Celebrate and Protect: A mixed methods evaluation

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Centre for Healthcare Improvement and Research

Foreword

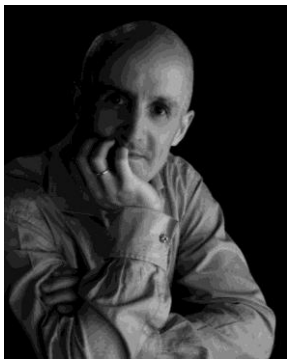
"NHS England, as commissioners of immunisations wish to commend this report. For many years immunisation providers have understood the benefits of reminding busy parents when their child's jabs are due - especially given the complexity of some regimes. The gifting of a card is one such reminder and this report evaluates this.

It is worth noting that this project was delivered during a period of unprecedented transformation within the NHS including changes to the immunisation regimes, a reduction in the commissioning system capacity and efficiencies in the NHS resources, amongst others.

To what extent these might have affected outcomes, we may not fully understand through this evaluation since the health benefits of immunisations may not be known for several years, if not decades.

Notwithstanding these transformation matters, all those delivering this programme are to be congratulated on their energy and enthusiasm for delivering this patient-centric programme which attempted to protect children, families and communities.

We would remind the reader of the World Health Organisation statement that, apart from clean water, vaccinations are the most important intervention we can give children to protect them."



Kenny Gibson

Head of Early Years, Immunisations and Military Health,
NHS England - London Region

Celebrate and Protect Evaluation

1 Executive Summary

'Celebrate and Protect' has been an innovative partnership between the NHS, Local Government and Sanofi Pasteur MSD to promote the uptake of childhood vaccinations across a number of areas of London between April 2012 and April 2014. The programme was intended as a 'call to action' for both parents/carers and healthcare professionals to ensure that children in London continue to receive vaccinations according to the Department of Health schedule to prevent future incidence of vaccine-preventable disease.

The evaluation of the Wave One pilot was commissioned by NHS Barking and Dagenham, as the lead organisation on behalf of the partners, and aimed to assess the suitability, feasibility and acceptability of the programme across a range of stakeholders including strategic leads, healthcare professionals and parents/carers. The evaluation also aimed to provide key learning for the development of similar future programmes and also to inform any future roll-out across London. In addition, the quantitative component of the evaluation intended to provide a preliminary indication of the effectiveness of the programme to improve vaccination uptake and provide suggestions for potential future evaluations of impact.

The Celebrate and Protect programme has demonstrated a clear and transparent approach to partnering with the pharmaceutical industry, and a range of NHS and local authority organisations to develop and deliver solutions to improve the health and wellbeing of Londoners.

Whilst the quantitative evaluation was unable to demonstrate an impact on the uptake of vaccination attributable to the Celebrate and Protect programme, the qualitative evaluation has clearly demonstrated the high-level of buy-in and support the programme has received from both parents/carers and primary care staff.

Celebrate and Protect has been a partnership between the NHS, Local Government and Sanofi Pasteur MSD.

NHS Barking and Dagenham contracted the evaluation work on behalf of the partners. Sanofi Pasteur MSD has had no involvement in the focus groups, contact with parents/carers or access to any practice-level data, but has reviewed the document for accuracy.

2 Background and purpose

2.1 Background

Vaccination is a public health intervention that has demonstrably reduced the global burden of disease and furthermore, ensuring comprehensive coverage, can reduce health inequalities (Andre, Booy, Bock, *et al.*, 2008). There are three main types of vaccination: childhood vaccination, adult vaccination and travel vaccination. Childhood vaccination results in individual immunisation to a range of diseases but also provides a level of indirect protection to the community when uptake is sufficiently high (Fine, Eames & Heymann, 2011). In the UK, childhood vaccinations are administered according the national schedule set out by the Department of Health (DH) (Table 1). Childhood vaccination is part of the GP contract, with payment linked to performance, which up until 2013 was locally overseen within each primary care trust (PCT) by the District Immunisation Committee (DIC).

When to immunise	**What vaccine is given**	**How it is given**
Two months old	Diphtheria, tetanus, pertussis, polio and Hib (DTaP/IPV/Hib) Pneumococcal conjugate (PCV) *Rotavirus **	One injection One injection *One oral application*
Three months old	Diphtheria, tetanus, pertussis, polio and Hib (DTaP/IPV/Hib) Meningococcal C conjugate (MenC)** *Rotavirus**	One injection One injection *One oral application*
Four months old	Diphtheria, tetanus, pertussis, polio and Hib (DTaP/IPV/Hib) Pneumococcal conjugate (PCV)	One injection One injection
Between 12 and 13 months of age (i.e. within a month of the first birthday)	Hib/MenC conjugate Pneumococcal conjugate (PCV) Measles, mumps and rubella (MMR)	One injection One injection One injection
Two years to less than 17 years old, annually	Influenza	Nasal spray, single application in each nostril annually
Three years four months old or soon after	Diphtheria, tetanus, pertussis and polio (DTaP/IPV or dTaP/IPV) Measles, mumps and rubella (MMR)	One injection One injection

Table 1: Immunisation schedule for children (Public Health England, 2013) * Rotavirus was introduced in 2014 and thus not included in the programme schedule. ** One, not two doses of Men C are now given to children under one years of age.

2.2 Vaccination targets

Current estimates suggest that vaccination coverage needs to reach 95% to ensure herd immunity, a standard adopted by the World Health Organisation (WHO). Historically, performance in immunisation uptake in London is variable and despite recent improvements many areas still perform below this target. With more than 350,000 children under the age of 5 eligible for vaccination in a single year (366,715 in 2010-11) ensuring 95% of this population is vaccinated remains a logistical challenge. Cover of Vaccination Evaluated Rapidly (COVER) is a national programme, now managed by Public Health England (PHE), which collates vaccination uptake data for each PCT[1] (Appendix 1). COVER indicators are generated from data extracted from the Child Health Information System (CHIS) and reported centrally. When reported at PCT level these indicators also include children that are not registered with a GP but reside within the PCT boundary. Indicators for childhood vaccination are generated for three cohorts based on the age of the child during the quarter reported: 12-months, 24 months and 5 years (Table 2), explained further in Appendix 2.

Age of cohort covered	**Indicator**	***London Average from COVER data (2010-11)***
12 months	Number of children	129,587
(≤12 months)	*DTaP/IPV/Hib%*	*89.8%*
	MenC2%	*88.5%*
	PCV2%	88.7*%*
	Neonatal hepatitis B vaccine coverage	80.5*%*
24 months	Number of Children	125,635
(>12 - ≤24 months)	DTaP/IPV/Hib%	92.2*%*
	MenC%	89.7*%*
	PCV Booster%	83.1*%*
	Hib/MenC%	*83.3%*
	MMR%	*82.3%*
5 years	Number of Children	111,493
(> 24 months - ≤5 years)	DT/Pol – Primary	90.1*%*
	Hib – Primary	90.1*%*
	MenC - Primary	85.9*%*
	MMR - 1st dose	*87.6%*
	MMR - 2nd dose	*74.7%*
	DTaP/IPV - Booster	73.5*%*
	Hib/MenC – Booster	60.2*%*

Table 2: COVER performance data at PCT level, collated centrally by PHE

[1] We refer to Primary Care Trusts (PCTs) throughout the report as this reflects the organisational arrangements in place in 2010/11 and when the Celebrate and Protect project commenced

2.3 Celebrate & Protect Programme Overview

NHS Barking and Dagenham, on behalf of a number of the Olympic and Paralympic Host Boroughs, in partnership with Sanofi Pasteur MSD (SPMSD), a vaccine manufacturer, developed the *Celebrate and Protect* initiative in 2012. The programme, as part of a wider Olympic and Paralympic Host Borough health legacy programme, aimed to increase uptake of childhood vaccination, by supplementing current GP practices' current call/recall activities. The programme also aimed to improve engagement between families and GP practices when children are at an early age. The intervention utilised within the programme consisted of a celebration card and immunisation schedule, sent out by the GP practice staff to families of children before their vaccination was scheduled. The celebration card was intended to act as a 'call to action' for the parents/carers of the child and augment the current call/recall system used by GP practices to promote uptake of vaccination. The first wave of the programme was initiated in July 2012 in nine London PCTs: Barking & Dagenham, Bexley, Greenwich, Kensington & Chelsea, Hammersmith & Fulham, Newham, Tower Hamlets, Waltham Forest and Westminster (Figure 1). This initial wave was intended to assess the feasibility and acceptability of the programme through engaging with a range of stakeholders and for iterative development of the intervention to allow a tailored roll-out across additional PCTs in London and possibly further afield through a phased approach (Appendix 3). During the first wave, practices across the PCTs were contacted and asked to participate with the aim of achieving 50% coverage. Across the nine PCTs included in the first wave, 66.3% (n=177) of GP practices were recruited, ranging from 42-100% of practices in some PCTs (Table 3).

Aims of the programme:

- Increase childhood immunisation uptake, especially MMR (1st and 2nd doses)
- Increase attendance for the 6 to 8wk check in primary care
- Provide an independent evaluation of the birthday card methodology at a population scale
- Provide key learning for scaling up best practice interventions across boundaries in London

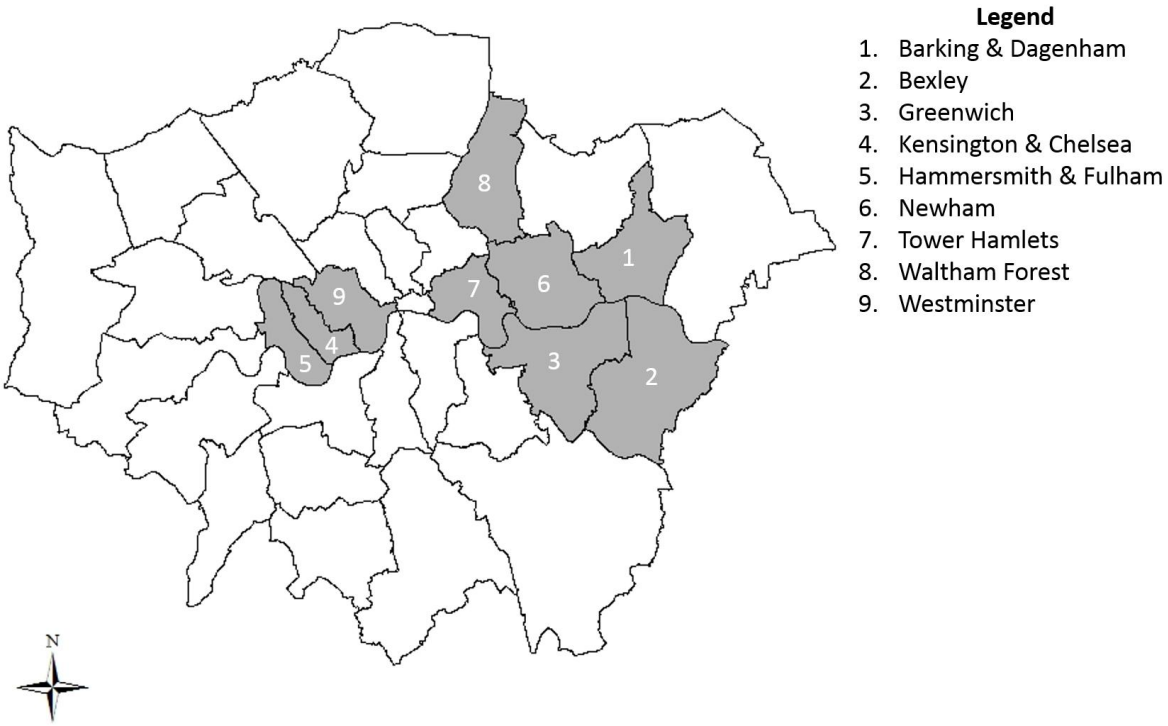


Figure 1: PCTs in in the first wave of the Celebrate and Protect programme were Barking & Dagenham, Bexley, Greenwich, Kensington & Chelsea, Hammersmith & Fulham, Newham, Tower Hamlets, Waltham Forest and Westminster

PCT	Total number of practices	Number of practices in first wave	Percentage of practices in first wave (%)
Barking & Dagenham	43	43	100.0
Bexley	28	14	50.0
Greenwich	45	28	62.2
Hammersmith & Fulham	31	13	41.9
Kensington and Chelsea	54	24	44.4
Newham	19	13	68.4
Tower Hamlets	15	14	93.3
Waltham Forest	14	12	85.7
Westminster	37	18	48.6
Total	286	179	66.1

Table 3: Percentage of GP practices recruited to the first wave of Celebrate & Protect programme initiated across the nine PCTs.

