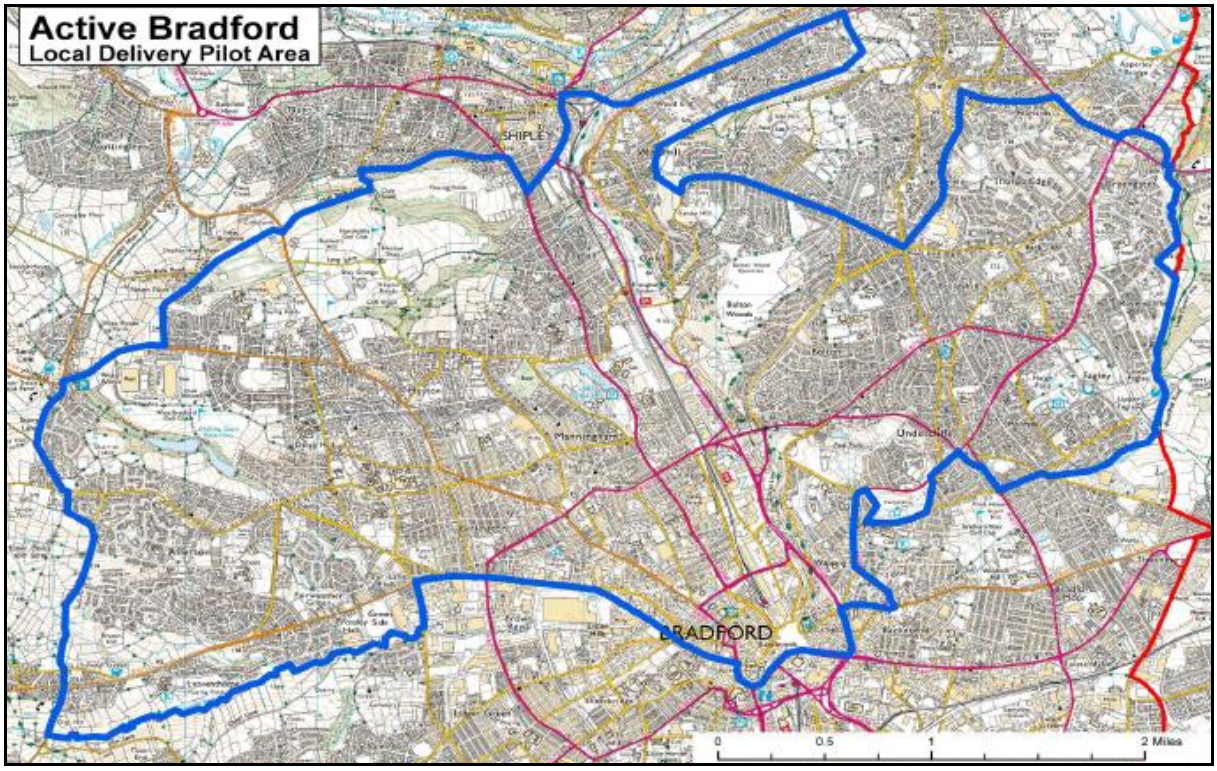


Figure 1: Map of the Bradford Local Delivery Pilot area.

To change the system of the Bradford LDP area, the JU:MP programme seeks to offer change through the implementation and commissioning of projects and investment in capital opportunities, all with bespoke neighbourhoods. The reason being is each neighbourhood has different barriers, facilitators to be physically active but also different assets already within neighbourhoods. Children also spend most of their time within the neighbourhood they live (school, family homes, friend homes, parks, green spaces, attend after school clubs, religious settings etc). Therefore, as the implementation of the JU:MP programme will be based around neighbourhoods so will a large part of the evaluation of the JU:MP programme. However, to examine and identify if the population of young people have changed their physical activity behaviour and other outcomes of the JU:MP programme, the research team will use data of participants from the Born in Bradford cohort as baseline (2016-2019) and follow-ups (2022 and 2024) the same participants for key variables and outcomes in the future. By comparing children's baseline and follow-up physical activity (measured by both objective measures and subjective, i.e. accelerometers and questionnaires) in the BiB cohort (average age 9 years of age) living or going to school in the in the LDP area compared to children in the BiB cohort living or going to school in other parts of Bradford, the research team will have a natural controlled designed study evaluating population change of young peoples physical activity and key variables.

3 Methods – Evaluation Package – Neighbourhood – Trial

Presented in Figure 2 is the flow diagram of the study. Outlining all of the different pahses.

