BB:2-6

Evaluating the long-term effectiveness, and the cost and consequences of the Family Nurse Partnership parenting support programme in reducing maltreatment in young children

Sponsor:	**Cardiff University, Park Place, Cardiff CF10 3AT**
Sponsor ref:	SPON 1281-13
Funder:	**NIHR-PHR**
Funder ref:	**11/3002/11**
REC ref:	14/WA/0062

This protocol has been authorised by:

	SEWTU Director		
Name	**Role**	**Signature**	**Date**
Mike Robling	Chief Investigator		
Name	**Role:**	**Signature**	**Date**
Kerenza Hood	**Director, Centre for Trials Research**		

General Information This protocol describes the study: 'Evaluating the long-term effectiveness, and the cost and consequences of the Family Nurse Partnership parenting support programme in reducing maltreatment in young children' (short title: Building Blocks: 2-6 - antenatal & postnatal parenting support to reduce maltreatment). Every care has been taken in drafting this protocol; however, corrections or amendments may be necessary. These will be circulated to the known Investigators in the study. Problems relating to the study should be referred, in the first instance, to SEWTU.

Compliance This study will adhere to the conditions and principles outlined in the EU Directive 2001/20/EC, EU Directive 2005/28/EC and the ICH Harmonised Tripartite Guideline for Good Clinical Practice (CPMP/ICH/135/95). It will be conducted in compliance with the protocol, the Research Governance Framework for Health and Social Care (Welsh Assembly Government November 2001 and Department of Health 2nd July 2005), the Data Protection Act 1998, and other regulatory requirements as appropriate.

Funding The study is funded by the NIHR-Public Health Research Programme.

Contact details – Chief Investigator

CHIEF INVESTIGATOR

Title and name: Dr Michael Robling
Position: Reader, and Co-Director, South East trials Unit (SEWTU)
Floor 7, Neuadd Meirionnydd,
Heath Park,
Cardiff
CF14 4YS

Tel : 029 2068 7177
Fax :
E-mail : roblingmr@cardiff.ac.uk

CO-INVESTIGATOR(S)

Title and name Dr Eleri Owen-Jones
Job Title: Trial Manager
South East Wales Trials Unit
School of Medicine
Cardiff University
7th Floor Neuadd Meirionnydd
Heath Park
Cardiff
CF14 4YS
Tel : 029 2068 7601
Fax :
E-mail : owen-jonesce@cardiff.ac.uk

Title and name Dr Rebecca Cannings-John
Job title: Senior Statistician
South East Wales Trials Unit
School of Medicine
Cardiff University
7th Floor Neuadd Meirionnydd
Heath Park
Cardiff
CF14 4YS
Tel : 029 2068 7248
Fax :
E-mail : canningsrl@cardiff.ac.uk

Title and name Dr Kerina Jones
Position Associate Professor of Health Informatics
Swansea University
SAIL and CIPHER
College of Medicine
Swansea
SA2 8PP
Tel : 01792 602764
Fax :
E-mail : k.h.jones@swansea.ac.uk

Title and name Professor David Cohen
Position Health Economist
University of South Wales
Faculty of Life Sciences and Education
Glyntaff Campus
Pontypridd, South Wales
CF37 1DL
Tel : 01443 483827
Fax :
E-mail : david.cohen@southwales.ac.uk

Title and name Professor Joyce Kenkre
Position
University of South Wales

Faculty of Life Sciences and Education
Glyntaff Campus
Pontypridd, South Wales
CF37 4BL
Tel :01443483170
Fax :
E-mail : jkenkre@glam.ac.uk

Title and name Dr S Channon
Position Research Fellow
Child Clinical Psychology Department,
Children's Centre,
11th Floor, Tower Building, Park Place,
Cardiff
CF10 3AT

Tel : 02920 870582
Fax :
E-mail : sue@channons.me.uk

Title and name Mr G Watson
Position Head of Information Management
Cardiff University
South East Wales Trials Unit
Heath Hospital
Cardiff
CF4 4YS
Tel :029 20687107
Fax :
E-mail : watsonGL@cf.ac.uk

Title and name Dr Kirsten McEwan
Position Research Associate
Cardiff University
South East Wales Trials Unit
Heath Hospital
Cardiff
CF4 4YS
Tel : 029 20687107
Fax :
E-mail : mcewan@cf.ac.uk

Title and name Dr J Segrott
Position Research Fellow
Cardiff University
DECIPHer
Room 2.04, 13
Museum Place
CF10 3BD
Tel :029 20875184
Fax :
E-mail : SegrottJ@Cardiff.ac.uk

Title and name Dr S Holland
Position Reader
Cardiff University
2.37 Glamorgan Building
Cardiff University
CF10 3WA

Tel : 029 208 76910
Fax :
E-mail : HollandS1@cf.ac.uk

Title and name Professor K Hood
Position Co director of South East Wales Trials Unit
Cardiff University
South East Wales Trials Unit

Heath Hospital
Cardiff
CF14 4YS
Tel : 029 2068 7163
Email : hoodk1@cardiff.ac.uk

Title and name Dr J Sanders
Position Consultant midwife & senior research fellow
Cardiff & Vale NHS Trust
Heath Park
Cardiff
CF14 4XN

Tel : 02920 870582
Email : Julia.Sanders@CardiffandVale.wales.nhs.uk

Title and name Professor A Kemp
Position Reader in Child Health
Cardiff University
School of Medicine
Heath Hospital
Cardiff
CF4 4YS
Tel : 029 2074 4446
Fax :
E-mail : Kempam@cardiff.ac.uk

Title and name Professor Christopher Butler
Position Professor of Primary Care Medicine
Cardiff University
Primary Care & Public Health
Heath Hospital
Cardiff
CF4 4YS
Tel : 029 2068 7168
Fax :
E-mail : butlercc@cardiff.ac.uk

Contact Details – Trial/Study Team:

Mr Rhys Thomas

South East Wales Trials Unit
School of Medicine
Cardiff University
Heath Park
Cardiff
CF14 4YS
Email: thomasr95@cf.ac.uk

STUDY MANAGER
Fiona Lugg
South East Wales Trials Unit
School of Medicine
Cardiff University
Heath Park
Cardiff
CF14 4YS
Tel : 029 2068 7519
Fax :
E-mail : LuggFV@cardiff.ac.uk

STUDY STATISTICIAN
Dr Rebecca Cannings-John
South East Wales Trials Unit
School of Medicine
Cardiff University
Heath Park
Cardiff
CF14 4YS
Tel : 029 2068 7248
Fax :
E-mail : canningsrl@cardiff.ac.uk

DATA MANAGER
Ms Gwen Moody
South East Wales Trials Unit
School of Medicine
Cardiff University
Heath Park
Cardiff
CF14 4YS
Tel : 02920687604
Fax :
E-mail: moodyg@cf.ac.uk

STUDY ADMINISTRATOR
Mr Rhys Thomas
South East Wales Trials Unit
School of Medicine
Cardiff University
Heath Park
Cardiff
CF14 4YS
Tel : 02920687511
Fax :
E-mail: thomasr95@cf.ac.uk

Table of Contents

[To update table of contents (TOC), hover cursor over the top left hand corner until the whole TOC highlights. Press the 'F9' button. Choose 'update entire table'.]