3 Evaluation rationale

3.1 Stakeholder identification and engagement

NHS Barking and Dagenham commissioned the evaluation on behalf of the partners to assess the suitability, feasibility and acceptability of the programme and provide key learning for scaling up the interventions and for the development of future interventions. The evaluation also aimed to provide a preliminary indication of the effectiveness of the programme to improve vaccination uptake and provide suggestions for potential further evaluations of effectiveness of the programme across further PCTs recruited in additional waves of the programme. Engagement of a range of stakeholders was sought including strategic leads across the PCTs, the programme management team, which included Sanofi Pasteur MSD (Appendix 4), healthcare professionals and other primary care staff responsible for delivering the intervention and parents/carers of children under 5, as potential recipients of the intervention.

3.2 Programme description

The Celebrate and Protect programme was comprised of an intervention that acted as a 'call to action' for parents/carers of children under five to schedule and attend a 6-8 week check (infants) and vaccinations (one year olds and four year olds) with their GP surgery. The intervention, which was a personalised celebration card and an information leaflet with a vaccination schedule, was developed through a co-production approach with parents/carers. Workshops were held with parents/carers of children to assess the response to the potential range of themes and select a central character and inclusion of London landmarks. Following the training sessions provided for practices nurses and practice managers, the celebration cards were delivered to practices. The cards were subsequently sent out by the GP practice to parents/carers registered at the practice following the birth of a child, or prior to the first or fourth birthday of a child registered at the practice. The card intended to celebrate the birth of a child or a child's birthday and act as a call to action for the parent /guardian to contact the practice and book a vaccination or health check, as summarised by the Action Effect Diagram that outlines the programme theory in Figure 2 (Reed, McNicholas, Woodcock, *et al.*, 2014).

Figure 2: Action Effect Diagram describing the anticipated link between the celebration cards and vaccinations and the aim of reducing future incidence of disease

The programme management team arranged for an appropriate number of celebration cards and pre-franked (second class postage) envelopes to be dispatched to the individual GP practices according to the number of registered children within each cohort, plus a 5% uplift. The practice staff were required to attach practice contact information to the card and patient information (name and address) to the card and envelope, which was then sent via the regular postal service. The original design of the cards included landmarks from East London associated with the Olympic and Paralympic games, as the initiative was part of the Olympic and Paralympic Host Borough health legacy programme. In addition, the celebration cards included a statement on the back regarding partnership between the NHS and Sanofi Pasteur MSD.

The card for infants included a message inviting parents/carers to make an appointment with the surgery to come and discuss any issues they had with the baby and for the baby to be examined, at which time it is usual for babies to receive their first set of vaccinations (Figure 3). Cards distributed within PCTs that had a universal Tuberculosis (TB) vaccination programme (i.e. incidence of TB greater than 40/100,000) included an additional message for parents to make an appointment for TB vaccination (London Health Programmes, 2013).

Birthday cards for one year olds included messages that the child's vaccinations were due and to contact the GP surgery to make an appointment (Figures 4). Birthday cards sent to the four year olds also had a message to contact their GP surgery to make an appointment (Figure 5). However, this card was only sent to those children who had not yet received their immunisations, so this card acted as a failsafe The cards also contained information signposting parents/carers to the 'Red Book', the Personal Child Health Record which is a national standard health and development record given to parents/carers at a child's birth, and www.immunisation.nhs.uk, along with an insert with information about the schedule of vaccination, as recommended by the DH (Figure 6).

Figure 3: New Arrival celebration card containing the following information: "You and your baby are invited to come and see us for a six-eight week check up to make sure you are both doing well. You just need to give us a ring at the surgery if you don't already have an appointment, and we will book one for you. The six-eight week check-up is a chance for you to talk to us about any issues or concerns you have. It also gives us a chance to examine your baby and make sure they are doing well. We understand that a few problems might occur in the first few weeks, so if you feel like you need any advice contact the surgery or speak to your health visitor for some extra support." In those areas where the universal TB screening programme was in place the following additional information was provided: "Look out for the letter about your baby's TB vaccination appointment. If you've missed the appointment please give the surgery a call to find out how you can rearrange with us or the local immunisation team."

Figure 4: First birthday celebration card containing the following information: "Now that your baby is turning one, it is time for their next set of immunisations. You just need to give us a call at the surgery to make an appointment with the nurse so that you can keep your baby healthy and protected. We look forward to seeing you both very soon. To find out more about the immunisations your baby will be having visit www.immunisation.nhs.uk or look for the immunisation page in your Red Book. If your baby has missed any earlier immunisations you can have a chat with the nurse about how you can catch up on these."

Figure 5: Fourth birthday celebration card containing the following information: "A little bird told us that you're turning 4! We all wanted to say a big happy birthday and remind whoever looks after you that it's time for you to come and see us for your next set of immunisations. These will protect you for when you start school and meet new friends. We look forward to seeing you soon. Give us a call at the surgery to make an appointment with the nurse. If you've missed any earlier immunisations the nurse can explain how you can catch up on these. If you'd like to find out more about the immunisations your child will be having there's lots more information at www.immunisation.nhs.uk. or look for the immunisation page in your Red Book"

Figure 6: Vaccination schedule in operation during Wave 1 (2012/13). This schedule has since been updated as shown in Table 1.

3.3 Aims and objectives of the evaluation

The evaluation aimed to:

1 Assess the delivery of wave one of the Celebrate and Protect programme

2 Evaluate the effect of wave one of the Celebrate and Protect programme on the uptake of childhood vaccinations

3 Identify ways of scaling up health improvement initiatives, particularly where there is no regional or national mandate

These aims were achieved through:

1.1 A qualitative review of the process involved in delivering the Celebrate and Protect programme through interviews with primary care staff responsible for vaccinations

1.2 Focus groups with parents of vaccination-age children to gauge opinion on aspects of the programme

2.1 A quantitative analysis of key indicators of childhood vaccination comparing aggregate data for practices recruited to the Celebrate and Protect programme and those practices not participating

3.1 A qualitative review of the setup and management of the Celebrate and Protect programme through interviews with strategic, commissioning or policy leads, including the Celebrate and Protect programme management group

4 Evaluation methods

4.1 Design

The evaluation utilises a mixed methods approach and included summative and formative components. The summative evaluation provided some feedback to the programme management team at the end of the Wave One pilot to offer some learning for the development of the roll-out strategies for waves two and three and the post-partnership 'local offer'. The formative evaluation consisted of both a rigorous qualitative analysis following stakeholder interviews/focus groups and a quantitative analysis of the outcomes of the programme i.e. uptake of vaccination using six indicators identified *a priori*.

4.2 Qualitative Analysis

4.2.1 Sampling procedure

Sample groups were identified to include stakeholders at three different levels: strategic, commissioning or policy leads along with the programme management team (including SPMSD stakeholders); providers including healthcare professionals and primary care teams delivering vaccinations, as potential or actual users of the intervention; parents/carers of children under five, as potential recipients of the intervention. A total of 56 respondents were included in the study, representing 16 strategic leads/programme management team, nine providers and 31 parents/carers. Cumulatively, respondents were affiliated to six of the nine PCTs involved in Wave One of the Celebrate and Protect programme (Table 4).

Group	Data collection	Grouping	Participants
1	Telephone interviews	Strategic, commissioning or policy leads along with the programme management team	Immunisation co-ordinators (n=5), public health consultants (n=3), senior public health managers (n=5) and industry stakeholders (n=2)
2	Telephone interviews	Primary care staff	PCT immunisation co-coordinators (n=9). Participants included administrators (n=2), managers (n=4), GP (n=1) and nursing staff (n=2)
3	Focus Groups	Parents/carers of children under 5	31 parents/carers

Table 4: Outline of participants included in the qualitative study

Group one, comprised of the strategic, commissioning or policy leads along with the programme management team, was a purposive sample identified from the broader stakeholder group (n=16). Participants included immunisation co-ordinators (n=5), public health consultants (n=3), senior public health managers (n=5) and industry stakeholders (n=2).

Group two participants were recruited by canvassing 40 (24%) GP practices involved in wave one via emails from the PCT immunisation co-coordinators (n=9). Participants included administrators (n=2), managers (n=4), GP (n=1) and nursing staff (n=2).

Group three, parents/carers of children under five, were recruited via the PCT immunisation co-ordinators with the aim of identifying 2-3 participants from each PCT (n=31). Participants were reimbursed travel expenses and provided with a £20 high street store voucher. Participants were of diverse ethnic make-up (including Korean, Somali, east European), and from a range of economics and educational backgrounds. Of the focus group participants 13% (n=4) were resident in areas where the Celebrate and Protect programme was not active at that time but had links with areas where Celebrate and Protect was active, either through work or social ties.

4.2.2 Data collection procedure

Semi-structured telephone Interviews were undertaken with all participants in Group One by a member of the evaluation team (NT). Semi-structured telephone Interviews were undertaken with all participants in Group Two by a member of the evaluation team (NT). A total of three focus groups were conducted in three locations: east, south east and northwest London, between October 2012 and February 2013, attracting a total of 31 parents/carers (3 - east, 18 - northwest and 10-southeast). The focus groups were facilitated by a member of the evaluation team (NT) and discussions were led by a topic guide.

4.2.3 Analysis

Proceedings from focus groups and interviews were audio-recorded (where possible) with the consent of participants, transcribed by a project administrator, and validated by two evaluation team members. Transcripts and field notes from all interviews and focus groups were thematically analysed by the evaluation consultant (SL) using the Johnson and Sholes suitability, acceptability and feasibility framework (Johnson, Scholes & Whittington, 2005).

4.2.4 Limitations

Whilst the sampling strategy identified a broad range of parents/carers it may not have specifically targeted the direct beneficiaries of the Celebrate and Protect programme. The recruitment of primary care staff coincided with a busy influenza vaccination season resulting in a lower than expected participation.

4.3 Quantitative Analysis

4.3.1 Sampling procedure

Only three of the nine PCTs involved in the wave one Celebrate and Protect programme were included in the analysis as there was incomplete data at practice level for the other six PCTs, excluding them for analysis. The three PCTs included have been aggregated to anonymise the PCTs involved and prevent interpretation at a PCT level. Data was aggregated to directly compare those practices that were engaged in the Celebrate and Protect programme and those there were not recruited to the programme.

4.3.2 Measures/indicators

Six indicators were selected *a priori* from a potential range of sixteen COVER indicators, as shown in Table 2 (Public Health England, 2014). Indicators are reported quarterly by GP practices for children that have reached the required age for each cohort within the quarter reported. The denominator for indicators for the '12 month cohort' include children registered with the GP practice that reach the age of 1 year during the quarter. This results in a potential 9 month lag for children who have received their vaccinations at 2/3/4 months, as required by the DH schedule. For children within the '24 month cohort' receiving vaccinations at 12 or 13 months they will be reported 12 or 11 months later, during the quarter that they turn 2 years old. Similarly children that are vaccinated when they are 3 years and four month, as required by the schedule, are reported when they turn five, which in effect is an 18 month lag, although within the programme children are only targeted that have still not been vaccinated prior to their 4th birthday, resulting in just a 12 month time lag from when the card is sent out.

4.3.3 Data collection procedure

Whilst COVER data was available from the PHE website for all nine PCTs, as not all practices within each of the PCTs were involved in the Celebrate and Protect programme and due to the inclusion of children not registered with practices within the PCT it was not appropriate to use this data to evaluate the programme. As no bespoke data collection was feasible for the evaluation it was decided that using the COVER indicators provided at a practice level would allow comparison of temporal trends in vaccination uptake and a comparison between practices involved in the Celebrate and Protect programme and those not recruited.

