Public Health England

Protecting and improving the nation's health

The national childhood flu immunisation programme 2020 to 2021

Information for healthcare practitioners

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Published November 2020
PHE publications
gateway number: 2020216

PHE supports the UN
Sustainable Development Goals

Document information

Date of Publication	Details
September 2020	Document first published for 2020 to 2021 flu season
November 2020	Document updated to include: 1. Additional information on the offer of inactivated influenza vaccine to children whose parents refuse live attenuated influenza vaccine (LAIV) due to the porcine gelatine content. 2. Clarification that children under nine years of age who are household contacts of those on the NHS shielded patients list or of immunocompromised patients who have never previously received any flu vaccine should be offered two doses of flu vaccine with a minimum of a four week interval between them. 3. More detailed information on fever following flu vaccination. 4. Advice not to dispose of LAIV that has been involved in a cold chain incident until further incident-specific advice has been sought from the manufacturer and from the local Screening and Immunisation team.

Contents

Influenza vaccination programme 2020 to 2021 and control measures to prevent the spread of the SARs-CoV-2

The flu vaccination programme for the 2020 to 2021 flu season has been extended, with more groups eligible to receive flu vaccine than in previous years. As Coronavirus Disease 2019 (COVID-19) is likely to be co-circulating with flu, protecting those at high risk of flu, who are also those most vulnerable to hospitalisation as a result of COVID-19, is vitally important.

Control measures to prevent the spread of severe acute respiratory syndrome coronavirus 2 (SARs-CoV-2) such as shielding and social distancing will mean that delivering the flu vaccine this year will be more challenging as flu vaccines are likely to be delivered in a very different way than in previous years. Flu immunisers will need to wear the recommended personal protective equipment (PPE) in keeping with the current advice from the government when delivering the flu vaccine.

This information document will focus specifically on the childhood flu programme recommendations for 2020 to 2021 (a separate information document is available containing flu programme details for the inactivated influenza vaccine). However, those involved in delivering this year's childhood flu vaccine should ensure that they are aware of the specific guidance that they should follow in order to safely and effectively deliver flu vaccines during the ongoing COVID-19 pandemic. This includes, but is not limited to, guidance on PPE and infection prevention and control measures.

Please ensure that you read the national flu immunisation programme 2020 to 2021 letters available on the PHE Annual flu programme webpage (www.gov.uk/government/collections/annual-flu-programme)

In addition to providing key information about this year's flu programme, these letters also contain links to the relevant coronavirus-related guidance. It is recommended that you regularly check the PHE Annual flu programme webpage during the flu vaccination period as any further information that becomes available about the flu vaccination programme will be published there. **Any further programme updates will also be reported in Vaccine Update** so please ensure that you subscribe using this link: New subscribers This "Information for Healthcare practitioners" document will also be updated with any new information and answers to frequently asked questions as the flu vaccination season progresses.

Background and 2020 to 2021 programme summary

In 2012, the Joint Committee on Vaccination and Immunisation (JCVI) recommended that the routine annual influenza vaccination programme should be extended to include children, both to provide individual protection to the children themselves and to reduce transmission across all age groups to lessen levels of flu overall and reduce the burden of flu across the population.

The phased introduction of this extension began in 2013 when flu vaccine was offered to all two and three year old children and to those aged four to ten years (up to and including pupils in school year 6) in seven different geographical pilot areas. Each year, more age groups have been added to the national programme and in the 2019/20 flu season, all children of primary school age were eligible for vaccination (Reception to year 6) in addition to all 2 and 3 year olds.

This year, with concerns about co-circulation of the SARS-CoV-2 virus during the 2020/21 flu season, it is particularly important to reduce transmission of flu in the community. For this reason, the childhood flu vaccine programme has been extended to include all children in Year 7 in secondary schools.

The vaccine recommendations for the 2020/21 flu season are described in Appendix B of the national flu immunisation programme update letter. During the 2020 to 2021 flu season, all children between two and eleven years old (but not twelve years or older) on 31 August 2020 and children from six months of age in clinical risk groups should be offered flu vaccine.

The vaccine recommendations for children for 2020/21 are summarised below:

- **at risk children aged 6 months to 2 years:** offer egg grown quadrivalent influenza vaccine (QIVe)
- **at risk children aged 2 years up to 18th birthday:** offer live attenuated influenza vaccine (LAIV) unless contraindicated*
- **aged 2 and 3 years on 31 August 2020, all primary school aged children and those in year 7 (ages 4 to 11 on 31 August 2020):** offer LAIV unless contraindicated* **

* Where a recommended vaccine is contraindicated, immunisers should follow the recommendations in the summary table of Appendix B of the second letter detailing the national flu immunisation programme (published 5th August).

** A supply of inactivated influenza vaccine for children whose parents object to the porcine gelatine content of Fluenz Tetra (LAIV) is now available to order by General Practice and school aged immunisation teams via ImmForm. The vaccine is Fluarix® Tetra, manufactured by GlaxoSmithKline. This vaccine is also available to order for children in clinical risk groups. See Statement on the childhood flu programme: the alternative offer to live attenuated Influenza vaccine (LAIV).

Extension of the flu vaccination programme to include healthy children

Extending the flu vaccination programme to include healthy children aims to lower the public health impact of flu by:

- providing indirect protection by lowering flu transmission from children to other children, adults and to those in the clinical risk groups of any age and averting cases of severe flu and flu-related deaths in older adults and people with clinical risk factors
- providing direct protection to children, helping to prevent a large number of cases of flu in children

Studies commissioned by JCVI[1] suggested that, despite the high cost, extending the flu vaccination programme to all children is highly likely to be cost-effective and well below the established cost-effectiveness threshold when indirect protection to the whole population is taken into account, particularly over the longer term.

