DDIPost-Exposure Prophylaxis (PEP) Guidelines for infants, children and adolescents potentially exposed to blood-borne viruses

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Date reviewed: August 2023

Next review date: August 2025

Scope of Guideline: Following exposure to blood-borne viruses, it should be remembered that the risk of transmission is highest for Hepatitis B, then Hepatitis C and then HIV. As this document has been prepared for the Children's HIV Association (Chiva), its focus is on HIV. However, it is important to consider risk of all the blood borne viruses as well as, pregnancy and sexually transmitted infections following high-risk sexual exposure, and any safeguarding concerns. The specific scenarios of infants breast/chestfeeding from women/birthing parents either newly diagnosed with HIV or who are previously diagnosed with HIV and have a newly detectable plasma viral load are also discussed.

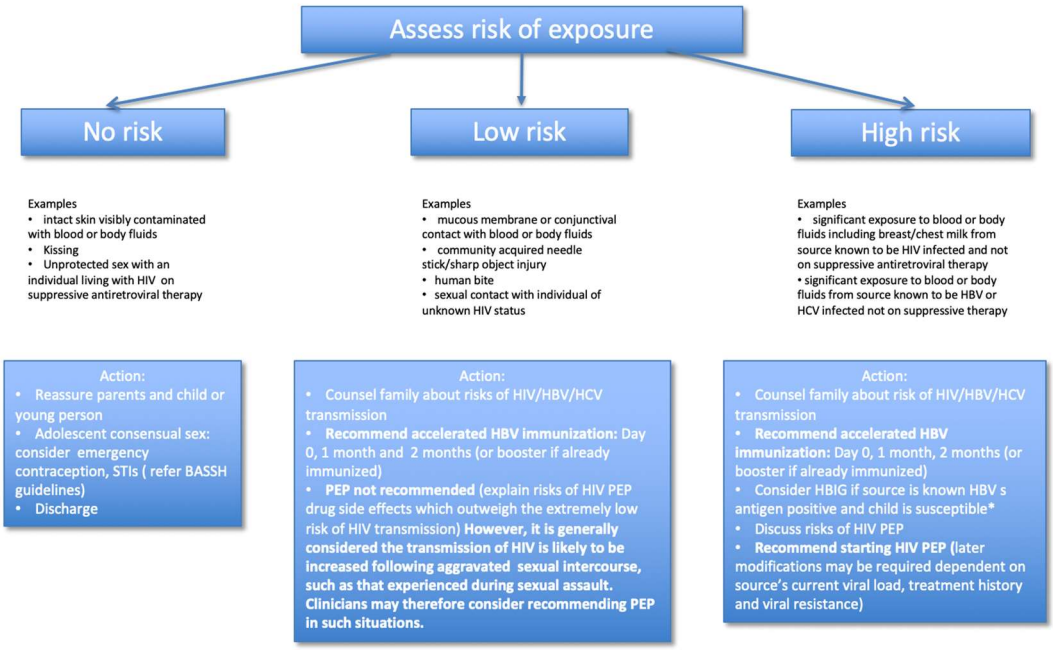
Guidelines for use alongside this Guideline

1. British HIV Association guideline for the prevention of transmission of HIV in pregnancy (https://www.bhiva.org/pregnancy-guidelines).[1]
2. British Association of Sexual Health guideline for the use of Post-Exposure Prophylaxis for HIV following sexual exposure (https://www.bashhguidelines.org/media/1269/pep-2021.pdf).[2]

New in Guideline 2023 update:

1. Dolutegravir-based regimens are the preferred options for children from 4 weeks to 6 years of age due to favourable tolerability and once daily dosing. Lopinavir/ritonavir and raltegravir based regimens remain as alternatives.
2. For older children (≥12 years and ≥40kg) recommendations for programmatic reasons remain in line with BASHH guidance for adults (raltegravir 1200mg once daily with emtricitabine/tenofovir disoproxil)[1]. However for reduction in pill burden/size a second generation integrase inhibitor (dolutegravir or bictegravir) with emtricitabine/tenofovir alafenamide are equally acceptable.
3. The specific considerations for PEP for infants breast/chest feeding from a parent found to have a detectable HIV viral load.

