

Annual Immunisation Report for Northern Ireland 2018-19



Acknowledgements

The Public Health Agency Health Protection Immunisation Team would like to thank everyone who works so hard across Northern Ireland to ensure that the population is protected against vaccine preventable diseases by maintaining high vaccine coverage. This includes health visitors, school health teams, GPs, practice nurses, treatment room nurses, midwives, paediatricians, pharmacists, Trust occupational health staff, Northern Ireland Child Health teams and the PHA communications team.

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Executive Summary

Childhood Immunisation Programmes

Following a long history of high coverage in the childhood vaccination programmes, it is disappointing and of public health concern that coverage has declined in recent years, particularly for vaccinations measured at 12 and 24 months of age. Whilst this trend has been seen across the UK, 2018-19 rates in Northern Ireland have declined at a faster rate than in other devolved administrations.

- Coverage of three doses of DTaP/IPV/Hib vaccine by 12 months of age was 94.5% in Northern Ireland, which is a decrease from the previous year and now below the 95% target level for the first time in seven years
- Coverage of one dose of MMR vaccine by 2 years of age was 92.6%, a 1.8% decrease from last year
- Coverage of one and two doses of MMR by 5 years of age was 96.7% and 91.6% respectively. This is a 0.1% and 0.8% decrease from last year

School-based Immunisation Programmes

Vaccination programmes offered in schools have consistently achieved high coverage. The notable exception was the HPV vaccination programme for girls, which experienced declining coverage in recent years. This year we are pleased to report increased uptake in those finishing school year 9, which is testament to the hard work of everyone involved in the programme.

- Coverage of a complete course of HPV vaccine by end of year 9 was 76.6%, an increase of 3.5% from 2017-18 (73.1%). Coverage of a complete course by the end of year 10 was 82.8%, a decrease from 84.7% in 2017-18

- By the end of year 12, 94.3% of young people had received two doses of MMR vaccine, 80.6% had received a booster of Td/IPV vaccine and 84.9% had received the meningococcal ACWY vaccine

Adult Immunisation Programmes

Uptake of adult vaccination programmes experience seasonal fluctuation as a result of alignment in delivery with the seasonal influenza vaccination programme. Due to the nature of flu vaccine production and supply the seasonal flu vaccine programme is more at risk of unexpected changes to delivery. It is therefore likely that programmes were impacted by the delays in delivery of the 2018-19 flu vaccine offered to those over 65 years of age.

- Coverage of pertussis vaccine in pregnancy for the financial year 2018-19 was 66.6% in Northern Ireland
- Uptake of shingles vaccine was 45.5% for the routine cohort (70 year olds) and 47.6% for the catch-up cohort (78 year olds). Coverage of the first routine cohort i.e. 70 year olds in the first year of the programme (2013-14) is now 66.3%
- Uptake of PPV vaccine in individuals 65 years and over was 23.4% for those that received the vaccine during 2018-19 only

Priorities for Improvement

During 2019-20, the PHA Immunisation Team will work with other Health and Social Care organisations with responsibility for vaccination programmes to:

- Co-ordinate and focus effort with those responsible for policy, commissioning, delivery, epidemiology and promotion
- Meet the UK WHO Member State commitments towards the elimination of measles and rubella in Europe through publication of the Northern Ireland Measles and Rubella Elimination Action Plan
- Investigate and analyse the reasons for falling uptake to better understand regional variation of pre-school vaccines, particularly in the Belfast area
- Improve the availability and accessibility of up to date resources for health professional, in line with the national immunisation core curriculum. This will include bespoke resources for vaccination programmes given in pregnancy
- Promote vaccination and encourage parents to take up the offer of vaccines. Central to this will be a better understanding of parental attitudes to vaccinations and understanding of benefits locally.
- Work with commissioners to improve accessibility of vaccination programmes to those that need through targeted interventions

Introduction

According to the *WHO Global Vaccine Action Plan 2011-2020*, “Overwhelming evidence demonstrates the benefits of immunisation as one of the most successful and cost-effective health interventions known”¹. Their vision for the Decade of Vaccines (2011–2020) is of a world in which all individuals and communities enjoy lives free from vaccine preventable diseases.

Northern Ireland has a very comprehensive vaccine programme, free at the point of delivery for those eligible by virtue of age or risk group status. The Department of Health is responsible for setting and funding immunisation policy on advice from the Joint Committee for Vaccines and Immunisation (JCVI). The committee regularly reviews the epidemiology of vaccine preventable diseases (VPDs) in the UK and makes recommendations on introduction of new programmes in response to changes in disease incidence and the likely cost-effectiveness.

It then takes the hard work of a wide range of Health and Social Care Organisations and beyond to deliver the programmes so that everyone eligible for the vaccine has an opportunity to receive it. HSC Organisations have their own responsibilities for delivering vaccination programmes including the PHA Nursing Directorate, Health and Social Care Board (HSCB), Health and Social Care Trust, Child Health Departments, including health visitors, school nursing service and the Child Health Information System, General Practitioners and the Education Authority.

The PHA Health Protection Immunisation Team provides:

- strategic oversight of implementation and delivery of regional vaccination programmes;
- investigation, risk assessment and management of cases, outbreaks and other immunisation incidents;
- disease and vaccine coverage surveillance;
- interventions to improve uptake, particularly targeting groups who may have lower uptake;
- resources for health professionals and the public;
- expert advice to policy makers, commissioners, providers and public.

Northern Ireland has implemented all JCVI recommendations and historically has had some of the highest immunisation uptakes worldwide. This has undoubtedly contributed to a reduction in the burden of communicable diseases in Northern Ireland. However, this year's report highlights that the coverage rates for pre-school vaccination programmes in Northern Ireland have been declining by a small but persistent percentage. Whilst the decline has been seen across the UK, in Northern Ireland the continuing declining trend in 2018-19 has been more marked than the other devolved administrations. Health inequalities also mean that some groups of people and some areas in Northern Ireland are less likely than others to be vaccinated.

It is important that HSC organisations that have worked so hard over the years to achieve and maintain high uptake of pre-school and school programmes continue to do so. The PHA Health Protection Immunisation Team is committed to working collaboratively with all organisations towards the WHO vision where individuals and

communities enjoy lives free from VPDs by maintaining and improving uptake rates of all immunisations.

The next section outlines the Immunisation Programmes that are offered to children and/or adults in Northern Ireland. Programmes can either be:

- **Routine Immunisation Programmes**
offered to everybody in recommended age group
- **Targeted Immunisation Programmes**
offered only to those at greater risk of the vaccine preventable disease

The epidemiology of Vaccine Preventable Diseases (VPDs) is published annually in Spring in the *Annual Vaccine Preventable Diseases Report for Northern Ireland*² to enable more timely reporting.

Immunisation Programmes in Northern Ireland

Routine Immunisation Schedule in Childhood

When to immunise	Diseases vaccine protects against	Vaccine given
2 months old	Diphtheria, tetanus, pertussis, polio, Haemophilus influenza type b (Hib) and hepatitis B (6 in 1) Pneumococcal disease Rotavirus Meningococcal group B disease (MenB)	DTaP/IPV/Hib/HepB (Infanrix hexa) PCV (Prevenar 13) Rotavirus (Rotarix) MenB (Bexsero)
3 months old	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B (6 in 1) Rotavirus	DTaP/IPV/Hib/HepB (Infanrix hexa) Rotavirus (Rotarix)
4 months old	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B (6 in 1) Pneumococcal disease Meningococcal group B disease (MenB)	DTaP/IPV/Hib/HepB (Infanrix hexa) PCV (Prevenar 13) MenB (Bexsero)
Between 12 and 13 months old – within a month of the first birthday	Measles, mumps and rubella Pneumococcal disease Hib/Meningococcal group C disease (MenC) Meningococcal group B disease (MenB)	MMR (Priorix or MMR VaxPRO) PCV (Prevenar 13) Hib/MenC (Menitorix) MenB (Bexsero)
Every year from 2 years old up to P7	Influenza	Flu nasal spray (Fluenz Tetra)
3 years and 4 months old	Diphtheria, tetanus, pertussis and polio Measles, mumps and rubella	DTaP/IPV (Repevax) or DTaP/IPV (Infanrix IPV) MMR (Priorix or MMR VaxPRO)
Girls 12 to 13 years old*	Cervical cancer caused by human papillomavirus types 16 and 18 (and genital warts caused by types 6 and 11)	HPV (Gardasil) (Two vaccinations at least six months apart)
14 to 18 years old	Tetanus, diphtheria and polio Meningococcal groups ACWY disease (MenACWY)	Td/IPV (Revaxis) MenACWY(Nimenrix or Menveo)

*From September 2019 the adolescent HPV programme will be offered to 12 to 13 year old boys and girls

Targeted Childhood Immunisations

When to immunise	Diseases vaccine protects against	Vaccine given
At birth, 1 month old and 12 months old	Hepatitis B	HepB
At birth	Tuberculosis	BCG
Six months up to two years	Influenza	Inactivated flu vaccine
Over two up to less than 18 years	Influenza	Flu nasal spray or inactivated flu vaccine

(For children assessed as being at risk of these conditions)

Routine Immunisation Schedule for Adults

When to immunise	Diseases vaccine protects against	Vaccine given
Age 65 years	Pneumococcal Disease	PPV-23
Annually from age 65 years	Influenza	Inactivated flu vaccine
Age 70 years	Shingles	Zostavax ®

Targeted Adult Immunisations

Who to immunise	Diseases vaccine protects against	Vaccine given
Risk groups as per CMO Flu letter	Influenza	Inactivated flu vaccine
Risk groups as per Green Book	Pneumococcal Disease	PPV-23
Pregnant women from 16 th gestational week	Pertussis in newborn	Boostrix-IPV ®
Men who have sex with men, aged ≤45 years who attend GUM clinics	Anal, throat and penile cancer caused by HPV types 16 and 18 (genital warts caused by types 6 and 11)	Gardasil ®
Adults born since 1970 with ≤ two doses MMR vaccine	Measles, mumps and rubella	MMR vaccine
Catch-up cohorts published annually	Shingles	Zostavax ®

Data Collection

The 2018-19 Northern Ireland Immunisation Report provides vaccine coverage or uptake for the pre-school, school and adult immunisation programmes.

Vaccine coverage

Defined as the total number of the eligible population who have ever received the vaccine (numerator) as a proportion of the total number of eligible population (denominator)

Vaccine uptake

Defined as the number of the eligible population who have received the vaccine during a specified time period (numerator) as a proportion of the number of the eligible population during the specified time period (denominator)

Time period

Coverage for the pre-school, pregnancy vaccines and pneumococcal for the elderly programmes are presented for the financial year from 1 April 2018 to 31 March 2019.