Glossary of abbreviations

AE	Adverse Event
CA	Competent Authority
CF	Consent Form
CI	Chief Investigator
CRF	Case Report Form
CTU	Clinical Trials Unit
CU	Cardiff University
EUCTD	European Union Clinical Trials Directive
ICH	International Conference on Harmonization
GCP	Good Clinical Practice
GP	General Practitioner
GAfREC	Governance Arrangements for NHS Research Ethics Committees
HE	Health Economics
HIRU	Health Information Research Unit (Swansea University)
HRA	Health Research Authority
HSCIC	Health and Social Care Information Centre
HTA	Health Technology Assessment
IC	Informed consent
IDMC	Independent Data Monitoring Committee
IEC	Independent Ethics Committee
ISRCTN	International Standard Randomised Controlled Trial Number
HB	Health Board
MRC	Medical Research Council
NHS	National Health Service
NISCHR	National Institute for Social Care & Health Research
NLI	No Local Investigator
NPSA	National Patient Safety Agency
NRR	National Research Register
PCT	Primary Care Trust
PI	Principal Investigator
PIAG	Patient Information Advisory Group
PIS	Patient Information Sheet
QL (QoL)	Quality of Life
QP	Qualified Person
R&D	Research and Development
RCT	Randomised Controlled Trial
REC	Research Ethics Committee
RGF	Research Governance Framework for Health and Social Care
SAE	Serious Adverse Event
SAIL	Secure Anonymised Information Linkage
SEWTU	South East Wales Trials Unit
SOP	Standard Operating Procedure
TMF	Trial Master File
TMG	Trial Management Group
TSC	Trial Steering Committee

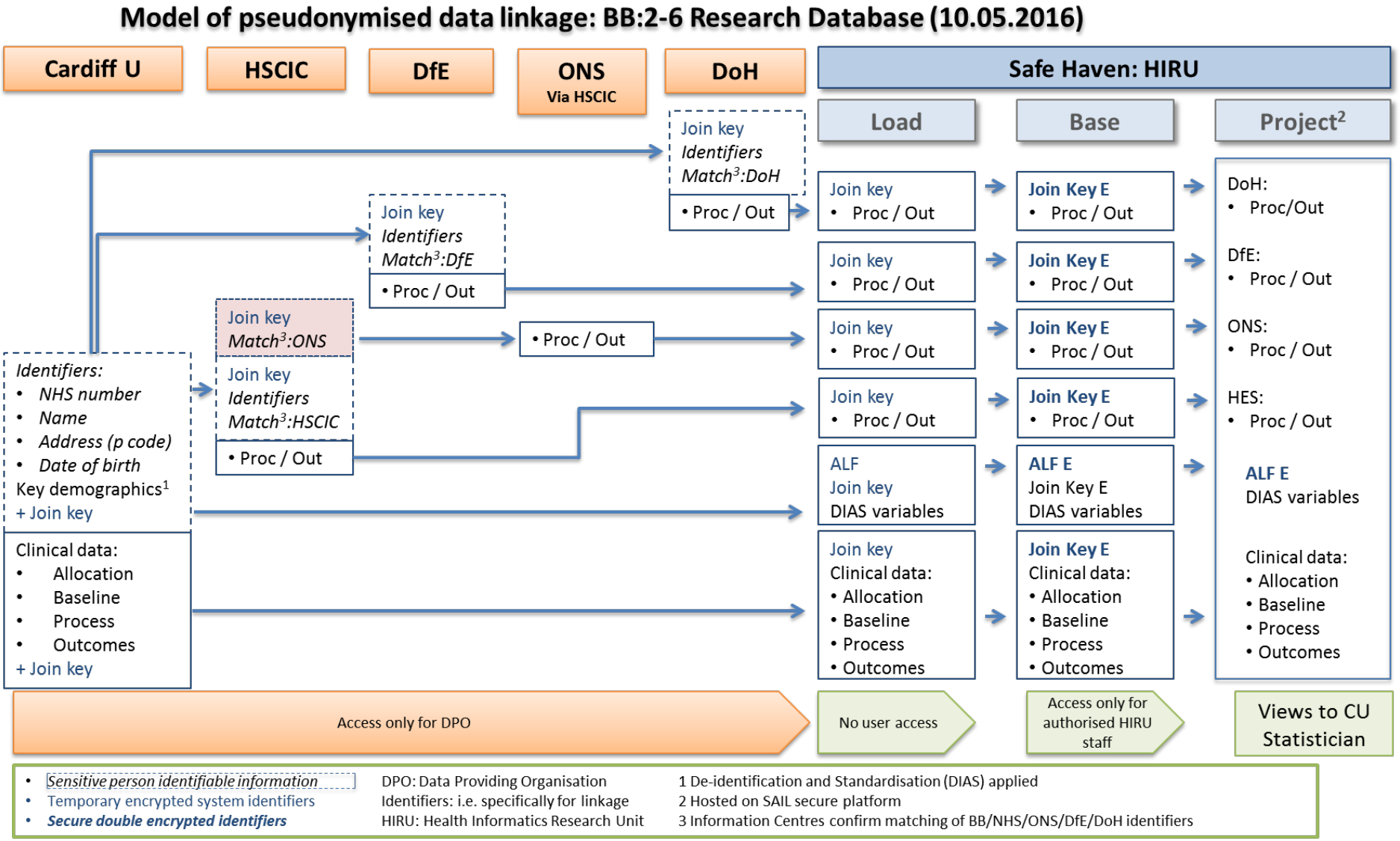
1 Amendment History

Amendment No.	Protocol version no.	Date issued	Author(s) of changes	Details of changes made
Non-Substantial	1.1	22.09.14	Fiona Lugg	Addition of Study Manager Details Further details regarding tracking participants with unknown birth outcome, contacting these participants with the option to dissent. New study schema: participant identifiers to be sent directly to NPD rather than via HSCIC. Text to reflect the schema. Altered acronym NHSIC to HSCIC
AMD01	2.0		Fiona Lugg	Information regarding the withdrawn participants who are potentially eligible for inclusion the follow on study. See Sections 10.1; 14.1; 18.2 and Appendix I & II.
AMD02	3.0	10 May	Fiona Lugg	Additional information regarding accessing abortion data from the Department of Health. See sections 6; 9.2; 14.1; and 18.1 Updated “model of Pseudonymised data linkage” and “map of required review and approvals”

2 Synopsis

Short title	Building Blocks: 2-6 – antenatal & postnatal parenting support to reduce maltreatment.
Acronym	BB: 2-6
Internal ref. no.	
Trial/study design	Anonymised data linkage.
Trial/study participants	Women previously recruited to the Building Blocks trial (BB: 0-2) and their first-born offspring
Planned sample size	N=1413
Follow-up duration	4 years
Planned study period	4 years
Primary objective	To determine the longer-term impact (to age six years) of the Family Nurse Partnership (FNP) home visiting intervention upon objective indicators of child maltreatment when compared to usually provided health and social care services alone.
Secondary objectives	To evaluate (i) the impact of FNP upon associated measures of maltreatment, (ii) intermediate indicators of theoretical FNP programme impact and (iii) potential moderators of FNP programme effect
Primary outcomes	Child in Need Status
Secondary outcomes	• Referral to Children's Social Care (CSC) • Child in Need referral • Child protection referral • Recorded child injuries & ingestions • Subsequent pregnancies • Health & social care resource use The study will use the multi-method multisource approach to maltreatment research where a continuum of outcomes ranging from child maltreatment to family wellness are considered, rather than a sole focus upon a single primary outcome.
Interventions	None implemented in current study. The study represents a long term follow-up for participants of a trial evaluating an intensive home visiting intervention (Family Nurse Partnership).

3 Study summary & schema



3.1 Participant flow diagram

As this is a data linkage study, there is no participant flow relevant. The data flow and linkage is described in the preceding section (study schema).