Fig 1. Immediate Action Algorithm



*For HBIG eligibility Hepatitis B immunoglobulin (issued September 2022) - GOV.UK (www.gov.uk)

Background

The risk of community acquired HIV in children is extremely low and continues to fall as the majority of people with HIV are on long term suppressive ART and therefore cannot transmit HIV horizontally to others.[3,4] In the UK in 2021, 99% of people diagnosed with HIV were accessing ART with 98% achieving viral suppression.[3] However, children and adolescents remain potentially at risk of acquiring HIV from a variety of exposures, including sexual abuse or assault and consensual sexual activity in adolescence.[5] There have been no reported school-related HIV transmissions. The risk of HIV acquisition from biting and from community acquired needle stick injuries is extremely low unless the source is known to be HIV infected and not on suppressive ART. [6,7]

Increasingly women/birthing parents living with HIV on suppressive ART are choosing to breast/chestfeed.[8,9] If a woman/birthing parent becomes viraemic during breast/chestfeeding, or is newly diagnosed with HIV during breast/chestfeeding, infant PEP is recommended, with immediate cessation of breast/chestfeeding.[10] The breast/chestfeeding parent should also be offered cabergoline to suppress lactation (dosing details below).

With the exception of an infant exposed to breast/chest milk from a person living with HIV with plasma viraemia, the HIV status of the source is often unknown and difficult to establish. The risks of HIV being transmitted from a variety of exposures where the index case is NOT on suppressive ART are shown in Table 1. Body fluids presenting a potential risk of HIV transmission include blood, breast

milk, semen, vaginal secretions or any body fluid that is visibly bloodstained. HIV-infected fluids cannot penetrate intact skin. Sexual abuse represents a particular risk because of possible multiple exposures, mucosal trauma and the cervical ectopy and vaginal epithelial thinness found in children.[11]

The average age of onset of sexual activity in the UK is 16 with up to one third of 15 year olds being sexually active.[12,13] Following the widespread use of ART, children with perinatally acquired HIV infection are surviving into adolescence and entering sexual relationships with peers who are not living with HIV who may present for PEPSE (Post Exposure Prophylaxis following Sexual Exposure). Approximately three quarters of adolescents with perinatally acquired HIV in the UK are on suppressive ART with an undetectable plasma viral load, and therefore their sexual partners would not require PEPSE following sexual exposure.[14,15] However, consideration for PEPSE should be given to sexual partners of those not on suppressive ART.[16] Please refer to BASHH Guidelines.[2] When the index case has unknown HIV status, the only circumstance when PEPSE is strongly recommended is following unprotected receptive anal intercourse.[2]

Table 1. Estimated risks of HIV transmission according to type of exposure from a known HIV positive individual with detectable HIV viral load. [2,6,17]

Type of HIV exposure	**Risk of transmission per exposure from HIV positive source NOT on suppressive ART**
Occupational needlestick injury that punctures skin*	0.3% or 1 in 333
Unprotected receptive anal sex	1.11% or 1 in 90
Unprotected receptive vaginal intercourse	0.1% or 1 in 1000
Human bite	< 1 in 10,000

If the HIV status of the source is not known, the risk can be calculated from the following formula:

Risk of HIV transmission =

Risk that source is HIV positive with a detectable HIV viral load x Risk of exposure

*The risks of transmission of Hepatitis B (HBV) and Hepatitis C (HCV) from a needle stick injury from a viraemic individual are significantly higher than for HIV.

Table 2. Risk of HIV transmission during breast/chestfeeding.[18,19]

Type of HIV exposure	Cumulative risk of HIV transmission
Breast/chestfeeding not on ART	26.9% (19.3-34.5) risk of postnatal HIV transmission
Breast/chestfeeding on suppressive ART	0.3% at 6 months, 0.6% at 12 months
Breast/chestfeeding with viral rebound	Risk dependent on birthing parental viral load, length of exposure and is very high in those who seroconvert during breast/chest feeding

Table 3. Seroprevalence data for blood-borne infections in people who use intravenous drugs in England, Wales and Northern Ireland (data end 2021)[17]

	Antibody positive	Detectable viraemia in those with positive antibody
HIV Prevalence	1.5%	6%*
HBV Prevalence	5.9%	0.2%
HCV Prevalence	57%	18%**

*98% of adults living with HIV and retained in care are on suppressive ART with an HIV viral load <200 copies/ml, however this will be an underestimate of prevalence of viraemia as it does not include people undiagnosed and those not retained in care.