Coverage for the school-based programmes are presented for the academic school year from 1 September 2018 to 31 August 2019 in line with delivery of the school programmes.

Coverage for the adult shingles vaccine programme is presented from 1 September 2018 to 31 August 2019 in line with delivery alongside the flu vaccine campaign.

Data Sources

Childhood Immunisations

Coverage for the pre-school childhood immunisations up to the age of 5 years is collected and collated quarterly from the Child Health Information Systems (CHIS), in line with national Cover of Vaccination Evaluated Rapidly (COVER) programme statistic reporting. The denominator is all children in the eligible age group (1 year, 2 year or 5 years). Coverage is presented for Northern Ireland and by Local Commissioning Group (LCG) area of residence.

Coverage for the school-based immunisations is collected and collated annually from CHIS, in line with the school year that the programme targets. The denominator is all children in the eligible school year. Coverage is presented for Northern Ireland and by LCG area where the school is registered.

Adult Immunisations

Uptake for shingles vaccine is reported for routine (70 years of age) and catch-up (78 years of age) cohorts. The number of individuals receiving shingles vaccine is auto-extracted from primary care clinical systems. Uptake is calculated using all GP registered adults in the eligible age group as the denominator. **Cumulative vaccine coverage** is reported for the routine cohorts of each programme year as of end of 2018-19. Uptake and cumulative coverage is presented for Northern Ireland and by LCG area of residence.

Vaccine data for the pneumococcal (PPV) programme for those 65 years and older is only available for the annual number of those 65 years and older that received the vaccine during the reported time frame. Cumulative coverage of those that have ever received the vaccine is not currently available. The number of individuals 65 years

and over is auto-extracted with uptake calculated using all GP registered adults as the denominator. Uptake is presented for Northern Ireland only.

Coverage for the pertussis vaccine in pregnancy is collected and collated monthly from the Northern Ireland Maternity Administrative System (NIMATS), a regional electronic information system that records maternal and neonatal information at the time of delivery. The denominator is all pregnant women that delivered after 24 weeks gestation (live and stillbirths) during the time period. Coverage is presented for Northern Ireland and by LCG area where women are resident.

Annual coverage of the influenza vaccine programme is published in *Surveillance of Influenza in Northern Ireland 2018-19*³.

Uptake and Coverage in Childhood Immunisation Programmes

The HSCB Integrated Care Directorate commissions primary care to deliver the pre-school childhood immunisation programme under additional services of the General Medical Services (GMS) Contract⁴.

In 2017, the Department of Health commissioned an independent group to review and advise on the design of a pre-school vaccination delivery model for Northern Ireland. In March 2019⁵, a report on the recommendations of the group was published. The group was led by an independent Chair and included key stakeholders such as the Northern Ireland General Practitioners Council, Royal College of General Practitioners, Royal College of Nursing, Community Practitioners and Health Visitors Association, Trust and PHA nursing representatives and a representative from the PHA Health Protection Immunisation Team.

The main recommendation was that responsibility for the pre-school vaccination programmes should continue to be held by General Practice. Nursing support of pre-school vaccines could be provided by Band 5 level nursing, with health visitors continuing to support families who have not accessed vaccination services.

The Group also concluded that funding for nursing support should be provided on an equitable basis to all General Practices to allow them to employ nursing staff by individual practices or on a collective basis or through contractual arrangements with Health and Social Care Trusts. Funding for nursing support to enable the delivery of all pre-school childhood vaccinations will be phased in as part of the implementation of the population based staffing model for primary care nursing under the Delivering

Care Policy Framework, subject to funding. During 2018-19 the new arrangements commenced in two GP Federation areas (West Belfast and South West).

Immunisations up to 12 months of age

The routine immunisation schedule for babies at 2, 3, and 4 months is detailed on page 9.

From October 2017, babies born on or after 1 August 2017 have been eligible for the 6 in 1 vaccine which protects against six diseases (diphtheria, tetanus, pertussis, polio, *Haemophilus influenzae* type b and hepatitis b). Infanrix hexa®, replaces the pentavalent vaccines Infanrix®-IPV+Hib and Pediacel®, which protected against five diseases. Hepatitis B is the additional disease that is now protected against. In 2018-19, children in the 12 month age cohort (those born between 1 April 2017 and 31 March 2018) are the first age cohort affected. They will have received either the pentavalent or hexavalent vaccine, depending on the date they were vaccinated.

In 2018-19, coverage of primary immunisations at 12 months of age in Northern Ireland remains higher than the national (UK) and England but has now fallen below Scotland and Wales by 1% to 2% depending on the vaccine. This year, for the first time in at least seven years coverage of DTaP/IPV/Hib/HepB, PCV, MenB and rotavirus are all below the 95% target (Figure 1).

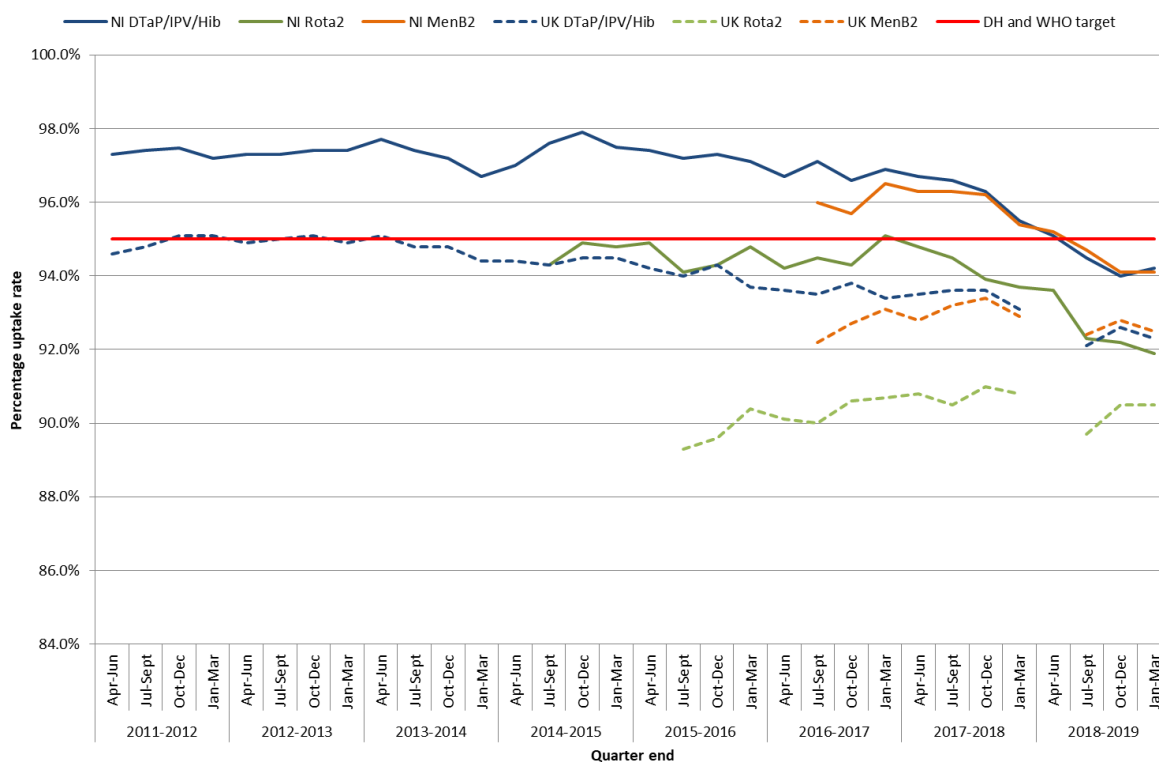
There is variation of uptake by local commissioning group (LCG) area, with lower coverage in Belfast by 5% to 8% across all primary immunisations (Table 1).

Table 1. Completed primary immunisations by 12 months of age, 2018-19, Northern Ireland and UK

Area	% vaccinated at 12 months			
	DTaP/IPV/Hib	PCV	Rota	MenB
Belfast	88.5%	89.0%	88.5%	88.4%
South Eastern	95.3%	95.5%	92.0%	95.1%
Northern	96.0%	96.3%	93.5%	95.9%
Southern	96.4%	96.5%	94.1%	96.1%
Western	95.4%	95.8%	92.6%	95.3%
NI Total	94.5%	94.8%	92.3%	94.3%
England	92.1%	92.8%	89.7%	92.0%
Scotland	95.8%	96.3%	92.7%	95.4%
Wales	95.4%	95.5%	93.6%	95.1%
UK	92.6%	93.2%	90.2%	92.5%

Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

Figure 1. DTaP/IPV/Hib(HepB), Rota, MenB vaccination uptake rates at 12 months of age, April 2011 – March 2019, Northern Ireland and UK

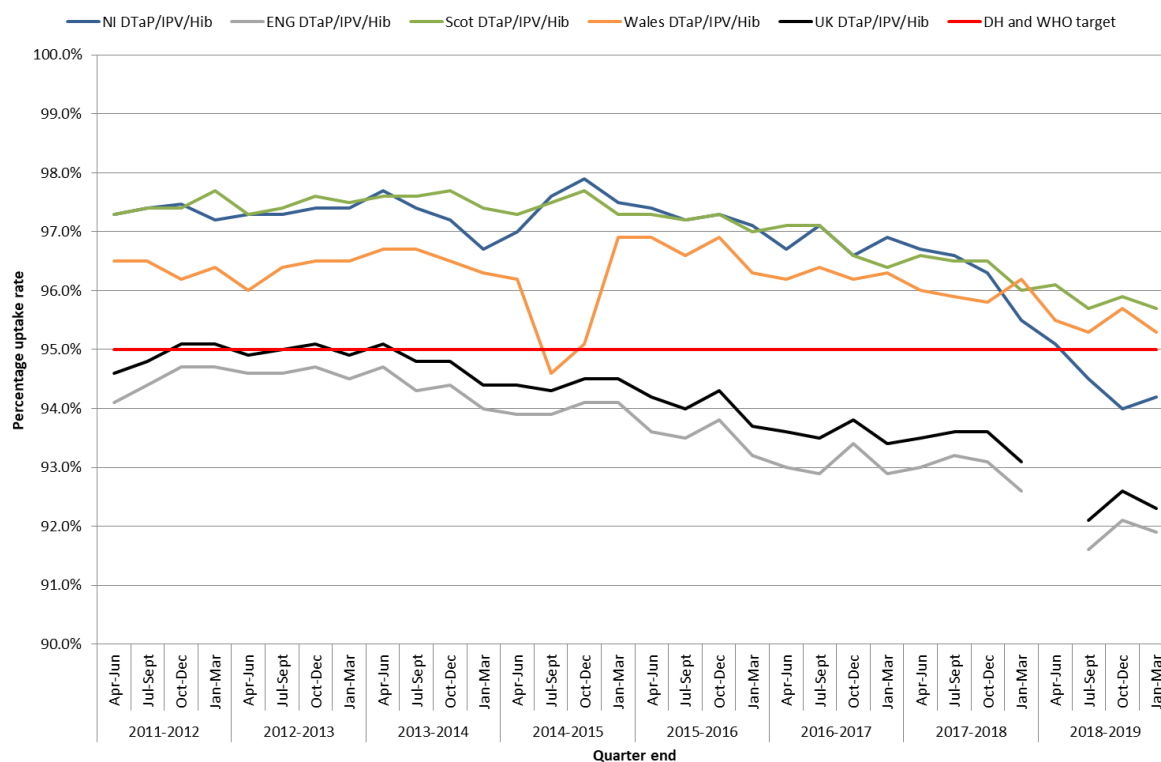


Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

The rate of decline of all primary immunisations has been greater during 2018-19 compared to that in the other devolved administrations.

