

UKHSA Advisory Board

Title of paper	UKHSA's role in optimising and delivering the national immunisation schedule
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1. Purpose of the paper

- 1.1. The purpose of this paper is to outline UKHSA's end-to-end leadership role in optimising and delivering the UK immunisation schedule to achieve the best population outcomes from our national immunisation programme.

2. Recommendations

- 2.1. The Advisory Board is asked to:
 - **NOTE** the work of UKHSA in the development of advice on, and implementation of, the routine immunisation schedule in England;
 - **COMMENT** on potential future risks and role of UKHSA to sustain and improve future delivery of the national immunisation programme.

3. Background

- 3.1. Globally, vaccination is the most effective public health infectious diseases intervention available, ranking second only to clean water for disease prevention. One hundred years ago, the biggest threat to life in people under the age of 35 was infection; it is now external factors.
- 3.2. With the advent of national immunisation programmes (and other health interventions) the average life expectancy has increased from 51 to 81 years in the UK. However, complacency related to low infection rates for common childhood vaccine preventable illness due to the success of the immunisation programme, means that uptake is falling in the UK and other high-income countries. This is resulting in increased risk of preventable infectious diseases such as measles which can result in morbidity and mortality even in high income countries.
- 3.3. The UK programme has changed dramatically since its inception (Annex 1), with the pace of change increasing since 2000, as the scope in terms of diseases targeted has increased. In addition to new vaccines, the programme undergoes clinically significant changes at least once a year (for example, changes in scheduled ages, increases in eligible populations or use of an updated vaccine product).
- 3.4. The current schedules are outlined in Annex 2. The current routine NHS programmes in England deliver around 13 million routine vaccines per year to provide protection

against 15 infectious diseases, with the seasonal flu programme also helping to protect around 15 million people. Other vaccination programmes are given in local authority commissioned services, for example sexual health and addiction services.

- 3.5. A number of additional doses and vaccines are given in the NHS and private sector (for example in occupational health and travel settings) for groups at higher risk of clinical complications of infection, of exposure to infection (including rapid post-exposure vaccination), or of exposing others (e.g. family members of those with immunosuppression). These are generally not part of formal commissioning arrangements and so rely heavily on clinical guidance produced by UKHSA.

4. Aims of the national immunisation programme

- 4.1. The overall aim of the national immunisation programme is to protect the population from vaccine preventable diseases and reduce the associated morbidity and mortality.
- 4.2. In line with the NHS constitution, however, all programmes are required to be cost-effective from a healthcare perspective. This drives world-leading innovation in schedule design and unparalleled value for money and allows the UK to be at forefront of using new vaccines (such as those against meningococcal C and B).
- 4.3. Estimated direct savings to the NHS for some of the historical programmes are around £400m per year (see Annex 3 for details on specific programmes). Taking into account traditional quality adjusted life years and wider economical savings to productivity, evidence suggests that vaccine programmes have [substantially higher benefits](#) than those currently included in standard analyses.

5. UKHSA's role in the national immunisation programme

- 5.1. The national immunisation programme is overseen by a tripartite collaboration between the Department of Health and Social Care (DHSC), UKHSA and NHSE as outlined in the Section 7a agreement. DHSC are responsible for policy with NHSE commissioning the provision of immunisation services.
- 5.2. UKHSA provides the public health and clinical technical expertise to both national agencies and to frontline healthcare professionals, including through the management and secretariat of the Joint Committee on Vaccination and Immunisation.
- 5.3. UKHSA also procures, stores and distributes vaccines for the routine programme direct to frontline vaccinators (with the major exception of adult flu). Having these functions brought together in a single agency, as described by the World Health Organization (see adapted figure – Annex 4), thus ensures an integrated end-to-end system to support these vertical programmes.
- 5.4. Local leadership roles, based in screening and immunisation teams, were transferred from Public Health England (PHE) to the NHS in October 2021, and provide equivalent support to design and delivery of the programmes at a local level, drawing on the expertise of the national teams as required.
- 5.5. The UK immunisation schedule is acknowledged to be world leading in its ability to innovate and achieve value for money, meaning that UK residents get more

comprehensive protection but with fewer vaccine doses and visits than comparable countries, and with vaccine prices generally below those paid in the US and Europe. Any risk from these innovative approaches is mitigated by high quality, rapid world-leading surveillance systems (supported by high quality reference laboratory services), that can detect and respond to signals of lower protection, loss of control or emerging vaccine escape.

- 5.6. UKHSA also supports the optimisation and delivery of the UK programme by generating evidence through its National Institute for Health Research Health Protection Research Units (most notably the HPRU in vaccines and immunisation based at the London School of Hygiene and Tropical Medicine (LSHTM)).

6. Surveillance of vaccine-preventable diseases and evaluation of immunisation programmes

- 6.1. Enhanced surveillance, analysing changes in disease epidemiology and vaccine uptake, supports programme evaluation and outbreak identification and response. Recent examples including the modelling and risk assessment undertaken that predicted the current measles outbreaks and highlighted the need for catch-up programmes, the detection of polio in wastewater to inform booster vaccination in London, and the detection of toxigenic diphtheria among asylum seekers with the introduction of antibiotic prophylaxis and immunisation in reception centres.
- 6.2. UKHSA has globally recognized expertise in monitoring vaccine effectiveness, for example providing first global evidence for Meningococcal Group B and maternal pertussis vaccines and the first documentation of vaccine effectiveness changes against COVID-19 Delta and Omicron variants.
- 6.3. Mathematical modelling and economic analysis are undertaken to determine the impact and cost-effectiveness of vaccination strategies. This has informed the 2024 potential procurements of higher valency pneumococcal adult and infant vaccines to improve population control of this major cause of hospital admission and death.
- 6.4. Epidemiological assessment of vaccine safety signals (usually identified by the Medicines and Healthcare products Regulatory Agency) is conducted to determine true adverse events. This can help to determine vaccine choice by providing evidence to JCVI [e.g. the age related risk of vaccine-induced thrombosis and thrombocytopenia (VITTs) after COVID-19 Vaxzevria vaccine].
- 6.5. UKHSA specialist laboratory services support diagnostics, the surveillance of organism diversity and of population susceptibility. This builds on reference laboratory capabilities to provide confirmatory testing for diagnosis of rare and serious cases for frontline clinicians (e.g. congenital rubella syndrome, polio isolation), specialist testing to support our international surveillance obligations for elimination targets (e.g. non-invasive oral fluid testing to discard suspected cases of measles and rubella), the monitoring of strain diversity (by genomic or non-genomic methods) to determine vaccine coverage and identify “escape” strains (e.g. detection of the increase in a virulent MenW strain in 2015 led to the adolescent MenACWY programme) and serological surveillance to monitor trends and identify potential susceptibility gaps (e.g. showing the high level of N and S antibody to COVID-19 informed the JCVI decision to move to a single dose primary course).