** Wide spread availability of short course curative HCV therapy is rapidly reducing HCV viraemia within the UK population and rates of detectable viraemia in those with a positive HCV antibody is likely to be significantly lower in 2023.

The risk of acquiring HIV from a community acquired needle stick injury can therefore be assessed as:

Risk that source has HIV with a detectable HIV viral load x Risk of exposure ie
1.5/100 x 6/100 x 0.3/100 = 0.0000027 i.e. less than 1 in 100,000

Note that quoted risks are based on injuries from needles contaminated with fresh blood and therefore should only be used, and PEP considered if the needle is known to be freshly discarded. Old blood in a syringe and a needle found in a community setting is likely to carry a lower risk of transmission. In studies where a small amount of blood is retained in a syringe, viable HIV cannot be detected after 24 hours.[20]

The risk of HBV seroconversion following a needle-stick from a **known** high risk source with HBV (HBe Ag +ve) is 37-62% and around 5% following needle-stick from a **known** low risk source with HBV (HBe Ag –ve).[21] The average HCV seroconversion rate following needle-stick from **known** source with HCV (RNA positive) is 1.8%.[21] Data for risk of transmission of HBV or HCV from single sexual exposure are not robust and are dependent on level of viraemia and type of sex, with HBV more easily transmitted than HCV.

Breast/chestfeeding and detectable maternal HIV viraemia

Increasing numbers of women/birthing parents living with HIV on suppressive ART in pregnancy are choosing to breast/chestfeed their infants. For low-risk infants born to mothers/birthing parents on suppressive ART in pregnancy, 2 weeks of infant postnatal prophylaxis (PNP) with zidovudine (AZT) is recommended.[1] Infants born to women/birthing parents who choose to continue to breast/chestfeed on suppressive ART in the UK, do not routinely receive any additional post-natal prophylaxis (PNP) during breast/chestfeeding. The risk of transmission through breast/chestfeeding in this setting is not zero but is estimated as <1% over 12 months.[19] Monthly viral load testing for both mother/birthing parent and infant is recommended.[1] A very small proportion of breast/chestfeeding women/birthing parents may develop a rebound detectable plasma viral load (>50 copies/mL) requiring consideration for cessation of breast/chestfeeding and commencing infant PEP.[10] In addition women/birthing parents who are already breast/chestfeeding may be newly diagnosed with HIV requiring urgent infant testing with cessation of breast/chestfeeding, and infant PEP in infants who test HIV negative at baseline.[10] Women/birthing parents who have to stop breast/chestfeeding acutely require support, including the offer of cabergoline to suppress lactation, at a dose of 250 micrograms every 12 hours for 2 days in established breast feeding (note this differs from the single dose required to inhibit lactation on the first day post-partum https://www.medicines.org.uk/emc/product/1691/smpc).[22] Breast/chest milk exposure is not a risk for HBV or HCV exposure or infection in the infant, therefore hepatitis screening is not required. Infants should progress with the normal HBV vaccine schedule.

Mechanism of action of HIV PEP

The presumed mechanism for HIV PEP is that shortly after an exposure to HIV, whatever the route, a window period exists during which antiretroviral therapy may help to prevent viral replication and the establishment of infection. In a small case controlled study on PEP following occupational exposure, AZT reduced the transmission rate of HIV by 79%.[23] PEP is most effective when started within 24 hours of exposure, although there may be benefit for PEP initiation up to 72 hours after exposure.[25] PEP should be taken for 28 days.

In addition, combination antiretroviral therapy has been shown to markedly reduce vertical transmission of HIV from to infants born to women/birthing parents living with HIV during pregnancy and breast/chestfeeding.[1,19]

HBV Vaccination

Given the safety of HBV vaccination, the risk-benefit ratio favours vaccinating all exposed children following needlestick injuries or sexual assault, unless they have a documented prior history of successful HBV immunisation. In the UK, universal neonatal HBV immunisation was added to the infant vaccination schedule in 2017. Baseline HBV serology should be tested, an initial HBV vaccination given, with an accelerated course of HBV vaccination (Day 0, 1 month and 2 months) recommended at follow up if baseline HBsAb <10 IU/L.