4.3.4 Data processing

Data were collated at practice level for the three PCTs between April 2010 (Q10_1) and March 2013 (Q13_4), representing 16 quarters and aggregated to produce two sets of comparative data for each indicator, Celebrate and Protect practices and non- Celebrate and Protect practices.

4.3.5 Analysis

Aggregate performance indicators from quarterly practice data were used to create charts that allowed comparison between the Celebrate and Protect and non- Celebrate and Protect practices between 2010/11 and 2013/14 (16 quarters).

4.3.6 Limitations

Attribution of the effects of the programme on the outcome measures is difficult to assign for a number of factors. The process of call/recall relies on the complex decision-making process of parents/guardian whether to not to have their child vaccinated. In addition, the structural changes that occurred within organisations that commission, deliver and monitor childhood vaccinations during 2012-13 have undoubtedly had some impact on performance.

5 Results

5.1 Qualitative Analysis

5.1.1 Suitability

Perceived aim of the Celebrate and Protect programme

One possible explanation for the relatively low vaccination coverage in London is the poor uptake of immunisation services by parents/carers. Celebration cards were sent out to parents/carers as a "call to action", to encourage parents/carers receiving the cards to proactively engage with their GP practices in scheduling vaccination for their children. Was this how parents/carers viewed the celebration cards? Responses from the focus groups (and some providers) would seem to indicate that participants' perceptions of the celebration cards was more of a reminder than a call to action. This may be explained by the fact that some parents/carers may already have received a letter from their GP reminding them the time to immunise the children is due, the card in this instance would function as a necessary reminder, following on from the letter.

A suggested way of assessing if vaccination appointments were directly generated through the Celebrate and Protect programme was to ask parents/carers to bring along letters or information that they have received when they attend their child's vaccination appointment. This was emphasised as a number of practices reported that some parents/carers brought in with them the celebration cards when they came "...parents have brought in birthday cards when they come in..."

Views on the content of the celebration cards

Participants in the focus groups were asked to comment on the content of the celebration cards, and whether sufficient information was availed to necessitate them to take action. There was some variation in opinions around the appropriateness or adequacy of the contents within the celebration card. Some participants felt the celebration card did not contain enough information to necessitate action. They felt information on scheduling or why to vaccinate would be useful. Many parents/carers felt that this information was necessary to allay anxieties or fears by groups of parents/carers who may have reservations regarding immunisation. This was countered by the inclusion of scheduling information provided on an insert to be included with the cards. The current content, parents/carers felt, was likely to be effective in prompting action amongst people not opposed to immunisation. Conversely, they may be less effective to those not interested in getting their children immunised.

"...There's nothing on here to say why you should have your baby immunised..." "...Quite dry information, it just gives you the name of the inoculation. I'm not a doctor... Haemophilus influenzae Type B, what does that protect my baby with...?" On the other hand, it was apparent that without including more direct information regarding what actions parents/carers need to take on receiving the card, there would be a risk of parents perceiving the card as a good gesture from practices as opposed to a call for action. "...I think it's a very good idea and it's wonderful, however...I'd presume ....it's just a card, a congratulation card…"

Focus group participants raised suggestions on how the cards could be improved in a way that could potentially sway the minds of those opposed to immunisation: "...put a little bit maybe on the back of there and say, well we could give hemacoccal against meningitis..." "...I think ...explain what some of the diseases that immunisation is trying to protect against..." Participants felt adding a link to credible website would be invaluable "...link, with the added recommendation that you can call your health care professional via telephone on the card...." Or add that "...If you have any questions or concerns please come along or give us a ring..." because "...just think it gives leeway for people who feel a bit insecure and nervous, sort of isolated; it just makes it more robust...the information... it's not just a reminder...you know, if you have any concerns, we'll be happy to speak with you..." And as one of the parents/carers mentioned, "... although I always had the intention to keep up with all the immunisation, I was always a little bit sceptical and worried about immunisation...I would like to be more informed about the [unclear] side effects of the immunisation..."

Perceptions of working with a pharmaceutical company

All categories of respondents expressed opinions to determine whether the strategic choice of working with a pharmaceutical company was suitable and conducive within the current economic and social climate. Most of the respondents were quite welcoming of the idea: "...personally....supportive of this stance....embrace new ways of working ....learn from partners...." while others seemed quite comfortable with the whole idea "does not worry me", "Personally 'don't have an issue", because the "reputation of pharmaco's is changing"...

"couple of years ago...probably would have had more reservations…but now as long as ethical issues are covered as required by DH policy document…..we need to get used to working with private providers". Some respondents could see the outright benefits of the pharmaceutical company in this initiative "without their financial support, taking [Wave One of the Celebrate and Protect programme] forward would be challenging".

"...growing reality...cannot afford purely a PH project as high costs....three times costs for distribution and procurement" "...in the new world .....you want to continue [working] with Sanofi....they will make a corporate social responsibility contribution....". These participants however acknowledged the challenges this arrangement may pose for other individuals "uncomfortable territory for some..."

This level of resistance, respondents noted, was apparent at the beginning of the programme "...we ....met a lot of resistance ... [re] whether it was appropriate to work with a pharmaceutical company...misplaced [concerns]... (Although) DH guidelines....support partnership working with industry.... (there is) local level resistance to engaging with this philosophy..."

Some participants identified potential conflicts of interest as a reason to oppose to working with pharmaceutical companies, although others felt that if SPMSD was really interested in supporting immunisation, then perhaps they could offer more direct support to practices "...why does Sanofi [SPMSD] not provide direct, more practical support ...to GPs..." Consequently, "some practices refused to sign up ... they were worried about patient concerns re: their working with [pharmaceutical] industry..." Some of these concerns were later eased by partnership agreement developed between the NHS and SPMSD and the implementation of processes that ensured ethical partnership working "...on our side [we have the] pharmaceutical code of practice....clear directives re working with partners...transparent set of guidance on both sides..." "But...now...it is very clear.... SPMSD no way connected to decisions regarding purchase of vaccines..."

Asked on their views about the NHS working with a pharmaceutical company, parents/carers were generally okay with the concept as long as necessary approvals and authorisations have been done by the NHS "...If the NHS have approved, then I am okay with it...".

Others however were quite sceptical in view of previously televised broadcasts on unethical activities by some pharmaceutical companies "...I saw on the telly about price fixing with pharmaceutical companies, where they offer GPs incentives to prescribe their product...."

Interest in the intervention from providers and parents/carers

The Celebrate and Protect celebration cards would seem to have created a niche in the immunisation programme. Responses from focus group deliberations indicate a high customer demand for the celebration cards. Prompted to express how they would feel if they were missed out in the celebration card mail out by their respective GPs, most parents/carers responded that they would feel offended or excluded

From the provider perspective, the cards also seemed to be very popular, evidenced by the ability to recruit additional PCTs into the Celebrate and Protect programme, including securing their buy-in and implementation of the scheme. '[Celebrate and Protect] Impressive...' ...12 boroughs [PCTs] signed up....175 practices registered...definitely a starting point...can only go up....parents more aware of imms..."

Retention rates of the pioneering subscribers (77.8%) of the first wave and subsequent sign-up of new PCTs in the second wave can also be an indicative variable. In the first wave, 9 PCTs signed up to the programme, increasing to the inclusion of 15 PCTs by wave 3. The demand for Celebrate and Protect was such that even though some providers were not aware of Celebrate and Protect, they made an instant decision to sign-up when Celebrate and Protect was presented in a meeting they attended.

"I was at a meeting when Celebrate and Protect was presented....helped decision to sign on..." strategic lead that signed up for phase two.

Nevertheless, responses from some strategic leads indicated that, at a micro-level, there were notable variances of GP practices within local authority areas that had signed up to Celebrate and Protect. "...there are practice variances - with some with total buy in and some that do not want to know / do not want any extra workload" (strategic lead from a pioneer PCT). These respondents felt that a demonstration of added value of Celebrate and Protect, for example, targeting areas that are already achieving high uptake of immunisation would be a good incentive to get practices to sign up.

The added-value of the celebration cards to the current call/recall system

Some participants, especially from the provider and strategic leads categories, were of the view that Celebrate and Protect celebration cards played a necessary role in helping to communicate an issue that is otherwise delicate or difficult to broker with some parents. They felt that celebration cards offered a suitable alternative "...Celebrate and Protect supports communication...it makes things easier..." strategic lead from one of the leading PCTs. Moreover, in their experiences, "...mothers are reluctant to go to practices (for vaccination) unless invited as they feel surgeries are busy" and "do not like letters that sound threatening".

Some providers felt that Celebrate and Protect adds value to the call/recall system, and is of particular value to practices without a robust call/recall system "...we were in bottom 10, since Celebrate and Protect, we are now in top 10..." (pioneering PCT).

Practices that had an established call/recall system noted the added value as "… get [Celebrate and Protect] people up to date with vaccinations… going fine, actually,...asked a couple of parents....those asked said...reminded me to come...very happy..."

They noted that "...Celebrate and Protect good for 'impetus' to start thinking about immunisation but need other basic processes in place, e.g. good call and recall system in practice and at PCT level; follow ups of defaulters; need for more 'support processes..." Some providers however did not perceive Celebrate and Protect as adjunct to a call/recall system but a substitute of the same "...Celebrate and Protect....birthday cards have lessened my workload...don't have to make phone calls....surgery does not have to pay for postage....reduced workload as do not have to speak to address concerns..."

Some parents/carers who had proactive relationship with their practices didn't see any added value to the card "...Well I…I don't really need because I have ...the Red Book...my doctor rang me and sent a text, so I get reminded all the time". "I still think it's a really good idea...(but)... a letter would be better I wouldn't need a pretty card". But others who didn't have such experience with their practice felt that the card would be more helpful "...personally, I haven't read the Red Book, this would remind me..." Parents/carers were also slightly wary and keen that cards should not replace the call/recall system already in place in GP Practices. "... I think you can't take away from people, like face to face or call..." as this active form of communication allows mothers to seek clarification on any issues they may be concerned with before scheduling immunisation appointment "...and if then they (mothers) say no then they can actually talk to them about the reason, so you're addressing…any other issues that they might have..."

5.1.2 Acceptability

Views on sending out celebration cards to parents/carers

The idea of receiving celebration cards was rated very highly by all categories of respondents. Even though only 9.7% of the parents/carers attending the focus group had received the celebration cards, they held the intervention in high regard. Comments ranged from "it's very good" to "it's a really good idea". Moreover, parents/carers felt they led a hectic lifestyle that made them prioritise other issues, and for them, receiving a card from GP was rather thoughtful. Providers on the other hand, felt it was more acceptable to send celebration cards as it would enhance the call/recall systems and improve relationships with patients.

If anything, some providers felt, "...mothers need all the prompting they can get..." They felt that the informal nature of the celebration cards was more favourable to parents/carers than an official letter from GP practice "... (celebration cards)...more informal...more colourful... (Parents) more likely to open card... (reminder) letter in a white envelope franked with surgery stamp...parents/carer...know what it's for...can't be bothered to ring up..."

This was echoed by parents/carers who felt the letters from GPs were more of a telling off "...do you see what I mean? You need to get your child to the clinic. You need to get them immunised. This (Celebrate and Protect card) is like; it is more of a positive reinforcement. The letter is more; you have been told off. This is more like… it is colourful…" Parents/carers who genuinely forget to take their children out for immunisation felt that receiving the celebration cards was a "...good idea... a good reminder...because you have a little baby, sleepless nights, sometimes you might forget to make an appointment", "Oh, even I missed the first MMR when he was two because I forgot, I'm involved in health and I forgot to get him immunised... (the card would have) without a doubt (helped)..."

Similar views were that the cards prompted the parents/carers to action when they'd forgotten prior dates "...oh yes I have to do that (take child for immunisation)". Another reason cited was the fact that some parents/carers do not receive reminder letters from their GPs. "...no, in my area my local GP sent a letter for my first two injections, and they booked appointments, but the third one they didn't tell me, I presumed the same thing would apply but didn't, so we didn't have her third injection until it was really late because I didn't know" "I didn't receive any letter or anything like that I had to do it myself, so then I went for six to eight weeks check-up, the GP said, oh by the way, do you know you should have vaccinations booked..."