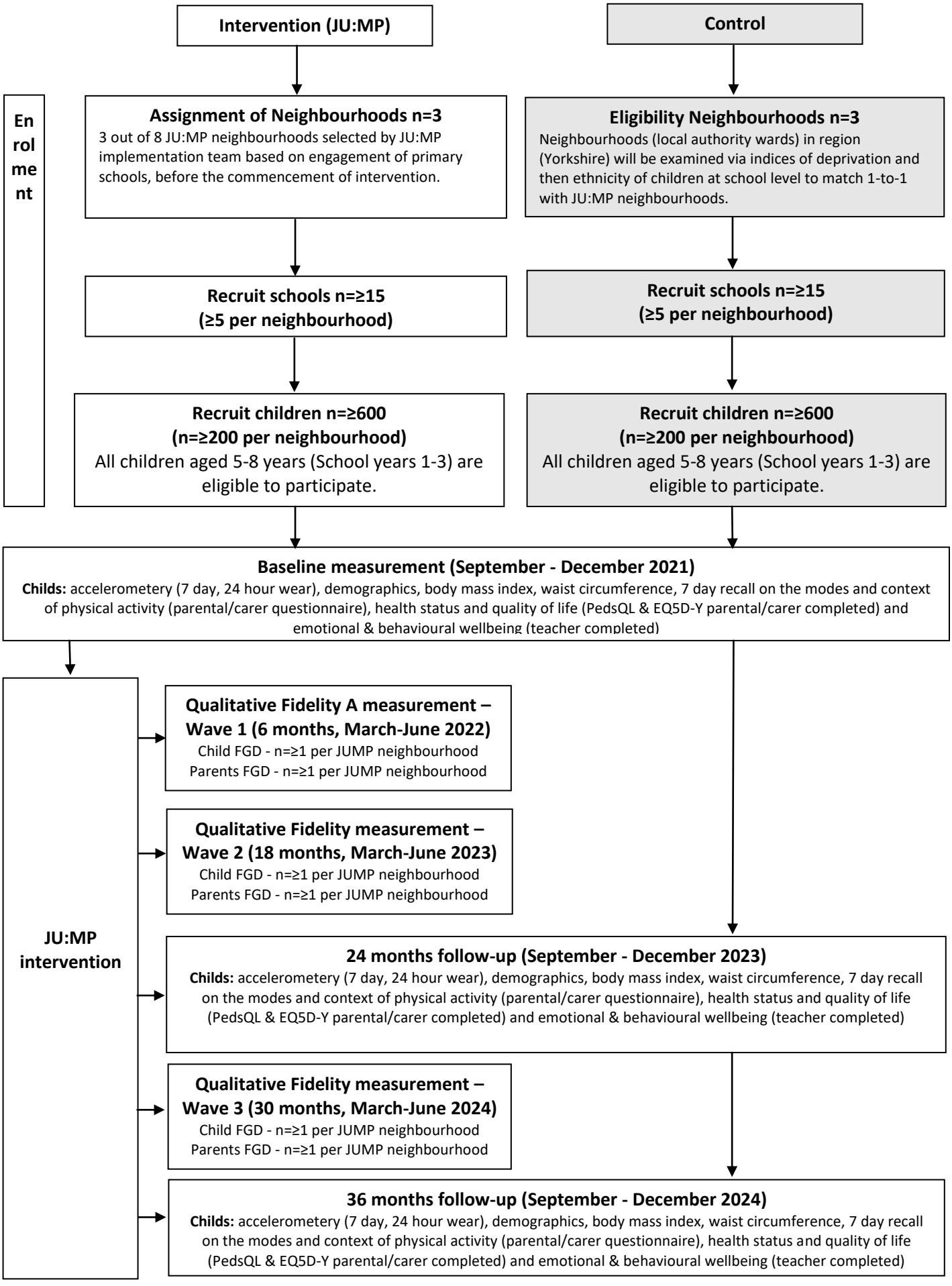


Figure 2: "Join Us: Move Play" (JU:MP) programme neighbourhood quasi-experimental nonequivalent groups trial

3.1 Study Design

The design of this study is a two-armed (intervention[JU:MP] and control) quasi-experimental non-equivalent groups design study, with three waves of data collection (baseline [before intervention], 24 months [during intervention], 36 months [post intervention]), see Figure 2 for the study flow diagram. The groups/clusters are neighbourhoods, with JU:MP neighbourhoods being matched with other similar neighbourhoods based upon school level demographics (proportion of free school dinners, ethnicity groups and index of multiple deprivation), acting as control clusters. A clustered randomised control trial is not possible for this study due to the JU:MP areas already being pre-selected, therefore randomised allocation to intervention is not possible; however, to test effectiveness quasi-experimental non-equivalent groups design study is adequate and common place within real world research settings such as the current study.

3.2 Setting and Participants

The setting of the research will be within primary schools (UK Government schools providing education provision for children aged 4-11 years of age) located across the Northern English county of West Yorkshire. Although the objectives of the current study are to investigate effectiveness of JU:MP at a neighbourhood level , this is a primary school based study because primary schools are located within neighbourhoods, children tend to live in close proximity to primary schools, and practically primary school allow access to a large number of potential children as participants, and conducting physical activity research using methodology similar to this study is common place, feasible and acceptable within primary schools (ref). For the intervention arm of the study, all primary schools located within three JU:MP neighbourhoods, will be invited to be part of the JU:MP programme and subsequently invited to be part of this research study. For the control arm, three neighbourhoods (local authority wards) from across West Yorkshire found to have similar demographics of children and similar levels of deprivation to that of the JU:MP neighbourhoods will be assigned to the control arm. Primary schools located in control neighbourhoods will be invited to be part of the research study and will allow researchers to invite participants (children) to the study.

3.3 Eligibility criteria

3.3.1 Neighbourhoods

The JU:MP programme has eight distinct neighbourhoods (see Figure 1). The three neighbourhoods eligible for the participant of this current study, was based upon the senior management of the JU:MP programme selecting three neighbourhoods ready in Spring 2021 to begin implementation of the JU:MP programme and thus qualifying to be part of the current effectiveness study. Control

neighbourhoods, which are based on local authority wards (local areas with elected officials representing the local area), must be located in the county West Yorkshire in order to ensure that neighbourhoods would be similar politically and geographically as the JU:MP neighbourhoods. Other neighbourhoods/wards in Bradford were excluded due to potential of intervention contamination from the JU:MP programme. Control neighbourhoods must also have similar characteristics as that of the JU:MP neighbourhoods to maximise internal validity. The process of identifying neighbourhood will include pooling state-funded primary school census data (ref),which is released from schools annually, for every ward in West Yorkshire. Then and calculating the median/mean of 1) the values of school postcode derived index of multiple of deprivation (IMD 2019) (ref); 2) the proportion of children eligible for state funded free school dinners (school population measure of deprivation); 3) the proportion of the two predominant ethnic groups of the three JU:MP areas, White British and South Asian Heritage (combining Pakistani Heritage, Bangladesh, Indian and other South Asian ethnic groups). Ward areas deemed to be suitable to be control areas, must have no more than 1 IMD decile median difference than a JU:MP neighbourhood; no more than 10% difference of the proportion of children eligible for free school, and the predominate ethnic group (majority or large minority) must be the same as a JU:MP neighbourhood with ideally no more than 15% difference.