Procedure for Infants, Children and Adolescents presenting with possible exposure to HIV

1. Risk assessment

Careful history and examination to assess the risk of exposure to HIV. Establish whether exposure occurred within the last 72 hours. Detailed plan in Immediate Action Algorithm (Fig 1).

2. Investigations

Source

If the source is known and if the individual gives consent HIV, HBV and HCV serology may be tested. If the source is already known to have HIV, obtain details of latest plasma HIV viral load, present and past antiretroviral medications, known previous resistance mutations and consider repeat viral load, although the latter should not delay commencement of PEP. Testing of source materials such as discarded needles is not recommended, since the test results are of low sensitivity and should not be used to guide management.

Exposed child or adolescent

All infants and children should be discussed with a consultant in paediatric infectious diseases with experience in PEP management. For adolescents following sexual exposure discussion with Genitourinary Medicine is also recommended. **Children presenting following non-consensual sexual activity should be referred to the local safe guarding team.**

Obtain baseline HCV, HBV and HIV status (HCV IgG +/- HCV PCR/antigen, HBcAb, HBsAg, HBsAb, HIV1&2 Ag/Ab, HIV RNA PCR). If PEP is to be started also request FBC, U&E and LFTs. Confirm with the virologist that urgent turn around of test results is required, as ascertainment that the exposed child does not already have HIV is important. Treatment with PEP in that circumstance would be inappropriate (although awaiting this result should not delay PEP as it can be started and subsequently stopped or switched if necessary). For children under 24 months of age, including breast/chestfeeding infants with new maternal/birth parent diagnosis/viraemia, an urgent HIV RNA plasma viral load should be requested as the HIV1&2 Ag/Ab test may be positive due to persistent transplacentally acquired parental antibody. The child's baseline HIV test result should be available at the first follow up visit (within 24-72 hours of PEP initiation). A pregnancy test should be performed for post pubertal girls and other people of childbearing potential.

3. Management

HIV PEP

The child and family should be counselled about the PEP regimen, dosing, potential side effects and possible drug interactions (Table 4) and given contact phone numbers in case of concerns during or after the treatment period. An appointment to see a consultant paediatrician with experience of PEP therapy /HIV physician, ideally within 24-72 hours of starting HIV PEP, should be made. Initially 5 days

of PEP should be prescribed. A full 4 weeks should **NOT** be prescribed at the first appointment for children. Whilst adult guidance has moved to providing a full 28 day course at baseline for those with no clinical or adherence concerns, for children a review of adherence, tolerability and toxicity within 5 days of starting PEP remains a recommendation. For adolescents (≥40kg) an adult PEP pack may be prescribed but follow up should occur within 3-5 days to discuss baseline results and assess adherence and tolerability. For children a further prescription for **a total of 4 weeks** should be given at consultant review if PEP is to be continued. PEP regimens may sometimes need modification if the index case is known to or likely to have genotypic resistance. Seek expert help but do not delay starting PEP. If local expertise is unavailable, referrals for advice can be sent to the Perinatal Virtual Clinic which although meets monthly can provide urgent advice in the interim (https://www.chiva.org.uk/ourworkprof/regional-networks/paediatric-virtual-clinic/)

ART regimens

A three drug PEP regimen should be prescribed; a combination of a 2 drug nucleoside backbone (NRTI) with an anchor drug. PEP regimens for UK adults recommend the integrase inhibitor (INSTI) raltegravir with the fixed dose NRTI tablet of tenofovir and emtricitabine, based on rapid genital tract tissue penetration, efficacy against most circulating UK variants, tolerability, safety and cost.[2] Raltegravir continues to be recommended as the preferred PEP INSTI in adults. For pragmatic reasons, preferred regimens for those ≥40kg and 12 years, (age/weight banding for licensed use of once daily raltegravir (≥40kg) and tenofovir DF/emtricitabine FDC [≥12 years and 35kg]) reflect adult PEP guidance**.**