The role of healthcare professionals

Healthcare professionals have a key role in promoting high uptake of flu vaccination in children through:

- understanding the benefits and evidence base relating to the use of the vaccine against flu
- promoting the vaccine to parents/carers of children who are eligible to receive the flu vaccination
- safely administering flu vaccines in accordance with the vaccine schedule
- ensuring any adverse effects are managed and reported appropriately

1 Pitman RJ, Nagy LD and Sculpher MJ (2013) Cost-effectiveness of childhood influenza vaccination in England and Wales: Results from a dynamic transmission model. Vaccine 31(6): 927-42.

Influenza

Flu is a highly infectious, acute, viral infection of the respiratory tract. It is transmitted by the inhalation of infected droplets and aerosols and by hand-to-mouth/eye contamination from an infected surface. The incubation period can be one to five days (average two to three days).

There are three types of influenza virus which affect humans. Influenza A causes epidemics and pandemics. This virus is found in many different animals and may spread between them. Birds, particularly wildfowl, are the main animal reservoir. The A viruses can live and multiply in wildfowl from where they can transmit to humans. Influenza B tends to cause less severe disease and smaller outbreaks. It is predominantly found in humans and the burden of disease is mostly in children. Influenza C causes minor respiratory illness only.

Groups affected by flu

Flu can affect anyone, but it is a more serious illness in babies, pregnant women, older people and those with certain underlying conditions.

Symptoms of flu

In healthy individuals, flu is usually an unpleasant but self-limiting illness with recovery in five to seven days. Common symptoms include the sudden onset of fever, chills, headache, myalgia (muscle aches) and severe fatigue. Sufferers can also experience a dry cough, sore throat and stuffy nose. In young children, gastrointestinal symptoms such as vomiting and diarrhoea may be seen.

Possible complications of flu

Common complications may include bronchitis, otitis media (middle ear infection) in children and sinusitis. Other less common complications include secondary bacterial pneumonia, viral pneumonia, meningitis and encephalitis.

Further information on influenza infection is included in the Green Book Influenza chapter and on NHS.UK.

Flu vaccination programme for children

Live attenuated influenza vaccine (LAIV)

The flu vaccine that should be offered to most children in the eligible cohort groups is a live attenuated influenza intranasal vaccine (LAIV). It contains an attenuated (weakened) vaccine virus that is also cold adapted so that it cannot cause clinical flu in immunocompetent children.

LAIV is manufactured by AstraZeneca/MedImmune and has been sold in many countries for 17 years. Only one LAIV vaccine is available, marketed as Fluenz Tetra for the UK and EU market, and FluMist Quadrivalent for the US market. Fluenz Tetra and FluMist Quadrivalent are the same product in different packaging.

LAIV may not be suitable for all children who are eligible for the flu vaccine (please refer to contraindications section below). For those children in whom LAIV is contraindicated, a suitable injectable inactivated influenza vaccine should be offered instead.

Presentation of LAIV

LAIV is supplied in a box containing 10 single-use, prefilled nasal applicators. Each applicator contains 0.2ml nasal suspension. The nasal applicator is ready to use - no reconstitution or dilution is required. The nasal suspension is colourless to pale yellow, clear to opalescent. Small white particles may be present.

Cold adapted influenza virus

The live viruses in LAIV are cold adapted so that they cannot replicate efficiently at body temperature (37°C). This means that the vaccine viruses will not replicate in the lungs but will reproduce at the cooler temperatures found in the nose (nasal mucosa). This allows the child to produce localised antibodies in the lining of the airways which then protect against infection if they encounter flu virus (which enters the body via the nose and mouth). These localised antibodies are not produced in response to the inactivated flu vaccine. In addition to localised antibodies in the nose, antibodies are also produced in the blood (systemic antibodies).

Transmission of vaccine virus in LAIV

There is a theoretical potential risk of transmission of the live attenuated flu virus in LAIV to very severely immunosuppressed contacts (for example bone marrow transplant patients requiring isolation) for one to two weeks following vaccination. In the US, where there has been extensive use of LAIV, there have been no reported instances of illness or infections from the vaccine virus among immunocompromised patients inadvertently exposed. Where close contact with very severely immunosuppressed contacts (for example household members) is likely or unavoidable however, consideration should be given to using an appropriate inactivated flu vaccine instead.

Healthcare workers and school staff may be asked questions in relation to the safety of the LAIV being given in schools. Specific information on potential exposure during administration, and from recently vaccinated children, is outlined below.

The nasal influenza vaccine uses a live attenuated (weakened) influenza virus which helps protect against influenza infection in those who receive it. LAIV does not cause clinical influenza in those immunised and is offered to children because it provides good overall protection for children against influenza virus and is expected to provide some cross-protection against mismatched strains. It has a good safety record and is easier to administer than injected vaccines. Millions of doses of LAIV have been given in the USA and in Canada. This vaccine is also given to children in Finland. In the UK, millions of doses of LAIV have been given to young children and to school age children during the last seven flu seasons. A small number of respiratory illnesses (including wheeze) were reported in the contacts of vaccinated children. Most of these events were self-limiting and some of them are likely to have been coincidental.

LAIV has a good safety record and unvaccinated contacts are not at risk of becoming seriously ill with the flu vaccine virus, either through being in the same room where flu vaccine has been given or by being in contact with a recently vaccinated individual. Excluding children from school during the period when LAIV is being offered or in the following weeks is therefore not considered necessary. The only exception to this would be the tiny number of children who are extremely immunocompromised (for example, those who have just had a bone marrow transplant). These children are normally advised not to attend school anyway because of the definite and much higher risk of being in contact with other infections, including ‘wild’ influenza, that spread in schools.

Exposure to vaccine virus during administration

- Administration of the vaccine is via a nasal applicator which delivers 0.1ml (around 1/50th of a teaspoon) of fluid into each nostril. There is not a 'mist' of vaccine virus in the air when children are being vaccinated and therefore others in the room should not be at risk of "catching" the vaccine virus. The room or school in which administration of nasal influenza vaccine has taken place does not require any special cleaning afterwards.