3.2 Study summary

A programme of home visiting by specially trained nurses called the Family Nurse Partnership (FNP) aims to support teenagers expecting their first child. The programme has been compared to usual health and social care in a study involving 18 English centres which followed mothers and their children until the child's second birthday. The current study will follow up the same women (a total of 1562) and their children for a further four years until their child is 6 years old. The FNP programme has been shown to reduce maltreatment of children in US studies. However, it has not yet been assessed for effectiveness in England where care usually provided to such families and their social circumstances are likely to be quite different. In this study we will measure whether the FNP programme reduces child maltreatment by accessing medical and education records of participating women and their children. The study will examine what aspect of programme delivery or of the participants themselves may affect outcomes. Approval will be sought to collect information from the health and educational records of former trial participants. These data will be linked to trial records using an established method (Secure Anonymised Information Linkage or SAIL) so that the researchers can not identify any individual in the resulting data set. The study team will use an established process for managing and linking data in an anonymised manner to satisfy the requirements of data providers for preservation of confidentiality and anonymity. All information collected will be entered onto secured computer databases for analysis. The applicants include the team conducting the current effectiveness study of FNP in England which has successfully recruited the largest number of trial participants for this intervention to date in the world (n=1645). This study will determine programme effectiveness over the next developmental stage in an existing group of women and children, reducing the costs over a new trial of a similar intervention.

4 Introduction

4.1 Background

This proposal offers a unique opportunity to evaluate the long term outcome of the Family Nurse Partnership as a preventative intervention to reduce child maltreatment in England.

Maltreatment involves acts of omission (neglect) or commission (abuse) often by caregivers that either threaten to risk, risk or actually cause harm to a child(1). Abuse may be physical, emotional or sexual. Neglect represents persistent failure to meet a child's basic physical or psychological needs, often resulting in serious impairment of the child's health or development(2). Neglect may involve failing to: protect a child from physical and emotional harm or danger; ensure adequate supervision; or ensure access to appropriate medical care. In the year ending 31st March 2013 in England there were 593,500 referrals to children's social care services, 378,600 children in need (an overall rate of 332.2 per 10,000) and 52,700 children became subject of a child protection plan(3). Of children who became subject of a child protection plan, the most common initial category of abuse was neglect (41.0%), followed by emotional abuse (31.7%) and physical abuse (11.7%). Child maltreatment is associated with adverse physical, social, emotional and cognitive long-term outcomes which may arise throughout the child's lifetime(4). For example, considering effects within the emotional / behavioural domain, physical abuse is associated with depression, anxiety, antisocial behaviour and substance abuse and in the longer term, with depression, anxiety, suicidal behaviour and psychosis.

Teenage mothers and their offspring face an elevated risk of social exclusion and health disadvantage, with children having lower birth weights, less likely to breast feed, exhibiting higher rates of mortality and accidents(5, 6). Young maternal age, and factors associated with teenage motherhood, such as lower levels of education and income, are indicators of the risk of maltreatment (7, 8).

Policy response: In the UK, preventing maltreatment is an important focus of Government concern. The Children Act 1989 specifies agencies' responsibilities to cooperate in the interests of vulnerable children, for Children in Need (section 17) and children suffering or likely to suffer from significant harm (section 47). How individuals and organisations should work together to safeguard and promote the welfare of children is set out in the statutory guidance document, Working Together to Safeguard Children. Every Child Matters, the Green Paper around the Children's Act 2004 (which made structural and organisational changes to children's services & inter-agency working), emphasised support for parents (including targeted services) and carers and early intervention as two of four areas of focus.

There has been an increasing emphasis upon the primary prevention of child maltreatment, including interventions directed at general populations and those targeting high-risk groups(9). One preventative home-visiting approach to reducing maltreatment is the Family Nurse Partnership (FNP) programme (developed in the US as the Nurse Family Partnership or NFP) with three overarching goals: to improve birth outcomes, improve child health and development - including reducing maltreatment - and promote economic self-sufficiency of mothers(10). The programme aims to promote sensitive and competent care-giving and to reduce maltreatment through activities such as education about child development, modelling sensitive parent-child interaction, and guidance on accessing appropriate child care. NFP is one of only two preventative programmes shown to be effective in preventing maltreatment and in the US is delivered in 24 states and in four state-wide programmes(11). In three US trials, the NFP has demonstrated improvements in prenatal health behaviours and birth outcomes, improvements in sensitive child care, reductions in child injuries, abuse and neglect, improvements in maternal life course (e.g. greater workforce participation) and improvements in child and adolescent functioning. NFP has shown greatest impact on those at greater risk and whilst there is no net saving for married women or those of higher socio-economic status, for low-income and unmarried mothers the cost of the programme was recovered by the child's fourth birthday.

In the first US trial, by age 2 there was verified abuse / neglect in 19% of control children compared to 4% in the NFP group and 56% relative reduction in emergency department encounters for injuries and ingestions during the second year of life(12). By age 4, amongst maltreated children, the NFP group of children exhibited fewer risks for harm than the control group (e.g. fewer attendances with injuries / ingestions, safer home environment)(13). In the 15 years after birth, mothers as perpetrators of abuse were less common in NFP vs control arm (0.29 vs 0.54; $p<0.001$), an effect even greater for the most vulnerable sub-group (low SES, unmarried; 0.11)(14). Whilst the beneficial impact upon state-verified first-time reports of maltreatment are generally experienced after age 5, this difference is earlier (age 3) for the most vulnerable sub-group of poor unmarried mothers.

FNP and the Building Blocks trial: The NFP was adapted for implementation as the Family Nurse Partnership and was introduced in England in 2007. An implementation evaluation reported progress in the delivery of the programme in ten test sites(15). The differing pattern of service provision and socio-cultural context means that the relative costs and benefits of the programme need to be replicated in England before wide-spread implementation can be recommended. This is an explicit licensing requirement of the programme and thus the Building Blocks trial ("BB0:0-2"; ISRCTN23019866) led by the applicants will provide evidence for the short-term effectiveness of the programme in teenage mothers (due to

report main results in 2014)(16). The longer-term impact of the intervention in an English context will remain unknown. Primary outcomes for both mother and child (0-2 years of age) in BB:0-2 are being recorded in the short and medium term (Maternal outcomes: changes in prenatal tobacco use, proportion of women with second pregnancy within two years of first birth; Child outcomes: birth weight, emergency attendances and hospital admissions up to second birthday). Participants in BB:0-2 were interviewed at baseline prior to random allocation to either intervention or control arm, and were followed up by telephone interviews (at 34-36 weeks gestation; six, 12, and 18 months after birth) with a final interview at home, together with an assessment of maternal sensitivity at 24 months. Outcome data was abstracted from medical records, in particular to monitor health resource utilisation, and health of mother and child. The clinical programme is rigorously conceived, but it is unclear whether the relative benefits seen in the US will be replicated in England with its more comprehensive system of universal services. The availability of the FNP programme is currently being expanded in England to 16,000 concurrent places by 2015, and has now been made available in Northern Ireland and Scotland. Therefore, evidence from the trial and in particular the current study will be crucial for policy decision-making over the next few years.

Rationale for current study: The proposed study will provide evidence for the long-term effectiveness and costs of one of the most promising early intervention programmes for reducing risk of child maltreatment in a targeted vulnerable population. It will inform policy about whether to continue implementing a programme for which there is no existing UK evidence for effectiveness. Whilst evidence of short term effect is currently being generated from the BB:0-2 trial, the recognised potential programme benefits – in particular for child maltreatment - have largely been evidenced in the longer term (13,14). The proposal presents a unique opportunity to extend learning from the trial by using existing outcome data in combination with newly arising routinely recorded data.

5 Study objectives

We will examine the longer-term impact of the FNP intervention upon child maltreatment outcomes and key indicators of neglect (e.g. injuries and ingestions). The impact of theoretical moderators of programme effect and fidelity to programme will be assessed using existing trial data (e.g. presence of domestic violence). Longer-term cost and consequences of the intervention (including health resource usage) will be assessed.