7. Expert clinical support to immunisation programme delivery

- 7.1. UKHSA produce and publish national guidance on immunisation '[The Green Book: Immunisation against infectious disease](#)', which has 43 (12 generic and 31 disease specific) chapters and is the single authoritative source of clinical advice on immunisation across the UK. The COVID-19 chapter alone has had 21 updates since December 2020 and the green book is one of the highest accessed webpages in the agency, with 861,458 individual accesses in the past year.
- 7.2. We produce [Patient Group Directions](#) (currently 29, with 18 updates in the past year) to support programme delivery without the need for individual prescribing. This facilitates administration of vaccines in non-specialist settings and without the requirement for individual prescription.
- 7.3. We lead on the drafting of professional communications. This includes the NHSE and UKHSA bipartite letters that explain and announce changes to the programmes (including the [annual flu letter](#)). These are usually supported by UKHSA hosted webinars for health care professionals. For example, a recent shingles webinar was attended by over 500 healthcare professionals.
- 7.4. We provide 24-hour, seven day a week advice to front line healthcare professionals for exposures, cases and outbreaks of vaccine preventable diseases. This includes the Rabies and Immunoglobulin Service (RIgS), who supply and issue rare immunoglobulins and antitoxins, supporting evidence based clinical practice in all NHS Trusts and primary care facilities, limiting use of blood products and, in the longer-term, saving money and NHS capacity. The national immunisation advice box receives around 1500 queries per year (excluding COVID-19) from local teams, whereas the RIgS receives over 3000 requests per year.
- 7.5. UKHSA teams undertake ongoing engagement with industry including through regular scientific exchange meetings (annual or twice yearly with the major vaccine manufacturers). These exchange meetings include UKHSA presentations on the performance of current vaccines, and may lead to UKHSA data on safety and/or efficacy being used to support global use and licensing changes. For example, data on the [efficacy](#) of the pertussis vaccine in pregnancy aided the expansion of the license (in the UK and globally) to include pregnancy. The companies present on their newer products and value discussion on the manufacturer's marketing strategy and how this may align with the UK public health needs.

8. Clinical expertise, options appraisal and secretariat functions for the Joint Committee on Vaccination and Immunisation (JCVI)

- 8.1. UKHSA hosts the secretariat for JCVI, and provides clinical and public health expertise and evidence to support JCVI's advice and recommendations to Ministers on immunisation, for example;
 - Following the discontinuation of Hib/MenC. UKHSA presented options and provided detailed analysis for several infections (pertussis, Hib, and meningococcal disease) to support decisions around changes to the childhood schedule for 2025.
 - Following the detection of vaccine-derived polio virus type 2 in sewage, UKHSA presented options for the JCVI to consider based on clinical need, risk to existing programmes and supply considerations. A rapid immunisation response was advised and then mounted in London in later 2022.

- UKHSA provided advice to JCVI on the evidence and options to reduce the risk of maternal vaccination (using a combination pertussis vaccine) impacting on infant response to polio vaccine. This has led to a change in vaccine procured for the maternal programme from late 2024.

8.2. The JCVI secretariat also supports comprehensive horizon scanning for new and updated vaccines.

9. Procurement and supply

9.1. UKHSA has responsibility for the procurement of vaccines used within the national immunisation programmes across the UK (excluding adult flu), gaining economies of scale, delivering value for money, improving security of supply. This helps to protect the national programmes from shortages and supply disruption through central stockpiling strategies, for example:

- Following a 2018 notification of the discontinuation of Hib/MenC vaccine and the absence of direct alternatives, UKHSA worked with the supplier and regulator to secure a 5-year extension to shelf life which enabled significant volumes of vaccine to be secured and stockpiled before discontinuation. This provided programme stability until 2025, and allowed time to develop and implement a new vaccination strategy dovetailed into wider childhood schedule changes.
- UKHSA, through its stockpiling and procurement strategies, protected the national childhood programme from any disruption while providing surge capacity through the offer of additional inactivated polio vaccines to the NHS to support the London catch-up campaign in 2022, in response to the detection of cVDPV2 in sewage.

9.2. Stock management systems and processes ensure equitable UK distribution to front line NHS locations and other customers, with NHS facing web-based ordering controlled by UKHSA (through the IMMForm platform).

10. Programme design and planning

10.1. UKHSA provides programme and project management support to design, plan for and implement changes to the routine immunisation programme. These boards bring together stakeholders across the tripartite, the devolved administrations and crown dependencies to enable a co-ordinated response to the roll out of programme changes. For example, planning is currently underway for significant changes to the routine childhood programme, including adding a dose of hexavalent vaccine, removing the MenC booster, and bringing forward the second dose of MMR to improve uptake from 2025.

10.2. UKHSA facilitates a network of local immunisation teams, mainly involving the local Screening and Immunisation teams who transferred to NHSE from PHE in October 2021. This National Immunisation Network (NIN) provides a platform for discussion of professional issues identified on the ground at weekly calls and at the popular annual NIN conference. The network also facilitates responses to issues such as provider errors. For example, an issue raised in relation to potential errors in choice of influenza vaccine product enabled rapid national investigation and communication to local immunisation teams in the 2022/3 season.