3.3.2 Schools

Government funded primary schools located in the JU:MP and control neighbourhoods will be invited. The number of control schools being sought to recruit will be based upon the recruitment of JU:MP schools to this study. Private and designated special schools are excluded from being part of this study.

3.3.3 Children

All children in recruited primary schools from school year groups 1, 2 and 3 (ages 5-8) will be invited to participate in the study. Children with special educational needs and/or disabilities will not be excluded from participating. Children without parents/careers informed consent will not be able to participate in the study. Children who do not provide their own assent will not participate in the study, even if with parental/carer consents. Children without capacity of providing assent will have the option of a proxy assent (teacher/teacher assistant) of whom are familiar with such child.

3.3.4 Selection and Recruitment

3.3.4.1 Neighbourhoods

Neighbourhoods of either arms of the trial are selected and not recruited and the process has been described previously.

3.3.4.2 Primary Schools

Once the neighbourhoods are selected, primary schools, which have already been identified by the JU:MP implementation team for the intervention neighbourhoods, and via the process of school census data for the identification and allocation of control neighbourhoods, will then be contacted via - 1) a standardised e-mail with an attached schools information sheet and schools consent form for the attention of the school leadership (executive head teacher, head teacher, deputy head and assistant head teacher); 2) a follow-up phone call to the primary school 48 hours after the e-mail was sent, to discuss the sent e-mail and address any issues or questions the school leadership may have, or arrange an in person meeting with the school leadership – during the phone call and/or face-to-face meeting a trained researcher will discuss the school consent form and query whether the member of the school leadership team on behalf of the school would like to participate in the study. If a member of the school leadership has agreed for the school to participate in the research aspect of JU:MP and has signed the consent form, then the school and research team will discuss the recruitment of children.

3.3.5 Primary Schools – incentives

Participating in a three-year research study will be a big commitment for many schools. The primary schools in the JU:MP neighbourhoods will of course be part of the JU:MP programme and will receive whatever benefits that may derive from participating in the programme. The primary schools within the control areas, will not be offered access to the JU:MP programme and must agree in principle not to commit to any whole systems school physical activity research in the next three years. To incentivise such a commitment each of the primary schools in the control areas will be offered a total of £600 to be spent on no physical activity (physical education, active travel, after school clubs etc) resources across the three-year commitment. The £1500 will be split into three instalments of £200 to be paid after the competition of each the three study data collections (baseline, 24 months follow-up, 36 months follow-up).

3.3.6 . Children

Once a member of the school leadership has agreed and consented for the school to participate, all children in Years 1, 2 and 3 from participating schools will be invited to participate in the study. Members of the research team will agree with the school leadership how best to speak and discuss with all children in the school about the study. Speaking to all children may occur by members of the research team speaking to each class in the school individually or during a school assembly. On the same day of speaking with children in school, the research team will bring pre-printed parental/career study information sheets and parental/career consent forms. The research team will ensure all forms are distributed to each class teacher and forms are sent home with children in book bags and/or school planners/diaries so that parents/careers can make an informed decision whether their child participants in the study. To ensure parents/carers have an opportunity to discuss the study with the research team, the research team during the same week will seek to agree a time and day with the school, in which parents/carers can attend a presentation and a question-and-answer session within school with members of the research team. The research team will also seek to agree with the school times and days during which researchers can be present in the school playground before and after school (pick up and drop off time). For children to participate their parent/carer must personally sign and date the latest approved version of the informed consent form before any study specific procedures are performed. On the day of data collection two members of the research team will discuss the study with every individual child and ask for verbal assent, with both researchers witnessing the assent, and writing a record in the signed parent consent form. For children with special educational needs/disability and who do not have the capacity to provide assent, the research team will instead seek assent from a school member of staff familiar and known to the child with the child present.

3.4 Measures

3.4.1 Child Demographics and school stored data

After the receipt of parental/carer consent researchers will request schools for school stored demographic data such as date of birth, unique pupil number (link to health records), sex, ethnicity, home postcode (for index of multiple deprivation calculation), class name, teacher name, childs disability and/or special educational need, receipt of free school dinners. The immediate request is to ensure the research team can plan the days of data collection and beware and plan provision for any children with any additional needs. On the first day of data collection the research team will request schools for the most recent attendance records, most recent educational attainment data, and a copy of class timetable for two weeks starting from the date of data collection (for

accelerometery data collection). If children do not provide assent than all other data collected from schools will be deleted.

The below measures will be repeated three times at baseline, 24 months and 36 months.