5.1 Primary objective

- To determine the effectiveness of the FNP programme in reducing objectively measured long-term maltreatment outcomes when compared to usually provided health and social care alone. Using a multi-method multisource approach to maltreatment research main outcomes will be:
    - Child in need status, child protection registration, referral to social care (overall; child protection; Child in Need)

5.2 Secondary objectives

- To determine the long-term effectiveness of the FNP programme in reducing maltreatment when assessed using associated measures of injuries and ingestions, hospital DNA rates and immunisation rates.
- To determine the long-term impact of the FNP programme upon intermediate programme outcomes, most notably subsequent pregnancies.
- To explore the impact of theoretical moderators of programme effect, including domestic abuse and baseline client characteristics
- To determine the costs and consequences of the FNP programme over the full period of available follow-up.

6 Study design

This is a data linkage study, which will generate a linked anonymised research database. Recruitment to original BB:0-2 study used individual randomisation and stratification by study site, gestation, and preferred language of data collection. Eligible participants will therefore be those women and children enrolled into the BB:0-2 study. The current study will conduct follow-up with mothers and children until that child is aged 6 years old. Half of the proposed study participants will have been offered FNP from time of antenatal booking until their child was aged 2, the other half will have continued to receive only usual health and social care services locally available. Follow-up will be by linked anonymous data abstraction from routine health and education records. Existing baseline and follow-up data from BB:0-2 will be incorporated in the proposed follow-up study analysis following a process of de-identification where necessary. No active trial intervention will be delivered. Women and their children will continue to be able to access existing locally available health and social care services. For FNP clients, care would have formally passed to the local health visiting service on the child's second birthday (FNP nurses fulfil the health visiting role until that

point, other universal services are available to both study groups before and after the child's second birthday).

Access to personally identifiable medical records is supportable under arrangements managed by the Health Research Authority's Confidentiality Advisory Group (formerly via the former National Information Governance Board). The study team hold personally identifiable data with current ethical approval and legally obtained participant consent. The study will require identifiers to be passed to the Department of Health, the Health and Social Care Information Centre (HSCIC) and Department for Education to establish linkage with routine data sets. It is this initial data transfer that requires HRA approval. With the establishment of rigorous data anonymised data linkage methods (Lyons et al 2009), any potential breach of patient confidentiality that may otherwise be entailed can be minimised through data safeguarding methods that can satisfactorily link, maintain and allow analysis of anonymous records (for example, through the use of trusted third party services and data safe havens). Therefore, we will seek governance approval (s251 approval, via CAG) and through required data providers (Department of Health, Department for Education) to link data to study data resulting in a linked anonymised data set. This will be maintained in a safe data haven (i.e. not by the research team in Cardiff University but at SAIL at Swansea University) within which all analyses will be undertaken. The research database will not be made available to other researchers (i.e. it will be a project specific resource) but also has the potential to accrue further datasets in the longer term (NB all such additional data acquisition would still be subject to governance and ethics approval). The linkage process and governance arrangements will use existing approved processes to ensure patient confidentiality and data security and integrity.

It is essential to provide an ethical means of linking patient data at an individual level in order to obtain an unbiased estimate of the long-term effect of FNP on objective and associated maltreatment outcomes (as direct self-reported approaches are very likely to substantially bias response, and invalidate the subsequent dataset). Data will be abstracted at two time-points. This will involve applications to the HSCIC for access to Hospital Episode Statistics (HES) and ONS data (via HSCIC) and to the General Practice Extraction Service (GPES**), to the Department of Health for abortion data** and to the Department for Education for access to the National Pupil Database. GPES data are not currently available to researchers, and therefore, further details of such a data request and linkage will be subject to an amendment to this application, and to amendments from other approving bodies as appropriate. Similarly, data may also be available via local departments of Children's Social Care and which may provide opportunities for further validation of data obtained from other providers (e.g. DfE). In such circumstances, a planned amendment to this submission would

be submitted and we would apply to the Association of Directors of Children's Services (ADCS) for multi-site approval, and approach to individual authorities. Our data linkage model (above) therefore represents the scope of this current application only, omitting GPES and departments of social care. For included data sets, data will be linked using a combination of NHS number and other identifiers which have already been collected as part of BB:0-2 study.

Data will be anonymised at the IC after the matching process before it is sent to SAIL. An anonymous linking field will be assigned to each record after the matching process. Only this and minimal demographics (SAIL usually receive gender, week of birth and LSOA from NWIS) will come to SAIL, as SAIL do not handle identifiable data. This is the approach for other data sets to be used in the study too. At SAIL data will be re-encrypted as a further safeguard.

The first wave of data collection from routine records will incorporate a formal pilot to develop and validate the process of data capture, to verify data linkage and to develop data management protocol and statistical scripts for the main analysis.

7 Centre and Investigator selection

Not applicable

8 Participant selection

Eligible participants will be those women and children exiting from BB:0-2 (i.e. at age 2 of their first born child). Women were recruited as nulliparous pregnant teenagers (specifically women aged 19 and under); living in one of 18 FNP catchment areas (across urban and rural areas of England); recruited by 24 weeks gestation; and able to consent to research. Women who planned to have their child adopted or move outside of the study area were not recruited. This was to ensure that women randomised to the FNP intervention would be able to receive care from the FNP team. Women recruited to BB:0-2 were followed up regardless of any subsequent movement, and will be included in BB:2-6. The control group in BB:0-2 received universal health and social care services as locally available. The intervention group also had access to such services (details of services actually used were collected for all participants as part of BB:0-2). BB:0-2 provides a cohort of 1562 women and their children to follow-up (i.e. all originally recruited and confirmed as meeting eligibility criteria.).

8.1 Inclusion criteria

The sample being followed up through anonymised data linkage will be women recruited to the BB:0-2 trial for which the following inclusion criteria were applied: nulliparous pregnant teenagers; living in one of 18 FNP catchment areas in England; less than 24 weeks gestation; and able to consent to research participation. No further inclusion would be applied.

8.2 Exclusion criteria

The sample being followed up through anonymised data linkage will be women recruited to the BB:0-2 trial for which the following exclusion criteria were applied: women planning to have their child adopted or planning to move from the study site for three or more months during the study, women who would have required a third person to receive the intervention (e.g. an interpreter).

Children permanently fostered or adopted within the 6 years study period secondary to child protection process can be linked (with approvals) to original health records (up to the point of adoption), and will be included in the anonymised database.

9 Outcome measures

The study is following the multi-method multisource approach to maltreatment research and considering an outcome continuum from child maltreatment to family wellness. Therefore, whilst a primary outcome is identified, analysis will collectively assess evidence for maltreatment.

9.1 Primary outcome measure/s

Child in Need status recorded at any time during the follow-up period.

9.2 Secondary outcome measure and effect moderators

The following outcome domains and secondary outcomes are described below. A full listing is provided in the appendix to this protocol.

Outcomes:

Objective measures of maltreatment: referral to social services (overall, Child Protection referral, Child in Need referral), child protection registration, Child in Need categorisation, Looked after status (mother, child)

Associated measures of maltreatment: recorded injuries and ingestions, DNA rates for hospital appointments, immunisations rates

Intermediate FNP programme outcomes: subsequent pregnancies (sourced from HES and abortions data)

Costs: health and social care resource use (the latter sourced via Education records)

Child health, developmental and educational outcomes: reported disability, special educational needs, early educational attendance and assessments (e.g. Key Stage 1)

Effect moderators (baseline)**:**

Intimate partner violence, baseline socio-demographic variables (e.g. age, family structure), intervention exposure (fidelity)

10 Recruitment and randomisation/registration

10.1 Number of participants

BB:0-2 recruited 1645 women but 83 were subsequently excluded due to (i) not meeting eligibility criteria upon further review or (ii) mandatory withdrawal (e.g. miscarriage). This leaves 1562 women, and their children.

For 110 of these participants, the participants' birth outcome is currently unknown and therefore at this point we are unsure if all of these 110 participants are eligible for follow up.