11. Improving uptake and addressing inequalities

- 11.1. UKHSA undertakes the collection, analysis and regular reporting of vaccine coverage and uptake across England for all routine programmes; with intermittent enhanced collections. This evidence is used to estimate [susceptibility](#) and inform disease control, and to support vaccine delivery. For example our [analysis](#) of coverage in boroughs giving the second dose of MMR early, showed higher coverage and led to JCVI advice to bring forward the second dose to 18 months.
- 11.2. Long term trends in coverage of routine programmes (see Annex 5) show substantial changes over time. Large effects on specific programmes are usually due to issues around parental concerns (for example pertussis in the 1970s, and MMR in the 1990s) but smaller changes are mainly driven by NHS changes in [delivery](#). A small decline in coverage of all vaccines has been apparent each quarter since 2013, the cumulative decline is now significant (noting that impacts on different age groups occur at different lags after any change), and decline has been accelerated by disruption during the pandemic.
- 11.3. Although the NHS is primarily responsible for delivery of the routine programmes, UKHSA plays a crucial underpinning role. This role includes measuring and analysing coverage data (see above), advice and evidence generation on aspects of delivery (for example through the HPRU see below), modifying supply chains to facilitate outbreak response and use of alternative delivery settings, and clinical support to facilitate delivery (for example clinical guidance on schedules, coadministration, prescribing guidance). A major function is our role in supporting and [training](#) vaccinators and other healthcare professionals, thus ensuring they administer vaccines safely and have the confidence to advocate for vaccination and to counsel and consent patients and carers of children appropriately.
- 11.4. UKHSA also produces, publishes, prints and distributes healthcare professional training materials, patient facing information leaflets and other relevant materials (posters, record cards and digital assets) to support informed consent and build confidence. Prior to the COVID-19 programme, around 8 million patient facing leaflets were printed and distributed each year. [Resources](#) are translated in up to 32 languages and produced in accessible formats such as British Sign Language with voiceover, braille and Easy-read.
- 11.5. The production of resources will flex to respond to specific underlying evidence, for example collaborative qualitative research with the HPRU showed that Eastern European migrants were not aware of how to access immunisation services. A UKHSA leaflet '[Moved to the UK](#)' was then produced in multiple relevant languages and later updated for the COVID pandemic. In response to the detection of vaccine-derived polio, UKHSA national and local teams worked with the Jewish community in London, sharing approaches with teams in New York and Israel. Efforts focused on tackling access, production of targeted material and work with community networks.
- 11.6. UKHSA commissions and analyses a [regular](#) tracking survey, including surveys in pregnant women, adolescents, and parents of young children and adolescents. Analysis provides context for interpreting changes in coverage (see two key graphs from the 2020 survey at Annex 6), and highlights needs for further research in the best ways to support confidence

- 11.7. UKHSA also collaborates in research on attitudes to immunisation and in health service research on the impact of organizational and service delivery changes. This includes broad topics such as impact of the 2013 system [changes](#), and specific topics such as evaluating [electronic consent in school age programmes](#).
- 11.8. UKHSA also works to address and mitigate health inequalities, including publishing a Health Equity Assessment and developing a [strategy](#), local action plan template and an evaluation toolkit for local teams.
- 11.9. Reduction of inequalities is also a key focus of our HPRU research, both with the LSHTM and the Evaluation HPRU at Bristol University. For example, compared to other countries and delivery models, we have shown that school-based delivery of the UK HPV programme achieved [high coverage with limited inequalities in uptake](#). This has resulted in a [decline in cervical cancer in eligible cohorts](#), with recent data showing that more cases are averted in the most deprived women, markedly reducing the long-established inequalities in cervical cancer rates.

12. Potential Future Risks

- 12.1. The UKHSA teams (Annex 7) have a challenge with workload and capacity as new programmes are recommended whilst existing programmes are sustained and optimised. Additional capacity and capability, including in reference laboratories, is required to maintain high quality timely outputs for current and new programmes. Work is underway to optimise the end-to-end UKHSA costs including the laboratory, genomic and clinical epidemiological surveillance, and evaluation work and ensure these are appropriately costed and charged to the relevant programme.
- 12.2. Developing new vaccination programmes involves additional upfront costs to prepare and develop coverage monitoring, enhanced surveillance, training, professional and public facing materials required for the initiation. At present, there are no programmatic funds available prior to programme initiation (for example for the two potential RSV programmes) and therefore UKHSA has to absorb these within the available core budget.
- 12.3. UKHSA work closely with the NHS to collaborate, support and influence the commissioning and delivery of the immunisation programmes. In March 2025, the commissioning of these programmes will be delegated from NHS England to the 42 integrated care boards (ICBs). This will require a change in engagement with, in support to commissioners and delivery of supply to more services. It also risks [greater variation in service delivery](#) as ICBs consider which services their population require, [how these are configured](#) and how these will be coordinated locally. While commissioning services closer to the population has great potential to ensure that inequalities gaps are narrowed, there may also be challenges in understanding reasons for and impact of variability in vaccine delivery on uptake.
- 12.4. The recently published NHS strategy is high level and UKHSA needs to work with NHSE to support detailed planning and ensure safe transition around the risks of changing lead providers. There is also an urgent need to clarify responsibilities for vaccinating during outbreaks and for provision of clinical advice to frontline vaccinators.
- 12.5. Another key aspect of the NHS E strategy is data transformation. There is currently no single national vaccination record and there are serious limitations to current data

flows between systems/providers. GP records are considered the central repository but may not be updated due to absence of electronic record transfer from other providers. An integrated national vaccination register could support the key requirement for local providers and coordinators to identify and reach out to unvaccinated individuals, and the same system could then be used to support regional and national performance monitoring in the NHS and UKHSA access for granular analysis to estimate susceptibility, including by key demographic characteristics. Creation of such a register for all life-course vaccines is considerably more challenging than the current system created for COVID-19, and likely to require significant investment.

13. Key Questions for the Advisory board

13.1. UKHSA teams would welcome advice on:

- how best to engage with local public health systems, in particular with the emerging ICBs; Directors of Public Health, wider local government, and their commissioned services (including health visitors, school nurses); and the screening and immunisation teams
- working with the Department for Education to improve school advocacy and consider the merits of embedding a school entry check of Immunisation status;
- using health economics better to demonstrate the value of vaccines, and thus support prioritization of vaccination in ICBs and other agencies;
- encourage research funders to prioritize and view evaluation of delivery and public health as equally important to the development of new vaccine technology;
- how best to sustain and expand the role of the people's voice in the vaccine programme to support local community advocacy and to contribute to improving health equity.

14. Conclusion

14.1. UKHSA has a vital end-to-end role in public health, using a range of expertise and approaches, in maximising the health outcomes of our immunisation programmes. Although DHSC are responsible for policy, this invariably follows JCVI advice which relies heavily on UKHSA evidence and expertise. Commissioning is led by NHS England, but with UKHSA providing a leading role in design and planning, and in guiding and supporting frontline healthcare professionals to deliver the programme safely and equitably to those with greatest need.