- Images of the vaccine being squirted into the air (which are widely available on the internet) and the US name of the vaccine (FluMist Quadrivalent) may give a false impression that a vaccine mist fills the room. These images are intended to show how gently the vaccine comes out when inserted into the nose but the vaccine does not create an external mist – almost all the fluid is immediately absorbed into the child's nose where it has been sprayed.

- Healthcare workers administering LAIV may, theoretically, be exposed to the vaccine virus if it is accidentally released outside of the child's nose. In the US, where there has been extensive use of the vaccine over many years, transmission of the vaccine virus to healthcare workers has not been reported to date. Health care workers who are immunocompromised and those who are pregnant can safely administer the vaccine. As a precautionary measure, however, very severely immunocompromised healthcare workers should not administer LAIV.

Shedding of vaccine virus

- Although vaccinated children are known to shed virus a few days after vaccination, it is less able to spread from person to person than the natural infection. The amount of virus shed is normally below the levels needed to pass on infection to others and the virus does not survive for long outside of the body. This is in contrast to natural flu infection, which spreads easily during the flu season. In schools where LAIV is administered therefore, the overall risk of contact with influenza viruses is massively reduced by having a large number of children vaccinated, thus reducing their risk of wild flu infection.

- In the US, where there has been extensive use of LAIV for many years, serious illness amongst immunocompromised contacts who are inadvertently exposed to vaccine virus has never been observed. Expert doctors at Great Ormond Street Hospital, who deal with many

children with very serious immune problems, do not recommend keeping such children off school purely because of LAIV vaccination.

- A tiny number of children who are extremely severely immunocompromised, for example, immediately after a bone marrow transplant, would not be attending school anyway because the risk from all the other infections that children pass to each other at school would be too great. It is important that all children with immune problems should themselves be vaccinated, usually with an injected inactivated vaccine. Similarly, healthy children who have family contacts who are very severely immunocompromised should be given an inactivated influenza vaccine.

Vaccine recommendations

In England, flu vaccine should be offered to all children who are aged two to eleven years old (but not twelve years or older) on 31 August 2020 and to children aged from 2 years up to 18 years in clinical risk groups. LAIV should be offered unless contraindicated (please refer to contraindications section below). For further information about the childhood flu immunisation programme 2020/21, please refer to the annual flu letters from DHSC/PHE/NHS England:
The national flu immunisation programme 2020 to 2021.

Number of vaccine doses required

Children NOT in clinical risk groups only require one dose of LAIV. A single dose is 0.2ml (administered as 0.1ml per nostril).

The marketing authorisation holder's Summary of Product Characteristics[2] (SPC) states that, for children who have not previously been vaccinated against seasonal flu, a second dose should be given after an interval of at least four weeks. The JCVI has considered this issue and has recommended that as a second dose of the vaccine provides only modest additional protection, children who are not in a clinical risk group should be offered a single dose of LAIV.

Healthcare professionals are reminded that in some circumstances, the recommendations regarding vaccines given in the Green Book chapters may differ from those in the SPC for a particular vaccine. When this occurs, the recommendations in the Green Book are based on current expert advice

[2] Fluenz Tetra Summary of Product Characteristics (SPC). Available at: www.medicines.org.uk/emc/product/3296

received from the JCVI and this advice should be followed. The Green Book recommendations and/or further advice from the Department of Health and Social Care/Public Health England should be reflected in PGDs.

Children under nine years of age who are in a clinical risk group or who are household contacts of those on the NHS shielded patients list or of immunocompromised patients who have never previously received any influenza vaccine should be offered two doses of influenza vaccine with a minimum of a four week interval between them.

Administering an inactivated influenza vaccine after a first dose of LAIV

In the event that all LAIV stock expires before children scheduled to receive a second dose are able to do so, a suitable inactivated injectable flu vaccine should be offered as an alternative, allowing a four-week minimum interval period between the two doses.

Contraindications and precautions

There are very few children who cannot receive any flu vaccine. When there is doubt, appropriate advice should be sought promptly from the local NHS England Screening and Immunisation team, local Health Protection team or a consultant paediatrician to minimise the period the child is left unvaccinated.

Contraindications

LAIV should not be given to a child or adolescent who:

- is under 24 months or 18 years or older
- has had a confirmed anaphylactic reaction to a previous dose of flu vaccine
- has had a confirmed anaphylactic reaction to any component of the vaccine
- is clinically severely immunodeficient due to conditions or immunosuppressive therapy such as: acute and chronic leukaemias; lymphoma; HIV infection not on highly active antiretroviral therapy (HAART); cellular immune deficiencies; and high dose corticosteroids (prednisolone at least 2mg/kg/day for a week or 1mg/kg/day for a month or equivalent)
- is receiving salicylate therapy
- is pregnant

The Green Book[3] chapter on 'contraindications and special considerations' (chapter 6) gives further advice on the use of live vaccines in individuals who are severely immunosuppressed. Where LAIV is contraindicated, consideration should be given to the use of inactivated flu vaccine instead.

LAIV is not contraindicated for use in children or adolescents with stable HIV infection receiving antiretroviral therapy; those receiving topical steroids, standard dose inhaled corticosteroids, low-dose systemic corticosteroids or those receiving corticosteroids as replacement therapy, for example for adrenal insufficiency.

Precautions

LAIV is not recommended for children and adolescents currently experiencing an acute exacerbation of asthma symptoms including those who have had increased wheezing and/or needed additional bronchodilator treatment in the previous 72 hours. Such children should be offered a suitable inactivated influenza vaccine to avoid a delay in protection.