Views on partnership working and innovation within the Celebrate and Protect programme

Many participants from the strategic lead category felt that the Celebrate and Protect initiative was leading-edge. Seldom in the history of immunisation in England have different partners across multiple health and social care geographies, pooled resources to work together, without impetus from a regional or central government "...this is a ground breaking project, with joint working across large area ....London boroughs [PCTs] agreed to work together when there is no push to work across a particular strategic area, or any national mandate..."

Respondents felt that Celebrate and Protect partnership had had good public health outcomes, commitment from all partners and demonstrated the much needed value for corporate positioning "...good outcomes....good for corporate positioning ...supports aims to improve PH....[project] demonstrated that some commitment and some funding....[more importantly] boroughs [PCTs] also invested slightly more than 50%..."

5.1.3 Feasibility

Impact on human resources

Responses from the strategic leads indicate that Celebrate and Protect was made possible by the involvement of immunisation leads linked to PCTs that had historically established trust with GP practices. The leads were encouraged to lead in the implementation, communication and provision of training and training materials to GP practices "... (Leads) were able to secure commitment from GP practices - as they have already established trust/good relationship with GP practices, so much easier to get GP buy-in to the project..." Some providers felt that Celebrate and Protect implementation "not needed any support from lead PCT for Celebrate and Protect all very straightforward.....with information pack...useful guide on how to do labels...." "....working fine...not much extra work per month...." If anything, some practices felt Celebrate and Protect gave them the additional resources to support their work "...before that (Celebrate and Protect) it was just me ... Celebrate and Protect added boost..." "...it's not a big job to do...an hour a month..."

Strategically however, they felt there was a need to secure commitment from a strategic organisation to take a lead role (e.g. NHS London), because, thus far, the programme was largely driven by individual personality – hence at a great risk of not being sustainable in the face of the imminent NHS structural changes. "...Celebrate and Protect is driven by power of personality / not supported by system. ..." Moreover, some respondents reported that NHS London had allocated potential funding for wave 2 of £58,000 and therefore were given to make a natural lead. Other suggestions on sustainability included mainstreaming the programme into the existing NHS Quality, Innovation, Productivity and Prevention (QIPP) programme that aims at improving the quality of care "...a way to engage with CCGs is to have Celebrate and Protect as a 'requirement within QIPP programme..."

Impact of IT resources

Some challenges around evidencing the impact of Celebrate and Protect were evident from responses from providers and strategic leads. Some respondents cited historical problems around lack of robust performance management data systems – there are apparent inconsistencies in how data is captured and communicated across different data systems used in the immunisation programme. Some felt that there were inconsistencies on how data were recorded, and that all these issues may prove difficult to demonstrate 'Celebrate and Protect' effect.

They felt that developing a robust monitoring of the process, for example, recording number of cards sent out, number of parents accessing vaccination as a direct result of receiving Celebrate and Protect cards, would add great impetus to evidencing impact and garnering more support for the initiative. A few strategic leads suggested that some areas had developed information on what and how to input data into GP systems that can be shared with GP practices.

Impact on financial resources

Many respondents from the strategic leads category felt that Celebrate and Protect model is a low cost initiative with its implementation designed in a manner that provides for growth on a local or national scale. Participants felt the programme was financially viable as *"...funding required"* is *"...not too high an amount..."* especially for practices not hitting the herd immunity target of 95%. They felt that scaling up was a possible prospect that can be successfully done with good consideration of resources and better co-ordination *"...it's replicable....to scale up [will need] more resources and co-ordination.....good value offer..."*

Perceived impact of Celebrate and Protect on vaccination coverage

Feedback from some of the providers indicates that Celebrate and Protect has improved uptake of immunisation *"... we are doing a lot better than we were…imms uptake has improved…no negative feedback from patients or staff…" "....percentage of children coming in has risen ... imms uptake [has increased]....our take up for 6 week check...good...anyway..."* especially amongst the 4 year olds *"... (increased uptake) for 4 yr olds...yes definitely....lot call back now..."* because *"...older the child gets, the more difficult for parents to see importance (of coming in for immunisation)..."* but, *"...age 4...cards give some mothers a nudge..."* Other notable increase in uptake cited by providers included *"...definitely improving our numbers... in 2010 numbers not great, by 2012 now have got % above 90%...hope to keep it there..."*

Going by these responses, it will be fair to say that though Celebrate and Protect was perceived as a reminder by most respondents, the resultant responses from providers would seem to show that in fact Celebrate and Protect's aim of call to action was being met, as the cards provoked a response as shown. Although it is important to note that the action to attend for immunisation cannot be solely attributed to the celebration cards, there is no doubt nonetheless of the potential contribution of Celebrate and Protect cards. ***"...****Celebrate and Protect birthday card... (Mothers) more inclined to make appointment once they get card.... (which they see as a) reminder..." and* ***"...****birthday card scheme...nice way of reminding parents.... [also] can chase them...."*

Perceived challenges to implementing the Celebrate and Protect programme

Most providers that adopted Celebrate and Protect from the outset cited no problems with its implementation *"...running smoothly...working really well....very manageable"* and that Celebrate and Protect *"...reinforces something that we already do..." "...added into what I do anyway...."* These providers already *"...incorporated (*Celebrate and Protect*) into workload…" and* do not see it as an additional burden *"...not much extra work per month..." "...no problems [with implementation]...fits in with what I do anyway...quite hard...our books run 4-5 weeks in advance....cards go out earlier than the actual birthday*..."

Nevertheless, some providers that were less well-resourced in terms of staffing perceived Celebrate and Protect less favourably; they saw it as a scheme that adds more work to their existing commitments. Some operational challenges cited was the duration it took to generate address labels. *"...Cards were (in a box) waiting for me when I returned from Maternity leave" "...difficult in our practice..." "...takes time...writing names and address on envelope....do not generate labels..."* Some providers felt that Celebrate and Protect needed a lot of attention to detail and feared missing any children *"...fantastic but...time consuming [especially] mail merge.....have to ensure search is correct'....one [issue]....'can miss new registrants in between monthly searches....uses Open Exeter..." "...takes time...writing names and address on envelope....do not generate labels..."*

Some providers showed a need for information – they seemed unaware of whom to approach if celebration card supply is running low. *"...have enough, but have signed on for another year...have enough cards...but if getting low?"*

Some providers felt sending Celebrate and Protect cards should not be restricted to GP practices as there could be new parents/carers who may not be going to the GPs – these parents/carers get reminders from Health visitors, "...(Celebrate and Protect) doesn't cover new parents/carers ... they do not see us ... see health visitor...HV reminds them but call has not come from surgery so mothers forget..." so Celebrate and Protect should consider liaising with maternity units to coordinate from birth as "some parents take time to register their newborn". Although resident in areas included in Wave One, many participants in the focus groups had not received a card. "...Yes, I was going to say that this is the first time to see these cards so I have a three year old and a one year old..." Reflected by the fact that only 10% of participants (n=3) in the focus groups had received Celebrate and Protect celebration cards - possible explanation for this is beyond the scope of this work.

Developing relationships between GPs and families

Celebrate and Protect was seen by all respondents as a good way of improving relationships between parents and practices as it *"...helps practices build rapport with families*..." *"...anyone would appreciate contact by their practice....in my view, not causing any harm..."* Asked to indicate whether the cards would improve their relationships with their GPs, parents/carers said *"... (it would make one) feel warmer towards your GP surgery", "...If you received a card from GP you would feel cared for..."* but others felt it wouldn't effect relations *"No...I don't think it would make a difference for me because my practice is always grumpy. I don't think it'll change that".*

5.2 Quantitative Analysis

5.2.1 Performance Indicators

Six COVER indicators were identified *a priori* during the evaluation planning from a selection of 16 potential indicators. The indicators included MenC and DTaP/IPV/Hib within the 12 month cohort, which protect against meningitis C and diphtheria, tetanus, whooping cough (pertussis), polio, and *Haemophilus influenzae* type b, respectively. The indicators in the 24 month cohort included Hib/MenC, a booster vaccination against *Haemophilus influenzae* type b, and MMR 1. MMR protects against Measles, mumps and rubella (German measles), included here if given between the age of one and two years of age. The final indicators for the 5 year cohort were MMR1 and MMR 2; MMR 1, is the first MMR dose given between the age of one and five (so includes those in MMR1 from the 24 month cohort). MMR 2 includes the first and second dose given 3 months either side of the fifth birthday. The selected indicators were visualised to compare the trends in percentage uptake over the period of analysis between practices recruited to the Celebrate and Protect programme and those that did not participate (non-Celebrate and Protect practices), as shown in Figures 7 to 12.

12 Month MenC%

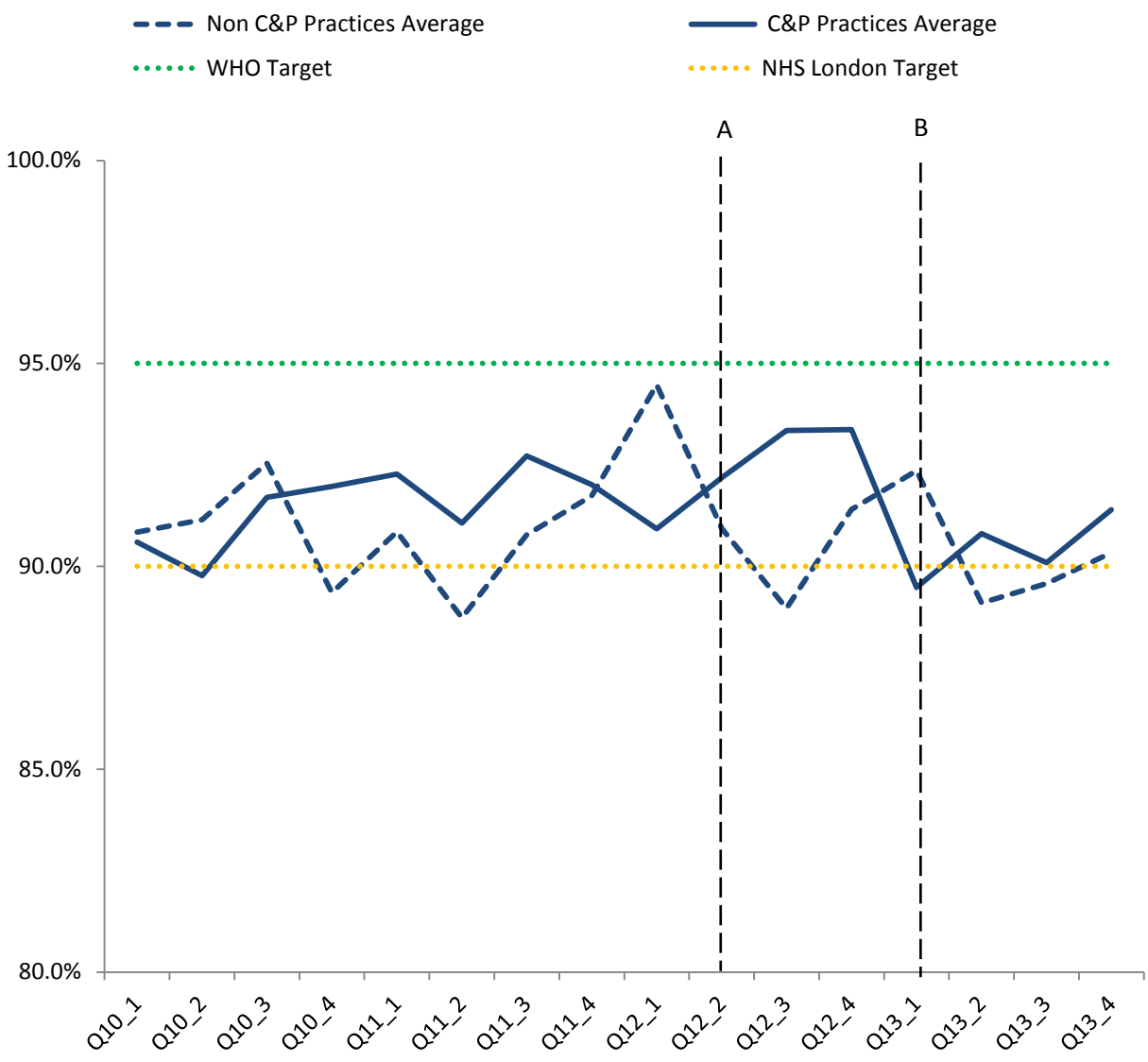


Figure 7: MenC in 12 month cohort indicator - quarterly data shown aggregated for Celebrate and Protect practices for each PCT included in analysis between 2010/11 and 2013/14. Time points A represents the introduction of the Celebrate and Protect programme and B indicates when the intended effects of the Celebrate and Protect programme would be observed. In Celebrate and Protect practices the 90% target has consistently been met from Q10-3 onwards with the exception of Q13-1, which was slightly below; non-Celebrate and Protect practices have observed greater variation in delivery.