A conservative rate of loss due to tracking and linkage errors of 10% loss would leave 1327-1405 for analysis, depending on how many of the 110 are excluded (this number will also expect to vary with the data sources being used).

10.2 Recruitment process

Participants will be those exiting the BB:0-2 trial. No further recruitment is relevant.

10.3 Informed consent

We will seek approval (s251) from the Health Research Authority's Confidentiality Advisory Group (CAG) to pass identifiable patient data legally held by Cardiff University to information centres (Health, Education). This intermediary procedural step will enable the development of a linked anonymised research database (operating with strict governance procedures to preserve patient confidentiality) so that no single organisation can identify any individual based on the data they have access to. Such an approach is necessary primarily due to the child protection focus of the study and the consequent sensitivity in asking directly for consent. Further considerations include, (i) the mobility and relative difficulty in on-going

direct access to this sample, (ii) the consequent introduction of non-ascertainment bias on sample representativeness, and (iii) the cost and logistical requirements of securing high levels of additional consent. In this study there is no on-going intervention to which the women or their children will be subject and the analysis does not require individuals to be personally identifiable to the researchers in the research database. Hence, no further consent will be sought from individuals. All women recruited to the original trial will be notified that longer-term follow-up using anonymised records will be undertaken and those notifying the study team of their dissent will not be included in further linkage or analysis. We plan to write to participants and inform them of our intention to conduct follow-on research which will make use of their anonymised routine collected data. The letter will include contact details should participants have concern or wish to dissent from the use of their data for research purposes.

Governance approval will be sought from data providers when seeking access to data to develop the database.

10.4 Randomisation/registration and unblinding

Information about treatment allocation in the original trial will be carried forward into the research database to enable the planned comparative analysis.

10.5 Screening logs

Not applicable

11 Withdrawal & loss to follow-up

Data linkage will be associated with some loss to follow up. We have conservatively estimated this to be about 10%. However, a single rate of loss to follow-up is unlikely to be relevant as we are measuring multiple outcomes arising from more than one data source.

12 Intervention

No active intervention is being delivered.

13 Adverse Events

Adverse event monitoring and reporting is not applicable as this study relates to the establishment of a linked anonymised research database and with no further active intervention.

14 Study procedures

14.1 Data collection/assessment

The process for linking clinical data held by Cardiff University on trial participants to health data (sourced via the HSCIC) and deposited in a third party safe haven for storage and analysis in Swansea's Health Informatics Research Unit (HIRU) is illustrated in the flow chart schema above. This follows an established secure method for anonymised data linkage. Data for Building Blocks trial participants will be abstracted from the trial database in Cardiff University. Identifiers (e.g. NHS number, name, address, date of birth) and a join key will be used to form a data set to enable linkage with clinical data from other Information Centres (ICs). This will be sent to the HSCIC (data provider) where it can be matched to clinical data (process and outcome) and then passed on to the safe haven at HIRU (via the SAIL research platform).

At the same time, participant identifiers (Name, address, date of birth, sex) and the same join key will be sent to Department for Education [DfE] National Pupil Database [NPD] for matching and linking to their datasets (process and outcome). Health and educational outcome data is available from the DfE NPD (most notably Child In Need status). NHS number is not held in the NPD datasets therefore will not be included in the file. Data matching will be carried out by the IC and then passed on to the safe haven at HIRU.

A third data set drawn from the Cardiff trial database comprised of the same join key and (following a process of de-identification and standardisation in Cardiff to reduce risk of later unintentional patient level identification) demographic data will be sent directly to HIRU where an anonymised linking field (ALF) will be attached to individual patient records. The resulting file will thus contain the ALF, the join key and de-identified demographic variables. Finally, a dataset of clinical data (plus a join key) will be extracted from the Cardiff database and sent directly to HIRU. All of these datasets will be loaded in a process that allows no user access and combined via the common join key, whilst the ALF is encrypted to result in a file that retains clinical variables (from originating database in Cardiff plus from HSCIC), de-identified demographic variables and the encrypted anonymised linking field. This resultant project file can then be made accessible to an external analyst (statistician at Cardiff University) via a remote-in portal.

Information on subsequent pregnancies will be sourced from both HES (HSCIC outlined above) and individual-level data from the abortions statistics department within the Department of Health (DoH). Identifiers (e.g. NHS number, name, address, date of birth) and a join key will be sent to the DoH (data provider) where it can be matched to clinical data (process and outcome) and then passed on to the safe haven at HIRU (via the SAIL research platform).

Maltreatment data may also be sourced from departments of social services. These sources may provide further detail on individual cases that may not be available from the routine returns provided to the DfE, and may provide an opportunity to further verify the data provided via DfE. Such activity would be subject to a planned amendment to this application, approval via the Association for Directors of Childrens Social Services and approvals from individual sites.

To facilitate and quality assure matching, we will use NHS number and the NHS tracing system, coordinated by the HSCIC, in addition to other viable identifiers. We will seek approval for access to ONS data on mortality to determine outcome status for individuals, a process that will be mediated via the HSCIC.

We will also use an NHS tracing system provided by NHS Shared Service Partnership or the HSCIC to update our records on the 110 participants whose birth outcome is currently unknown as well as their current status (mother and child are alive), prior to contacting them with the option to dissent.

14.2 Follow-up

Baseline data and follow-up data from BB:0-2 will be included in the main analysis, so that the total follow-up period for each child will be just over six years. We plan to follow-up until age six for two reasons. First, we wish to capture any detection of abuse and neglect associated with starting school and the increased surveillance opportunities (for both intervention and control group children) (29). Second, we wish to include the period within which intervention and control groups in the US trials started to show a difference for maltreatment outcomes for the most vulnerable participants(14). Follow-up will be by data abstraction from health and education records conducted on two occasions.

15 Statistical considerations

15.1 Randomisation

Randomisation has already been conducted in the BB:0-2 trial. Recruitment to BB:0-2 used individual randomisation and stratification by study site, gestation, and preferred language of data collection.

15.2 Sample size

Primary outcome (Child in Need status): For Child in Need status, available UK data on rates are not specific to the age-range of interest, but the rate in the general population aged 5-9 years is 4.6% (average rate of study sites in BB:0-2). The rate would be expected to be greater in the specific study sample, and therefore we have assumed a rate of 8%. To detect a difference of 4% (4% vs 8%) would require 602 children in each arm (1204 in total) using 80% power and a two-sided 5% alpha level. A key secondary outcome is referral to Children's Social Care (CSC). Data from the FNP implementation evaluation (n=1177 women) shows an observed referral rate of children (in the period up to child's second birthday) of 8.2%. A sample of 1319 for analysis will provide 90% power at the two-sided 2.5% alpha level to detect a difference between the two groups of 6.3% (14.5% to 8.2%) in the proportion having a referral to CSC. This represents a conservative estimate as further referrals to CSC will be observed in the remaining four-year period.

BB:0-2 recruited 1645 women, with 1562 available for follow-up (i.e. excluding those subject to a mandatory withdrawal). Follow through medical records (assuming 10% loss in tracking & linkage) would result in 1405 participants.

16 Analysis

16.1 Main analysis

Main analysis: Analyses will be conducted on an intention-to-treat basis and due emphasis placed on confidence intervals for the between-arm comparisons. Descriptive statistics of demographic and outcome measures will be used to ascertain any marked imbalance between the arms at 2 years. The primary comparative analysis on CIN status at any point between birth and 6 years will use logistic multilevel modelling to investigate differences between the groups. Modelling the impact of key subgroups and different intervention elements (e.g. gestational age at programme entry, dosage) on outcome will be undertaken by extending the primary models and testing for interaction effects. Comparisons will be presented as odds ratios, 95% confidence intervals and p-values. Multilevel modelling will

allow for clustering of effect within a site and family nurse and where this indicates little impact of clustering on effect, results from the single level model will be presented.