There are limited safety data in children who require regular oral steroids for maintenance of asthma control or have previously required intensive care for asthma exacerbation – such children should only be given LAIV on the advice of their specialist. As these children may be at higher risk from influenza infection, those who cannot receive LAIV should receive a suitable inactivated influenza vaccine.

If a child is acutely unwell, immunisation may be postponed until they have fully recovered. This is to avoid confusing the differential diagnosis of any acute illness by wrongly attributing any signs or symptoms to any adverse effects of the vaccine. However, minor illnesses without fever or systemic upset are not valid reasons to postpone immunisation.

Reporting adverse reactions

As with all vaccines and other medicines, healthcare professionals and patients are encouraged to report suspected adverse reactions to flu vaccines using the yellow card reporting scheme at https://yellowcard.mhra.gov.uk/. The black triangle symbol (▼) is used as a reminder to healthcare professionals and the public to report all suspected side-effects to the Medicines and Healthcare Products Regulatory Agency (MHRA) using the Yellow Card scheme.

[3] Public Health England. Chapter 6 Contraindications and Special Considerations. Immunisation against infectious disease (the Green Book). Last updated October 2017. www.gov.uk/government/publications/contraindications-and-special-considerations-the-green-book-chapter-6

Risk of anaphylaxis following administration of LAIV

As with all vaccines, there is a very rare possibility of this vaccine causing a severe allergic reaction (anaphylaxis). All healthcare professionals who administer vaccines should be trained to recognise and treat anaphylaxis.

Pregnancy

There is limited data on the use of live attenuated flu vaccine in pregnancy. While there is no evidence of risk with LAIV, inactivated flu vaccines are preferred for those who are pregnant. There is no need, however, to specifically test eligible girls for pregnancy or to advise avoidance of pregnancy in those who have been recently vaccinated. There are no specific precautions regarding pregnant women who are exposed to children who have been vaccinated with LAIV as the likelihood of onward transmission is considered very low.

Egg allergy

JCVI has advised[4] that children with an egg allergy, including those with previous anaphylaxis to egg, can be safely vaccinated with LAIV in any setting (including primary care and schools). The only exception is for children who have required admission to intensive care for a previous severe anaphylaxis to egg, for whom no data are available; such children are best given LAIV in the hospital setting. LAIV remains the preferred vaccine for this group and the intranasal route is less likely to cause systemic reactions.

Children with egg allergy but who also have another condition which contraindicates LAIV (for example, immunosuppression) should be offered an inactivated influenza vaccine with a very low ovalbumin content (less than 0.12 micrograms/ml). If these children are aged under nine years and have not previously been vaccinated against influenza, they will require a second dose of vaccine four weeks after the first.

Egg-allergic children with asthma can receive LAIV if their asthma is well controlled (please see the advice on asthma in the Precautions section above).

[4] Joint Committee on Vaccination and Immunisation. Minutes of the February 2015 meeting. Available at : www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#minutes

Inactivated vaccines with ovalbumin content more than 0.12 micrograms/ml (equivalent to 0.06 micrograms/ml for 0.5ml dose) or where content is not stated should not be used in egg-allergic children. The ovalbumin content of the flu vaccines for 2020/21 is published in a separate document on the PHE Annual flu programme web page.

Egg-allergic children aged nine years and over can be given the quadrivalent inactivated egg-free vaccine, QIVc, which is licensed for use in this age group.

The use of inactivated flu vaccine when LAIV is contraindicated

Children in clinical risk groups under 18 years of age who are contraindicated to receive LAIV should be offered an appropriate inactivated quadrivalent vaccine, as should children in clinical risk groups aged 6 months to less than 2 years (for whom LAIV is not licensed). Children who are household contacts of very severely immunocompromised people should also be offered inactivated rather than live flu vaccine.

The inactivated vaccines to offer are as follows:

- Children aged 6 months to less than 9 years of age should be offered an egg-grown quadrivalent influenza vaccine (QIVe) which should be ordered through ImmForm from centrally purchased supplies (https://portal.immform.phe.gov.uk). GP practices should not use their own locally procured QIVe vaccines for these children.

- Children aged 9 years and over in clinical risk groups who access the vaccine through general practice should ideally be offered the **cell-based quadrivalent influenza vaccines (QIVc)** from their locally procured vaccine stocks. GP practices offering QIVc to these children will be reimbursed by NHS England and NHS Improvement (NHSE/I). Where QIVc vaccine is unavailable, practices can either offer QIVe ordered through ImmForm from centrally purchased supplies, or their own locally procured QIVe which will be reimbursed by NHSE/I.

- In a school setting, where there will only be a small number of children aged 9 years and over in clinical risk groups who are contraindicated to receive LAIV and are offered an injectable alternative on-site (and not referred to General Practice), it is acceptable to offer QIVe ordered through ImmForm from centrally purchased supplies.

Inactivated flu vaccines suitable for children are presented as prefilled syringes for intramuscular injection. The preferred site for injection is the anterolateral aspect of the thigh for infants six months to under one year. Children over one year of age can receive the vaccine in the deltoid region of the upper arm.

Some inactivated flu vaccines are restricted to use in particular age groups or are not suitable for those with an egg allergy. Those administering flu vaccines must be familiar with, and refer to the manufacturer's SPC for individual brands when administering inactivated flu vaccines.

Inactivated flu vaccines can cause similar systemic adverse reactions as LAIV. They may also cause injection site reactions (redness, swelling, tenderness). These usually disappear after one or two days.

Number of doses (at risk groups)

Where a child, aged two years to less than nine years in a clinical risk group cannot receive LAIV due to a contraindication and has not received any flu vaccine before, they should receive two doses of inactivated flu vaccine, with the second dose at least four weeks after the first. This also applies to children aged 6 months to two years who are too young to be eligible for LAIV and to children under nine years of age who are household contacts of those on the NHS shielded patients list or of immunocompromised patients who have never previously received any influenza vaccine. The inactivated flu vaccines are interchangeable – the second dose does not have to be the same vaccine given for the first dose.