12 Month DTaP/IPV/Hib%

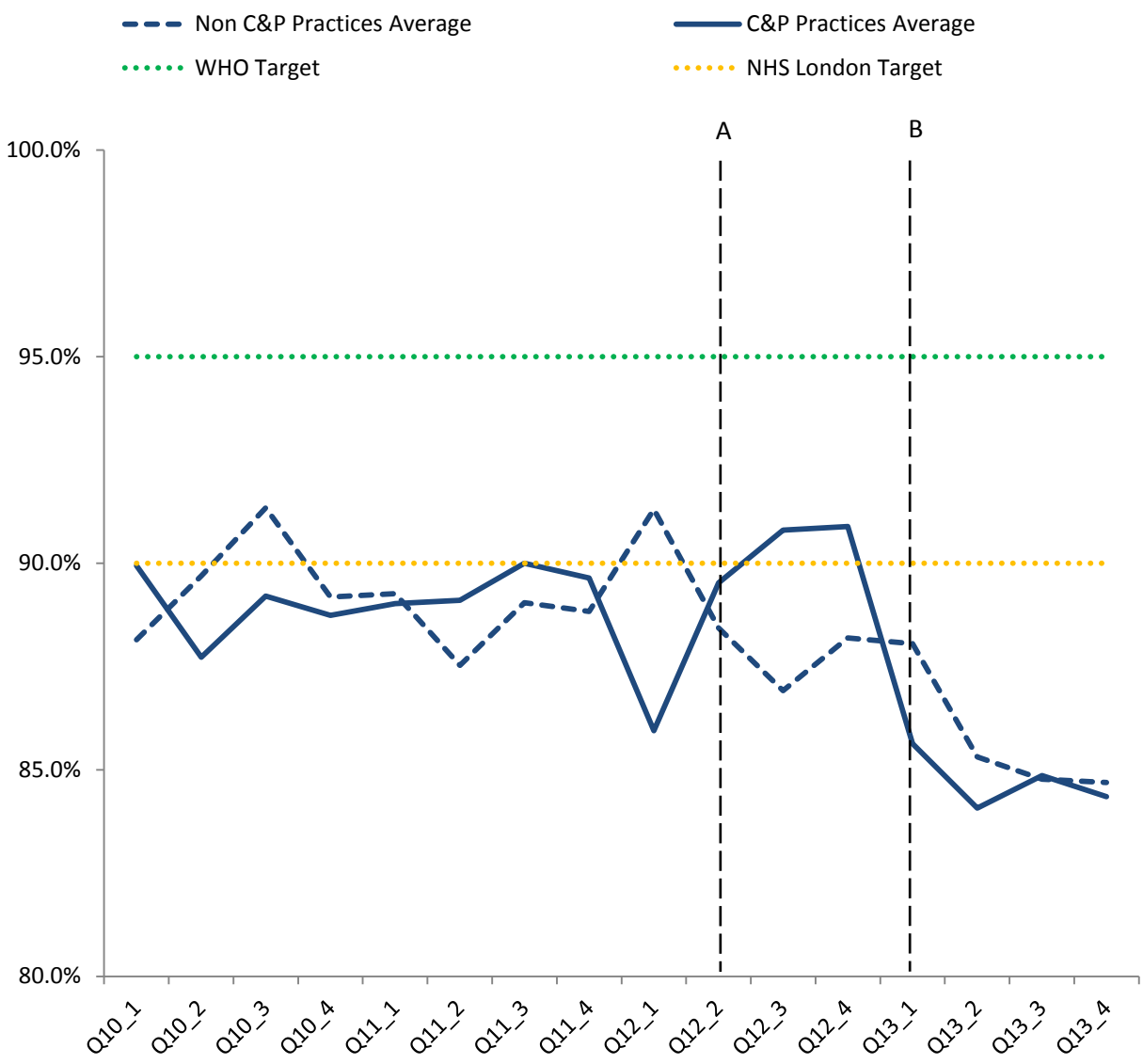


Figure 8: DTaP/IPV/Hib in 12 month cohort indicator - quarterly data shown aggregated for Celebrate and Protect practices for each PCT included in analysis between 2010/11 and 2013/14 Time points A represents the introduction of the Celebrate and Protect programme and B indicates when the intended effects of the Celebrate and Protect programme would be observed. During the period between Q10-1 and Q12-2 both non-Celebrate and Protect and Celebrate and Protect practise were consistently delivering slightly below the 90% threshold, after Q12-2 Celebrate and Protect practices held this deliver until Q12-4 until a steady declined was observed similar to that of non- Celebrate and Protect practise, reaching a low of 84% in Q13-4

24 Month Hib/MenC%

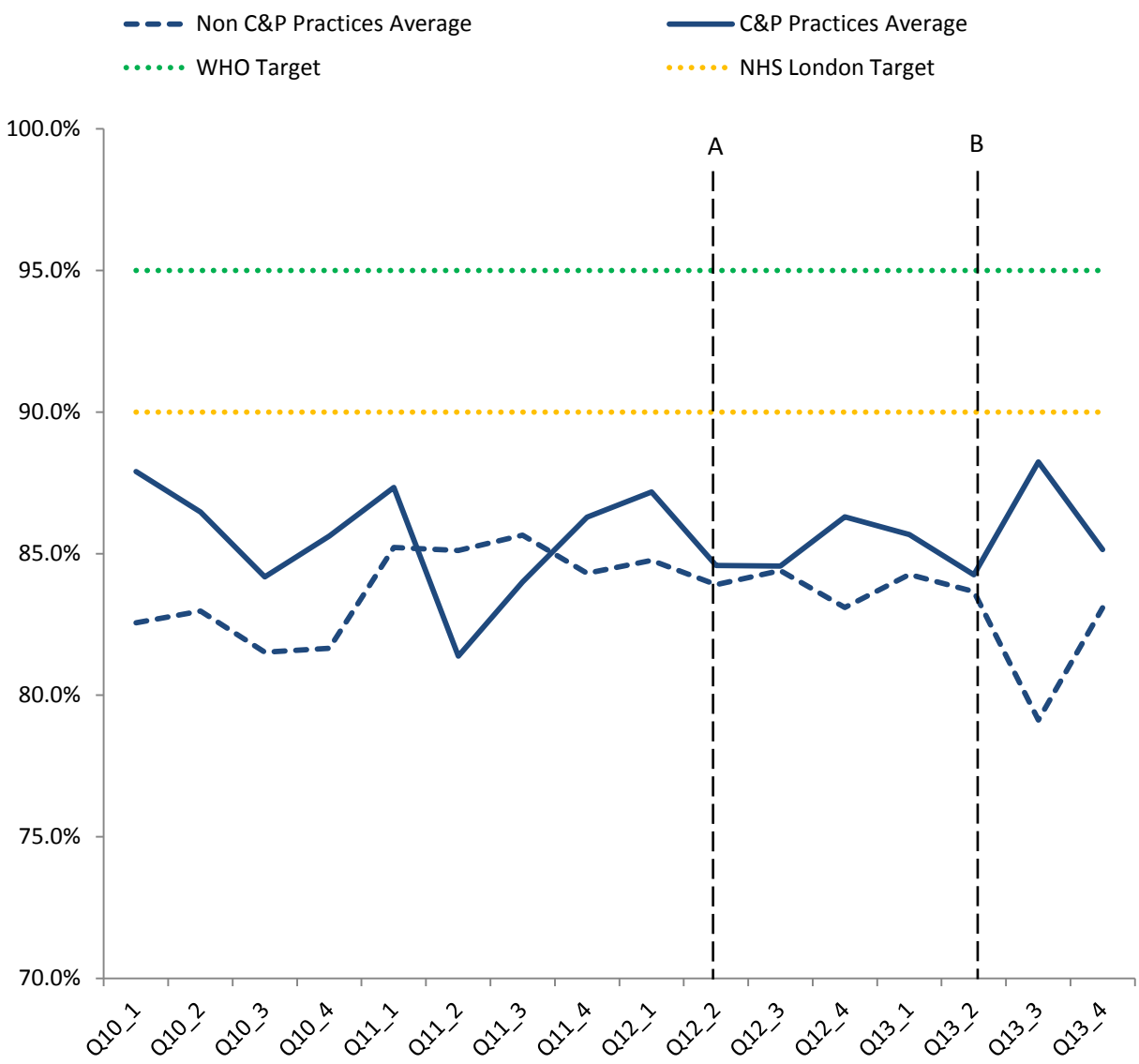


Figure 9: Hib/MenC in 24-month cohort indicator - quarterly data shown aggregated for Celebrate and Protect practices for each PCT included in analysis between 2010/11 and 2013/14 Time points A represents the introduction of the Celebrate and Protect programme and B indicates when the intended effects of the Celebrate and Protect programme would be observed. Performance for both Celebrate and Protect and non-Celebrate and Protect practices has been quite consistent throughout the whole time period, despite not attaining the 90% target. Celebrate and Protect practices saw a spike in activity in Q13-3, whilst at the same time non- Celebrate and Protect practices saw a dip.