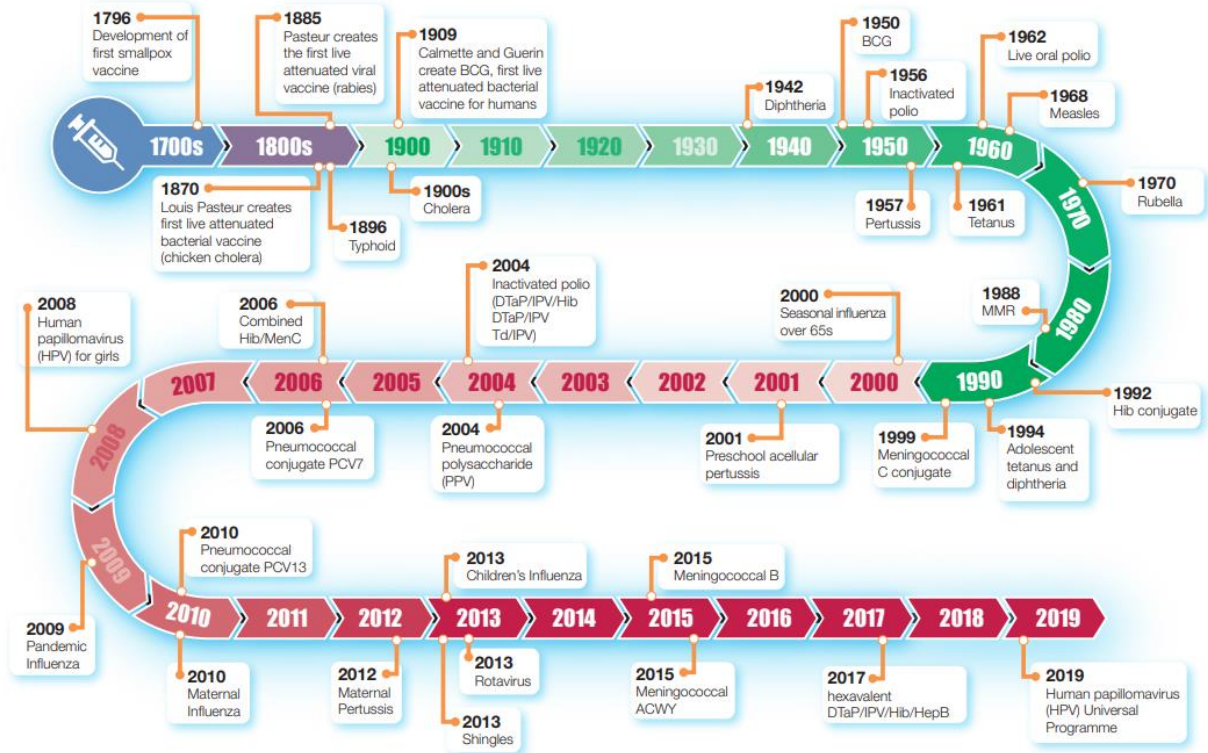
Mary Ramsay, *Director of Public Health Programmes.*

April 2024

Annex 1: Immunisation timeline



Historical vaccine development and introduction of routine vaccine programmes in the UK



Annex 2: Immunisation Schedules

The complete routine immunisation schedule				From September 2023
Age due	Diseases protected against	Vaccine given and trade name		Usual site ¹
Eight weeks old	Diphtheria, tetanus, pertussis (whooping cough), polio, <i>Haemophilus influenzae</i> type b (Hib) and hepatitis B	DTaP/IPV/Hib/HepB	Infanrix hexa or Vaxelis	Thigh
	Meningococcal group B (MenB)	MenB	Bexsero	Left thigh
	Rotavirus gastroenteritis	Rotavirus ²	Rotarix ²	By mouth
Twelve weeks old	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B	DTaP/IPV/Hib/HepB	Infanrix hexa or Vaxelis	Thigh
	Pneumococcal (13 serotypes)	Pneumococcal conjugate vaccine (PCV)	Prevenar 13	Thigh
	Rotavirus	Rotavirus ²	Rotarix ²	By mouth
Sixteen weeks old	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B	DTaP/IPV/Hib/HepB	Infanrix hexa or Vaxelis	Thigh
	MenB	MenB	Bexsero	Left thigh
One year old (on or after the child's first birthday)	Hib and MenC	Hib/MenC	Menitorix	Upper arm/thigh
	Pneumococcal	PCV booster	Prevenar 13	Upper arm/thigh
	Measles, mumps and rubella (German measles)	MMR	MMRvaxPro ³ or Priorix	Upper arm/thigh
	MenB	MenB booster	Bexsero	Left thigh
Eligible paediatric age groups ⁴	Influenza (each year from September)	Live attenuated influenza vaccine LAIV ^{5,6}	Fluenz Tetra ^{3,6}	Both nostrils
Three years four months old or soon after	Diphtheria, tetanus, pertussis and polio	dTaP/IPV	Boostrix-IPV	Upper arm
	Measles, mumps and rubella	MMR (check first dose given)	MMRvaxPro ³ or Priorix	Upper arm
Boys and girls aged twelve to thirteen years	Cancers and genital warts caused by specific human papillomavirus (HPV) types	HPV ⁶	Gardasil 9	Upper arm
Fourteen years old (school Year 9)	Tetanus, diphtheria and polio	Td/IPV (check MMR status)	Revaxis	Upper arm
	Meningococcal groups A, C, W and Y	MenACWY	Nimenrix	Upper arm
65 years old	Pneumococcal (23 serotypes)	Pneumococcal Polysaccharide Vaccine (PPV23)	Pneumovax 23	Upper arm
65 years of age and older	Influenza (each year from September)	Inactivated influenza vaccine	Multiple	Upper arm
65 from September 2023 ⁷	Shingles	Shingles vaccine	Shingrix	Upper arm
70 to 79 years of age (plus eligible age groups and severely immunosuppressed) ⁷	Shingles	Shingles vaccine	Zostavax ^{3,7} (or Shingrix if Zostavax contraindicated)	Upper arm

1. Intramuscular injection into deltoid muscle in upper arm or anterolateral aspect of the thigh.
 2. Rotavirus vaccine should only be given after checking for SCID screening result.
 3. Contains porcine gelatine.
 4. See annual flu letter at: www.gov.uk/government/collections/annual-flu-programme
 5. See Green Book HPV Chapter 18a for details on immunising immunocompromised young people who will need 3 doses.

6. If LAIV (live attenuated influenza vaccine) is contraindicated or otherwise unsuitable use inactivated flu vaccine (check Green Book Chapter 19 for details).
 7. See Green Book Shingles Chapter 28a for details on eligible age groups including severely immunosuppressed individuals from age 50.