3.4.2 Accelerometry

The primary measure of this study is accelerometery. Researchers will fit an accelerometer (brand: ActiGraph) worn on a belt around the childs waist, just above the right hip, will be fitted on each recruited child. Children will receive a demonstration by a member of the research team, showing them how to fit the accelerometer and the children will then fit the devices themselves, this is very simple to do. The child will have their belt checked by the researcher to make sure it is fitted correctly. The accelerometer is similar to a pedometer and about the size of a matchbox. Children will be asked to wear the accelerometer for 24 hours a day, and for 7 days of the week, including at the weekends (to be removed for showering, bathing and swimming). They will be told that if it is uncomfortable to sleep in, they can remove it at night-time and replace it when the get up. Accelerometers have been used widely in research studies and within this age group within Bradford (reference). Children will be asked to return their accelerometer to school where a member of the research team will collect. The ActiGraph accelerometer is the most commonly used accelerometer in field-based research(35), and has been shown to have acceptable reliability and validity in paediatric populations (36). Times spent sleeping, in sedentary, in light and in moderate-to-vigorous intensity activity will be extracted from the ActiGraph data using the cut-points (state evenson cut-points).

3.4.3 Teacher completed Strengths and Difficulties Questionnaire (SDQ)

Teachers of the recruited children will be asked to complete an assessment of the child's behaviour and socio-emotional development using the Strengths and Difficulties Questionnaire (34). Teachers will be asked to complete the questionnaire for all children within their class who have been recruited to the study. This tool has widely been used in Bradford schools as part of the Born in Bradford primary school years study.

Research will primarily be conducted in Primary schools (all schools recruited to the JU:MP programme and matched control schools).

3.4.4 Anthropometric measurements of children

All children will have the following measurements taken during school. Weight will be assessed barefoot and in light clothing using a digital scale (for example, Tanita Body composition Analyser SC-240MA III). Height will be measured unshod, with head placed in the correct position, on a Seca213 stadiometer (d=1mm). Waist circumference will be measured using a Seca 201, d=1mm tape. A mixture of male and female staff will be part of the research team conducting these measures.

3.4.5 Childrens emotional and conduct behaviour estimated by Teacher completed Strengths and Difficulties Questionnaire (SDQ)

Teachers of the recruited children will be asked to complete an assessment of the child's behaviour and socio-emotional development using the Strengths and Difficulties Questionnaire.[5] Teachers will be asked to complete the questionnaire for all children within their class who have been recruited to the study. This tool has widely been used in Bradford schools as part of the Born in Bradford previous work.[6] Please find a version in Appendix 4 for a copy of the teachers strengths and difficulties questionnaire.

3.4.6 Childrens context of physical activity, sedentary behaviours, sleep, quality of life – answered by parents/carers

Parents will be given a questionnaire (See Appendix 5), which takes an estimated 20 minutes, to complete after the measurement day of children. Parents from both conditions will complete this questionnaire at all three time points of the study. This questionnaire has been piloted with numerous of parents currently living in West Yorkshire. The questionnaire comprises of eight sections.

- Section 1 - Personal information of children comprising of name, child's class, teachers name, age of child, date of completing and what the relationship of the person completing the questionnaire.

- Section 2 - Youth Activity profile – measure of physical activities and sedentary behaviours

- The Youth Activity Profile (YAP)[7]is a published questionnaire which requires parents to report the frequency and/or duration of physical activities through different segments of a usual day (i.e. before school, break time at school, lunch at school, after school). The YAP is also used to estimate sedentary behaviours whilst watching television, playing video games, using a mobile phone, a computer/tablet during the previous 7 days of the child.

- Section 3 - Sleep time

- Children's average sleep time will be estimated by parents reporting their child's normal bedtime and a wake time on weekdays and weekend days. This is a standardized way of documenting sleep behaviour.[8]

- Section 4 – Place child is active - A series of questions asking parents to report the frequency of places children are usually active.

- Section 5 – Attendance at a religious setting – A series if questions asking whether children attend a religious setting and what modes of activity children do to travel to a religious setting. The reason for such a series of questions is due to many children living within the JU:MP programme are of a Muslim faith and do attend religious settings frequently during the an usual week. Active religious settings are key part of the JU:MP programme (Appendix 1) and knowing times children attend will also allow the quantifying of accelerometer during those specific times.

- Section 6 – You and your child's neighbourhood – a series of questions asking parents to consider their own parenting practices when it comes to physical activity and also how they themselves consider there own neighbourhood and the characteristics of their neighbourhood. These questions are taken from two validated questionnaires.[9, 10]

- Section 7 - Childs Quality of Life - Parents of children will be asked to complete the parental reported version of the EQ-5D-Y[11-13] and PedsQL.[14] Data of the responses will be used to inform the economic cost effectiveness evaluation.

- Section 8 – Marketing campaigns – parents will be asked whether they have seen marketing or social campaigns recently. The purpose of these questions are estimate the possible reach of the JU:MP social marketing campaigns and also whether the social marketing campaigns have reached the control areas and could be possible cause of intervention continuation.

3.5 Sample Size

For the quantitative aspect of the study we conducted a sample size calculation (using STATA V.15, function 'power two means cluster') which produced a minimum sample of n=1200 children (n=600 per condition, n=200 per neighbourhood, n=32) would be required to have adequate power (80%) to

detect a 10 minute or more change in the primary outcome of mean MVPA (minutes) at both 24 months follow-up and 36 months follow-up. Sample size calculation factored in six clusters (three intervention neighbourhoods, three control neighbourhoods) 5% two-sided alpha; assumed control average daily value of MVPA of 53.7 minutes, a standard deviation (SD) of 19.7, and an intra-cluster correlation (ICC) value of 0.007, which was conservatively rounded up to 0.01. As the JU:MP project is a neighbourhood/community level intervention and no previous studies using accelerometers as an outcome with children or young people could be identified, the values of an average daily MVPA, SD and ICC were derived from an unpublished pilot study (sample size n=564, n=3 neighbourhoods and n=12 primary schools). Missingness of data were conservatively factored into sample size calculation by assuming a 30% loss of accelerometer non-compliance at baseline, followed by further 50% (30% accelerometer non-compliance, 20% loss to attrition-missingness) of data at both 24 months follow-up and 36 months follow-up.