Using DTaP/IPV/Hib/HepB as an example, since the end of 2014-15, when coverage was highest during the past eight years (97.9%), coverage has fallen by 3.4% to the end of 2018-19 (94.5%) with half of the decline occurring during 2018-19 alone (Figure 2).

Figure 2. DTaP/IPV/Hib(HepB) vaccination uptake rate at 12 Months of age, April 2011 – March 2019, Northern Ireland and UK



Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

Immunisations up to 24 months of age

In 2018-19, uptake of all immunisations given just after the first birthday and measured at 24 months also remains higher than the national (UK) and England but, again, has now fallen just below Scotland and Wales by less than 2% depending on the vaccine.

By 24 months of age coverage of primary immunisations for DTaP/IPV/Hib (pentavalent vaccine) has reached the 95% target with the other immunisations below the 95% target.

There is variation of coverage by LCG area of residence, with lower coverage again reported in Belfast LCG across all primary immunisations (Table 2).

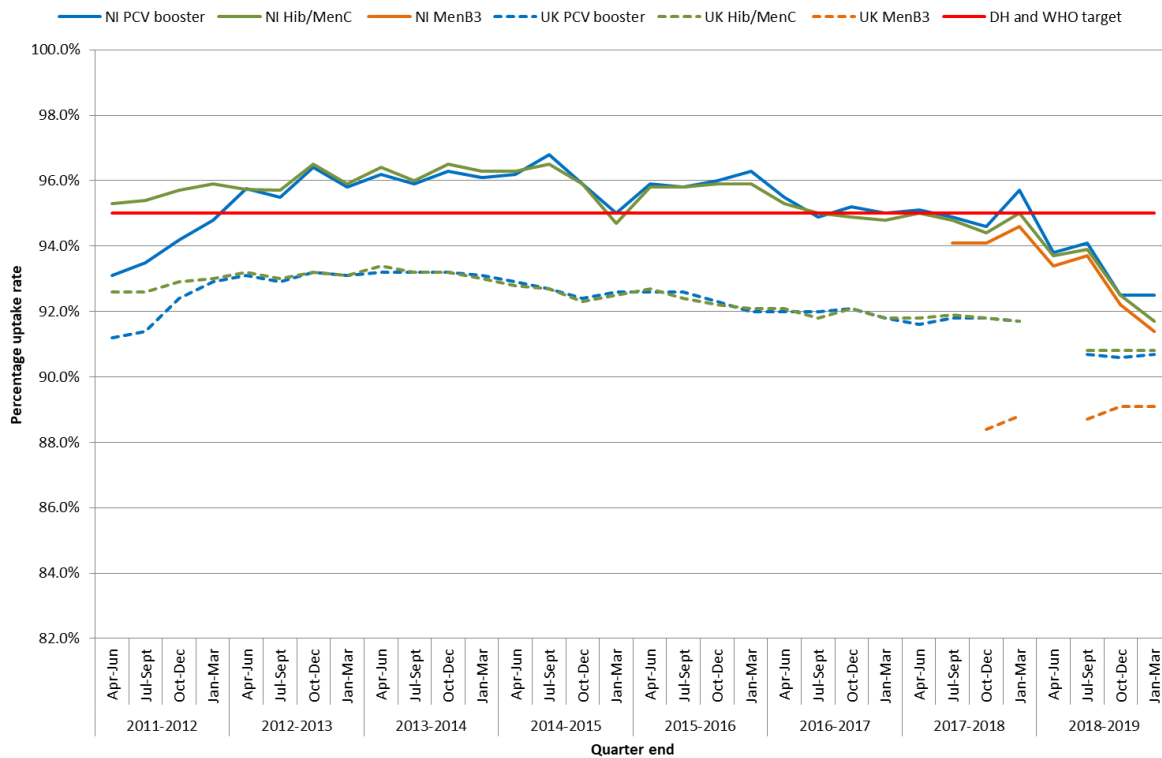
Table 2. Completed primary immunisations by 24 months of age, 2018-19, Northern Ireland and UK

Area	% vaccinated at 24 months				
	DTaP/IPV/Hib	PCV booster	Hib/MenC booster	MenB booster	MMR1
Belfast	94.6%	87.6%	87.0%	86.7%	87.4%
South Eastern	97.0%	93.5%	93.4%	93.3%	93.1%
Northern	97.6%	96.7%	94.5%	94.2%	94.2%
Southern	97.5%	93.8%	94.0%	93.3%	94.1%
Western	97.9%	97.1%	94.4%	94.0%	93.6%
NI Total	97.0%	93.9%	92.8%	92.4%	92.6%
England	94.2%	90.2%	90.4%	87.8%	90.3%
Scotland	97.2%	94.5%	94.4%	93.6%	94.0%
Wales	96.9%	94.8%	94.2%	93.8%	94.5%
UK	94.6%	90.8%	90.9%	88.6%	90.8%

Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

Since the last quarter of 2015-16 there has been a decrease in uptake for all vaccines monitored at 24 months. The similar decline for all vaccinations normally given at the same appointment suggests that the decline is less likely to be due to parental hesitancy of one or more vaccine.

Figure 3. Hib/MenC, PCV and MenB vaccination uptake rates at 24 months of age, April 2011 – March 2019, Northern Ireland and UK

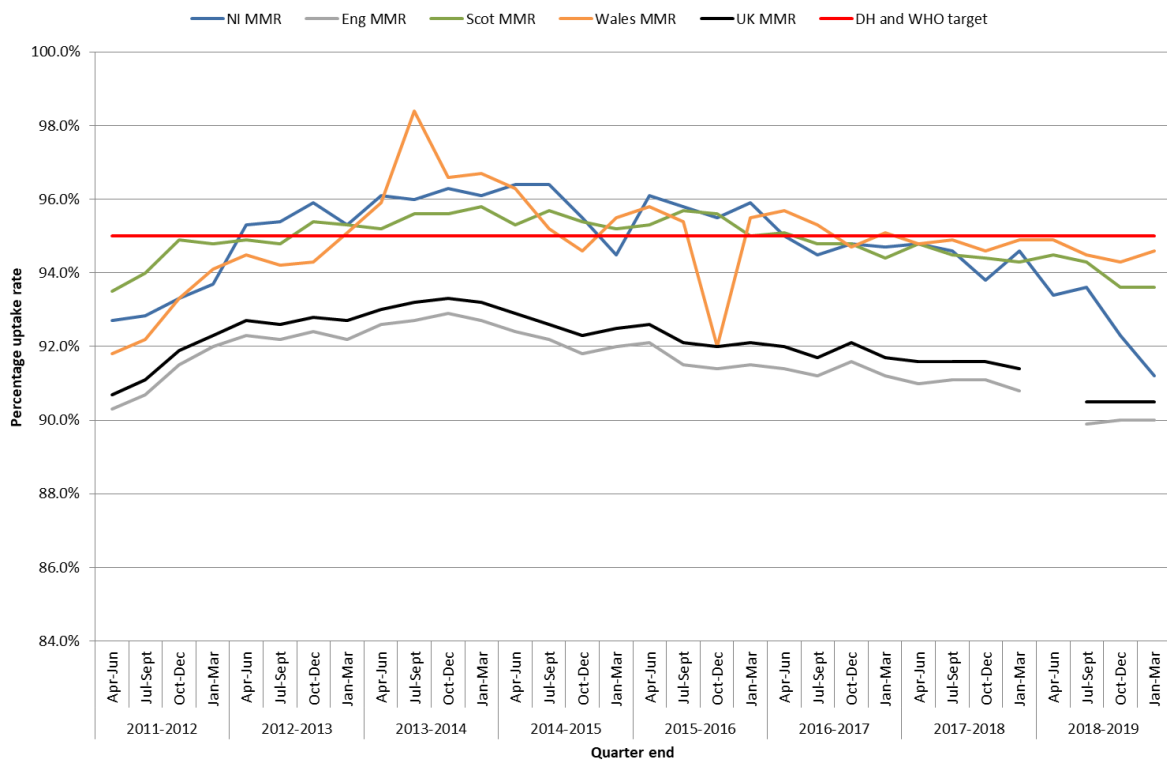


Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

Using one dose of MMR at 24 months of age as an example, similar to the primary immunisations trends at 12 months, coverage has been declining since the last quarter of 2015-16, with a faster rate of decline occurring in the last year.

Between Q4 2015-16 and Q4 2017-18 (2 years), coverage of MMR1 fell from 95.9% to 94.6%; a decline of 1.3%, compared with a decline of 3.4% between Q4 2017-18 (94.6%) and Q4 2018-19 (91.2%) (Figure 4).

Figure 4. MMR vaccination uptake rate at 24 Months, April 2011 – March 2019, Northern Ireland and UK



Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

Immunisations up to five years of age

Children are offered “pre-school booster” immunisations from the age of 3 years and 4 months, providing a fourth dose booster of protection against diphtheria, tetanus, polio and pertussis (DTaP/IPV) and a second dose of MMR vaccine.

Coverage of these immunisations measured at 5 years show that they are again below 95% for 2018-19, and slightly below last year’s figures of 92.8% for second MMR and 93.3% for DTaP/IPV booster.