Selective immunisation programmes			
Target group	Age and schedule	Disease	Vaccines required
Babies born to hepatitis B infected mothers	At birth, four weeks and 12 months old ^{1,2}	Hepatitis B	Hepatitis B (Engerix B/HBvaxPRO)
Infants in areas of the country with TB incidence $\geq 40/100,000$	Around 28 days old ⁴	Tuberculosis	BCG
Infants with a parent or grandparent born in a high incidence country ³	Around 28 days old ⁴	Tuberculosis	BCG
Children in a clinical risk group	From 6 months to 17 years of age	Influenza	LAIV or inactivated flu vaccine if contraindicated to LAIV or under 2 years of age
Pregnant women	At any stage of pregnancy during flu season	Influenza	Inactivated flu vaccine
	From 16 weeks gestation ⁵	Pertussis	dTaP/IPV (Boostrix-IPV)

1. Take blood for HBsAg at 12 months to exclude infection.

2. In addition hexavalent vaccine (Infanrix hexa or Vaxelis) is given at 8, 12 and 16 weeks.

3. Where the annual incidence of TB is $\geq 40/100,000$ – see www.gov.uk/government/publications/tuberculosis-tb-by-country-rates-per-100000-people

4. Check SCID screening outcome before giving BCG.

5. Ideally before 32 weeks gestation but may still be given after 32 weeks.

Additional vaccines for individuals with underlying medical conditions		
Medical condition	Diseases protected against	Vaccines required ¹
Asplenia or splenic dysfunction (including due to sickle cell and coeliac disease)	Meningococcal groups A, B, C, W and Y Pneumococcal Influenza	MenACWY MenB PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine
Cochlear implants	Pneumococcal	PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age)
Chronic respiratory and heart conditions (such as severe asthma, chronic pulmonary disease, and heart failure)	Pneumococcal Influenza	PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine
Chronic neurological conditions (such as Parkinson's or motor neurone disease, or learning disability)	Pneumococcal Influenza	PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine
Diabetes	Pneumococcal Influenza	PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine
Chronic kidney disease (CKD) (including haemodialysis)	Pneumococcal (stage 4 and 5 CKD) Influenza (stage 3, 4 and 5 CKD) Hepatitis B (stage 4 and 5 CKD)	PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine Hepatitis B
Chronic liver conditions	Pneumococcal Influenza Hepatitis A Hepatitis B	PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine Hepatitis A Hepatitis B
Haemophilia	Hepatitis A Hepatitis B	Hepatitis A Hepatitis B
Immunosuppression due to disease or treatment ⁴	Pneumococcal Shingles vaccine Influenza	PCV13 (up to 10 years of age) ^{2,3} PPV23 (from 2 years of age) Shingrix – over 50 years of age ⁵ Annual flu vaccine
Complement disorders (including those receiving complement inhibitor therapy)	Meningococcal groups A, B, C, W and Y Pneumococcal Influenza	MenACWY MenB PCV13 (up to 10 years of age) ² PPV23 (from 2 years of age) Annual flu vaccine

1. Check relevant chapter of the Green Book for specific schedule: www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book

2. If aged 2 years to under 10 years of age and unimmunised or partially immunised against pneumococcal infection, give one PCV13 dose.

3. To any age in severely immunosuppressed.

4. Consider annual influenza vaccination for household members and those who care for people with these conditions.

5. Check Green Book Shingles Chapter 26a: www.gov.uk/government/publications/shingles-herpes-zoster-the-green-book-chapter-26a

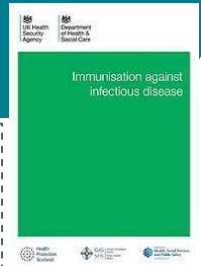
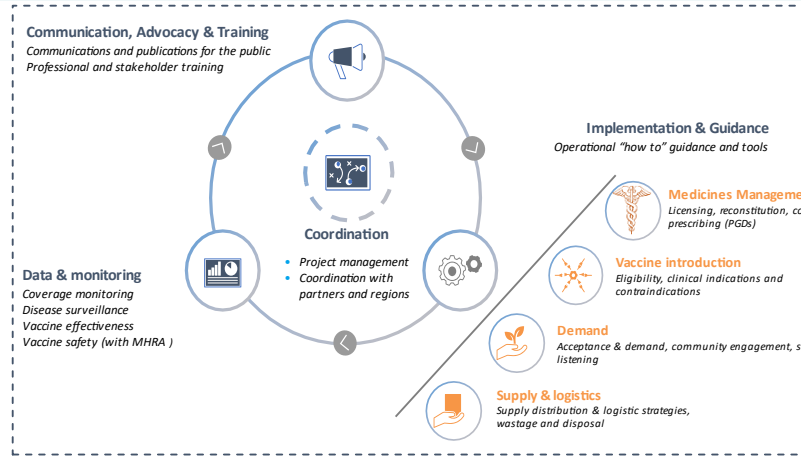
Annex 3: Estimated annual NHS cost savings from current programmes

Vaccine	Estimated annual savings
MMR	£90 million
Diphtheria/Tetanus/Hib/Polio/Pertussis	£220 million
Children Flu	£25 million
Rotavirus	£20 million
Men C	£5-10 million
HPV	£5 million
PCV	£15 million
Shingles	£200,000
PPV	~£700,000
Men B	£7 million
Men ACWY	£1-5 million
Maternal Pertussis	£1 million