24 Month MMR-1

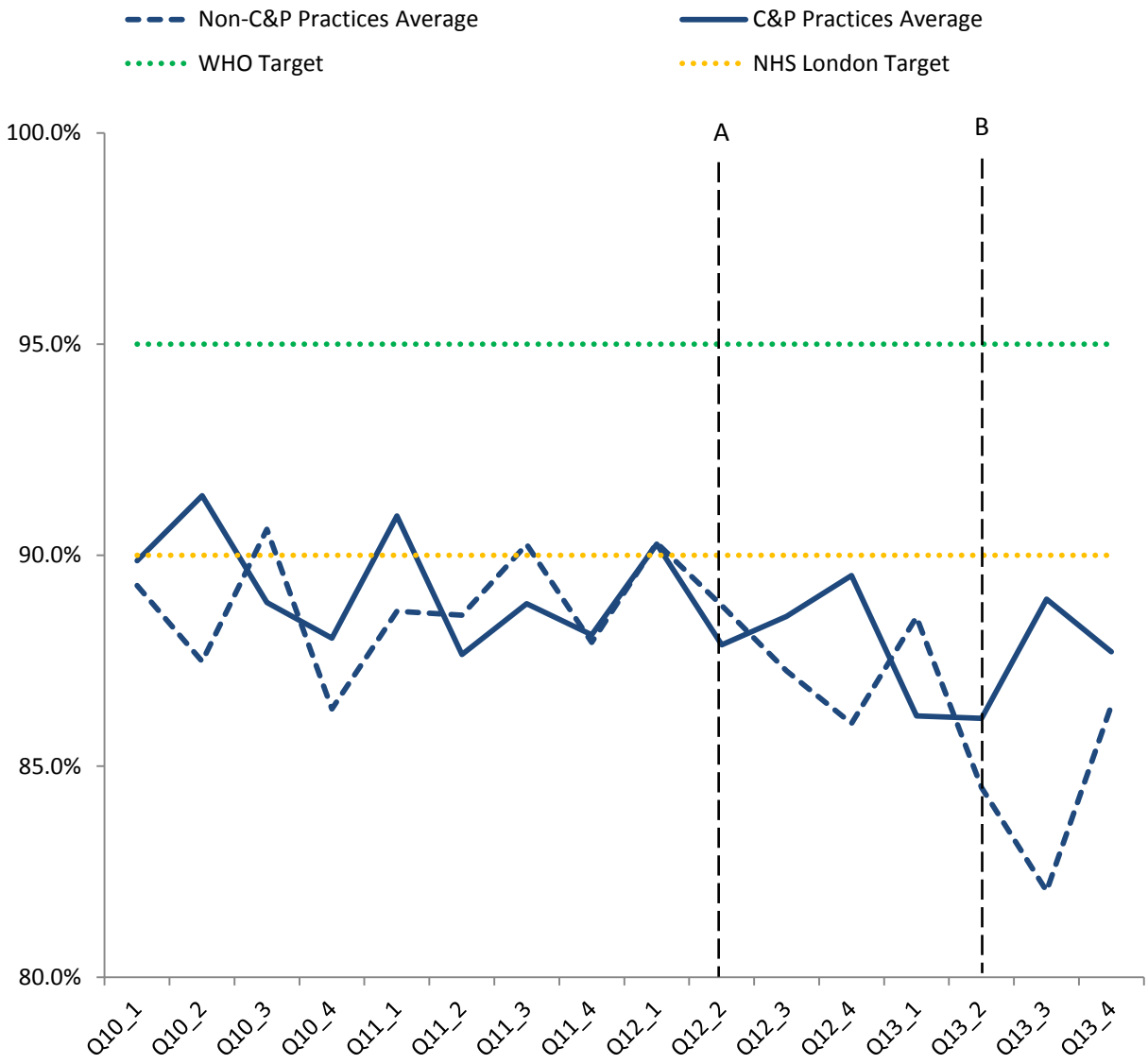


Figure 10: MMR-1st in 24 month cohort indicator - quarterly data shown aggregated for Celebrate and Protect practices for each PCT included in analysis between 2010/11 and 2013/14. Time points A represents the introduction of the Celebrate and Protect programme and B indicates when the intended effects of the Celebrate and Protect programme would be observed. Overall MMR 1 (24 months) rates have fallen throughout the time period, although it would appear that rates in non- Celebrate and Protect practices have fallen more sharply than those in Celebrate and Protect practices during the period in which the effects of the programme are expected to be seen.

5 Year MMR_1st

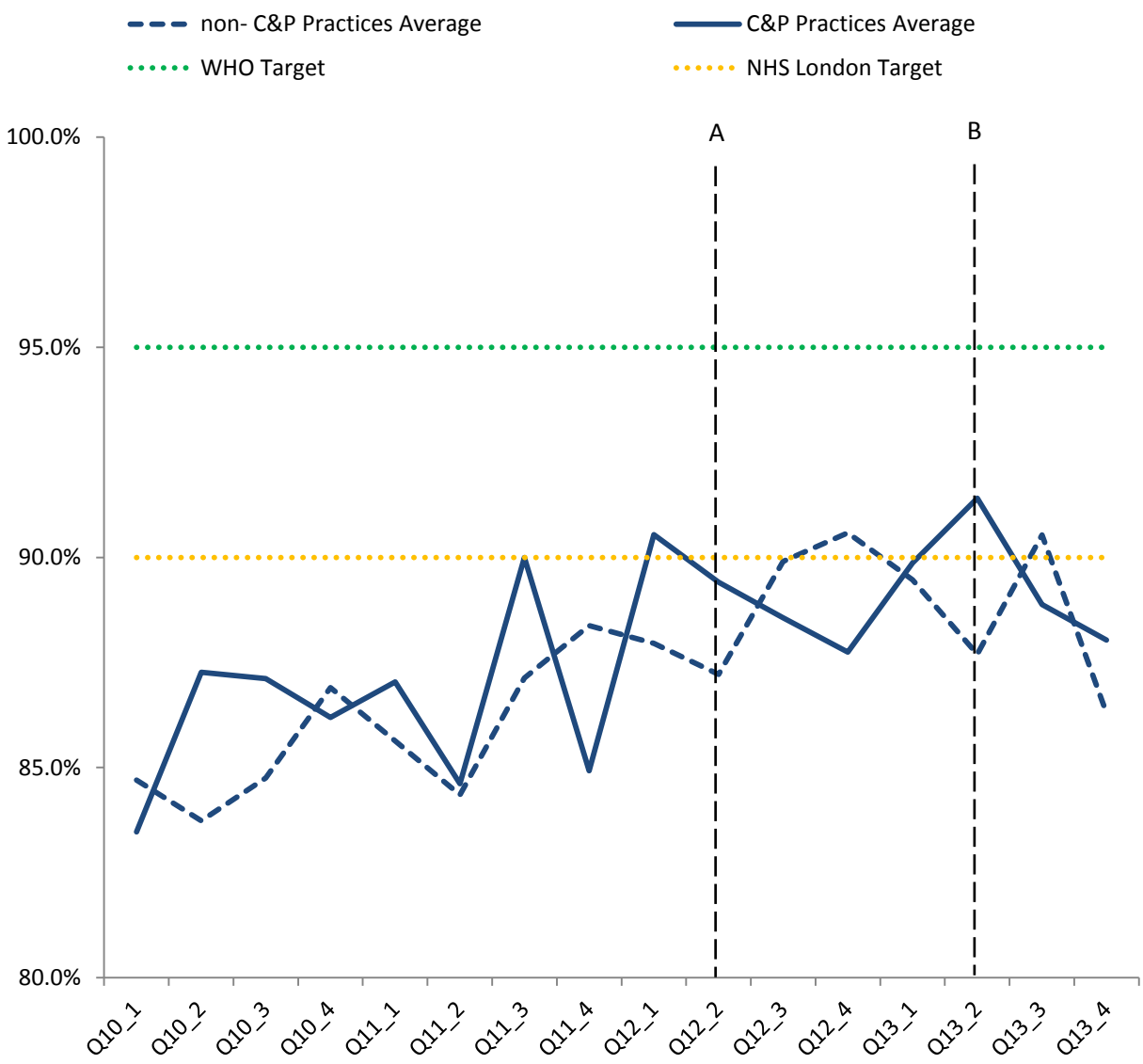


Figure 11: MMR-1st in 5 year cohort indicator - quarterly data shown aggregated for Celebrate and Protect practices for each PCT included in analysis between 2010/11 and 2013/14. Time points A represents the introduction of the Celebrate and Protect programme and B indicates when the intended effects of the Celebrate and Protect programme would be observed. MMR 1 (5 years) rates have seen a steady increase throughout the period of analysis in both Celebrate and Protect and non-Celebrate and Protect groups although plateaued towards the end of the period.

5 Year MMR_2nd

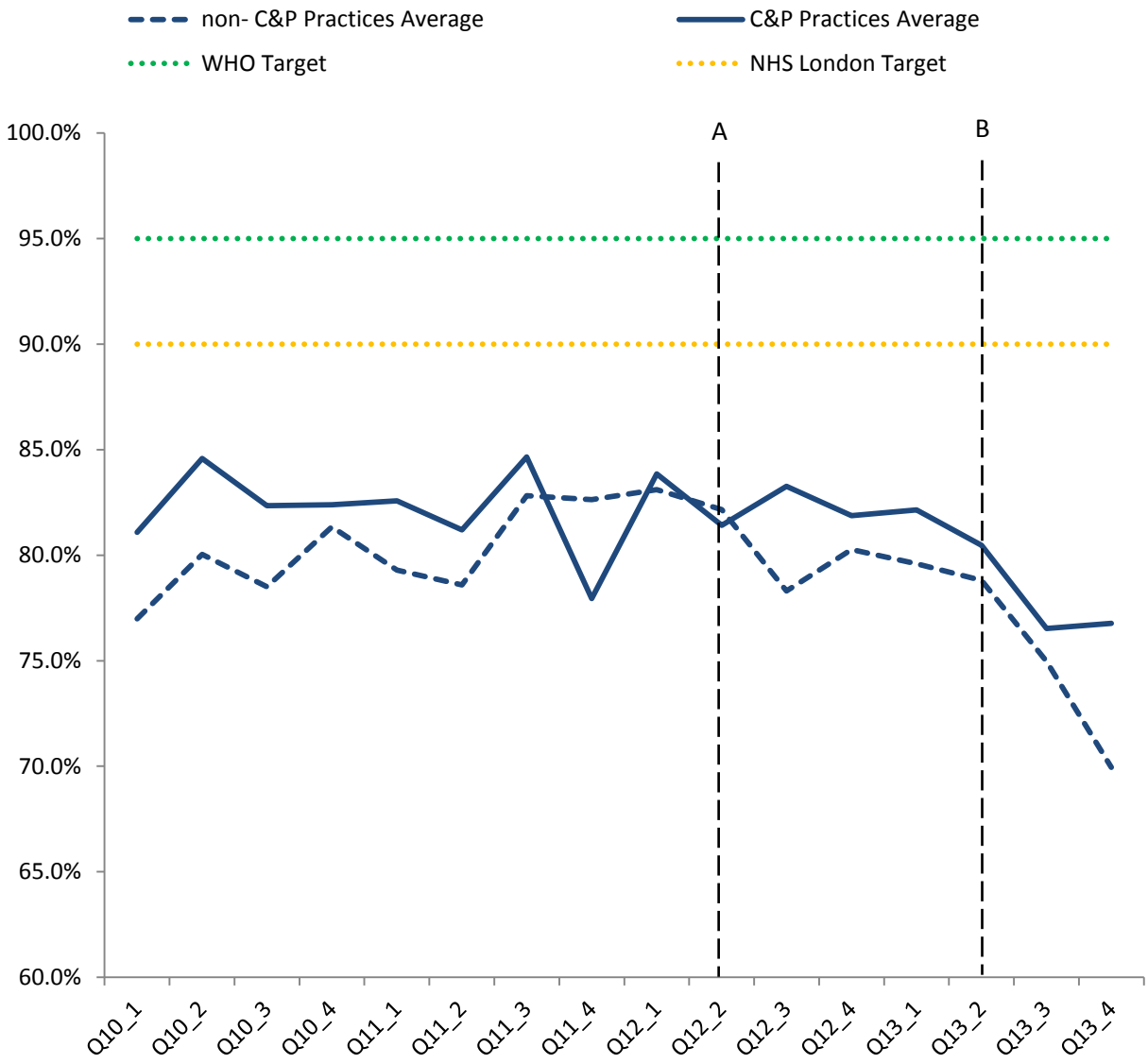


Figure 12: MMR-2nd in 5 year cohort indicator - quarterly data shown aggregated for Celebrate and Protect practices for each PCT included in analysis between 2010/11 and 2013/14. Time points A represents the introduction of the Celebrate and Protect programme and B indicates when the intended effects of the Celebrate and Protect programme would be observed. MMR 2 rates have been reasonably consistent between Q10-1 and Q13-1 in both Celebrate and Protect and non- Celebrate and Protect practices, although well below the performance targets. Between Q13-2 to Q13-4 a sharp declined can be observed resulting in a low of 77% and 70% for Celebrate and Protect and non- Celebrate and Protect practices respectively.

6 Discussion

6.1 Development of Celebrate and Protect programme

The Celebrate and Protect programme has demonstrated innovative partnership working bringing together strategic leads from the NHS and local government alongside partners from the pharmaceutical industry, Sanofi Pasteur MSD. The intervention, delivered within the programme, was developed using a co-production approach with parents/carers, who were able to inform the design and content of the card, providing some insight to inform why some parents/carers may or may not choose to get their children immunised. Parental/guardian decision making, as well as access to vaccination services, is fundamental to the complexity of vaccine uptake. Researchers have proposed typologies associated with the beliefs and associated actions that parents/carers hold around vaccination (Benin, Wisler-Scher, Colson, *et al.*, 2006):

1 "Accepters" - those whom believe in vaccination and actively vaccinate their children;
2 "Vaccine-hesitant" – those whom accept vaccination but have significant concerns about vaccinating their children;
3 "Late vaccinators" – those whom purposely delay vaccinating or chose only some vaccines;
4 "Rejecters" – those whom completely reject vaccination

These typologies categorise parents/carers according to individual beliefs and actions. it has been proposed that these represent a continuum or spectrum of acceptance, from "active demand for vaccines to complete refusal of all vaccines" (Dubé, Laberge, Guay, *et al.*, 2013).