In Belfast, although uptake of the first MMR has just reached the 95% target by 5 years of age, uptake of the booster dose is around 6% lower than in other areas. Uptake of MMR2 in Belfast is 85.4%, well below the 95% target needed to ensure

that the spread of measles outbreaks can be contained through herd immunity, making improving MMR2 uptake an important goal.

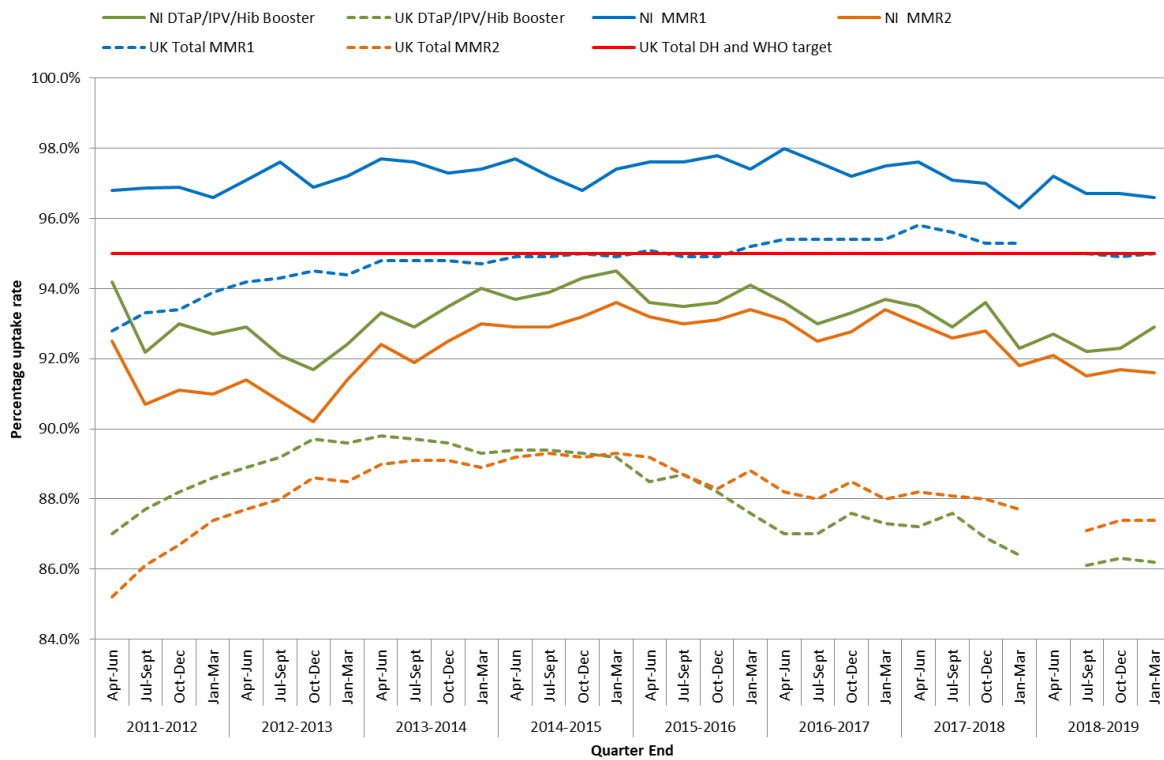
Table 3. Completed primary immunisations and boosters by 5 years of age, 2018-19, Northern Ireland and UK

Area	% vaccinated at 5 years				
	DTaP/IPV/Hib primary	DTaP/IPV booster	MMR1	MMR2	Hib/MenC booster
Belfast	95.4%	85.7%	94.9%	85.4%	93.0%
South Eastern	97.5%	92.1%	96.4%	91.7%	95.8%
Northern	97.9%	94.3%	97.0%	93.6%	96.8%
Southern	97.6%	97.6%	97.1%	92.7%	96.0%
Western	97.6%	94.3%	97.8%	93.7%	97.3%
NI Total	97.3%	93.1%	96.7%	91.6%	95.8%
England	95.0%	84.8%	94.5%	86.4%	92.2%
Scotland	97.8%	91.9%	96.8%	91.5%	95.9%
Wales	97.3%	92.6%	96.8%	92.2%	95.0%
UK	95.4%	85.9%	94.8%	87.2%	92.7%

Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

As with uptake at one year, there has been a slow but steady decline in uptake at 5 years on the quarterly data (Figure 5).

Figure 5. DTaP/IPV and MMR vaccination uptake rates at 5 years of age, April 2011 – March 2019, Northern Ireland and UK



Source: Quarterly COVER returns (Northern Ireland Child Health System and PHE)

During 2018-19, the PHA Immunisation Team worked with the HSCB and Belfast GPs to improve uptake of MMR in children of school age. GPs reviewed children recorded as ‘unimmunised’ or ‘partially immunised’ against practice records and invited those unvaccinated for vaccination. Child health identified just over 2,000 children that had an incomplete MMR vaccine record from practices that participated (half of all GP practices in Belfast LCG). Overall, 25% of the cohort was vaccinated, either through correcting child health records (17%) or recalling and administering MMR vaccine (9.5%).

Uptake and Coverage of School-based Immunisation Programmes

Human Papilloma Virus (HPV)

In 2008, the Human Papilloma Virus (HPV) vaccine was introduced for girls aged 12-13 years old, with a catch-up campaign for girls up to 18 years old. The HPV vaccine offers protection against types 16 and 18 of the virus which together cause up to 70% of cervical cancers, as well as protection against types 6 and 11 of the virus which cause genital warts. The programme is delivered routinely in schools with vaccines given in year 9 and opportunities provided in school to catch-up on missing doses in year 10.

From September 2019 the HPV vaccination programme will also be offered to boys aged 12-13 years old. This is because evidence is now clear that the HPV vaccine is effective in protecting both boys and girls from HPV-related cancers. HPV vaccination coverage for both boys and girls will be presented in future reports.

In 2018-19 coverage of a completed course of HPV vaccination was 76.6% by the end of year 9, which is an increase of 3.5% from the previous year (73.1%). Coverage for a completed course by the end of year 10 was 82.8%, which is a 1.9% decrease from the year before (Table 4 and 5).

Uptake in year 9 ranges by LCG area from 73.4% to 80.1%. Uptake was highest in the Northern area. The next highest uptake, in the Western area, was 2.5% lower at 77.6%. Belfast area uptake was 76.4% and there was a further gap of 2.1% between this and the Southern area (74.3%). Uptake was lowest in the South Eastern area at 73.4% (Table 4).

Uptake by the end of year 10 again shows variation by area. It was highest in the Northern area at 86.4% and 2.1% lower in Belfast (84.3%). This was 3.3% higher than uptake in the South Eastern and Western areas, both on 81%. Uptake was lowest in the Southern area (80.3%).

Table 4. HPV vaccine coverage, year 9 and 10 girls completing full course, 2018-19, Northern Ireland

Area where school registered	Year 9	Year 10
Belfast	76.4%	84.3%
South Eastern	73.4%	81.0%
Northern	80.1%	86.4%
Southern	74.3%	80.3%
Western	77.6%	81.0%
NI Total	76.6%	82.8%

Source: Northern Ireland Child Health System

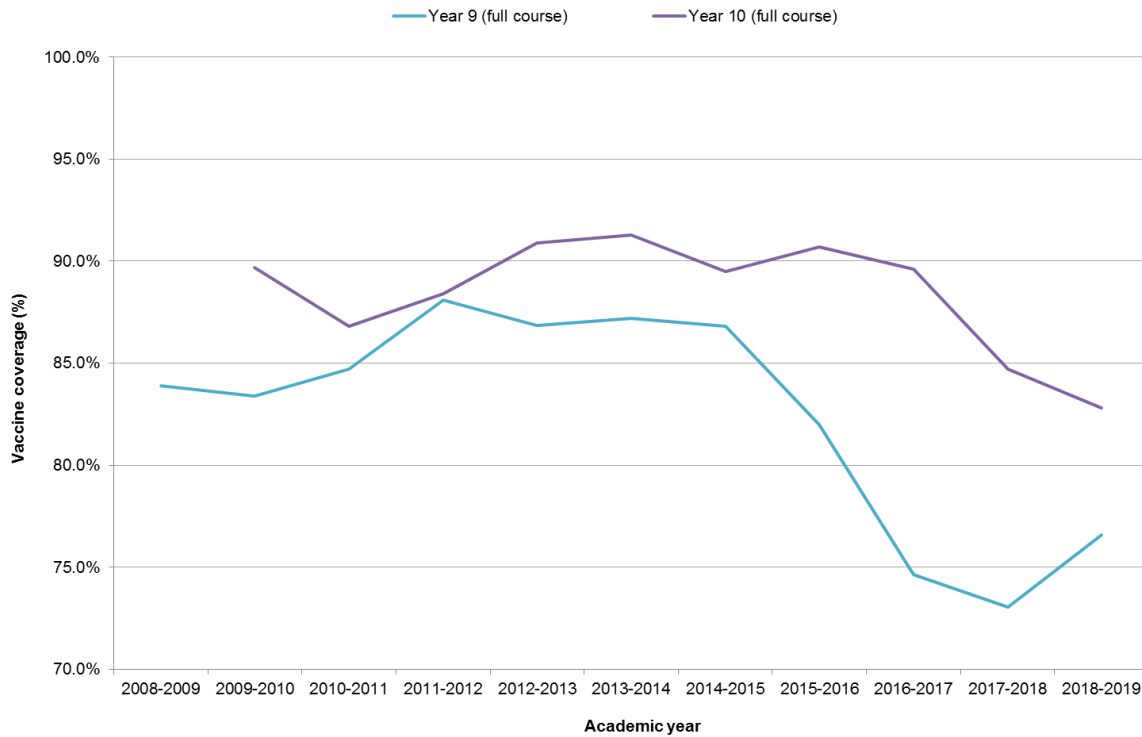
Since the programme started, coverage of a complete HPV course in girls finishing school year 9 and 10 increased to a high of 87.2% and 91.3% respectively, by the end of 2013-14. However, both school years then started to decline from 2014-15 onwards with the rate of decline greater for those in year 9. It is encouraging to see that uptake for school year 9 has increased by 3.5% in 2018-19 compared with 2017-18 (Table 5 and Figure 6).