Annex 4: UKHSA technical roles in the national immunisation programme

Implementation and delivery of vaccination programmes

UKHSA technical functions

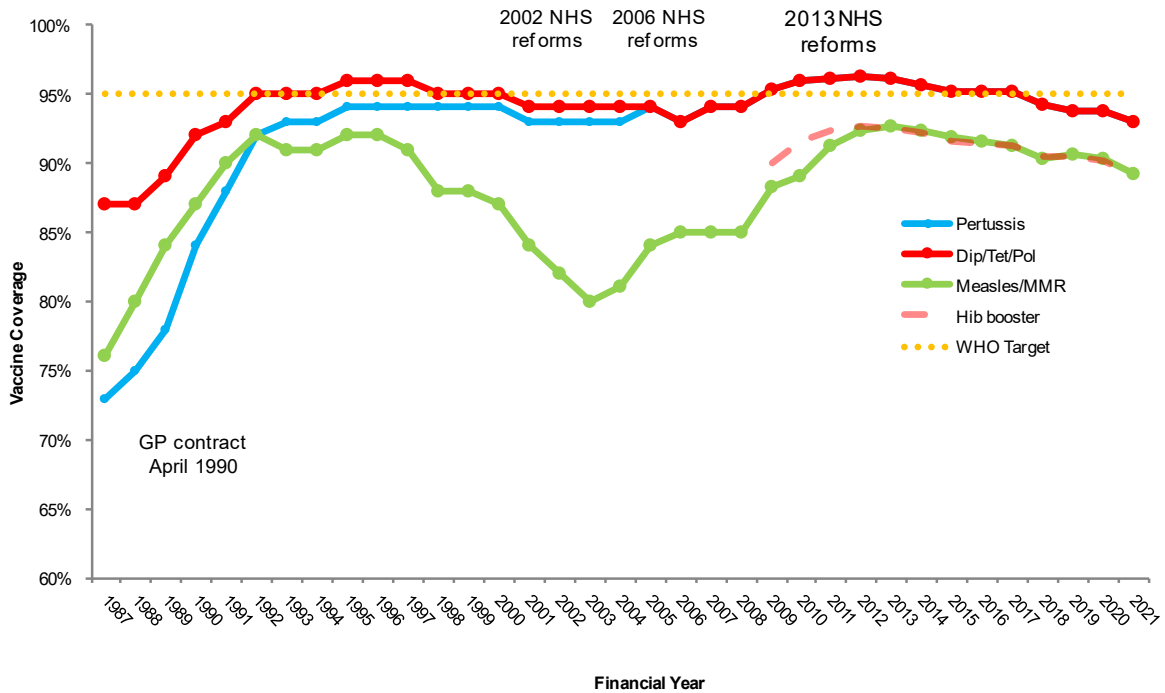


Adapted from WHO COVID assessment of country readiness and delivery for COVID vaccine

Annex 5: Historical trends in vaccine coverage

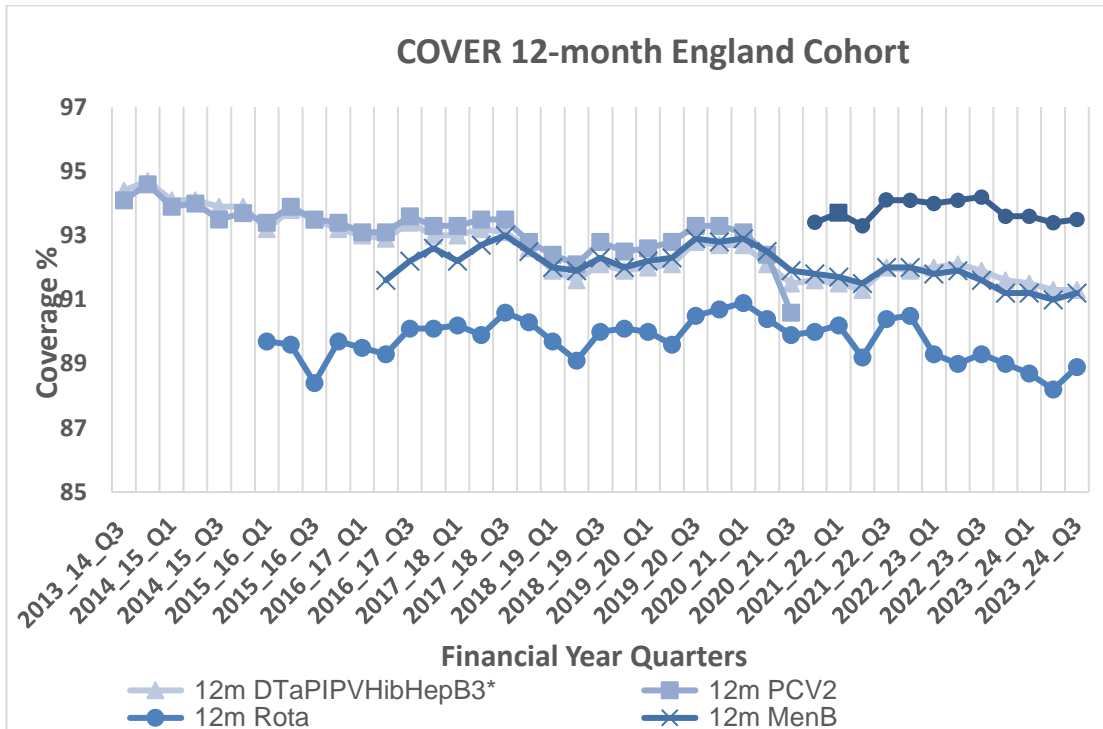
Figure 1: Annual

**Annual vaccination coverage at 24 months
England : 1987/88 – 2021/22**



COVER: Coverage of Vaccination Evaluated Rapidly scheme

Figure 2: Quarterly coverage of completed primary immunisations in England at 12 months (Q3 2013-14 to Q3 2023-24)



Note: From 01 January 2020, infants have been offered one dose of PCV vaccine at 12 weeks of age, followed by a booster at one year of age. This is the fourth quarter where PCV1 coverage has been published.

Figure 3: Quarterly coverage of completed primary immunisations in England at 24 months (Q3 2013-14 to Q3 2023-24)