Children who have received one or more doses of any flu vaccine before should be considered as previously vaccinated. Two doses are only required the first year the child receives any flu vaccine. In subsequent years, they can be given a single dose as their immune system will already have been primed.

Vaccination of patients recently diagnosed with COVID-19 infection

Patients eligible to receive NHS-funded flu vaccine but recently in contact with, or diagnosed with COVID-19 infection can be vaccinated when recovered and self-isolation requirements have been fulfilled. Immunisers should refer to the GOV.UK Coronavirus pages to ensure recommendations that are current at the time of vaccination are followed.

If the child has an acute severe febrile illness, LAIV administration should be deferred until recovered. Minor illnesses without fever or systemic upset are not valid reasons to postpone vaccination.

Fever following influenza vaccination

LAIV

The nasal spray flu vaccine may cause a runny or blocked nose, reduced appetite, feeling generally unwell and headache. These symptoms usually disappear within one to two days without treatment, but paracetamol can be given if necessary. It is not necessary for children to stay off school or self-isolate when presenting with these symptoms unless there are reasons to suspect COVID-19. Studies have found that the likelihood of children presenting with a fever after receiving the flu nasal spray is similar to that in the general population i.e. children of the same age who have not received LAIV are just as likely to present with a fever. On this basis, if a child does present with fever after LAIV administration, then COVID-19 guidance should be followed.

Inactivated influenza vaccine

Feeling generally unwell, shivery, achy and tired are also commonly reported symptoms following vaccination with inactivated flu vaccineParents and carers should be advised that the inactivated flu vaccination may cause a mild fever which usually resolves within 48 hours. This is a common, expected reaction and staying off school or self-isolation is not required unless there are reasons to suspect COVID-19.

As has always been recommended, any fever after vaccination should be monitored and if parents or carers are concerned about their child's health at any time, they should seek advice from their GP or NHS 111.

Vaccine constituents

The LAIV is supplied in a single use nasal applicator (type 1 glass) with nozzle (polypropylene with polyethylene transfer valve), nozzle tip-protector (synthetic rubber), plunger rod, plunger stopper (butyl rubber) and dose divider clip, none of which should affect latex sensitive individuals.

LAIV does not contain any preservatives such as thiomersal but it does contain a highly processed form of gelatine (derived from pigs) as one of its additives. Gelatine is commonly used in a range of pharmaceutical products, including many capsules and some vaccines. The gelatine in LAIV is used as a stabiliser to protect the live viruses from the effects of temperature.

The gelatine used in live vaccines is highly purified and hydrolysed (broken down by water), so it is different from the natural gelatine used in foods. Very sensitive scientific tests have shown that no DNA from pigs can be detected in the LAIV nasal flu vaccine (Fluenz Tetra). These tests show that the gelatine is broken down so much that the original source cannot be identified[5].

Vaccine acceptability for people who object to the use of porcine gelatine, including Muslim and Jewish communities

Some people, including members of Muslim or Jewish religious communities may be concerned about using vaccines that contain gelatine from pigs (porcine gelatine). This statement from representatives of the Jewish community may help some patients/parents/carers to reach a decision about having the vaccine:

Rabbi Abraham Adler from the Kashrus and Medicines Information Service said:
“It should be noted that according to Jewish laws, there is no problem with porcine or other animal derived ingredients in non-oral products. This includes vaccines, including those administered via the nose, injections, suppositories, creams and ointments”.

However, it is acknowledged that some groups within the British Muslim community may consider the porcine-containing product to be forbidden. The final decision about whether parents have their child vaccinated is with them. In order to come to an informed decision, they should be able to consider the evidence about the advantages and disadvantages of the vaccination.

Fluenz Tetra is the only live attenuated flu vaccine available in Europe.

[5] Oxford Vaccine Group. Vaccine Knowledge Project Vaccine ingredients page, gelatine section. Available at: vk.ovg.ox.ac.uk/vaccine-ingredients#gelatine

Use of inactivated flu vaccine as an alternative to LAIV when LAIV is NOT contraindicated

This flu season, from November, children whose parents refuse live attenuated influenza vaccine (LAIV) due to the porcine gelatine content may now be offered an inactivated influenza vaccine, subject to availability. Arrangements should be made to ensure that children who previously declined vaccination earlier in the flu season due to the porcine gelatine content are recalled and offered the alternative vaccine. Vaccine for this cohort is now available to order by General Practice and school aged immunisation teams via Immform. Further information is available in the Statement on the childhood flu programme: the alternative offer to live attenuated Influenza vaccine (LAIV).

For confirmation that the use of the 'Inactivated Influenza Vaccine patient group direction (PGD) V08.00' may be extended to children whose parents refuse LAIV due to the porcine gelatine content, see the extension of eligible cohorts at: www.gov.uk/government/publications/intramuscular-inactivated-influenza-vaccine-patient-group-direction-pgd-template.

Ordering and storing LAIV and inactivated flu vaccine for children

LAIV is purchased centrally by PHE for all children aged two to three years, for children in reception class and school years 1 to 7 and for children in risk groups aged six months to less than 18 years.

PHE has centrally procured a suitable quadrivalent inactivated influenza vaccine for children aged from 6 months of age and for those children in a clinical risk group who are contraindicated to receive LAIV. The quadrivalent inactivated influenza vaccine being supplied by PHE is an egg-grown quadrivalent influenza vaccine (QIVe) and it is licensed for children from six months of age.

It is recommended that children aged 9 years and over in clinical risk groups who are contraindicated to receive LAIV are offered the cell-based quadrivalent influenza vaccine (QIVc). Those who attend their GP surgery for flu vaccination should ideally be offered the QIVc from the practice's locally procured vaccine stocks. GP practices offering QIVc to these children will be reimbursed by NHS England and NHS Improvement (NHSE/I). Where QIVc vaccine is unavailable, practices can either offer QIVe ordered through

ImmForm from centrally purchased supplies or their own locally procured QIVe which will be reimbursed by NHSE/I.