For the qualitative aspect of the research, we will seek to conduct a minimum of 1 focus group discussion for children and 1 for parents in each of the three intervention neighbourhoods, at each of the three qualitative time points (Wave 1 – 6months, Wave 2 – 18 months, Wave 3-30 months). Conducting more focus groups until saturation is found would be ideal, but this will depend on capacity of the research team and number of parents indicting that they would be willing to participate in focus group discussions.

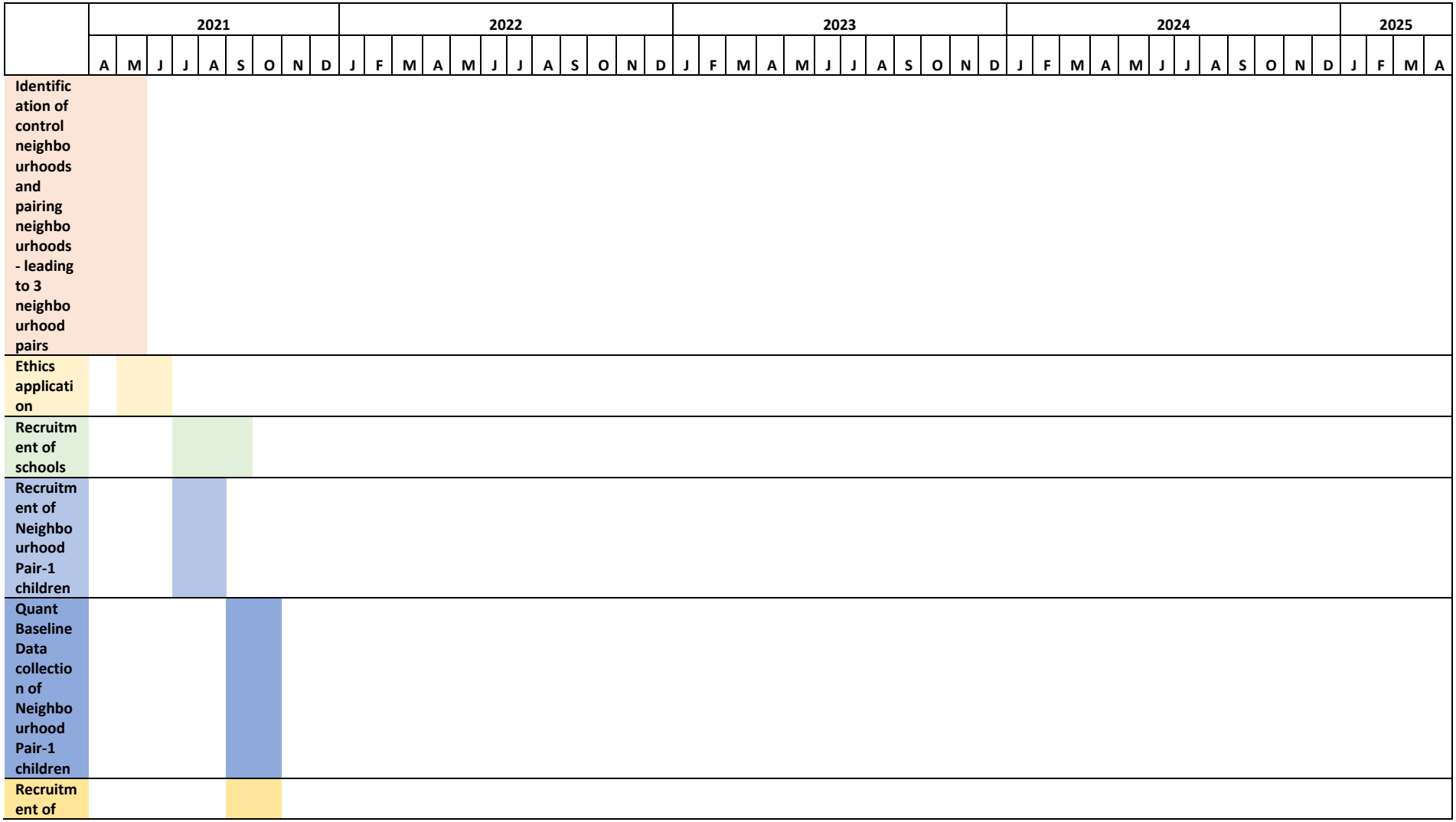
3.6 Data Analysis

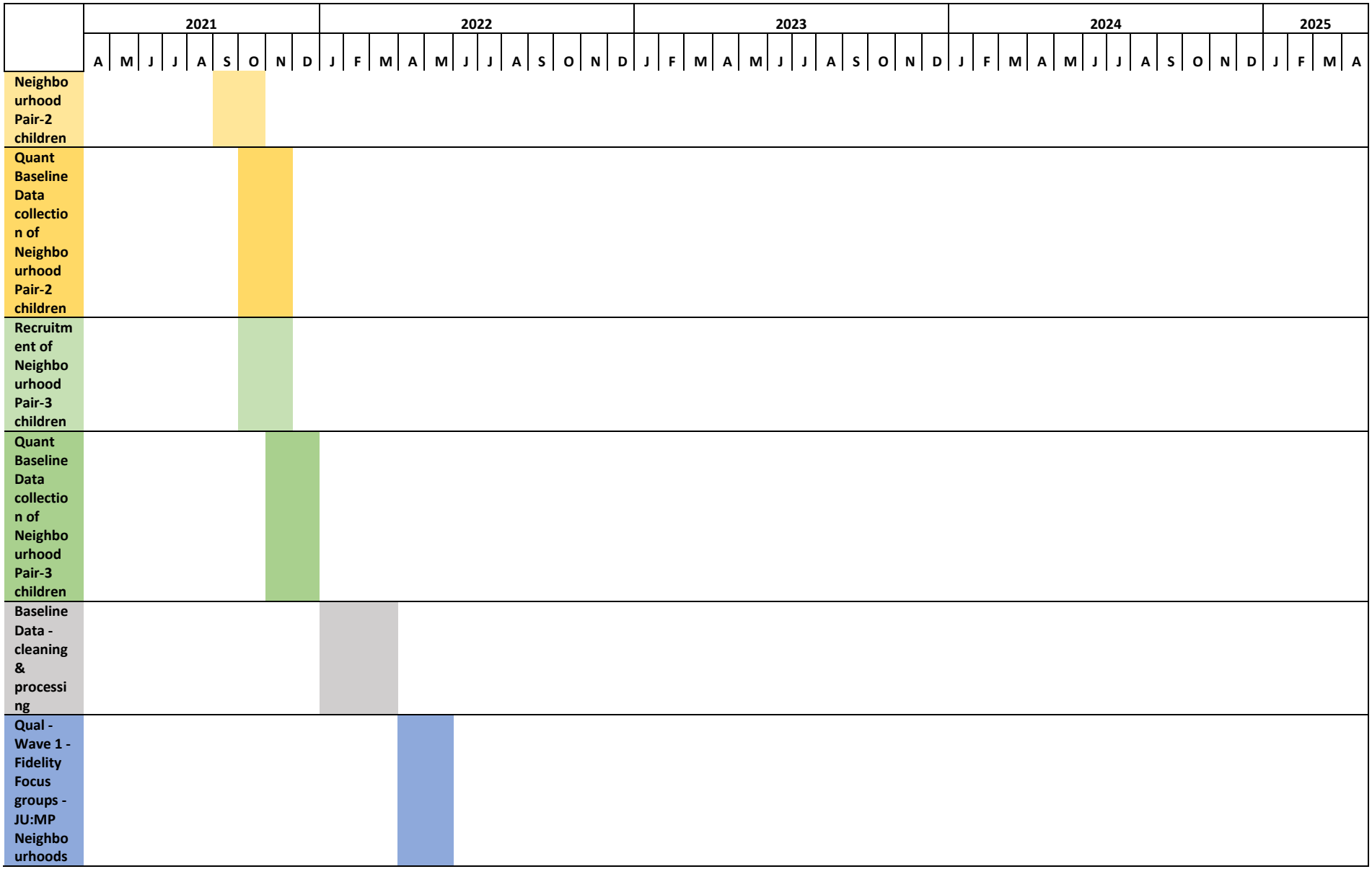
Univariate and multivariate statistical models will be applied to answer the research objectives:

Random effects modelling using the demographic variables of gender, ethnicity as random effects, and baseline moderate-to-vigorous physical activity, age, accelerometer wear-time, body mass index, school, neighbourhood and condition to study as fixed effect variables; will be applied to answer the primary research question. Similar modelling will be applied to answer the other quantitative based questions Q2-4. Thematic analysis will be utilised to analyse the qualitative data. Data from each neighbourhood will initially be analysed separately, to produce neighbourhood ‘case studies’. Analytic themes will then be constructed by comparing and contrasting the neighbourhood case studies in regard to the research question of Q5. To assess the fidelity and acceptability of JUMP to children and parents/carers.

