Introduction and Background

UK infant immunisation rates are generally high[1]. By five years of age over 95% of children have received at least one dose of the measles-mumps-rubella (MMR) vaccine and 88% have completed the two-dose course[1].

However, some communities have significantly lower than the WHO recommended threshold needed to achieve herd immunity leading to increased susceptibility to vaccine preventable diseases. Due to the diversity of these populations and the variety of reasons behind sub optimal vaccination uptake a 'one size fits all' strategy is unlikely to be effective and a more tailored approach is required. The North London borough of Hackney is home to the largest Charedi Orthodox Jewish community in Europe. The community was already established in London in the 1920s and the population increased significantly during the Second World War as new arrivals fled the Holocaust[8]. Membership of this community is not systematically recorded in medical records and is currently estimated at between 25,000 and 30,000 people[9,10]. The community has suffered recurrent outbreaks of vaccine preventable disease, indicating suboptimal vaccination uptake. Charedi families have a much higher than average number of children placing considerable pressure on immunisation services. Local immunisation teams were already aware that immunisation uptake within this community was consistently lower than the rest of the borough and the rest of England for example between January and March 2015 General Medical Practices serving the Charedi community achieved 78% uptake of the first dose of MMR at 2 years of age compared to 86% in the rest of the borough[11].

Sub-optimal immunisation coverage has led to outbreaks of vaccine preventable diseases (VPDs) with measles outbreaks occurring in Hackney in 2007 and 2013. During these outbreaks the Charedi community suffered a higher burden of disease, with an estimated rate of measles of 117 per 100,000 population compared to a rate of 29 per 100,000 for the

rest of Hackney[11]. Due to close links with Charedi communities in other parts of the world, measles was exported from the UK to other countries including Israel[12] and Belgium[13].

It has previously been suggested that parental religious beliefs against vaccination, perceived risk of vaccine preventable diseases, mistrust of the government and perceived insensitive cultural practices of health care providers were key factors behind the suboptimal vaccination uptake, along with issues related to family size, birth order and maternal education[2,3,4,5]. However, the data available up until now has been limited and fragmented.

In 2011, in response to increasing numbers of people refusing or delaying immunisation within the European Region, the European Technical Advisory Group of Experts on Immunisation (ETAGE) asked the WHO Regional Office for Europe to develop tools to help countries address vaccine hesitancy more effectively[6]. This resulted in the development of The Guide to Tailoring Immunization Programmes (TIP) published in 2013[7]. The TIP approach provides a framework based on behavioural insights methodology to enable countries to:

- identify populations susceptible to vaccine preventable diseases
- diagnose supply- and demand-side barriers and enablers to vaccination
- recommend evidence-informed responses to improve vaccination uptake

The approach involves working very closely with a broad stakeholder group, particularly the communities involved, to identify their beliefs, experiences, requirements and preferences. Some subgroups within communities may be more difficult to engage with or persuade, so the information collected can be used to carry out 'segmentation' to identify specific subgroups within the communities and enable targeted interventions.

In 2014 the teams responsible for immunisation services in Hackney decided to use the WHO Tailoring Immunisation Programmes (TIP) approach to fully explore the reasons for sub optimal vaccination uptake within the Charedi community.

Applying the TIP approach in the Charedi Orthodox Jewish Community

Methods

The TIP initiative was carried out within the Hackney Charedi community in 2015/16 with the aim of understanding the barriers and enablers to vaccination. The work was led by representatives from Public Health England (PHE), National Health Service England (NHSE) with support from WHO Regional Office for Europe. TIP offers a step by step process where each step identifies and informs the next e.g. the SWOT analysis led to the decision to carry out the parental survey. The issues highlighted from these steps were then explored in more detail in the qualitative interviews with parents and key informants. The methods and results from each component of the TIP process are detailed in the full report on the gov.uk website[11] but the key stages of TIP are outlined in Fig. 1.