Table 5. HPV vaccine coverage, year 9 and 10 girls completing full course, 2008-19, Northern Ireland

Academic year	Year 9	Year 10
2008-2009	83.9%	
2009-2010	83.4%	89.7%
2010-2011	84.7%	86.8%
2011-2012	88.1%	88.4%
2012-2013	86.8%	90.9%
2013-2014	87.2%	91.3%
2014-2015	86.8%	89.5%
2015-2016	82.0%	90.7%
2016-2017	74.6%	89.6%
2017-2018	73.1%	84.7%
2018-2019	76.6%	82.8%

Source: Northern Ireland Child Health System

Figure 6. HPV vaccine coverage, year 9 and 10 girls completing full course, 2008-19, Northern Ireland

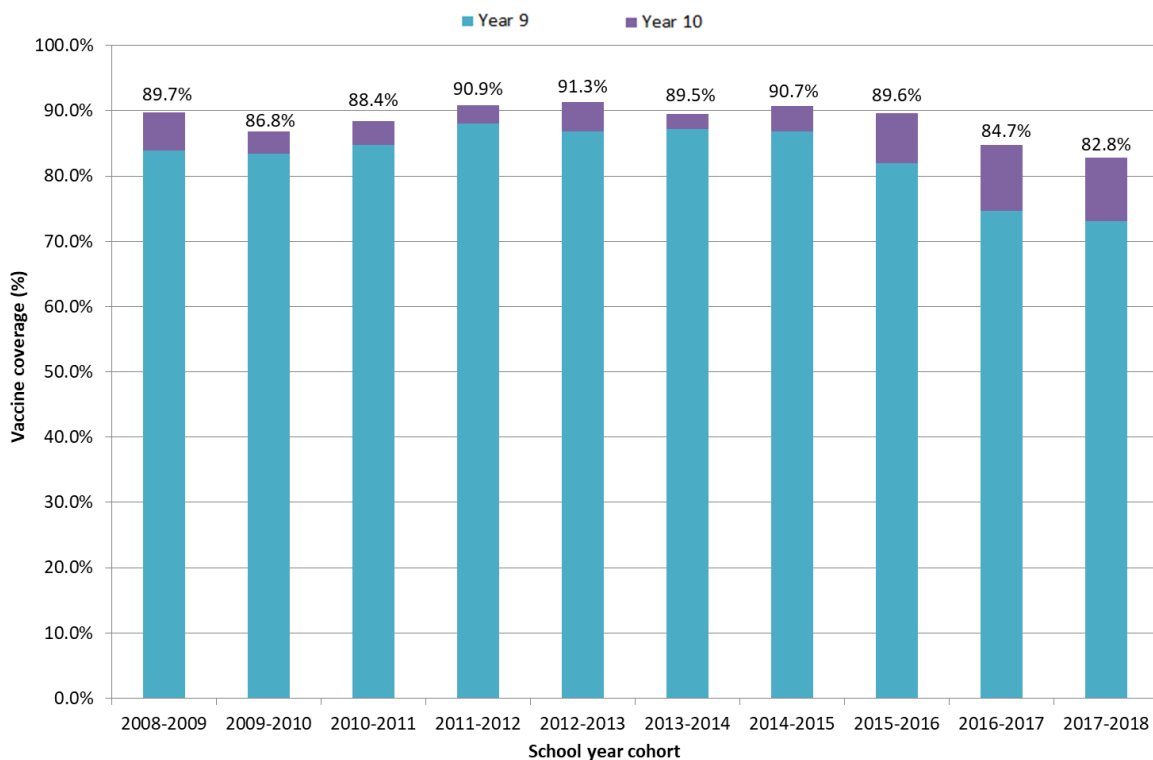


Source: Northern Ireland Child Health System

Girls who attend school during the same period of time, i.e. school year, are known as a 'school cohort'. For the purposes of vaccine coverage a school cohort of an academic year assumes that those in year 9 also attend year 10 the following year.

Coverage of school cohorts has been around 90% until the two most recent years, with the 2017-18 school cohort (latest cohort) at 82.8%. Since 2014-15 an increasing proportion of the cohorts has chosen to receive the vaccine in year 10 instead of year 9 (9.7% of 2017-18 and 10.1% of 2016-17 cohorts) (Figure 7). The PHA Immunisation Team will continue to encourage those eligible to receive the vaccine in year 9. However, if this trend and increasing uptake in year 9 continues it is anticipated that coverage of the 2018-19 and future school cohorts will start to increase towards previous levels.

Figure 7. HPV vaccine coverage by school year cohort (2008-2018) completing full course in year 9 and year 10, Northern Ireland



Source: Northern Ireland Child Health System

Meningococcal ACWY Vaccine

The meningococcal ACWY (Men ACWY) vaccine programme was introduced in August 2015 in response to an outbreak of meningococcal group W disease across the UK. Teenagers aged 14-18 years and university “freshers” were chosen as the target group for immunisation. For operational reasons the programme was introduced in a phased way. Although the catch-up has now finished, young people in the eligible age range who have not yet been immunised can request this from their GP up to the age of 25 years. The Men ACWY vaccine is provided routinely to young people in schools in year 11 with the school leaver booster and MMR, with an opportunity to catch up in year 12.

In 2018-19, 84.9% of young people had received the Men ACWY vaccine by the end of year 12, a decrease of 0.4% from the previous year. The Southern area had the highest uptake at 87.5%, 1.3% higher than the Northern area at 86.2%. In Belfast 84.5% of young people had received the vaccine by the end of year 12. Western area uptake was 83.3% and the South Eastern area had the lowest uptake at 81.7%. (Table 6).

Regional variation was more marked for year 11, with uptake in the South Eastern area lowest at 66.8%. This was considerably lower than the other areas and 6% lower than the Western area (72.8%). This in turn was 3.9% lower than the Southern area at 76.7%. Uptake in year 11 was similar in the Northern (78.6%) and Belfast (79.3%) areas.

Table 6. Annual Meningococcal ACWY vaccine coverage, 2018-19, Northern Ireland

Area	Year 11 % vaccinated	Year 12 % vaccinated
Belfast	79.3%	84.5%
South Eastern	66.8%	81.7%
Northern	78.6%	86.2%
Southern	76.7%	87.5%
Western	72.8%	83.3%
NI Total	75.6%	84.9%

Source: Northern Ireland Child Health System

Diphtheria, Tetanus and Polio Booster

In year 11, school health teams offer a booster vaccine to all young people against diphtheria, tetanus and polio (Td/IPV), commonly known as the “school leaver booster” (SLB). For most, this will be the fifth and final dose that they require. There is a further opportunity to receive the Td/IPV vaccine in year 12 for those who have not yet completed the course. Pupils who have not received this vaccine from school health can continue to request it from their GP.

In 2018-19, 80.6% of pupils had received the completed course of diphtheria, tetanus and polio containing vaccines by the end of year 12. The pattern for school leaver booster (SLB) coverage is similar to that for Men ACWY, which is to be expected since both are offered at the same time. There is marked regional variation particularly for year 11, with uptake ranging from 64.2% in the South Eastern area to 75.9% in the Northern area (Table 7). Southern area has the second highest uptake at 74%, similar to Belfast (73.6%). Western area uptake is 2.5% lower at 71.1% but this is still 6.9% higher than in the South Eastern area. Discussions are ongoing

between the PHA and school health teams to try to clarify the reasons for this disparity.

Table 7. Annual school leaver booster vaccine coverage, 2018-19, Northern Ireland

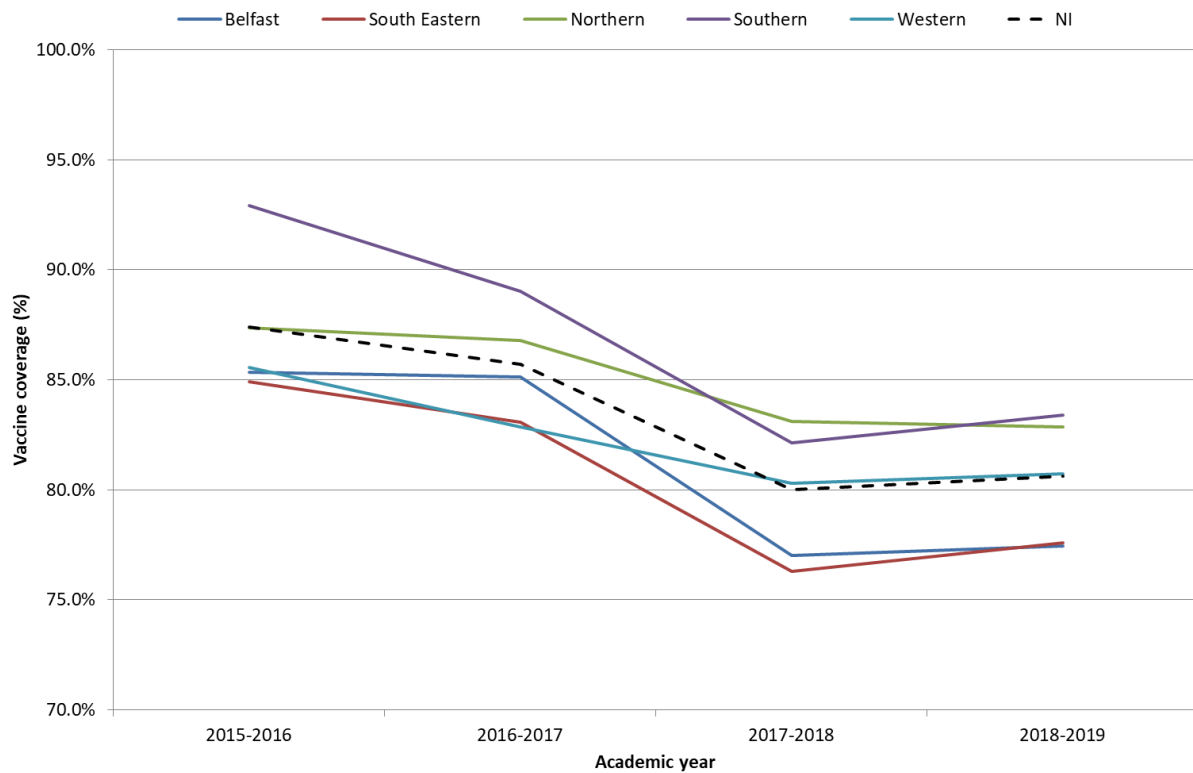
Area	Year 11 % vaccinated	Year 12 % vaccinated
Belfast	73.6%	77.5%
South Eastern	64.2%	77.6%
Northern	75.9%	82.8%
Southern	74.0%	83.4%
Western	71.1%	80.7%
NI Total	72.4%	80.6%

Source: Northern Ireland Child Health System

The figures by the end of year 12 are less variable, ranging from 83.4% in the Southern area to 77.5% in Belfast. South Eastern area had 77.6% uptake, 3.1% below Western at 80.7%. Uptake in the Northern and Southern areas was similar at 82.8% and 83.4% respectively.