In a school setting, there will only be a small number of children in clinical risk groups aged 9 years and over who require an inactivated flu vaccine. If the immunisation team wish and are able to offer it on-site at the school immunisation session rather than refer the child to General Practice, it is acceptable to offer QIVe ordered through ImmForm from centrally purchased supplies.

LAIV and inactivated injectable flu vaccines for children can be ordered through the ImmForm website: https://portal.immform.phe.gov.uk as for other centrally purchased vaccines.

It is important not to order or hold more than two weeks' worth of LAIV as local stockpiling can cause delays in stock being released and increases the risk of significant loss if there are cold chain failures. It also increases the risk of out of date vaccine being used as Fluenz Tetra has a short shelf life.

In previous flu seasons, ordering controls using allocations based on previous years uptake were introduced on centrally supplied flu vaccines. These were put in place to reduce the amount of excess vaccine, in particular LAIV, ordered by providers but not administered to children. Ordering controls will also be in place in 2020/21. Further information on ordering controls and other ordering advice for LAIV will be available in Vaccine Update and on the ImmForm news item both prior to, and during, the flu vaccination period.

Storing LAIV

LAIV must be stored in accordance with the manufacturer's instructions. It should be stored between +2°C and +8°C in its original packaging and protected from light. It must not be frozen and as for other vaccines, heat speeds up the decline in potency, reducing vaccine shelf life.

Before use, LAIV may be out of the refrigerator for a maximum period of 12 hours at a temperature not above 25°C as indicated in the Summary of Product Characteristics[2] (SPC). If the vaccine has not been used after this 12 hour period, it should be disposed of. If LAIV is involved in cold chain failure incident, **do not** immediately dispose of the vaccine. Label and isolate the vaccine involved, keep it between +2 to +8°C, and seek further advice from the local Screening and Immunisation team and the vaccine manufacturer.

Shelf life of LAIV

LAIV has an expiry date 18 weeks after manufacture. This is much shorter than inactivated injectable flu vaccines. Expiry dates should be checked regularly and all efforts should be made to use the vaccine as soon as possible.

Vaccine safety and efficacy

Nasal congestion/runny nose (rhinorrhoea), reduced appetite, fever, malaise and headache are common adverse reactions following administration of LAIV. Hypersensitivity reactions such as urticaria, facial oedema, bronchospasm and anaphylaxis can occur rarely.

LAIV efficacy

LAIV provides good overall protection for children against influenza virus and is expected to provide some cross-protection against mismatched strains. Using a live attenuated vaccine provides more antigenic stimuli; more elements of the immune system are involved resulting in the production of IgA (important in mucosal immunity), a T-cell response and cell mediated immunity. Vaccine effectiveness varies from year to year depending upon the circulating strains and the vaccine composition. The overall adjusted vaccine effectiveness for 2019/20 for 2 to 17 year olds receiving LAIV was 45.4%.

Timing of vaccination

Vaccination should be given in sufficient time to ensure children are protected before flu starts circulating. If an eligible child presents late for vaccination it is generally appropriate to still offer it however and this is particularly important if it is a late flu season. The decision to vaccinate should take into account the fact that the immune response to vaccination takes about two weeks to fully develop.

As the immunisation teams have to go into a considerable number of schools in a short space of time, some children may be offered immunisation later in the season. Parents of any child at risk from flu because of an underlying medical condition can choose to receive flu vaccination in general practice, especially if the parent would prefer this, the child missed the session at school or they do not want their child to have to wait for the school vaccination session. GP practices should invite these children for vaccination, making it clear to their parents that they have the option to have their child

vaccinated in general practice (and that if they receive it in general practice, they will not then require a dose in school).

Vaccine administration

LAIV is administered by the intranasal route and is supplied in an applicator that allows 0.1ml to be administered into each nostril (total dose of 0.2ml). Clear diagrams showing administration are provided in the SPC and NHS Education for Scotland has made a video for health professionals on how to administer the vaccine.

Administration of LAIV by healthcare staff in clinical risk groups

In theory, healthcare workers may have low level exposure to live attenuated influenza vaccine viruses during administration of the vaccine and/or from recently vaccinated patients. The vaccine viruses are cold-adapted and attenuated however and are unlikely to cause symptomatic influenza. In the US, where there has been extensive use of LAIV, no transmission of vaccine virus in healthcare settings has ever been reported and there have been no reported instances of illness or infections from the vaccine virus among healthcare professionals inadvertently exposed. Thus, the US Centers for Disease Control and Prevention has considered that the risk of acquiring vaccine viruses from the environment is unknown but is probably low[6]. As a precaution, however, very severely immunosuppressed individuals should not administer LAIV. Other healthcare workers who have less severe immunosuppression or are pregnant, should take reasonable precautions to avoid inhaling the vaccine and ensure that they themselves are appropriately vaccinated.

Sneezing, nose blowing and nasal dripping following administration

If the child sneezes, blows their nose or has nasal dripping following administration of LAIV, the vaccine dose does not need to be repeated. Binding of the virus to epithelial cells occurs very rapidly and there are more virus particles in the vaccine than are needed to establish immunity. Therefore sneezing or blowing the nose immediately after immunisation with

[6] Centers for Disease Control and Prevention (2013) Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2013–2014. MMWR September 20, 62(RR07);1-43
www.cdc.gov/mmwr/preview/mmwrhtml/rr6207a1.htm?s_cid=rr6207a1_w#AvailableLAIV

LAIV will not affect immunity[7] and reassurance should be given that the vaccine will still be effective if any of these occur.