However regimens based on the anchor INSTIs dolutegravir or bictegravir are equally acceptable for children over 6 years of age and ≥25kg. Dolutegravir is licensed at adult dosing (50mg tablet once daily) from ≥6 years and ≥20kg with dispersible tablet formulation licensed from ≥4 weeks of age and ≥3kg and is the preferred first line agent for the treatment of children with HIV. Previous concerns regarding a possible increase in neural tube defects in infants exposed in utero to DTG have been shown not to be valid, with DTG based regimens now recommended WHO first and second line therapy for all those with HIV including people of child bearing potential.[26,27] Emtricitabine 200mg/tenofovir alafenamide 25mg is licensed from ≥12 years and ≥35kg, although when included in fixed dose combination therapy for the treatment of HIV from ≥6 years and ≥25kg in combination with dolutegravir, it has the advantage of offering a once daily, low toxicity, 2 small pill regimen and may be considered for children from ≥6 years and ≥25kg who struggle with the larger pill size/burden of other regimens. The single tablet regimen of bictegravir 50mg/emtricitabine 200mg/tenofovir alafenamide 25mg is licensed from ≥12 years and ≥25kg with early data suggesting improved rates of PEP completion in adults when compared to multi-tablet regimens.[28]

The regimens below are based on age and weight bandings; with dosing correct on date of publication (August 2023); however accurate weight measurements should be used to calculate individual drug doses as per Table 5 or the Chiva antiretroviral dosing table (http://www.chiva.org.uk/). **The start of**

PEP should not be delayed whilst obtaining paediatric formulations of newer agents and hence alternative regimens are provided.

In centres where dispersible dolutegravir is not available, for children requiring liquid formulations raltegravir or lopinavir/ritonavir with zidovudine and lamivudine are acceptable starting alternatives.

Table 4. Suggested PEP regimens (see dose table below)

Always use a 3 drug regimen consisting of 2NRTIs + 1 anchor drug.

For programmatic reasons, adolescents over 12 years of age and 40kg should receive adult PEP packs of raltegravir 1200mg OD + emtricitabine 200mg/ tenofovir disoproxil 245mg.

Preferred anchor drugs	**Weight/age**
raltegravir OD[a]	≥40kg and ≥12 years
dolutegravir	≥3kg and ≥4 weeks
bictegravir	≥25kg and ≥12 years
Alternative anchor drugs[b]	
lopinavir/ritonavir	≥3kg and ≥2 weeks
raltegravir BD	From birth

NRTIs	**Weight/age**
emtricitabine/tenofovir disoproxil[c]	≥35kg and ≥12 years
emtricitabine/tenofovir alafenamide[d]	≥35kg and ≥12 years **OR** from ≥25kg and ≥6 years co-formulated with bictegravir[e]
lamivudine + zidovudine[f]	From birth[g]

Notes:

a. Standard adult PEP; once daily raltegravir is licensed from ≥40kg weight with tenofovir/emtricitabine licensed from ≥35kg and ≥12 years of age.

b. Although paediatric formulations of dolutegravir and raltegravir are licensed from infancy, preparations may not be immediately available. For these reasons lopinavir/ritonavir liquid remains an alternative starting recommendation in children unable to swallow tablets.

c. Tenofovir disoproxil should not be used in the presence of renal impairment so an alternative backbone of lamivudine with zidovudine or emtricitabine/tenofovir alafenamide should be used (seek expert advice).

d. Emtricitabine/tenofovir alafenamide is licensed from ≥12 years and ≥35kg although within fixed dose combination therapy for the treatment of HIV from ≥6 years and ≥25kg.

e. The single tablet fixed dose combination pill of bictegravir 50mg/emtricitabine 200mg/ tenofovir alafenamide 25mg is licensed by the FDA and EMA for treatment of HIV from 25kg

and early data suggests a reduction in side effects and improved completion rates in adults receiving PEP.[29]

f. For children under 6 years of age and those unable to swallow tablets lamivudine + zidovudine are the preferred NRTI combination but are twice daily (see table 5).

g. Drug dosing of many antiretrovirals differs in the immediate postnatal period when compared to 4+ weeks of age therefore expert advice should be sought. For newborn infant postnatal prophylaxis the BHIVA Pregnancy guidelines should be followed.[1]

Table 5. HIV PEP Drugs, Doses and Side effects

Dosing is correct as per date of guideline publication but for updated dosing please see Chiva ART dosing table http://www.chiva.org.uk/

Dose frequency abbreviations: OD = once daily, BD = twice a day, AM = morning, PM = evening