Fig. 1: The steps of the TIP process in the North East London Charedi community

An initial stakeholder meeting served to engage key stakeholders and agree on the focus of the TIP process in the community. The meeting was hosted by PHE and included a local Rabbi and representatives from the Homerton University Hospital NHS Foundation Trust, the London borough of Hackney Public Health Department NHS England, and WHO Europe. This led to:

- mapping of the current immunisation service and support for immunisation within the community.
- a literature review conducted to build on evidence from research with Charedi communities globally
- analysis of relevant surveillance and outbreak data.

A second stakeholder meeting enabled broader stakeholder engagement, additionally including community representatives from three local children's centres, the health policy

lead for the Interlink Foundation (umbrella organisation for Orthodox Jewish charities and voluntary organisations) and local health and immunisation service providers. The initial situation analysis was presented, and a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was carried out in order to identify barriers and enablers to immunisation. A questionnaire was designed to address key issues identified in this SWOT. These self-completed questionnaires were distributed to parents via General Practices and children's centres. Hebrew and Yiddish translations were available. Parents completing the questionnaire were asked to indicate whether they were interested in taking part in an interview. Key informants including community leaders, commissioners and providers of immunisation services, were approached with the interview study details via email and asked to respond directly to the study team if interested.

Data from returned questionnaires was entered onto a database created using EpiData Manager and the analysis carried out using Stata. Ordinal logistic regression assuming proportional odds was used.

Parents and key informants expressing interest in being interviewed were contacted by the researchers and written informed consent obtained prior to interview. Semi structured interviews by trained interviewers were carried out with parents and key informants to explore the barriers and enablers identified in the questionnaire in more detail.

Interview recordings were transcribed anonymously and the transcriptions were downloaded into a qualitative data analysis software programme (NVivo)

Data analysis was mainly thematic although grounded theory techniques were also applied. The analysis proceeded in tandem with data collection and the investigators met regularly to discuss emerging findings and fine tune interview questions accordingly.
The relevant research governance and ethics approvals were obtained for both the questionnaire and interview studies.

Barriers and enablers identified at all stages of the TIP formative process were analysed to explore behavioural patterns. Issues were grouped according to whether they were societal, community or individual. Parents were grouped according to their beliefs and behaviours to ensure solutions could be tailored to meet the needs of different segments of the community.
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Key findings

Questionnaire Survey

One hundred and twenty-six questionnaires were returned from General Practices and children's centres between June and September 2015. Of these, 43 (34%) had children who were not up-to-date with their immunisations, 4 (3%) were unsure of their children's vaccination status, and 78 (62%) had children who were up to date with their immunisations (one respondent left this field blank).

Interview studies

We approached 28 Jewish parents, who indicated on the questionnaire that they were willing to be contacted for further information. Of these, 10 parents were interviewed (36%). Six (21%) declined on further contact, and 12 (43%) were unavailable. Of those interviewed, 50% of parents stated that their children were fully vaccinated.

Of the 38 key informants approached, 10 were interviewed (26%). Fourteen (37%)key informants did not respond, 3 (8%) were not involved in the childhood immunisation programme in the Charedi community, and 11(29%)initially expressed interest but were then unavailable.

TIP process

The findings of the formative process, including mapping of services, data analysis, questionnaire survey, in-depth interviews and three stakeholder meetings, included the following:

- analysis of surveillance and outbreak data confirmed that uptake of immunisations was lower within the Charedi community and recurring VPDs were placing a burden on the community particularly in children under 4 years of age

The questionnaire survey and interview studies confirmed

- Mothers generally make the decisions around vaccination of their children
- There was no evidence of community resistance against vaccination for example, related to cultural norms, opinions or religion
- There was, also little evidence of the concept of childhood immunisation as an important social value within the community
- Parents who delayed or refused vaccinations did so for reasons that were broadly similar to the wider population for example, concerns about side effects or the mistaken belief that too many vaccinations would over-load an immature immune system
- Ease of access to booking appointments, child friendly facilities and reducing waiting times were important issues for parents. As an example, due to the higher than average number of children in each family, a lack of waiting room space for small children to play, for storing buggies and long waiting times were identified as barriers to vaccination
- Community specific initiatives such as community venues, Sunday clinics and Charedi nurse immunisers were identified as enablers to vaccination
- There are un-met information needs within the community. Community specific information was particularly valued.