Since the PHA Immunisation Team started collecting routine coverage surveillance of the school leaver booster vaccines (4 years ago), there has been a decline in Td/IPV across Northern Ireland. Latest coverage in 2018-19 appears to have plateaued and it is hoped that in future years it will start to increase again (Figure 8). Uptake of Men ACWY is generally slightly higher than that for SLB. The reason for this is unclear as the vaccines are offered at the same time. Further work is needed to clarify this.

Figure 8. School leaver booster vaccine coverage, year 12, 2015-19, LCG area and Northern Ireland



Source: Northern Ireland Child Health System

Two Doses of MMR Vaccine

In year 11, at the same visit for the “school leaver booster” school health also check MMR status and offer it to children who have not yet received two doses to ensure that they complete the recommended course, with a further opportunity to receive MMR vaccine in year 12. It is anticipated that those individuals over 16 years of age who have not received two doses of MMR vaccine will have the opportunity to obtain the vaccine in the coming year.

In 2018-19, by the end of year 12 coverage of two doses of MMR was just under the 95% target. Only the Northern area has just reached over 95% but overall, coverage is broadly similar across LCG areas (Table 8).

Since MMR2 in year 12 has been included in routine surveillance, the coverage has achieved or just fallen short of the WHO 95% target, which reflects the high coverage levels that were achieved for these birth cohorts when they were pre-school age.

Table 8. Annual MMR2 vaccine coverage, 2017-19, Northern Ireland

Area	Year 12 % vaccinated	
	2017-2018	2018-2019
Belfast	93.3%	93.1%
South Eastern	93.2%	93.8%
Northern	95.2%	95.2%
Southern	94.9%	94.6%
Western	95.1%	94.7%
NI Total	94.4%	94.3%

Source: Northern Ireland Child Health System

Uptake and Coverage in Targeted Childhood Immunisation Programmes

Targeted Hepatitis B Immunisation Programme for Babies Born to Hepatitis B Positive Mothers

Hepatitis B is a virus that mainly affects the liver and is transmitted by blood and bodily fluids. The neonatal selective hepatitis B immunisation programme is delivered for babies born to hepatitis B positive mothers. This is because hepatitis B can pass from mother to baby during pregnancy, birth or early life and without intervention about 90% will develop chronic hepatitis B infection which can lead to liver cirrhosis and liver cancer.

All pregnant women in Northern Ireland are offered testing for hepatitis B as part of their antenatal care and if found to be hepatitis B positive, their babies are offered post exposure hepatitis B immunisation to prevent mother to child transmission at or around the time of birth.

- Babies born before August 2017 receive the monovalent Hepatitis B vaccine at birth, 1, 2 and 12 months of age.
- Babies born after August 2017 receive the combined 6 in 1 vaccine at 2, 3, and 4 months and the monovalent Hepatitis B vaccine at birth, 1 and 12 months.

The number of babies born to hepatitis B positive women is small in Northern Ireland. During the financial year 2018-19 there were 35 babies born with an annual mean of 35 (25-46) babies since 2009-19.

Coverage of three doses of hepatitis B vaccine is measured at 12 months and four doses at 24 months. In 2018-19 100% babies born to hepatitis B positive mothers received three doses of hepatitis B vaccine (either monovalent or hexavalent) by 12 months and 92% received four doses by 24 months (Table 9).

Due to the small birth cohort the number of babies that did not receive four doses by 24 months is very small (<5) and this is attributed to families moving out of Northern Ireland.

Table 9. Hepatitis B vaccine uptake rates at 12 and 24 months of age, 2009-19, Northern Ireland

	Vaccination uptake @ 12 months (3 HepB doses)	Vaccination uptake @ 24 months (4 HepB doses)
2009-10	82.76%	72.34%
2010-11	83.78%	65.52%
2011-12	93.18%	75.68%
2012-13	100.00%	81.82%
2013-14	100.00%	87.88%
2014-15	100.00%	93.94%
2015-16	95.65%	86.49%
2016-17	93.55%	89.13%
2017-18	100.00%	87.10%
2018-19**	100.00%	92.00%

** The 2018-19 12 month cohort includes babies offered HepB containing vaccine under two different schedules

Uptake and Coverage in Adult Immunisation Programmes

Shingles Vaccine

The shingles vaccine programme for older adults was introduced in September 2013 following recommendation by JCVI in 2010 and a Northern Ireland policy outlined in HSS(MD) 27/2013^{6,7}.

In Northern Ireland delivery of the shingles vaccine programme runs from 1 September to 31 August. A single herpes zoster (shingles) vaccine is routinely offered to individuals that turn 70 years of age between 1 September and 31 August the following year (routine cohort). Catch-up has also been offered every year so that all individuals in their 70s when the programme started receive the vaccine over time (catch-up cohorts). Routine and catch-up cohorts remain eligible for vaccination until they are 80 years of age (Table 10).

Table 10. Eligible cohorts for the Shingles vaccine (age on 1 September of each year)

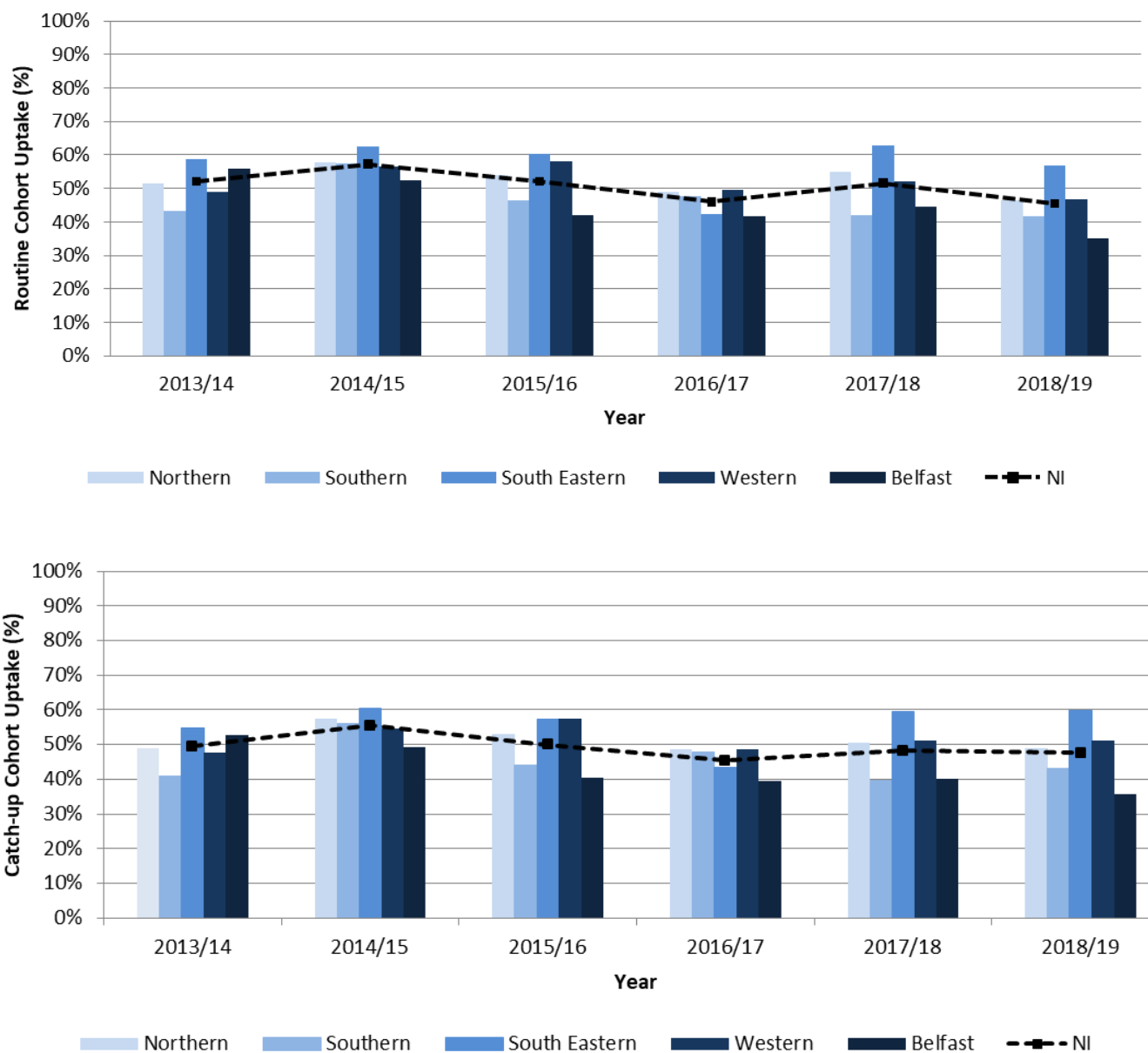
Programme Year*	Routine Cohort (years)	Catch-up Cohort (years)	Still Eligible (years)
2013-14	70	79	NA
2014-15	70	78, 79	71
2015-16	70	78	71, 72, 79
2016-17	70	78	71- 73, 79
2017-18	70	78	71- 74, 79
2018-19	70	78	71- 75, 79
2019-20	70	78	71- 76, 79
2020-21	70	78	71- 77, 79
2021-22	70	Finish	71-79

Source: Apollo® Information System * Programme year runs from 1 September to 31 August, in line with delivery

In 2018-19, regional uptake for the routine cohort (70 year olds) was 45.5%, which is a decline of 6.4% from 2017-18. Since the programme started uptake has remained fairly constant, with average annual uptake of 50.8% (46.0% to 57.3%).

There is variation in uptake across LCG areas of residence, ranging from 56.8% in the South Eastern LCG to only 35.0% in Belfast (Figure 9). It is likely that this year's uptake was affected by delays in delivery of the adjuvanted Trivalent influenza vaccine offered to those over 65 years of age.