Benin *et al* (2006) also identified a number of barriers to vaccination and some potential enablers or promoters (Benin, Wisler-Scher, Colson, *et al.*, 2006). Barriers included poor relationships with healthcare professionals resulting in a lack of trust, which may coincide with a strong trusting relationship with someone opposed to vaccination, both socially (friends, family or other parents) or professionally (homeopaths etc.). Of course this was often coupled with anxieties about the side-effects of vaccines or reassurance that herd immunity would protect their child. Some of the promoters of vaccination included good relationships with healthcare professionals that fostered trust and an open dialogue about vaccinations, and recognition that parents/carers may want to adhere to social/cultural norms by vaccinating.

Those classified as “vaccine hesitant” or “late vaccinators” often have a broad range of reasons and rationales for their hesitancy to engage with vaccination, and an equally diverse range of external influences that may ‘nudge’ parents/carers along the continuum in either direction.

A conceptual model that encompasses many of the historic, political and socio-cultural factors that influence hesitancy, all of which are underpinned by trust influences is shown in Figure 13 (Dubé, Laberge, Guay, *et al.*, 2013).

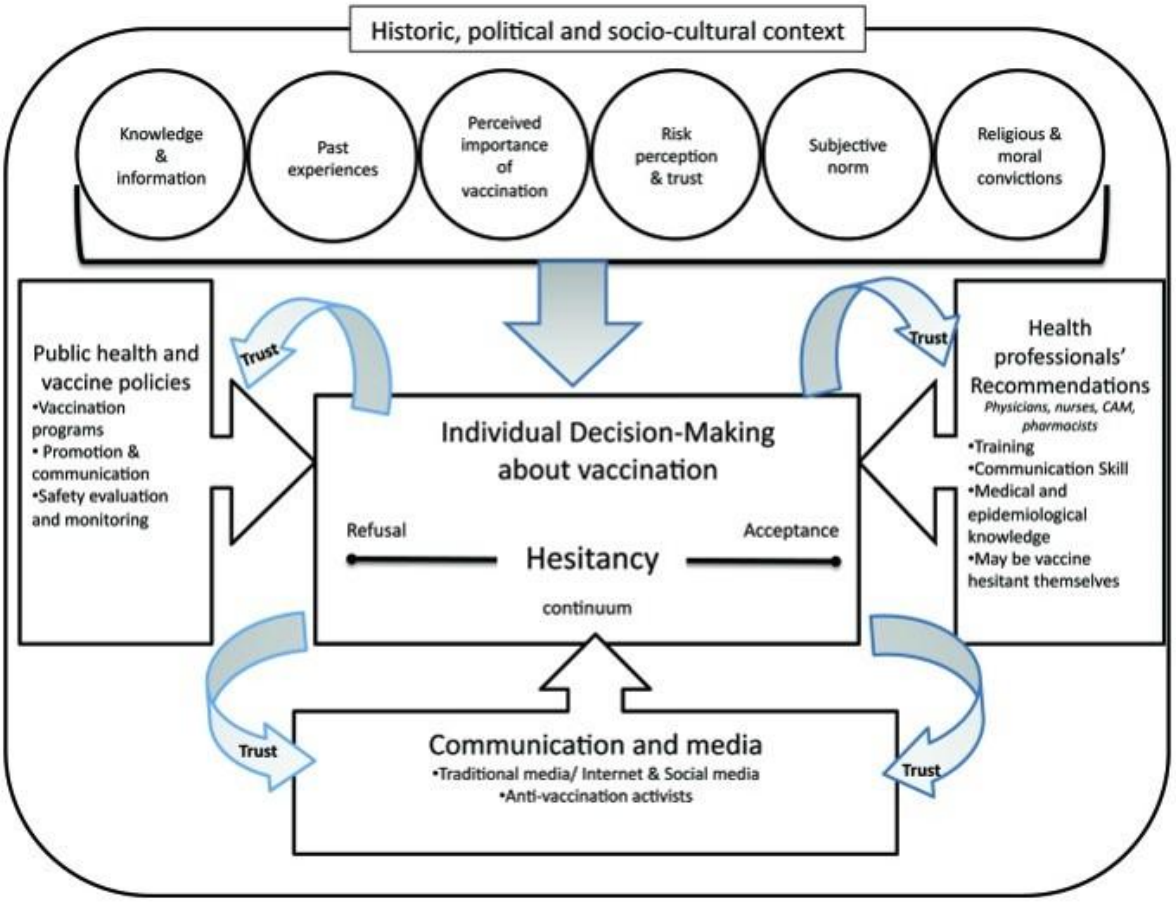


Figure 13: A conceptual model that encompasses many of the historic, political and socio-cultural factors that influence the position of parents/carers on the hesitancy continuum, all of which are underpinned by trust (Dubé, Laberge, Guay, *et al.*, 2013).

A number of strategies have been developed that aim to target parent/carers to improve vaccination coverage including simple strategies such as sending reminder letters/cards to more complex and costly strategies such as home visiting or involving the school nurse teams (National Institute for Health and Care Excellence, 2009; The London Regional Immunisation Steering Group, 2009). Whilst most initiates have demonstrated some impact this is dependent on the population targeted, although all required good systems of data collection/reporting and communication between systems and agencies to ensure timely and targeted activity.

6.1.1 Feasibility, Suitability and Acceptability

The Feasibility, Suitability and Acceptability framework is used to assess the relative success or failure of a strategic option. Feasibility is concerned with whether an organisation/programme has the resources and competencies to deliver a strategy, whilst suitability is concerned with investigating the rationale of the strategy and whether it supports the organisation/programmes strategic position. Acceptability relates to expected return, likely reaction of stakeholders and identification of any likely risks.

Following the qualitative evaluation of Wave One, it would seem that Celebrate & Protect could be judged as a low risk and low cost strategy that can clearly be delivered within the resources and competencies that were available during Wave One, although significant organisational and structural changes have occurred since the delivery of Wave One of the programme. The specific intervention i.e. celebration card and vaccine schedule, used within the programme has been shown to be suitable to achieve the objectives of the programme, although demonstrating the effectiveness of the intervention remains a challenge. Whilst the intervention has been shown to be acceptable in terms of both those that would deliver the intervention i.e. primary care staff and the intended recipients of the intervention i.e. parents/carers of children under the age of 5, a number of recommendations were identified from the focus groups that resulted in changes to the intervention for subsequent waves. This demonstrates the flexibility and adaptability of the intervention and the iterative nature of the interventions development. Acceptability of the programme at a strategic level was considered favourably throughout the evaluation, although due to the structural reorganisation and changes in roles and responsibilities of those initially involved in the programme consideration of these changes should be recognised as important risks in terms of managing these relationships.

6.1.2 Collaboration with industry

Childhood vaccine is procured nationally through a tendering process so there is no conflict of interest in working with SPMSD and the partnership abides by the DH/Association of British Pharmaceutical Industries Framework on partnership with pharmaceutical companies (Medicines Pharmacy & Industry Group Department of Health, 2008).

Collaboration with 'industry' provided economies of scale along with strategic expertise and an in-depth understanding of logistics for a bespoke delivery that was fundamental to the programme. Funding was pooled between the PCTs, Local government and Sanofi Pasteur MSD for delivery of the programme within the first wave, although subsequent waves also included a contribution from NHS London.

In addition it was observed that an important role of the industry partner, especially during time of transition, such as that experienced during the programme, is the consistency and continuity offered to the programme. As the Celebrate and Protect programme was initiated by the industry partner a unique collaborative framework was provided through which many different organisations voluntarily co-operated to develop a 'bottom-up' potential solution to an intractable problem.

6.2 Data collection and analysis

The evaluation utilised a mixed methods approach comprising of a qualitative process evaluation and a quantitative outcome evaluation (Rossi, Lipsey & Freeman, 2003). During the planning of the evaluation the feasibility of collecting data, from both interviews /focus groups and formal routinely collected potential issues were identified. The collection of data from interviews and focus groups for use in the qualitative analysis presented a number of challenges. Developing the right recruitment strategy to engage with a range of parents/carers willing to participate was essential, involving the local immunisation co-ordinators in the recruitment proved very successful. The recruitments of strategic, commissioning or policy leads along with the programme management team (including SPMSD stakeholders) was relatively straight forward with all those approached agreeing to participate in a telephone interview. On the other hand, recruiting healthcare professionals and primary care staff was quite challenging as the scheduling of telephone interviews was during the flu vaccination period, when workloads were stretched although a number did agree to participate. The focus groups and interviews were conducted during the early stages of the delivery of Wave One by GP practices, in line with the projected timelines, although this meant that many of the parents/carers involved had not actually received the celebration cards at that stage, which could have been improved through a targeted recruitment strategy. None the less the data collection and analysis provide a rich picture from both the perspectives of those delivering the intervention and those receiving the intervention (or intended to).

The original quantitative evaluation plan had focussed on the use of the quarterly COVER data to detect changes in vaccination uptake at PCT level. A number of issues were subsequently identified that questioned the validity of such an approach. The initial challenge using COVER data was the fact that children that are not registered with a GP are included in the denominator value in COVER indicators according to the PCT of the area in which they live. As the evaluation was of the Celebrate and Protect programme it was important to ensure that the denominator value should reflect only those that were potentially able to receive the intervention i.e. children registered with a GP practice in the PCTs included. The second problem was that not all practices were recruited within each PCT, as the target was only 50%.

Recruitment in some PCTs such Hammersmith & Fulham and Kensington and Chelsea achieved 41.9% and 44.4%, respectively whilst others such Barking & Dagenham reached 100%. As COVER data was provided at PCT level, this meant it was impossible to differentiate the coverage rates between those practices that were recruited to the Celebrate and Protect programme and those that were not. As such COVER data was not suitable for assessing the effect of the programme.

Another important factor in evaluating the effectiveness of the programme was the impact of the delay between introducing the intervention and when one would expect to see an effect of the intervention. Infant cards were designed to engage parents/carers with the 6-8 week check and subsequent 2, 3 and 4 month vaccination, the outcome of vaccination would subsequently be reported in the quarter in which the infant turns 1. This would likely result in a 3 or 4 quarter lag between the introduction of the Celebrate and Protect programme (Q12-2 (July-September 2012) and the reporting of the vaccination. Similarly, the one and four year birthday cards would have a 4 quarter lag as vaccinations would be reported in the quarter in which the child turns 2 years and 5 years, respectively. Undertaking the quantitative analysis in July-September 2014 would mean that the latest data available would be Q13-4 (Jan-Feb 2014), providing only 3 or 4 time points to assess the effectiveness of the programme.

The decision was made to use aggregated practice level data that would allow comparison of changes in trends in both the Celebrate and Protect practices and non-Celebrate and Protect practices as well as comparison between them. In order to undertake the analysis practice level data was required for all PCTs that were involved in the Celebrate and Protect programme that would allow categorisation of practices as either Celebrate and Protect or non-Celebrate and Protect (for Wave One only). Whilst some data was provided historically by the PCTs, up until 2012/13, this was not the case for all quarters or indeed all PCTs. Requests for data from April 2013 were submitted to NHS England London, combined with historic data (from 2012/13 – prior to “transition”) that were provided by the Programme Management team received directly from the PCT prior to the analysis. Reviewing the data that was provided it was clearly not feasible to use data for six of the nine PCTs, resulting in the quantitative analysis focussing just on aggregate data from three PCTs.

Ideally the indicators would have been able to provide real-time (or as close as) feedback to the PCTs or practices on performance, but with the time lag, exacerbated by recent changes in the collection, collation and reporting of vaccination performance measures, this was not feasible.