3.7 Timeline

Bingham et al (2021) – JUMP-Quasi-CT – Gantt Chart

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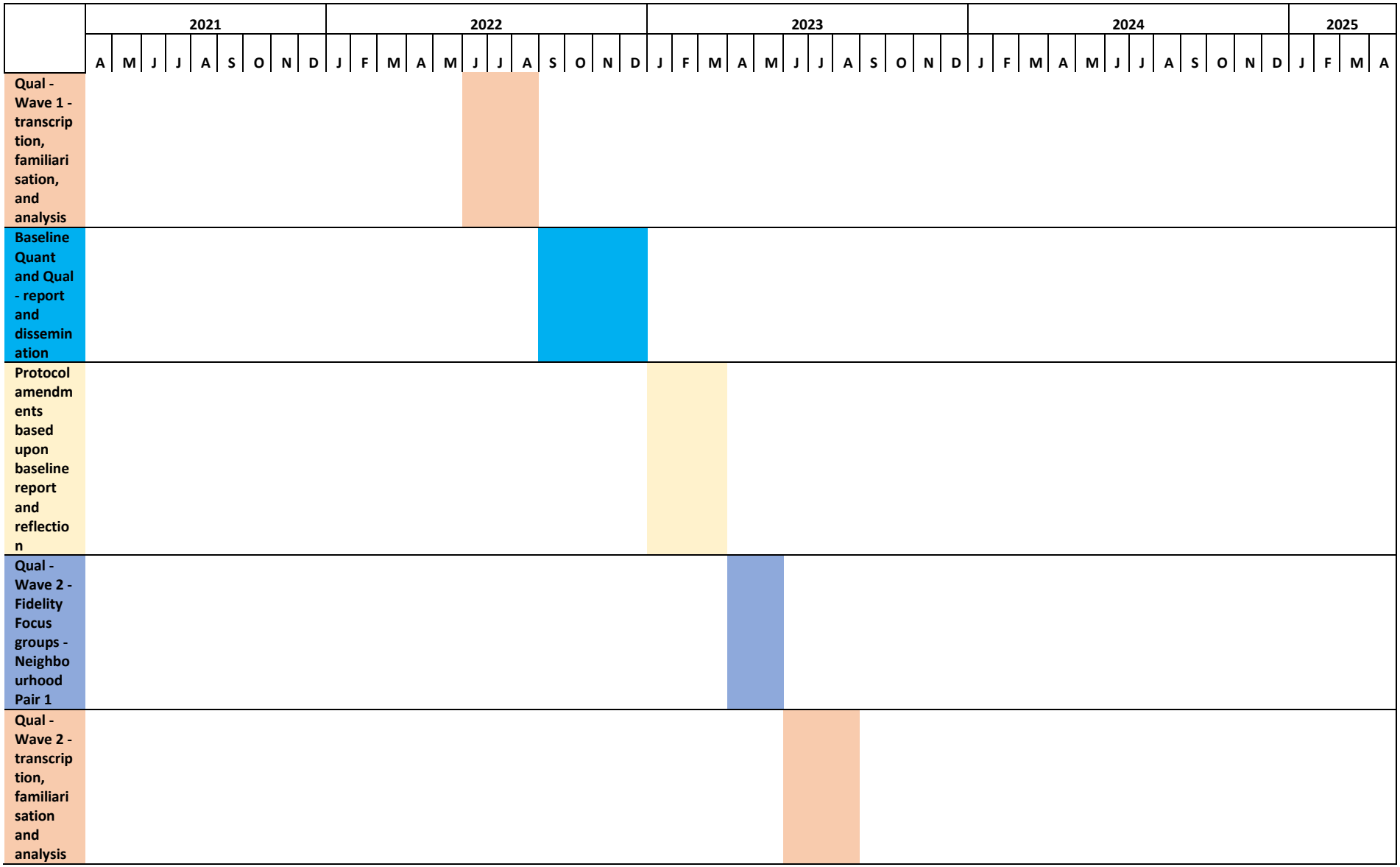
Neighbourhood Pair-2 children
Quant Baseline Data collection of Neighbourhood Pair-2 children
Recruitment of Neighbourhood Pair-3 children
Quant Baseline Data collection of Neighbourhood Pair-3 children
Baseline Data - cleaning & processing
Qual - Wave 1 - Fidelity Focus groups - JU:MP Neighbourhoods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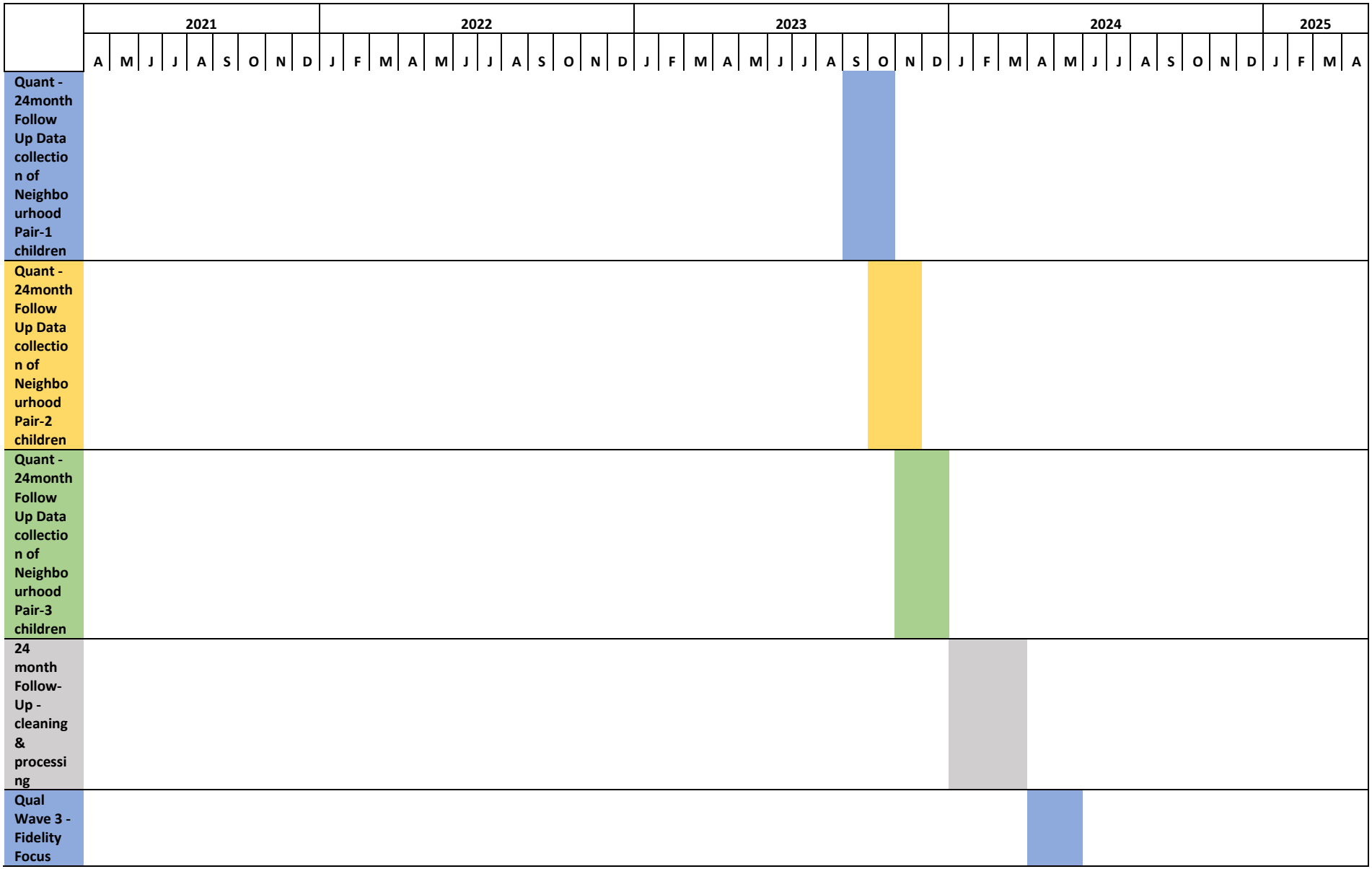
Qual - Wave 1 - transcription, familiarisation, and analysis
Baseline Quant and Qual - report and dissemination
Protocol amendments based upon baseline report and reflection
Qual - Wave 2 - Fidelity Focus groups - Neighbourhood Pair 1
Qual - Wave 2 - transcription, familiarisation and analysis