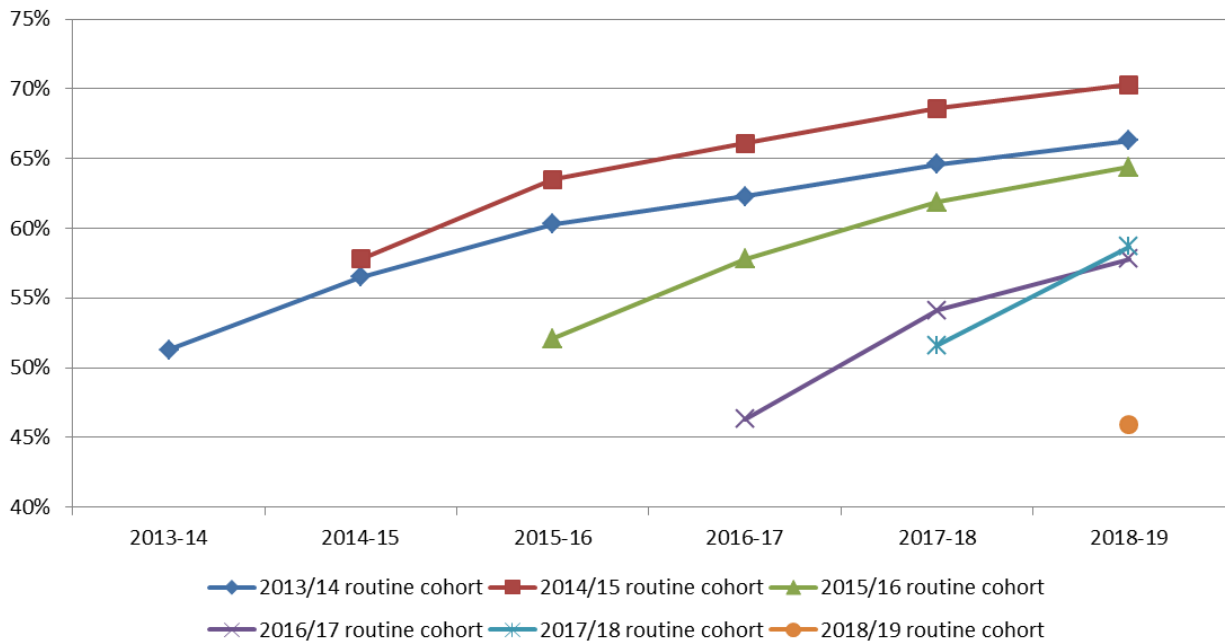
Figure 9. Estimated Shingles vaccine uptake for the routine (70 year olds) and catch-up (78 year olds) cohorts, 2013-14 to 2018-19, by LCG Area and Northern Ireland



*Uptake by 79 year olds in 2013/14
 Source: Apollo® Information System

Regional uptake for 78 year olds was slightly higher than the routine cohort at 47.6% and experience the same degree of decline from 2017-18. The trend across LCG areas is similar to that in the routine cohort, with South Eastern experiencing highest uptake and Belfast lowest. Uptake has also remained fairly constant for this age year with average annual uptake of 49.4% (45.4% to 55.5%).

Figure 10. Cumulative shingles vaccine coverage for routine (70 year olds) cohort, September 2013 – August 2019, Northern Ireland



* Programme year runs from 1 September to 31 August, in line with delivery
 Source: Apollo® Information System

This year we also report cumulative vaccine coverage for each routine cohort that has been eligible since the programme started. This is the cumulative proportion of individuals that received the shingles vaccine since the year they became eligible (i.e. 70 years) until 31 August 2019.

Coverage of each routine cohort continues to increase annually following their first year of eligibility. As at the end of 2018-19, the routine cohorts from 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18 increased to 66.3%, 70.3%, 64.4%, 57.8% and 58.7% respectively (Figure 10).

For each cohort, the largest one-year increase in coverage occurs in the year immediately following the first year of eligibility.

Pneumococcal Polysaccharide Vaccine (PPV)

Young children, the elderly and people in clinical risk groups are most at risk of severe pneumococcal disease, and so all of these groups are currently offered pneumococcal immunisation (see page 9)

A pneumococcal immunisation programme for older people was introduced in August 2003. A single dose of Pneumococcal Polysaccharide Vaccine (PPV) is offered to provide protection against 23 strains of pneumococcal disease. Since April 2005 all people aged 65 years and over have been eligible for the vaccine.

A targeted PPV programme is also offered to those aged 2 to 64 years with clinical risk factors (Table 11).

Table 11. Routine and targets cohorts for the PPV vaccine for each year of the programme

Programme Year	Financial Year*	Routine Cohort	Targeted Cohorts
1	2003-04*	80 years	2 to 64 years
2	2004-05	75 years	2 to 64 years
3	2005-06	65 years	2 to 64 years
4 onwards	2006-07 to 2018-19	65 years	2 to 64 years

*Started August 2003

Currently there is a long-term supply issue with PPV with intermittent availability of the vaccine. Correspondence from the Department of Health, outlined in HSS (MD) 23/2017⁸ has been published to manage vaccination of priority patients in light of the shortage, based on Public Health England (PHE) temporary guidance.

At present, uptake of people 65 years and older that received PPV vaccine during the financial year as a proportion of the number of the total registered with primary

care at the start of the financial year. This does not provide information on the proportion of those 65 years and older that have ever received PPV vaccine (i.e. the coverage).

In 2018-19, 23.4% of GP registered people aged 65 years and older received PPV vaccine within this financial year (Table 12). This is approximately the same proportion of people aged 65 years and older who received the vaccine in the previous financial year.

Table 12. Estimated Pneumococcal Polysaccharide Vaccine (PPV) uptake in people aged 65 years and older, 2014-15 to 2018-19, Northern Ireland

Financial Year	Eligible Population at start of year	No. vaccinated during year	Uptake by end year
2016-17	287,035	60,308	21.0%
2017-18	291,361	68,669	23.6%
2018-19	297,647	69,582	23.4%

Source: Apollo® Information System

Pertussis (Whooping Cough) Vaccine in Pregnant Women

In October 2012 the pertussis vaccine in pregnancy programme commenced as an emergency response to a national outbreak and was offered between 28 and 32 weeks gestation. Since then the programme has continued with Boostrix-IPV® (which contains diphtheria, tetanus, acellular pertussis and inactivated polio antigens – DTaP/IPV). Since May 2016 it has been offered from 16 weeks of gestation until delivery.

In Northern Ireland the pertussis vaccine in pregnancy programme is delivered in primary care. Boostrix-IPV should be offered to all pregnant women from 16 weeks

up to 32 weeks gestation. Midwives have an important role in promoting the vaccine, ensuring pregnant women are informed and advised to make an appointment with their GP to receive the vaccine.

This is the first year (2018-19) with complete data from the NIMATS data source.

In 2018-19, coverage in Northern Ireland was 66.6% compared to 69.9% in 2017-18; a decrease of 3.3%. Women resident in South Eastern LCG had the highest coverage (75.3%) compared to other LCG areas of residence, which were broadly similar (Table 13).

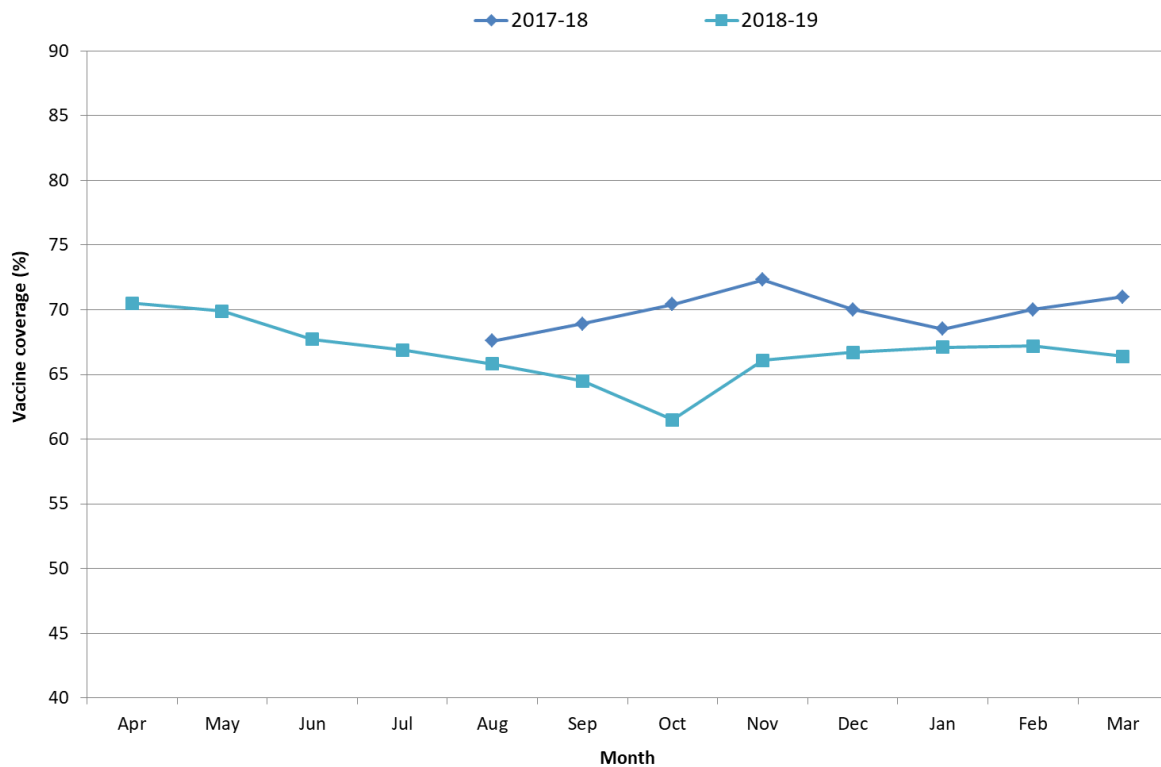
Table 13. Pertussis vaccine coverage (%) in pregnant women, August 2017 – March 2019, Northern Ireland

Area	% pregnant women vaccinated DTaP/IPV	
	August 2017- March 2018	April 2018 - March 2019
Belfast	71.0%	65.3%
South Eastern	78.9%	75.3%
Northern	66.3%	64.2%
Southern	67.0%	64.4%
Western	68.4%	65.9%
NI Total	69.9%	66.6%

Source: NIMATS

Monthly uptake shows seasonal fluctuation of uptake with highest coverage during the winter months. This coincides with delivery of the seasonal influenza vaccination programme, which also targets pregnant women (Figure 11).

Figure 11. Monthly pertussis vaccine coverage (%) in pregnant women, August 2017 – March 2019, Northern Ireland



Source: NIMATS

During 2018-19, the PHA evaluated a maternity flu vaccine pilot where community midwives offered and administered the seasonal influenza vaccine during the 2017-18 flu season. Whilst the pilot only offered flu vaccine, the findings are generally applicable to all vaccines offered to pregnant women. Although the pilot had limited impact in terms of vaccinating pregnant women, the evaluation highlighted issues around knowledge and confidence of midwives when discussing vaccination with their patients. As a result, the PHA Immunisation Team is developing bespoke pregnancy training resources to support GP practices and maternity units in the delivery of the programme.