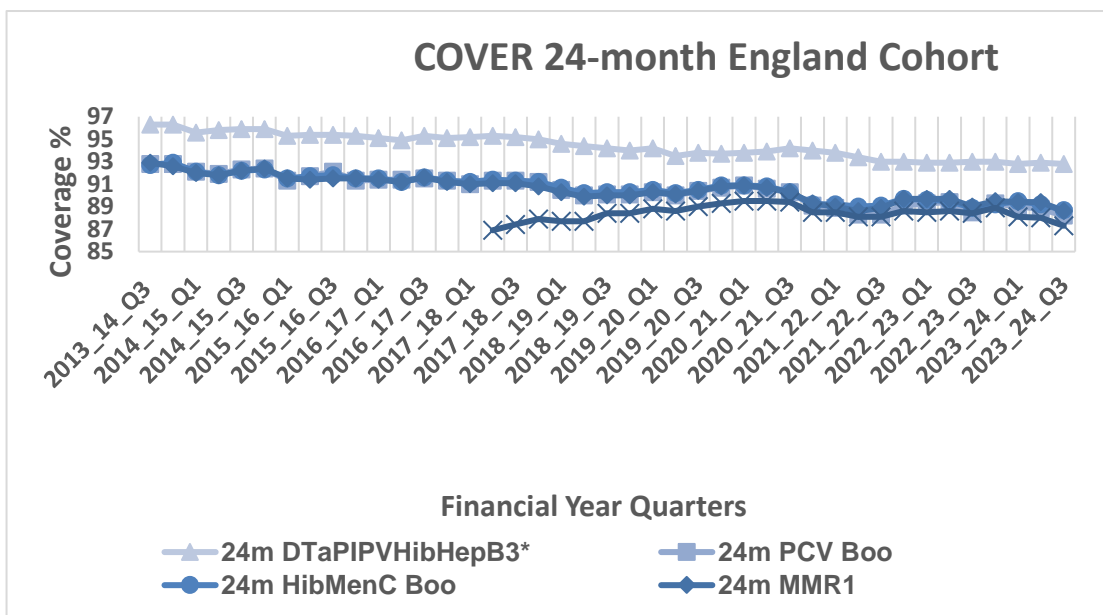
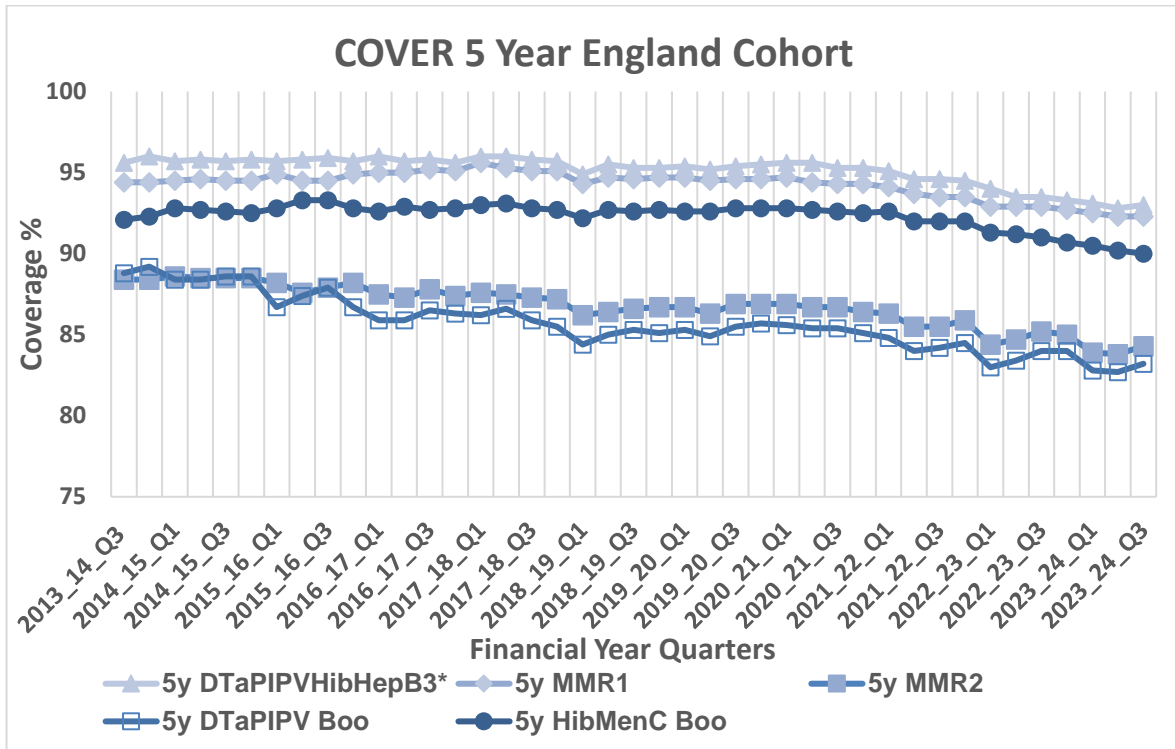


Figure 4: Quarterly coverage of completed primary immunisations in England at 5 years (Q3 2013-14 to Q3 2023-24)



Explanatory note: vaccines evaluated in the quarterly Coverage of Vaccine Evaluated Rapidly (COVER) scheme

Vaccine	Trade name	Diseases protected against	Age due	No. of doses and age measured	
DTaP/IPV/Hib/HepB	Infanrix hexa "Hexavalent"	Diphtheria, tetanus, pertussis (whooping cough), polio, Haemophilus influenzae type b (Hib) and hepatitis B (HepB)	Eight, twelve and sixteen weeks old	3	12 months 24 months 5 years
Meningococcal group B (MenB)	Bexsero	MenB	Eight and sixteen weeks old, and one year old (MenB booster)	2	12 months 24 months
				Booster	24 months
Rotavirus	Rotarix	Rotavirus gastroenteritis	Eight and twelve weeks old	2	12 months
Pneumococcal conjugate vaccine (PCV)	Prevenar 13	Pneumococcal (13 serotypes)	Twelve weeks old and one year old (PCV booster)	1	12 months 24 months
				Booster	24 months
Hib/Men C	Menitorix	Hib and Men C	One year old (on or after the child's first birthday)	1	24 months
MMR	MMR VaxPRO2 or Priorix	Measles, mumps and rubella	One year old and three years four months old	1	24 months 5 years
				2	5 years
dTaP/IPV booster	Repevax or Boostrix-IPV	Diphtheria, tetanus, pertussis and polio	Three years four months old	1	5 years

1. Official UK childhood vaccine coverage measurements are published quarterly and annually by UKHSA as part of the COVER programme, using data extracted from regional Child Health Information Services (CHIS). Data is published at national, regional, CCG/ICB and GP level.
2. Coverage measurements of childhood vaccines delivered before the age of five are presented in COVER reports, including the 6-in-1 vaccine (protects against Diphtheria, tetanus, pertussis (whooping cough), polio, Haemophilus influenzae type b and hepatitis B), and the Measles Mumps Rubella (MMR) vaccine.
3. Coverage of childhood vaccines are measured when children reach their first, second and fifth birthdays. Coverage measurements are therefore produced at a fixed time point after children first become eligible to receive that specific vaccine. This allows sufficient time for children to receive their vaccines and provides a robust measure of overall population susceptibility including any vaccines delivered after the scheduled age.
4. COVER data is the official authoritative data source for childhood vaccine coverage and used by bodies like the World Health Organization to assess population susceptibility and to determine disease elimination status. Mandated data returns ensure data completeness, data undergoes a thorough quality assurance process because of its official statistic status, and coverage estimates include children even if they are not registered with a GP. National data has also been used to predict outbreaks and to plan catch-up programmes to prevent national epidemics. Regional CHIS is used for similar functions at a local level, but also contains individual level data for targeted approaches at a population level.
5. In addition to regional CHIS data, the other main data source is GP records. These clinical systems are used by providers in the National Health Service to support local delivery and targeting call-recall to under-vaccinated children. Data are extracted from GP systems to the ImmForm platform to provide more timely data to NHS England for local performance management, commissioning processes, and informing future delivery plans.