7 Action Learning and Recommendations

7.1 Action Learning

- Design of card – Olympic/sporting themes included in Wave one cards removed and prominent landmarks of new boroughs joining Wave two added
- Translation of 'Celebrate and Protect' into 10 languages on reverse of cards
- Signposting to NHS Choices and DH website addresses added on reverse of schedule inserts
- Posters produced for practice waiting rooms and Children's Centres to promote the initiative and highlight importance of boosters
- SPMSD logo removed from envelope and NHS logo enlarged and moved to front of envelope to be more prominent and SPMSD logos repositioned/decreased in size on birthday cards and inserts
- Reminder cards for 3 year 4 month vaccinations were trialled in Wave Three, by way of a 4th Birthday card to children who had not taken up these vaccinations
- Non-postage paid envelope was produced and trialled in Wave Three
- Changes were made to the materials to reflect national schedule updates

7.2 Celebrate and Protect Programme

- A thorough literature review and assessment of the current evidence for different strategies to increase vaccination uptake may have provided a balanced view of options. Whilst simple programmes such as postal reminders/call to actions can be effective other options could have been explored, especially related to the equity of vaccination uptake thus targeting hard to reach groups etc.
- Sign-posting to additional sources of information was identified by parents/carers as a potential avenue to developing a better understanding of vaccination and why it's required.
- The Celebrate and Protect programme provides a good example of clear and transparent collaborative working with industry partners and was welcomed from all stakeholders, especially at a time when financial restrictions would mean that innovative approaches may not be feasible. Consider developing a transferable model based on the Celebrate and Protect programme to provide structure for similar future programmes.
- The co-production approach used to develop the intervention within the Celebrate and Protect programme was a good example of engaging a range of stakeholders to develop a locally acceptable and tailored intervention within the community. Disseminate this good practice to catalyse future co-production activities.

- As the quantitative analysis was unable to effectively evaluate the impact of the programme due to the small number of post-implementation data point it would be recommended to re-visit the analysis in 12 months to assess impact.

7.3 Data Collection Systems

- The existence of multiple data collection systems, prior to April 2013, and a lack of clarity around the agencies involved in the collation, analysis and dissemination of data has resulted in a convoluted system with uncertainties about the ownership and sharing of public data. Harmonisation of systems is required to ensure the availability of timely and responsive data. The development of tools by NHS England for data sharing is welcomed but clarity around the availability and completeness of historic data is still needed.
- Whilst the transition of responsibilities for vaccination and structural changes across health care and local government have been taking place, systems have been strained resulting in inconsistencies in the availability and accessibility of the data which may necessitate a review of the impact of the reorganisation on data flow.
- The release of COVER data aims to contribute to the transparency of public services yet there seems to be little faith in the accuracy/reality of the coverage that the data represents. Review whether COVER data as currently presented is fit for purpose in the new NHS.

8 Conclusion

The Celebrate and Protect programme has demonstrated a clear and transparent approach to partnering with the pharmaceutical industry, which in turn has provided a unique platform for engaging a range of NHS and local authority organisations, at scale. This bottom-up approach to developing and delivering solutions to improve the health and wellbeing of Londoners is to be commended for its innovative approach. The qualitative evaluation has clearly demonstrated the high-level of buy-in and support the programme has received from both parents/carers and primary care staff. Whilst the quantitative evaluation was unable to demonstrate an impact on the uptake of vaccination attributable to the Celebrate and Protect programme, it did bring to light a number of concerns around the availability of historic vaccination uptake data to allow evaluation of programmes such as Celebrate and Protect. As the NHS turns its attention to quality and safety in healthcare the use of real-time data to feedback on the delivery of services across the NHS becomes crucial.

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10 Appendices

Appendix 1: Primary Care Trust and Local Authority Boundaries

The report utilises historic PCT boundaries as these geographical units have been used to report COVER indicators in 2010-11, 11-12 and 12-13. Since 2013-14 the quarterly data has continued to be published by PCT and additionally by Local Authorities (LA), as LAs are now responsible for providing assurance of vaccination coverage and CCGs. PCTs included in Wave One are co-terminus with their corresponding CCGs and LAs with the exception of West London and Central London CCGs are not co-terminus (Table 6). West London CCG includes a number of additional practices that were previously included in Westminster PCT (now called Central London CCG).

PCT	Local Authority	Clinical Commissioning Group
Barking & Dagenham PCT	London Borough of Barking and Dagenham Council	Barking & Dagenham CCG
Bexley Care Trust PCT	London Borough of Bexley	Bexley CCG
Greenwich Teaching PCT	Royal Borough of Greenwich	Greenwich CCG
Hammersmith & Fulham PCT	London Borough of Hammersmith & Fulham	Hammersmith & Fulham CCG
Kensington & Chelsea PCT	Royal Borough of Kensington and Chelsea	West London (K&C and QPP) CCG
Newham PCT	London Borough of Newham Council	Newham CCG
Tower Hamlets PCT	London Borough of Tower Hamlets Council	Tower Hamlets CCG
Waltham Forest PCT	London Borough of Waltham Forest	Waltham Forest CCG
Westminster PCT	City of Westminster	Central London (Westminster - QPP) CCG

Table 5: Alignment of Primary Care Trusts (PCTs), Local Authorities (LAs) and Clinical Commissioning Groups (CCGs)

Appendix 2: COVER Definitions

All the coverage definitions below refer to the PCT responsible population which is defined as those for whom the PCT is responsible at a certain point in time (in this instance on 31st March 2013) and includes (Health and Social Care Information Centre, 2013)**:**

- All persons registered with a GP whose practice forms part of the PCT, regardless of where the person is resident, plus
- Any persons not registered with a GP, who are resident within the PCTs statutory geographical boundary Note that persons resident within the PCT geographical area but registered with a GP belonging to another PCT, are the responsibility of that other PCT.[2]

COVER: 12-Month Cohort

Coverage for the 12-month cohort is calculated as follows:

$$\frac{\text{Total number of children for whom the PCT is responsible, reaching their first birthday during the evaluation period (e.g. 2012-13) and immunised before their first birthday}}{\text{Total number of children for whom the PCT is responsible reaching their first birthday during the evaluation period (e.g 2012-13)}} \times 100$$

DTaP/IPV/Hib: Immunised is defined as a completed course which is three doses before the child's first birthday. If the child received primary immunisations outside the UK, then a completed course would require three doses of each: DTP or DTaP, IPV or OPV, Hib before their first birthday.

MenC and PCV: Immunised is defined as a completed course which is two doses before the child's first birthday. (PCV can be either PCV7 or PCV13, given in any combination).[3]

[2] Whilst unregistered children that reside in a borough/PCT locality are included in COVER data this evaluation uses aggregated practice level data to generate the COVER indicators, so whilst the definitions are accurate the data included in this report does not included any unregistered children unless identified.

[3] This has now changed to include only one dose

COVER: 24 Month Cohort

Coverage for the 24 month cohort is calculated as follows:

$$\frac{\text{Total number of children for whom the PCT is responsible, reaching their second birthday during the evaluation period (e.g. 2012-13) and immunised before their second birthday}}{\text{Total number of children for whom the PCT is responsible reaching their second birthday during the evaluation period (eg2012-13)}} \times 100$$

DTaP/IPV/Hib: Immunised is defined as a completed course which is three doses before the child's second birthday. If the child received primary immunisations outside the UK, then a completed course would require three doses of each: DTP or DTaP, IPV or OPV before their second birthday.

MMR: Immunised is defined as one dose given on or after the child's first birthday and before their second birthday (i.e. excludes MMR given before their first birthday).

MenC primary: Immunised is defined as a completed course which is two doses before the child's first birthday.

Hib/MenC booster: Immunised is defined as either: i) one dose of combined Hib/MenC vaccine on or after the child's first birthday and before their second birthday or: ii) one dose of DTaP/IPV/Hib and one dose of MenC, both given on or after the child's first birthday and before their second birthday (i.e. children completing primary course after their first birthday).

PCV booster: Immunised is defined as one dose given on or after the child's first birthday (irrespective of the number of doses before that age) and before their second birthday.

COVER: 5 Year Cohort

Coverage for the 5 year cohort is calculated as follows:

$$\frac{\text{Total number of children for whom the PCT is responsible, reaching their fifth birthday during the evaluation period (eg 2012-13) and immunised before their fifth birthday}}{\text{Total number of children for whom the PCT is responsible reaching their fifth birthday during the evaluation period (2012-13)}} \times 100$$

Diphtheria, Tetanus and Polio (primary): Immunised is defined as a completed course which is three doses before the child's fifth birthday. Children reaching their 5th birthday from the 2010-11 collection year onwards would have been routinely offered the DTaP/IPV/Hib '5 in 1' vaccine which includes Tetanus, Diphtheria, Pertussis, Polio and Hib. If the child received primary immunisations outside the UK, then a completed course would require three doses of each: DTP or DTaP, IPV or OPV before their fifth birthday.

Diphtheria, Tetanus, Polio and Pertussis (DTaP/IPV) (booster): Immunised is defined as the fourth dose of diphtheria/tetanus/ pertussis/polio containing vaccine given from age three years four months, and before the child's fifth birthday.

Hib (primary): Immunised is defined as a completed course which is three doses of a Hib-containing vaccine before the child's fifth birthday. Children reaching their 5th birthday from the 2010-11 collection year onwards would have been routinely offered the DTaP/IPV/Hib '5 in 1' vaccine.

MMR1 (1st dose): Immunised is defined as one dose given on or after the child's first birthday and before their fifth birthday (i.e. excludes MMR given before their first birthday).

MMR2 (2nd dose): Immunised is defined as two doses, the first given on or after the child's first birthday and the second at least three months after and before their fifth birthday (excludes MMR given before their first birthday).

Hib/MenC (booster): Immunised is defined as either: i) one dose of combined Hib/MenC vaccine on or after the child's first birthday and before their fifth birthday or: ii) one dose of DTaP/IPV/Hib and one dose of MenC, both given on or after the child's first birthday and before their fifth birthday (i.e. children completing primary course after their first birthday).

Appendix 3: Roll-out of Celebrate and Protect programme

Figure 14: Phased introduction of Celebrate and Protect programme across 16 PCTs in London between July 2012 and April 2014

PCT	Wave 1	Wave 2	Wave 3	Local Offer, continuation post- April 2014
Barking & Dagenham	✓	✓	✓	
Barnet		✓	✓	✓(funded by LB Barnet)
Bexley	✓	✓	✓	
Brent			✓	
City & Hackney			✓	
Croydon		✓	✓	
Greenwich	✓	✓	✓	✓(funded by RB Greenwich)
Hammersmith & Fulham	✓	✓	✓	✓(funded by H&F CCG)
Haringey			✓	✓ (funded by LB Haringey)
Hounslow		**		
Kensington & Chelsea	✓	✓	✓	✓ (funded by West London CCG)
Newham	✓			
Southwark		✓	✓	
Tower Hamlets	✓			
Waltham Forest	✓			
Westminster	✓	✓	✓	✓(funded by Central London CCG)

Table 6: A table outlining the participation of PCTs in the three waves of the Celebrate and Protect programme and those that continued to implement the programme when the Celebrate and Protect partnership came to an end on 1st April 2014. ** Hounslow requested to join at Wave Two, but then withdrew their participation.

Appendix 4: Programme Management and Evaluation Teams

Programme Management Team

Programme sponsor: Dr Justin Varney, Consultant in Public Health Medicine, London Borough of Barking and Dagenham/NHS Outer North East London (to end of March 2013)

Programme sponsor: Kenny Gibson, Head of Early Years, Immunisation & Military Health, NHS England - London Region (from April 2013)

Programme Manager: Rachel Weber, NHS Barking and Dagenham (to end of March 2013) then as consultant auspiced by the Growth Boroughs from August 2013 to February 2014)

Programme host: Jane Connor, Health Legacy Programme Manager, London Borough of Hackney, for the six Olympic and Paralympic Host, now Growth Boroughs

Colin Valler: Manager, NHS & Regional Government Relations, Sanofi Pasteur MSD

Sobia Chaudhry: Population Health Practitioner Manager, NHS England - London Region

Evaluation Team

Lead: Ruth Barnes, NHS Institute Fellow and Independent Consultant

Qualitative Evaluation Lead: Dr Nuttan Tanna, NIHR CLAHRC Northwest London

Qualitative Evaluation Consultant: Saumu Lwembe, Doctoral Researcher, London School of Hygiene and Tropical Medicine

Quantitative Evaluation Lead: Stuart Green, Public Health Research Fellow, NIHR CLAHRC Northwest London, Imperial College London

Statistical Advice: Sylvia Chalkley, Statistician, Imperial College London

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Samar Pankanti, Public Health Project Manager, Central London, West London, Hammersmith and Fulham, Hounslow and Ealing (CWHHE) Clinical Commissioning Groups Collaborative

Donah Hendrikson, Senior Health Improvement Specialist Early Years, Royal Borough of Greenwich

Imperial College
London