Work to Improve Uptake of Immunisation Programmes

Leadership and strategic direction

In 2019-20, the PHA Immunisation Team will continue to work with those responsible for policy, commissioning, delivery, epidemiology and promotion to co-ordinate and focus multi-agency effort around increasing uptake of all vaccination programmes.

This will include meeting the UK World Health Organisation (WHO) Member State European Region, who has signed up to a longstanding commitment to eliminate measles and rubella along with all Member States of WHO. The Northern Ireland Measles and Rubella Elimination Action Plan outlines the regional situation and local actions and will be published during 2019-20.

Data Analysis

In 2019-20, the PHA Immunisation Team will work with colleagues in health intelligence, BSO, Trust child health information offices and other organisations to investigate and analyse the reasons for falling uptake to better understand regional variation of pre-school vaccines, particularly in children aged 12 and 24 months of age.

Immunisation Training Resources for Health Professionals

In 2019-20, the PHA Immunisation Team will continue to work with PHA communications colleagues, primary care teams, health visitors and school health teams in the provision of accessible, up to date professional resources, in line with the national immunisation core curriculum⁹. This will include development of bespoke

pregnancy training resources to support GP practices and maternity units and to continue to highlight the importance of immunisations.

Public Promotion of Vaccinations

In 2019-20, the PHA Immunisation Team will continue to work with communications colleagues and other health professionals to promote vaccination and to encourage parents to take up the offer of vaccines.

Central to this will be a better understanding of parental attitudes to vaccinations and understanding of benefits locally.

Support to Delivery of Vaccination Programmes

In 2019-20, the PHA Immunisation Team will work with commissioners, in the main HSCB Integrated Care Directorate and PHA Nursing Directorate, to improve the delivery and accessibility of vaccination programmes for those that need through implementation of targeted interventions, if and where appropriate.

This includes roll out of the MMR Locally Enhanced Service (described in page 23) to all GP practices in Northern Ireland and evaluation of an MMR Vaccine Service that has been offered at the Belfast Trust Northern Ireland New Entrant Service (NINES) since October 2018.

Conclusions

Following a long history of high coverage in the pre-school and school-based childhood vaccination programmes in Northern Ireland, it is disappointing and of public health concern that pre-school vaccination coverage has declined by a small but persistent proportion over recent years, particularly for vaccinations measured at 12 and 24 months of age. Whilst this trend has been seen across the UK, the 2018-19 rates in Northern Ireland have declined at a faster rate than in other devolved administrations and, for the first time in seven years, vaccination coverage at 12 and 24 months of age has fallen below the recommended 95% WHO target.

It is important to acknowledge that those working to deliver our vaccination programmes, within primary care, health visiting and school nursing, continue to work as hard as ever to ensure that those that require vaccine receive it. Overall coverage of the pre-school vaccination programme remains higher than the national (UK) average and there continues to be many locations in the region that are achieving the 95% WHO targets.

The school-based vaccination programmes consistently maintain coverage of higher than 80% across the programmes offered in school. The notable exception was the HPV vaccination programme for girls, which experienced declining coverage in the previous four years (73.1% lowest in 2017-18) from a high of over 88% in 2011-12. It is therefore with great pleasure that we have been able to report an increasing uptake in 2018-19 for those finishing school year 9. This is testament to the hard work of everyone involved in the programme and highlights how falling trends can be halted and indeed reversed with the appropriate and focused effort and resource.

There is also room for improvement in the adult vaccination programmes. Latest uptake of pertussis vaccine in pregnancy was 66.6% and for the routine cohort (70 year olds) of the shingles programme only 45.5%. Both programmes experience seasonal fluctuation in uptake as a result of influence from delivery of the seasonal influenza vaccination programme. Flu vaccine is also offered to pregnant women and high coverage of pertussis vaccine in pregnancy occurs during the winter months. Recent findings show that 90% of shingles vaccine is administered by primary care between October and the following January despite availability of the vaccine throughout the year. The seasonal flu vaccine programme is more at risk of unexpected changes to its delivery as a result of the nature of vaccine production and supply and it is likely that this year's shingles uptake was impacted by the delays in delivery of adjuvanted Trivalent influenza vaccine offered to those over 65 years of age.

The vaccine coverage surveillance information presented in this report identifies further areas for improvement for the PHA Immunisation Team over the coming years and they have been highlighted in the previous section. The Team will also continue to meet their UK WHO Member State commitments towards the elimination of measles and rubella in Europe through publication of the Northern Ireland Measles and Rubella Elimination Action Plan in partnership with relevant colleagues during 2019-20.

However, central to halting the declining trend of vaccination coverage amongst our pre-school programmes and improving coverage across both childhood and adult programmes, is the need for co-ordinated and focused effort across the Health and Social Care organisations in Northern Ireland. This includes those responsible for

policy and funding within Government, the commissioners introducing evidence-based models of delivery, epidemiologists and public health experts.

Only then will we reduce inequalities and protect the population from acquiring vaccine preventable diseases such as, measles, which is now occurring across European countries, with associated fatalities, that had previously eliminated or interrupted endemic transmission.

Sources of Further Information

The most useful resource for health professionals is the on-line version of The Green Book, which contains the most up-to-date information on immunisation.

Name	Link
Immunisation against Infectious Diseases (“The Green Book”)	https://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book
Public Health Agency Immunisation page	http://pha.site/immunisationvaccine-preventable-diseases
Public Health England Immunisation page	https://www.gov.uk/government/collections/immunisation
Chief Medical Officer (CMO) letters (Northern Ireland)	https://www.health-ni.gov.uk/publications/letters-and-urgent-communications-2017
Country Specific Vaccine schedules	http://apps.who.int/immunization_monitoring/globalsummary/schedules
Vaccination of individuals with uncertain or incomplete immunisation status	https://www.gov.uk/government/publications/vaccination-of-individuals-with-uncertain-or-incomplete-immunisation-status
Public Health Agency Publications	http://www.publichealth.hscni.net/publications

Glossary of Terms

Antigen: A substance that when introduced into the body stimulates the production of an antibody

Apollo®: Software used to extract data from primary care systems

BCG: (Bacillus Calmette-Guerin) is a vaccine primarily used to provide protection against Tuberculosis (TB)

Booster Vaccine: This is an additional dose of vaccine given following an earlier dose / course of vaccines which is referred to as primary vaccines. The purpose of a booster dose is to increase / “boost” immunity

Vaccine Cohort: Group of people who are eligible for a vaccine programme based on age or other risk factors for developing a vaccine preventable disease

COVER: (Cover of Vaccination Evaluated Early) is a quarterly data collection used to evaluate childhood immunisation coverage across the UK

Diphtheria: is an infectious disease caused by the bacterium *Corynebacterium diphtheriae*. It primarily infects the throat and upper airways

DTaP/IPV/Hib Vaccine: This vaccine offers protection against diphtheria, tetanus, pertussis, polio and *haemophilus influenza type b*. It is commonly referred to as the “five in one”

DTaP/IPV/Hib/HepB Vaccine: This vaccine offers protection against diphtheria, tetanus, pertussis, polio, *haemophilus influenza type b* and hepatitis B. It is commonly referred to as the “six in one” or “hexa” vaccine

Epidemiology: The study of the distribution and determinants of health-related states / events (including disease) and the application of this study to the control of diseases / other health problems

Hepatitis B: is a viral infection that attacks the liver and can cause chronic disease

Hepatitis B positive: is a term used to describe someone who has hepatitis B infection and the diagnosis is based on the detection of hepatitis B surface antigen from a blood sample

Hib: Haemophilus influenza type b is the second most common cause of bacterial pneumonia

HPV Vaccine: is a vaccine that offers protection against certain types of Human Papilloma Virus

Human Papilloma Virus (HPV): is a viral infection that is mainly transmitted via sexual contact. HPV-related disease includes genital warts, cervical and ano-genital cancers

Immunisation: is a process whereby a person is made immune / resistant to an infectious disease, typically by administration of a vaccine

Inactivated Vaccine: is a vaccine that is made from microorganisms (bacteria, viruses, other) that have been killed through physical / chemical processes. These killed organisms cannot cause disease

Incidence: is the number of individual who develop a specific disease / experience a health-related event during a particular time period

LCG: Local commissioning groups

Measles: is a vaccine preventable disease. Measles is a serious respiratory disease that causes a rash and fever and can cause significant morbidity and mortality

Men ACWY Vaccine: Inactivated vaccine that offers protection against invasive meningococcal disease caused by *Neisseria meningitidis* groups A, C, W & Y

Meningococcal Group B Vaccine: Inactivated vaccine that offers protection against invasive meningococcal disease caused by *Neisseria meningitidis* group B

Meningococcal Group C Vaccine: Inactivated vaccine that offers protection against invasive meningococcal disease caused by *Neisseria meningitidis* group C

MMR Vaccine: Combined vaccine used to offer protection against measles, mumps and rubella. MMR is a live vaccine i.e. contains attenuated / weakened organisms

Pertussis: is a highly contagious disease of the respiratory tract caused by *Bordetella pertussis*. The disease caused by this bacterium is commonly referred to as “whooping cough”

PHE: (Public Health England) is an executive agency of the Department of Health in England

Pneumococcal Disease: is caused by a bacterium known as *Streptococcus pneumoniae*. Pneumococcal disease can range from upper respiratory tract infections to pneumonia, septicaemia and meningitis

Polio: is a highly infectious disease caused by a virus. It invades the nervous system and can cause total paralysis in hours

Rotavirus: is a virus that can cause severe diarrhoea and vomiting, especially in babies and young children

Rubella: (German Measles) is a viral disease that causes a fever and a rash. It can cause defects in pregnant women who develop the infection

Serogroup: A group of bacteria containing a common antigen / a group of viral species that are antigenically closely related

Shingles: is caused by *varicella zoster virus* (VZV), the same virus that causes chickenpox

Tetanus: is an infection caused by a bacteria called *Clostridium tetani*. The bacteria produce a toxin that causes painful muscle contractions

Tuberculosis: (TB) is caused by the bacterium *Mycobacteria tuberculosis*. It usually causes infection of the lungs but can cause infection in other parts of the body too. If not treated properly TB can be fatal

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