- Interviews with key informants identified pressure on providers of immunisation services due to having to manage a high proportion of young children with no additional resource

Analysis of the barriers and enablers identified societal, community or individual factors (Table 1).

Table 1: Barriers and enablers to immunisation uptake within the Hackney Charedi community 2015

A feedback meeting was held with community members, a senior Rabbi, NHS commissioners and providers, general practice staff, Public Health England, WHO, Government and the qualitative research team from the London School of Hygiene & Tropical Medicine to discuss the findings and to provide input into the grouping of the mothers into specific categories and the development of the recommendations. The behavioural pattern analysis and feedback meeting output enabled four broad categories of mothers to be identified (Table 2). The different categories may need differing strategies whilst also bearing in mind that most mothers fit into more than one category.

Table 2: Barriers and enablers to childhood immunisation for specific subgroups within the Hackney Charedi Orthodox Jewish community

Discussion

The results of the formative research and behavioural analysis challenged the assumption that a cultural or religious anti-vaccination sentiment existed within the community. Many of the issues related to access to services. Service providers in the area have challenges due

to having to deliver immunisation services to the large numbers of children with no additional resource. This leads to issues in setting up robust invitation and reminder systems, discussing immunisation with families and following up with non-responders. From the parents' point of view, large families with competing pressures makes it challenging to prioritise immunisation particularly if it's difficult to make an appointment and there are long waiting times and no child friendly facilities. One issue highlighted subsequently is the lack of private space for breastfeeding in the waiting area [14, 15]

Where mothers were choosing to delay or refuse vaccinations their reasons were broadly similar to the wider population and reduced access to mainstream media means that myths or misinformation may circulate for longer within the community[16-18]. The behavioural analysis identified potential categorisation of subgroups within the community enabling a more tailored approach to addressing concerns and meeting parents' needs.

The final feedback meeting with the broader stakeholder group, enabled a series of recommendations for commissioners and providers of immunisation services working with the community to be developed. These are detailed in the main report[11] and include recommendations for commissioners to review services to ensure that providers are able to meet the needs of the community. The services commissioned should be flexible, sustainable and the use of community champions or increasing the provision of Charedi immunisation nurse specialists should be considered. Continued close working with community members including religious leadership and use of community media to publicise immunisation information should help to promote immunisation as a social norm. Information should also include social norm messaging such as 'most people within the community get their children immunised on time'.

TIP is not a project with an end, but rather a long-term process to ensure sustainable health behaviour change through understanding the needs of the intended beneficiaries. Since the development of the recommendations NHS commissioners and the relevant General

Practices have been working in partnership to provide sustainable solutions. This includes developing flexible appointments in family friendly surroundings, robust call and recall systems and improving data collection. The General Practices have also collaboratively employed culturally sensitive nurses to work across the practices to increase uptake. As another important outcome of the process, the Charedi community representatives engaged in the process are still actively advocating for immunisation in their community. Community members and religious leaders were involved at all stages of the project and were key to its success. The chief Rabbi with responsibility for health who is pro-immunisation and a representative from the Interlink foundation (an umbrella organisation for Orthodox Jewish charities) were and continue to be, keen supporters of the project and advocates for wider community engagement.

As part of the way forward it is a critical recommendation of the main report that all community specific interventions are fully evaluated so that effective sustainable solutions can continue to be developed and refined.