Drug	Formulation	Dose	Side Effects*
Raltegravir (RAL) NOTE: different formulations are **not** bioequivalent. Must specify formulation when prescribing; use chewable tabs for children ≥11kg who cannot swallow tablets	**Tablet:** 400mg, 600mg **Chewable tablet:** 25mg, 100mg (can be chewed or swallowed) **100mg granules for oral suspension:** Recommended dilution 10mg/ml	**Tablet:** ≥40kg 1200mg OD (2x 600mg) or 400mg BD **Chewable tablet:** 11-13kg 75 mg BD 14-19kg 100mg BD 20-27kg 150mg BD 28-39kg 200mg BD ≥40kg 300mg BD **Granules:** ≥3kg 25mg BD 4-5kg 30mg BD 6-7kg 40mg BD 8-10kg 60mg BD 11-13kg 80mg BD 14-19kg 100mg BD	Rash, nausea, hepatitis
Dolutegravir (DTG) NOTE: different formulations are **not** bioequivalent. Must specify formulation when prescribing[30]	**Tablet:** 50mg **Dispersible tablets for oral suspension:** 5mg tabs	**Tablet:** ≥20kg 50mg OD **Dispersible tablet (**≥4 weeks**):** 3-5kg 5mg OD 6-9kg 15mg OD 10-13kg 20mg OD 14-19kg 25mg OD ≥20kg 30mg OD	Nausea, rash, sleep disturbance
Tenofovir alafenamide/emtricitabine (F/TAF)	**Tab:** FTC 200mg/ TAF 10mg FTC 200mg/ TAF 25mg	**Licensed ≥12 years or ≥35kg** *(trial evidence from ≥6yrs & ≥25kg)* With RAL or DTG 200mg/25mg OD With LPV/RTV 200mg/10mg OD	nausea

Bictegravir 50mg/emtricitabine 200mg/ tenofovir alafenamide 25mg	**Tab:** BIC 50mg/ FTC 200mg/ TAF 25mg	EMA licensing from 25kg ≥25kg – 1 tablet OD	
Tenofovir Disoproxil /emtricitabine (TD+FTC) **Do not use if known renal impairment**	**Combined tablet:** TD 245mg/FTC 200mg	**Combined tablet:** ≥35kg – 1 tablet OD	Headache, diarrhoea, nausea, vomiting, renal tubular dysfunction, bone demineralization
Tenofovir Disoproxil (TD) Note: 300mg tenofovir disoproxil fumarate (TDF) = 245mg tenofovir disoproxil (TD) All doses expressed as TD	**Tablet TD:** 245mg **Paed tab TD:** 123mg 163mg 204mg **Granules TD:** 33mg per 1g scoop	**Tablet:** ≥35kg – 245mg OD **Paed tab:** 17-21kg – 123mg OD 22-27mg – 163mg OD 28-34kg – 204mg OD **Granules:** 10-11kg – 2 scoops OD 12-13kg – 2.5 scoops OD 14-16kg – 3 scoops OD 17-19kg – 3.5 scoops OD 19-21kg – 4 scoops OD 22-23kg – 4.5 scoops OD 24-26kg – 5 scoops OD 27-28kg – 5.5 scoops OD 29-31kg – 6 scoops OD 32-33kg – 6.5 scoops OD 34kg – 7 scoops OD ≥35kg – 7.5 scoops OD	**Do not use if known renal impairment**
Lamivudine (3TC)	**Tablet:** 100mg, 150mg **Liquid:** 10mg/ml	**Liquid**: 1-2 months 4mg/kg BD ≥3 months 5mg/kg BD or 10mg/kg OD Max dose 300mg/day **Tablet**: 14-19kg 75mg BD *or* 150mg OD 20-24kg 75mg AM & 150mg PM *or* 225mg OD ≥25kg 300mg OD	Peripheral neuropathy, nausea, diarrhoea, headache
Zidovudine (AZT, ZDV)	**Capsule**: 250mg **Liquid**: 10mg/ml	**Liquid**: 4-8kg 12mg/kg BD ≥9-30kg 9mg/kg BD Max dose 300mg BD **Capsule**: ≥28kg 250mg BD	Granulocytopenia and/or anaemia, nausea, headache, myopathy, hepatitis, neuropathy
Lamivudine 150mg/zidovudine 300mg	**Tablet:** 3TC 150mg/ZDV 300mg	**Tablet:** ≥30kg – 1 tablet BD	As for ZDV and 3TC