There is no evidence that crying or screaming is aerosol generating.

Coughing and sneezing which may occur following administration of live attenuated influenza vaccine (LAIV) are not included as high-risk aerosol generating procedures.

Immunisers should follow the recommendations for PPE which are current at the time of delivering the flu vaccines.

Administering LAIV when the patient has a blocked or runny nose

There are no data on the effectiveness of LAIV when given to children with a heavily blocked or runny nose (rhinitis) caused by infection or allergy. As heavy nasal congestion might impede delivery of the vaccine to the nasopharyngeal mucosa, deferral of administration until resolution of the nasal congestion or use of an appropriate alternative intramuscularly administered inactivated flu vaccine should be considered.

Administering an incomplete dose of vaccine

It is not necessary to repeat the dose of vaccine as long as at least 0.1ml of the vaccine has been given intranasally[8] as each half dose (0.1ml) contains enough viral particles to induce an immune response[9].

If the vaccine is accidentally squirted into the child's eye, it may cause some slight irritation to the eye and eyewash/normal saline should be used to wash out the eye. The child/parent should be advised to seek medical advice if any irritation occurs and persists beyond what might reasonably be expected.

[7] Astra Zeneca. Re: FLUMIST (influenza vaccine [live attenuated]) – Re-administration of FLUMIST subsequent to sneezing [Internet] Message to: British Columbia Centre for Disease Control. 2013 July 30. Cited in: British Columbia Centre for Disease Control. Live Attenuated Influenza Vaccine Questions and Answers for Health Care Providers 2014-2015. Revised Oct 2014

[8] Astra Zeneca. FLUMIST® (Influenza Vaccine [Live, attenuated]) – Inadvertent Oral Administration & Inadvertent Eye Exposure [Internet] Message to: British Columbia Centre for Disease Control. 2013 July 30. Cited in: British Columbia Centre for Disease Control. Live Attenuated Influenza Vaccine Questions and Answers for Health Care Providers 2014-2015. Revised Oct 2014

[9] Astra Zeneca. FLUMIST® (Influenza Vaccine [Live, attenuated]) – Single nostril Administration/Inadvertent Single Nostril Administration [Internet] Message to: British Columbia Centre for Disease Control. 2013 July 30. Cited in: British Columbia Centre for Disease Control. Live Attenuated Influenza Vaccine Questions and Answers for Health Care Providers 2014-2015. Revised Oct 2014

Inadvertent administration of both half doses in the same nostril

It is recommended that LAIV be administered as two divided sprays (0.1ml into each nostril) to maximise the vaccine's contact surface area of epithelial cells within the nasopharynx. No clinical trials have been conducted using a single-nostril administration. However, there is no need to repeat immunisation as each half dose (0.1ml) contains enough viral particles to induce an immune response[9].

Inadvertent administration of LAIV to a child who is aged less than 24 months

LAIV is contraindicated in children aged less than 24 months due to an increase in adverse events in this age group. An increase in wheezing and hospitalisation was observed in clinical trials that included children aged from six to 23 months of age. The decision not to license the vaccine for use in children aged less than 24 months was based on these observations rather than vaccine efficacy in this age group.

Children who have received LAIV at less than 24 months of age do not require a replacement dose. The inadvertently administered vaccine should count as a valid dose as LAIV will provide protection in this age group. However, the child's parents/carers should be informed of the possible adverse events in the short term and advised to seek medical care if adverse events occur. They should be reassured that no long-term effects from receiving LAIV are anticipated.

Children from six months of age in clinical risk groups who have not received a flu vaccine previously should count the inadvertently administered LAIV as the first dose. The child should also be offered the inactivated flu vaccine four weeks later to complete the two dose schedule (in line with the recommendation that children in clinical risk groups aged six months to under 9 years who have not received inactivated flu vaccine previously should be offered a second dose at least four weeks after the first dose). If the child reaches their second birthday in the four weeks between the dose of LAIV and when a second dose of flu vaccine would be due, a further dose of LAIV can be given (if not contraindicated).

Healthcare professionals should report the administration error via their local governance system(s) so that lessons can be learnt and the risk of future errors minimised.

Inadvertent administration of LAIV to a child who is immunosuppressed

If an immunocompromised individual receives LAIV then the degree of immunosuppression should be assessed. If the individual is severely immunocompromised, antiviral prophylaxis should be considered. Otherwise they should be advised to seek medical advice if they develop flu-like symptoms in the four days (the usual incubation period) following administration of the vaccine. If antivirals are used for prophylaxis or treatment, then in order to maximise their protection in the forthcoming flu season, the patient should also be offered inactivated influenza vaccine. This can be given straight away.

Healthcare professionals should report the administration error via their local governance system(s) so that the appropriate action can be taken, lessons can be learned and the risk of future errors minimised.

Recognition of severe immunosuppression

An individual may be considered severely immunosuppressed if they:

- are severely immunodeficient due to conditions or immunosuppressive therapy
- have acute and chronic leukaemia
- have lymphoma
- are HIV positive and not on highly active antiretroviral therapy
- have a cellular immune deficiency
- are taking a high dose of steroids

Household contacts of those who are shielding

Children living with someone on the NHS shielded patients list are eligible to receive flu vaccine. This will reduce the chance of a person with an underlying health condition catching flu from household contacts. If the child is not in a group being offered the vaccine at school, it should be requested from their GP surgery. If the shielded patient is immunosuppressed, an inactivated vaccine may be offered rather than LAIV depending on the level of immunosuppression.

If the child is shielding then their household contacts should request vaccination from their GP. This includes any siblings not being offered the vaccine at school.