Although the study will be powered to examine a 4% difference in CIN status, secondary analyses (using logistic multilevel regression modelling) will assess group differences in referral rates to CSC and maltreatment profile. Levels of concern will be examined by looking at extent of action taken (for example, category of abuse, subjected to a section 47 enquiry, subjected to a child protection plan etc). Child protection outcomes will also be examined by groups, as will the referral source and perpetrator.

Logistic multilevel modelling will also be used to analyse the associated outcomes (e.g. proportion of children with injuries and ingestions). Counts data such as the number of emergency attendances will be analysed using Poisson multilevel regression modelling.

State transition model using Markov chains will be used to assess the probabilities of moving from one stage marker (states) to another(31). A Markov chain is an iterative process where subjects are assumed to stay in one cycle for a certain time and then make a transition to another cycle. The Markov chain will contain the following states: referred to Social Services, initial assessment, Child identified as in need, outcome of CIN core assessment, section 47 enquiry, case conference, child protection plan, removed from home (e.g. Care / fostered / adopted). The transition probabilities (the probability of the various state-changes) in our model will be derived from our data and compared between groups.

The BB:0-2 sample is well characterised (in terms of demographic and clinical data recorded at baseline), and there are detailed records on programme fidelity. We will explore (i) how such variation in adherence to programme fidelity (e.g. dosage) is associated with outcome variation, (ii) how FNP impact varies by participant, practitioner and site characteristics (including individual and site level demographics), (iii) the role of potential moderators of programme effect (e.g. domestic violence). This will be explored by extensions to the primary models including predictive factors (main effects) and interaction terms.

Bias: Bias in the followed-up BB:0-2 sample will be quantified by examining group differences (participants and non-participants) in baseline variables such as age, deprivation, gestational age, and education. Surveillance bias in detection of maltreatment during the child's infancy and toddlerhood can be assessed by examining subsequent reporting(32). The duration between birth and the date of first referral to CSC will be calculated and group differences examined using Cox regression analysis to calculate hazard ratios for referral, together with 95% confidence intervals. Surveillance bias is most likely to occur during the intervention phase, although improved handover to other services at 2 years may lead to

higher identification in the following year. Severity of the referral will also be compared between the two groups (an approach used in US trials of NFP to explore surveillance bias).

16.1.1 Sub-group & interim analysis

Sub-group analysis is an investigation of whether any between-arm effects are different according to site or some characteristic measured at baseline. Variables to be used as a basis for sub-group analyses will be: Deprivation, adaptive functioning, NEET status and age. These variables will be prioritised as a priori sub-group analyses. Other variables included for examination as exploratory analyses will be self-efficacy, subjective social status, social support. These data will be sourced from the original trial dataset. The role domestic violence as a mediator will be explored in analysis. No interim analysis is planned.

16.2 Qualitative analysis

N/A

16.3 Cost effectiveness analysis

Economic evaluation: will consider costs and consequences of the FNP over the full follow-up period (BB:0-2 & BB:2-6). The current BB:0-2 study includes 1) a within trial cost utility analysis assessing NHS costs against quality adjusted life years (QALY) , 2) a within trial cost consequences analysis relating all costs (including those to the social care, education and criminal justice sectors as well as health) against the full range of effects and 3) long term modelling (lifetime of child) of costs and effects using data linking short term outcomes and long term costs and effects gleaned from a systematic review supplemented with expert views and collected from a variety of sources.

The absence of longer term data on Health Related Quality of Life means that it will not be possible to estimate longer term QALYs and hence extend the within trial cost utility analysis. However, the within trial cost consequences analysis will be extended from 0-2 to 0-6 years through collection of resource use data from medical and education records (including from the latter data related to social care usage). This will also improve the validity of the BB: 0-2-lifetime model by replacing predicted resource use values with actual data for years 3 – 6. Moreover, the nature of the data collected during the extended period will allow the long-term model to include additional predictors and hence produce more robust long-term estimates of costs and effects.

16.4 Data storage & retention

Outcome data is being abstracted from medical records, in particular to monitor health resource utilisation, and health of mother and child. All data will be anonymised when extracted and linked via ID codes.

All data will be kept for 15 years in line with Cardiff University's Research Governance Framework Regulations for clinical research. This data will be stored confidentially on password protected servers maintained under formally contracted arrangements at Swansea University's Health Informatics Research Unit (via the SAIL research platform). Data provided by external organisations (HSCIC, DoH, DfE) will be managed in accordance with their requirements for data usage.

17 Trial/study closure

The end of the trial will be considered as the date on which data has been extracted for the last participant on their 6th birthday.

18 Regulatory issues

18.1 Ethical and research governance approval

The study will be conducted in accordance with the recommendations for physicians involved in research on human participants adopted by the 18th World Medical Assembly, Helsinki 1964 and later revisions (most recently October 2013).

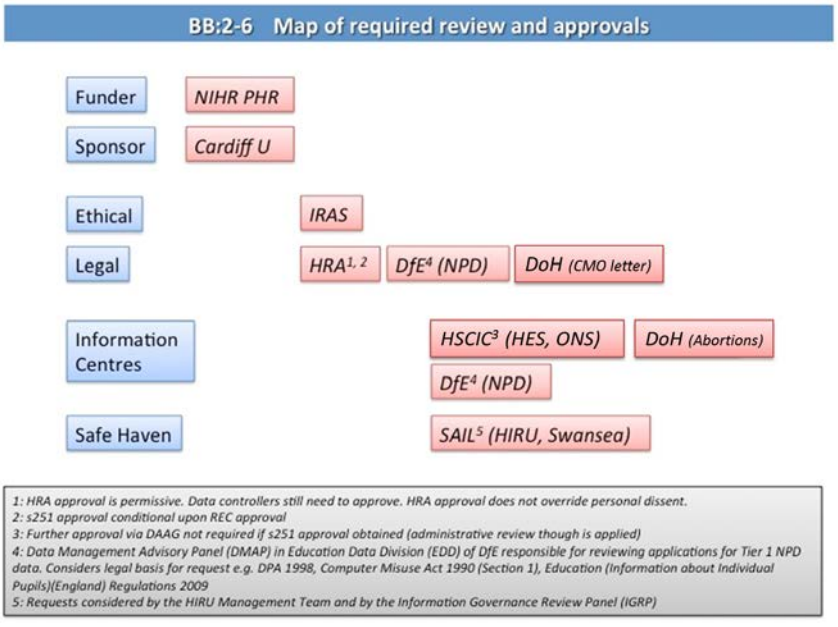
Participants are currently enrolled in BB:0-2 and have provided consent for follow-up until their first child is aged 2. We will seek approval to use data legally held by the research team to enable linkage to health and social care data in existing records to form a linked anonymous research database. This would require section 251 approval from the Health Research Authority's Confidentiality Advisory Group (CAG). The CAG is the independent statutory body established to monitor information governance in health and adult social care. The CAG reviews and advises the Secretary of State upon requests to access confidential patient data under section 251 of the NHS Act 2006 (which allows identifiable patient information to be used without consent in specific circumstances). Approval for non-consented access to medical records is required in order to obtain an unbiased estimate of the long-term effect of FNP on objective and associated maltreatment. The rationale for this is: i) participants have previously agreed to long-term follow-up in the trial, ii) there is no on-

going intervention to which the women or their children will be subject, iii) the child protection focus of the study and the consequent sensitivity in asking directly for consent, iv) the mobility and relative difficulty in on-going direct access to this sample, v) the consequent introduction of non-ascertainment bias on sample representativeness, vi) the cost and logistical requirements of securing high levels of additional consent. Establishing the linked anonymous research database in HIRU (Swansea University) minimises the risk of individuals being identified in the analysis of linked data sets. For data to be sourced via the DfE, the Data Management Advisory Panel (DMAP) in the Department's Education Data Division (EDD) is responsible for reviewing and approving access request to the NPD.