2021
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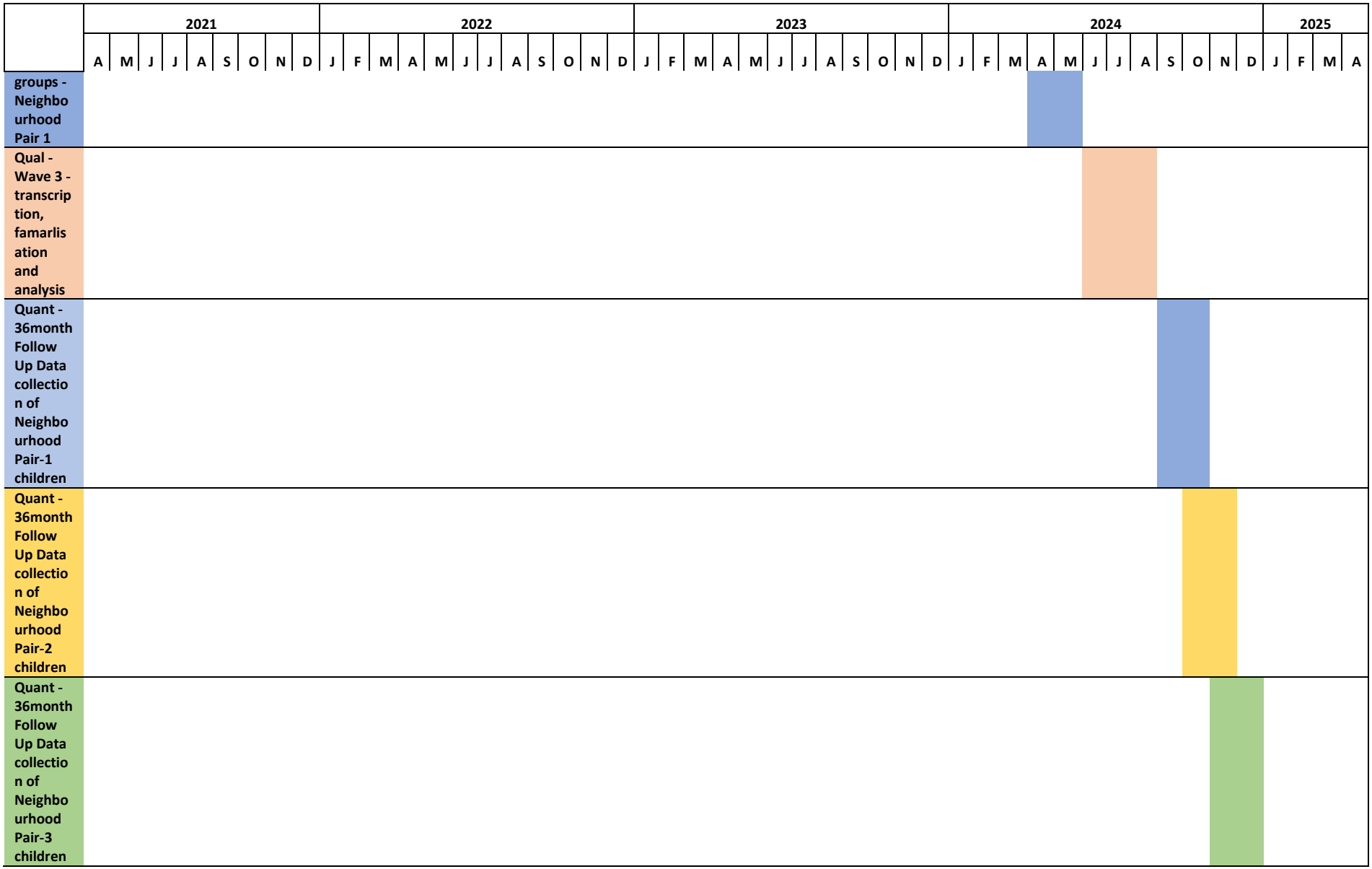
A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
Quant - 24month Follow Up Data collection of Neighbourhood Pair-1 children
Quant - 24month Follow Up Data collection of Neighbourhood Pair-2 children
Quant - 24month Follow Up Data collection of Neighbourhood Pair-3 children
24 month Follow-Up - cleaning & processing
Qual Wave 3 - Fidelity Focus


2021
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A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
groups - Neighbourhood Pair 1
Qual - Wave 3 - transcription, famarlisation and analysis
Quant - 36month Follow Up Data collection of Neighbourhood Pair-1 children
Quant - 36month Follow Up Data collection of Neighbourhood Pair-2 children
Quant - 36month Follow Up Data collection of Neighbourhood Pair-3 children

	2021									2022										2023										2024										2025			
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
36 month Follow-Up - cleaning & processing																																														
Writing of Final Report																																														

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