Administering LAIV with other vaccines

LAIV can be given at the same time as, or at any interval before or after other currently used vaccines, including live vaccines. Although it was previously recommended that, where vaccines cannot be administered simultaneously, a four-week interval should be observed between live viral vaccines, JCVI has now advised that no specific intervals need to be observed between the live attenuated intranasal flu vaccine and other live vaccines. See 'Intervals between vaccines" section in Green Book Chapter 11[10] for more information. If any new vaccines are introduced during the flu vaccination season, please ensure you follow the specific guidance given about concomitant administration for these.

Administering LAIV with antiviral agents against flu

There is a potential for flu antiviral agents to lower the effectiveness of LAIV. Therefore, flu antiviral agents and LAIV should not be administered concomitantly. LAIV should be delayed for at least 48 hours after cessation of treatment with flu antiviral agents. Administration of flu antiviral agents within two weeks of administration of LAIV may adversely affect the effectiveness of the vaccine and an additional dose of vaccine may be required.

Inadvertent administration of an expired dose of LAIV

Inadvertently administering an expired dose of LAIV is unlikely to cause harm to the child other than that the expired dose may not offer them adequate protection. Healthcare practitioners should inform the parent/carer of the error, provide reassurance where necessary and discount the expired dose. An additional dose of LAIV that is in date should be offered as soon as possible (on the same day as the expired vaccine was given or as soon as the error is discovered), to ensure satisfactory protection. There is no minimum interval between an expired and a valid dose of LAIV as it is the same product being administered. In the event that 'in date' LAIV is not available, a suitable inactivated flu vaccine should be offered as an alternative.

Inadvertently administering an expired dose of LAIV is a clinical incident that should be reported via the local governance system(s), so that appropriate action can be taken, lessons can be learnt and the risk of future errors minimised.

[10] Public Health England. Chapter 11 The UK Immunisation Schedule. Immunisation against infection disease (the Green Book). Revised April 2019. Available at: www.gov.uk/government/publications/immunisation-schedule-the-green-book-chapter-11

Patients requesting live intranasal influenza vaccine (LAIV) instead of an inactivated injected vaccine due to needle phobia

Patients for whom the inactivated injected vaccine is recommended should be encouraged, where possible, to have the inactivated injected vaccine.

Public Health England procures LAIV and distributes this to general practices, who vaccinate two and three year olds and children in at risk groups, and to providers responsible for vaccinating children in primary school. LAIV is licensed for children aged 2 to 17 years of age. It is not licensed in adults because there is some evidence of poorer efficacy when compared with the inactivated influenza vaccines.

PHE do not supply flu vaccine to occupational health departments, pharmacies or GP practices for adult patients.

However, in exceptional circumstances, individual medical practitioners may choose to use their stocks of LAIV 'off-label' to vaccinate patients with a needle phobia.

It is envisaged that the type of patient who would be offered this might be someone with learning disabilities who becomes seriously distressed about needles. This is part of the requirement that the NHS has to make reasonable adjustments to accommodate the needs of a person with learning disabilities[11]. See Flu vaccinations: supporting people with learning disabilities for more information.

Others who might also be offered LAIV include people in a clinical risk group with a serious needle phobia who may otherwise go unimmunised if they refuse to have an injected inactivated vaccine.

The legislation does allow for such situations and the Medicines and Healthcare products Regulatory Agency state that 'there are clinical situations when the use of medicines outside the terms of the licence (ie, 'off-label') may be judged by the prescriber to be in the best interest of the patient on the basis of available evidence'[12]. The responsibility for such use rests with the health professional. In this situation, a Patient Specific Direction (PSD) will be required. In these exceptional circumstances, where it has not proved

[11] Public Health England. Flu Vaccinations: Supporting people with learning disabilities. www.gov.uk/government/publications/flu-vaccinations-for-people-with-learning-disabilities

[12] Medicines and Healthcare products Regulatory Agency. Off-label or unlicensed use of medicines: prescribers' responsibilities. Available on Gov.uk website at: www.gov.uk/drug-safety-update/off-label-or-unlicensed-use-of-medicines-prescribers-responsibilities

possible to administer the inactivated vaccine, PHE has agreed that the national LAIV stock can be used for this purpose.

Useful links

Letters detailing 2020 to 2021 flu programme
Department of Health and Social Care, Public Health England, NHS England. The national flu immunisation programme 2020 to 2021. Published 14 May 2020 and 5 August 2020. Available at: www.gov.uk/government/publications/national-flu-immunisation-programme-plan

Immunisation against infectious disease (the Green Book) Influenza chapter 19. Available at: www.gov.uk/government/publications/influenza-the-green-book-chapter-19

Leaflets (including translated versions), posters and training slides prepared specifically for the childhood flu programme. Available at: www.gov.uk/government/publications/flu-vaccination-leaflets-and-posters

Easy read resources. Available at: www.gov.uk/government/publications/flu-leaflet-for-people-with-learning-disabilities

Flu posters, leaflets, schools guidance and other flu publications created by the Department of Health and Social Care, National Health Service England and Public Health England can be ordered and downloaded from: www.healthpublications.gov.uk/Home.html

Toolkit for childhood flu programme. Available at: www.gov.uk/government/publications/flu-immunisation-toolkit-for-programme-extension-to-children

A video for health professionals on how to administer LAIV produced by NHS Education for Scotland is available at: www.nes.scot.nhs.uk/education-and-training/by-theme-initiative/public-health/health-protection/seasonal-flu/childhood-seasonal-flu-vaccination-programme-resources-for-registered-practitioners.aspx

Fluenz Tetra Summary of Product Characteristics and Patient Information Leaflet. Available at: www.medicines.org.uk/emc/product/3296

PGD templates for LAIV and inactivated flu vaccines are available at:
www.gov.uk/government/collections/immunisation-patient-group-direction-pgd

Vaccine Knowledge Project. Nasal Flu Vaccine. Available at:
https://vk.ovg.ox.ac.uk/vk/nasal-flu-vaccine

Additional flu resources are available at:
www.gov.uk/government/collections/annual-flu-programme