Under regulation 5(e) of the Abortion Regulations 1991, patient level data may be released in a controlled manner "for the purposes of bona fide scientific research", subject to the Chief Medical Officer's (CMO) agreement and the receipt of a completed and signed confidentiality agreement. A data request will be submitted to the Department of Health (DoH) and a letter written to the CMO requesting patient-level data for the purpose of this project. The letter will detail how the data will be linked, how it will be kept secure and how it will be used in the statistical analysis. Ethical approval and s251 support letter allowing the access and linkage will also be evidenced.

Additional local procedures (e.g. named access control) adapting existing standard operating procedures (SOPs) in Cardiff will enforce this and follow guidance from colleagues at the Health Informatics Research Unit, Swansea who have innovated in this area(33). We will model the data management pathway in line with the requirements of NIGB, including review and reporting arrangements, to construct project specific SOPs to preserve patient confidentiality and minimise potential breaches.

A summary of the required review and approvals is provided (right):



Consent

Participants previously consented to enter into the BB:0-2 trial and have their data follow-up for two years. In order to obtain an unbiased estimate of the long-term effect of FNP on objective and associated maltreatment outcomes we will apply to the HRA CAG for approval to link datasets using patient identifiable data to produce an anonymised research database. Individuals expressing their dissent to the linkage will not be included in the research database. We have discussed the issue of dissent and fair processing with the HRA and we plan to write to participants and inform them of our intention to conduct follow-on research which will make use of their anonymised routine collected data. The wording of this correspondence will be agreed with a young peoples research advisory group to ensure that this intention to conduct follow-on research is communicated in a sensitive manner. The letter will include contact details should participants have concern or wish to dissent from the use of their data for research purposes. We will also supply a URL to a webpage containing more details of the planned follow-on study.

Within this population, there are 110 individuals whose birth outcome and current status is currently unknown. Contacting individuals who are not eligible for follow up (mothers whose pregnancy did not result in a child, if the child was subsequently adopted, has died or the mother has died) could result in considerable distress. Therefore, we will need to trace these individuals to confirm their birth outcome and current status to confirm eligibility for this study. We propose doing this prior to contacting these 110 individuals as well as amending the current letter to acknowledge that they did not complete the whole trial.

See Appendix I and II for the flow chart that describes eligibility for this study and the process in which personal identifiers will be used.

18.2 Confidentiality

All data will be anonymised when extracted and linked via ID codes. The Chief Investigator and the research team will preserve the confidentiality of participants in accordance with the Data Protection Act 1998.

18.3 Indemnity

Cardiff University will provide indemnity and compensation in the event of a claim by, or on behalf of participants, for negligent harm as a result of the study design and/or in respect of the protocol authors/research team. Cardiff University does not provide compensation for non-negligent harm.

18.4 Study sponsorship

Cardiff University will act as sponsor for study. Delegated responsibilities will be assigned to the other HEIs participating as collaborators in this study.

18.5 Funding

The funder for this study is the NIHR Public Health Research (NIHR PHR) programme.

18.6 Audits & inspections

The study is subject to inspection by the NIHR-PHR as the funding organisation. The study may also be participant to inspection and audit by SEWTU, by Cardiff University under their remit as sponsor and by organisations who may act as data providers under the terms of the relevant governance approvals.

19 Study/trial management

A study management group formed of the investigators and employed researchers will be responsible for the day-to-day running of the study. Whilst meeting frequency will vary over the course of the study according to the phase, meetings will be no less than every three months. Meeting agendas will also reflect the contemporary study requirements. The management group will follow standard SEWTU operating procedures. A project team comprised of the Chief Investigator and contract research staff will meet weekly.

20 Data monitoring & quality assurance

A data management plan will incorporate and document quality assurance procedures required at each applicable stage of data linkage and management.

20.1 SSC (Study Steering Committee)

A Study Steering Committee will oversee the study and comprise an independent Chair and provide reports to the study Sponsor. The SSC will be constituted and be managed in line with SEWTU standard operating procedures, and its members will be required to sign up to the remit and conditions as set out in the SSC Charter.

20.2 DMC (Data Monitoring Committee)

Not applicable.

21 Publication policy

All publications and presentations relating to the study will be authorised by the Study Management Group. A study publication plan will be drafted and maintained in line with standard procedures.

22 Milestones

Period	***Milestone***	***Start date***	***End date***
Pre-funding	Participants exit BB trial at 24 months	Nov 2011	Mar 2013
Funded	Develop full protocol	Oct 2013	Dec 2013
	Submit NHS REC, HRA application	Jan 2014	Jan 2014
	Submit applications to HSCIC HES, NPD, SAIL	Feb 2014	Mar 2014
	Develop clinical database system	May 2014	Jul 2014
	Retrieve wave 1 data (HES, NPD)	Oct 2014	Oct 2014
	Pilot analysis	Oct 2014	May 2015
	Retrieve wave 2 data (HES, NPD)	Oct 2017	Oct 2017
	Final analysis (HES, NPD)	Oct 2017	Mar 2018
	Prepare final study report	Jan 2018	May 2018

23 References

1. Leeb RT, Paulozzi LJ, Melanson C, Simon TR, Arias I. Child maltreatment surveillance: uniform definitions for public health and recommended data elements. Altanta, Georgia: 2008 Contract No.: Version 1.
2. Department for Children Schools and Families. Working together to safeguard children: A guide to inter-agency working to safeguard and promote the welfare of children. 2010.
3. Department for Education. Children in Need in England, including their characteristics and further information on children who were subject of a child protection plan (Children in Need Census - Final) year ending 31 March 2010. London: Department for Education, 2010 Contract No.: OSR28/2010.
4. MacMillan HL, Munn C. The sequelae of child maltreatment. Current Opinions in Psychiatry. 2001;14(4):325-31.
5. Moffitt TE. Teen-aged mothers in contemporary Britain. Journal of child Psychology and Psychiatry. 2002;43(6).
6. Botting B, Rosato M, Wood R. Teenage mothers and the health of their children. Population Trends. 1998;93.
7. Gonzalez A, MacMillan HL. Preventing child maltreatment: an evidence-based update. Journal of Postgraduate Medicine. 2008;54:280-6.
8. Stier DM, Leventhal JM, Berg AT, Johnson L, Mezger J. Are children born to young mothers at increased risk of maltreatment? Pediatrics. 1993;91:642-7.
9. MacMillan HL, MacMillan JH, Offord DR, Griffith L, MacMillan A. Primary prevention of Child Physical Abuse and Neglect: A Critical Review. Part I. Journal of Child Psychology and Psychiatry. 1994;35(5):835-56.
10. Olds DL, Hill PL, O'Brien R, Racine D, Moritz P. Taking preventive intervention to scale: The nurse-family partnership. Cognitive and Behavioral Practice. 2003;10(4):278-90.
11. MacMillan HL, Wathen CN, Barlow J, Fergusson DM, Leventhal JM, Taussig HN. Interventions to prevent child maltreatment and associated impairment. The Lancet. 2009;373:250-66.
12. Olds DL, Henderson CRJ, Chamberlin R, Tatelbaum R. Preventing Child Abuse and Neglect: A Randomized Trial of Nurse Home Visitation. Pediatrics. 1986;78(1).
13. Olds D, Henderson CRJ, Kitzman H, Cole R. Effects of Prenatal and Infancy Nurse Home Visitation on Surveillance of Child Maltreatment. Pediatrics. 1995;95(3).
14. Olds DL, Eckenrode J, Henderson CR, Kitzman H, Powers J, Cole R, et al. Long-term effects of home visitation on maternal life course and child abuse and neglect - Fifteen-

year follow-up of a randomized trial. Jama-Journal of the American Medical Association. 1997;278(8):637-43.