Conclusions

The TIP approach was an effective way of investigating factors linked to sub-optimal immunisation within the Charedi community confirming some assumptions and challenging others. The use of behavioural insights including segmentation enabled the categorisation of subgroups so that more targeted interventions could be developed. The comprehensive stakeholder engagement which is a key pillar of the TIP approach ensured a deeper understanding of the barriers and enablers to vaccination as well as increasing ownership in the community. TIP should be considered as a useful approach to identify communities or populations with sub-optimal immunisation uptake and to help identify their main enablers and barriers to vaccination.

Conflicts of interest

There are no conflicts of interest to declare.

The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the institutions with which are affiliated.

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References

1. UK COVER data www.gov.uk/government/collections/vaccine-uptake
2. T Lernout, E Kissling, V Hutse, K De Schrijve, G Top. Surveillance and outbreak reports: An outbreak of measles in orthodox Jewish communities in Antwerp, Belgium, 2007-2008: different reasons for accumulation of susceptibles.
3. Khitam M, El-Hai R, Amit-aharon A, Nehama H, Gondia M, Davidovitch N, Goren S, Cohen D. Risk factors of underutilization of childhood immunisations in ultraorthodox Jewish communities in Israel despite high access to health care services. Vaccine. 2012; 30 (12)
4. Gavrielov-Yusim N, Battat E, Neumann L, Friger M, Balicer R. Birth order and private voluntary immunisation – a study of 110,902 children. Vaccine. 2012; 30 (2)
5. Henderson L, Millet C, Thorogood N. Perceptions of childhood immunisation in a minority community:qualitative study. Journal of the Royal Society of Medicine. 2008; 101: 244-251

6. ETAGE Meeting Report 2011. [accessed 15 January 2018] http://www.who.int/immunisation/sage/7_etage_2011_nov11.pdf?ua=1 [accessed 15 January 2018]
7. Guide to Tailoring Immunization Programmes http://www.euro.who.int/en/health-topics/communicable-diseases/measles-and-rubella/publications/2013/guide-to-tailoring-immunisation-programmes [accessed 15 January 2018]
8. The history of Hackney. http://www.hackney.gov.uk/hackney-diversity [accessed 15 January 2018]
9. Interlink Patient Centred Care http://www.healthwatchhackney.co.uk/publications [accessed 15 January 2018]
10. Sherwood, H (7 August, 2016), North London Jews find room to flourish in the wide open spaces of Canvey Island. The Guardian. https://www.theguardian.com/world/2016/aug/06/house-prices-jews [accessed 15 January 2018]
11. Tailoring Immunisation Programmes, Charedi community, north London https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/568194/Tailoring_immunisation_programs_Charedi.pdf [accessed 15 January 2018]
12. Stewart-Freedman B, Kovalsky N. An ongoing outbreak of measles linked to the United Kingdom in an ultra-orthodox Jewish community in Israel. Euro Surveill. 007;12(38):pii=3270. http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3270 [accessed 15 January 2018]
13. Abbott S. Lay and professional views on health visiting in an orthodox Jewish community. British Journal of Community Nursing. 2004; 9 (2): 80-6
14. Children at risk as Charedi parents say no to vaccinations. The Jewish Chronicle. https://www.thejc.com/news/uk-news/children-at-risk-as-charedi-parents-say-no-to-vaccinations-1.430122 [accessed 15 January 2018]
15. In search of better vaccines: creating the route to ending a disease http://www.lshtm.ac.uk/research/research-action/features/search-better-vaccines-creating-route-ending-disease [accessed 15 January 2018]

16. Gellin BG, Maibach EW, Marcuse EK. Do parents understand immunisations? A National telephone survey. Pediatrics. November 2000; 106(5): 1097-1102.
17. Madlon-Kay DJ and Harper PG. Too many shots? Parent, nurse, and physician attitudes toward multiple simultaneous childhood vaccinations. Arch Fam Med. July 1994; (3): 610-613.
18. Offit PA, Quarles J, Gerber MA et al. Addressing parents' concerns: Do multiple vaccines overwhelm or weaken the infant's immune system? Pediatrics. January 2002; 109(1); 124-129.