Annex 6: Longer term trends in attitudes to vaccines in parents of under fives (abstracted from the 2020 tracking report)

Figure 10: Whether seen anything that might persuade them not to immunise

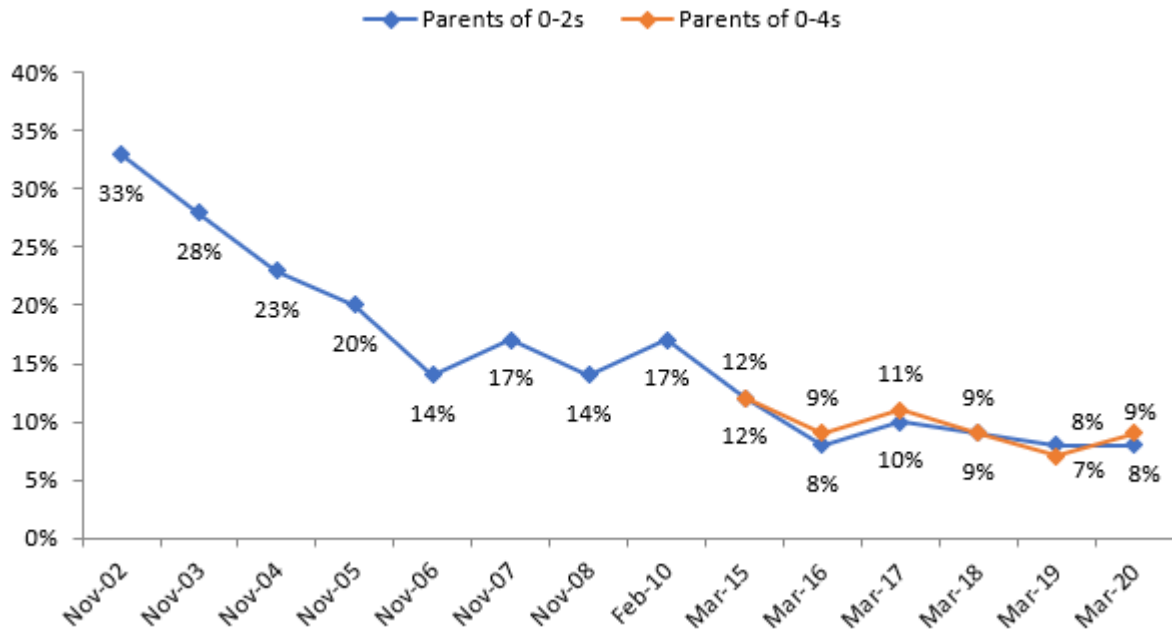
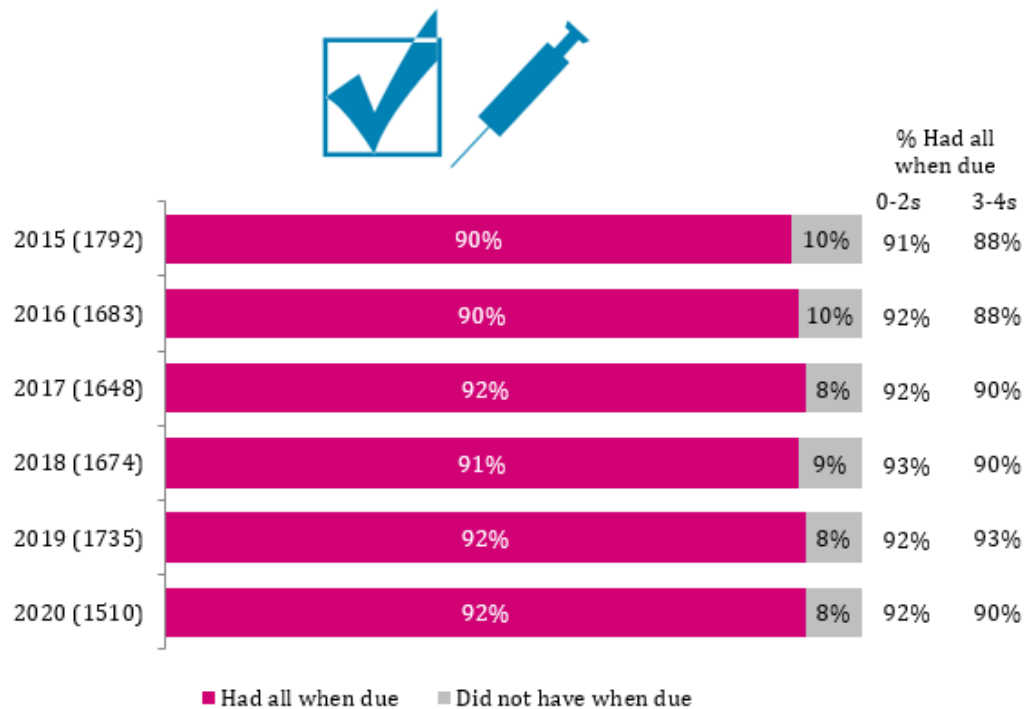


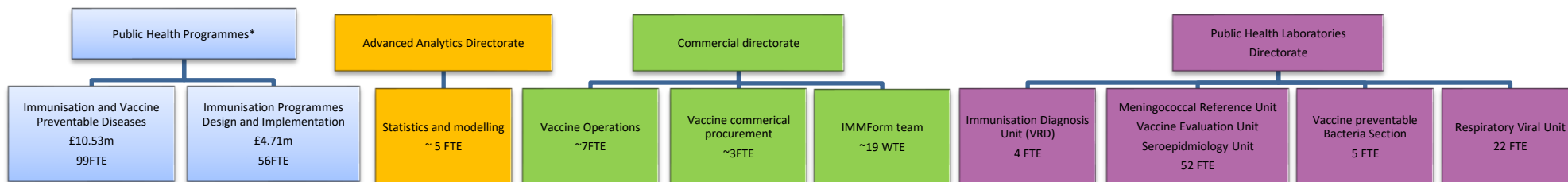
Figure 29: Whether ever refused or postponed immunisations



Bases in parentheses: All Parents
 Q59. Have you ever refused or delayed any immunisations your child has / children have been offered?

Enclosure AB/24/026

Annex 7: UKHSA teams dedicated to national immunisation programme (*including COVID epidemiology*)



*includes £8.59m contribution from VCR and CVU programme monies, some of which supports posts in DAS and Science