15. Barnes J. Nurse-Family Partnership Implementation Evaluation. [cited 2011]; Available from: http://www.iscfsi.bbk.ac.uk/projects/nurse-family-partnership-implementation-evaluation.

16. Robling M. Evaluating the Family Nurse Partnership in England: a randomised controlled trial. ISRCTN entry for Building Blocks Trial]. Available from: http://www.controlled-trials.com/ISRCTN23019866.

17. Social Exclusion Task Force. Reaching Out: Think Family Analysis and themes from the Families At Risk Review. In: Office C, editor. 2007.

18. Bowlby J. Attachment and Loss1982.

19. Bronfenbrenner U. The ecology of human development: experiments by nature and design: Harvard University Press; 1979.

20. Bandura A. Self-efficacy: Toward a Unifying Theory of Behavioural Change. Psychological Review. 1977;84(2).

21. Olds DL, Henderson CRJ, Kitzman H. Does Prenatal and Infancy Home Visitation Have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25 to 50 Months of Life? Pediatrics. 1994;93(1).

22. Kitzman H, Olds DL, Henderson CR, Hanks C, Cole R, Tatelbaum R, et al. Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing trial - A randomized controlled trial. Jama-Journal of the American Medical Association. 1997;278(8):644-52.

23. Olds DL, Robinson J, O'Brien R, Luckey DW, Pettitt LM, Henderson CR, et al. Home visiting by paraprofessionals and by nurses: A randomized, controlled trial. Pediatrics. 2002;110(3):486-96.

24. Lyons RA, Jones KH, John G, Brooks CJ, Verplancke J-P, Ford D, et al. The SAIL databank: linking multiple health and social care datasets. BMC Medical Informatics and Decision Making. 2009;9:3.

25. Barlow J, Johnston I, Kendrick D, Polnay L, Stewart-Brown S. Individual and group-based parenting programmes for the treatment of physcal child abuse and neglect. Cochrane Database of Systematic Reviews. 2006;Issue 3(Art. No.: CD005463).

26. Skowron E, Reinemann DHS. Effectiveness of psychological interventions for child maltreatment: a meta-analysis. Psychotherapy: Theory, Research, Practice, Training. 2005;42(1):52-71.

27. MacLeod J, Nelson G. Programs for the promotion of family wellness and the prevention of child maltreatment: a meta-analytic review. Child Abuse & Neglect. 2000;24(9):1127-49.

28. González-Izquierdo A, Woodman J, Copley L, van der Meulen J, Brandon M, Hodes D, et al. Variation in recordings of child maltreatment in adminstrative records of hospital admissions for injury in England, 1997-2009. Archives of Disease in Childhood. 2010;95:918-25.

29. Gilbert R, Kemp A, Thoburn J, Sidebotham P, Radford L, Glaser D, et al. Child Maltreatment 2: Recognising and responding to child maltreatment. The Lancet. 2009;373:167-80.

30. Hegarty K. Composite Abuse Scale Manual. Melbourne: Department of General Practice, University of Melbourne, 2007.

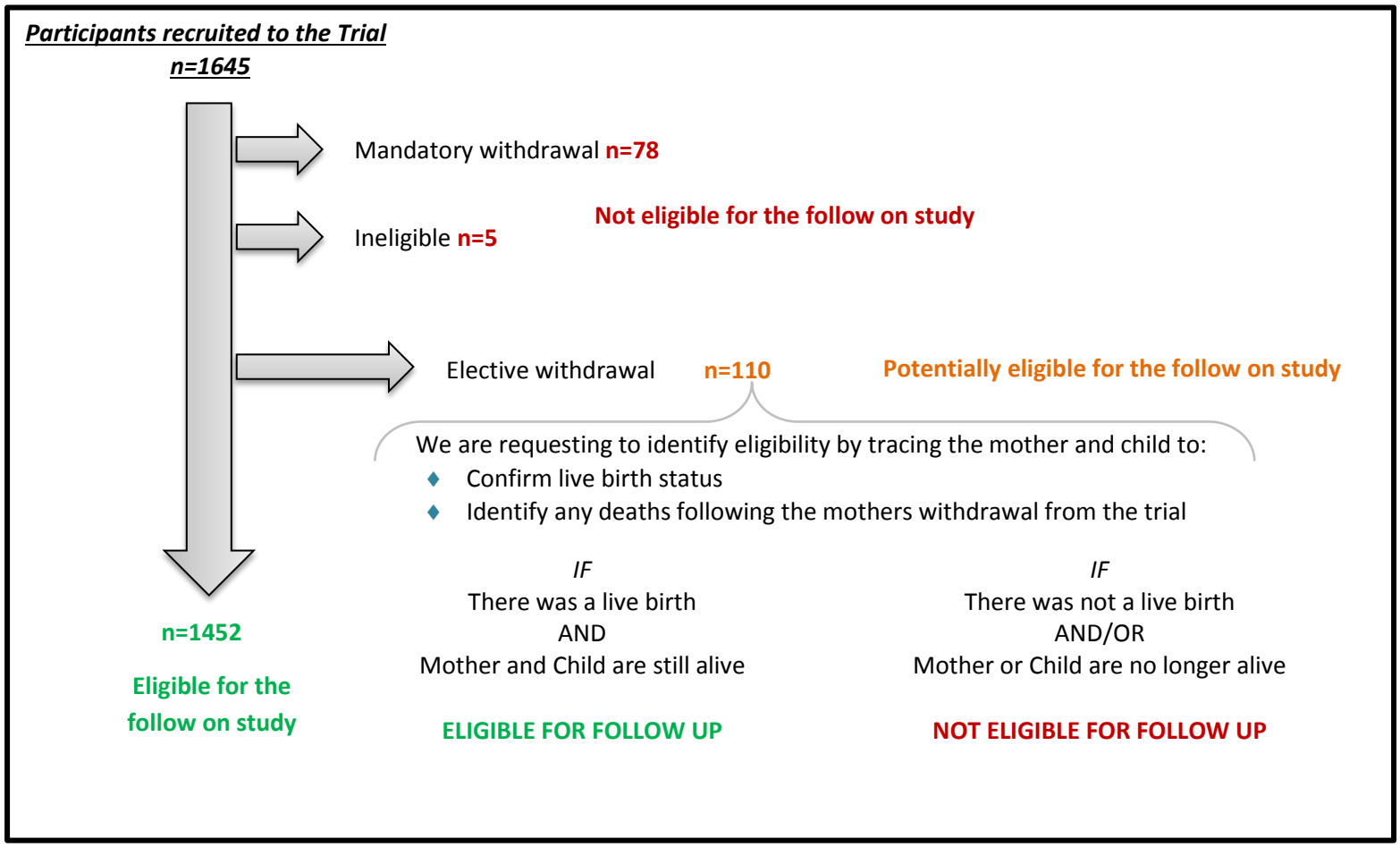
31. Meyn SP, Tweedie RL. Markov Chains and Stochastic Stability. Second Edition ed. Cambridge: Cambridge University Press; 2008.

32. Chaffin M, Bard D. Impact of intervention surveillance bias on analyses of child welfare report outcomes. Child maltreatment. 2006;11(4):301-12.

33. Ford D, Jones KH, Verplancke J-P, Lyons RA, John G, Brown G, et al. The SAIL Databank: building a national architecture for e-health research and evaluation. BMC Health Services Research. 2009;9:157.

34. The Association of Directors of Children's Services Ltd. [cited 2011]; ADCS website]. Available from: http://www.adcs.org.uk/research/research-guidelines.html

24 Appendices – Appendix I



Appendix II – Flowchart for tracing details of withdrawn participants in order to contact them about BB:2-6.