Lopinavir/ritonavir (LPV/RTV) 2 adult tabs = 4 paed tabs = 5ml of liquid ****All doses based on LPV****	**Adult tablet:** LPV 200mg/RTV 50mg **Paed tablet:** LPV 100mg/RTV 25mg **Liquid:** LPV 80mg/RTV 20mg per mL	**Adult tablet:** ≥35kg 2 tabs BD **Paed tablet**: 10-13kg 2 tabs AM & 1 tab PM 14-24kg 2 tabs BD 25-34kg 3 tabs BD ≥35kg 4 tabs BD **Liquid:** 3-5 kg 1ml BD 6-9kg 1.5ml BD 10-13kg 2ml BD 14-19kg 2.5ml BD 20-24kg 3ml BD	Diarrhoea, abdominal pain, nausea, vomiting, headache

*This list of side effects is not exhaustive – refer to product datasheet (summary of product characteristics - https://www.medicines.org.uk/emc/) for detailed information on side effects, interactions with other medicinesand other cautions for use.

Drug interactions:

The prescriber must be aware of the risks of significant drug interactions that may impact the efficacy of antiretroviral therapy and take a full medication history for the patient, including topical therapies, injectable drugs and over the counter medicines, including vitamin and mineral supplements. Discuss with a pharmacist and/or utilise the Liverpool HIV drug interactions checker to identify risks (https://www.hiv-druginteractions.org/)

Note: Oral divalent cations that may reduce the absoprtion of dolutegravir/raltegravir/bictegravir:

- iron, calcium, magnesium, aluminium (seek pharmacy advice re drug spacing of doses from mineral supplement)

Avoid co-administration of ritonavir with steroids including nasal/inhaled preparations of fluticasone and budesonide due to the interaction with ritonavir producing extremely high steroid levels impacting on bone metabolism.

Antiemetics: Gastrointestinal side effects are more likely to occur with regimens that contain lopinavir/ritonavir when compared to dolutegravir/bictegravir/raltegravir. For those with nausea and vomiting on lopinavir/ritonavir based PEP, a switch to paediatric dolutegravir/bictegravir/raltegravir should be considered. Alternatively the addition of an anti-emetic to a lopinavir/ritonavir based regimen requires a risk benefit discussion with the family (including discussion regarding the unknown risk of prolonged QT in the paediatric population inferred from adult data) and specialist advice from a tertiary centre and/or HIV pharmacist is recommended.

HBV

For a significant exposure to an unknown source an accelerated course of HBV immunisation (Day 0, 1 month and 2 months) should be offered. The UK Health Security Agency recommends the use of intramuscular hepatitis B immunoglobulin only if the source is known to be HBV infected, although would agree to its use with an unknown source if compelling circumstances existed.[29]

HCV

There is no recognised PEP for HCV. Families may be counselled that, in the event of HCV seroconversion, curative therapies (8-12 weeks single tablet/granule formulations) are licenced for children from 3 years of age.

Tetanus

The need for tetanus injection/booster should be assessed per usual practice.

4. Emergency contraception and screening for sexually transmitted infections

In cases of sexual assault refer to BASHH guidelines on management of adult and adolescent complainants of sexual assault. Following sexual exposure it is important to consider emergency contraception in girls and other people of childbearing potential and the need for screening/prophylaxis for other sexually transmitted infections. See BASHH Guidelines.[2]

NB: Children under 18 presenting with non-consensual sexual activity should be referred to the local safe guarding team. For those cases where sexual trauma has occurred in a child with a risk of HIV transmission, those carrying out testing and PEP care need to be sensitive to reducing possibility of creating extra trauma or exacerbating distress. e.g. blood tests/investigations should be in a paediatric setting if a younger child.

5. Follow-up

Prior to discharge from A&E families embarking on HIV PEP should have the following:

- An outpatient appointment, preferably within the next 3-5 days to see a named clinician with experience in prescribing antiretroviral drugs
- Contact telephone numbers in case of concerns about any aspect of the HIV PEP including out-of-hours number
- At least 5 days of antiretroviral therapy
- A letter for their GP, with patient's/carer(s)' consent

Clear guidance should be provided for family/child as well as involved services about what details will be communicated between services (those dealing with episode of abuse/rape or other incident and those managing the PEP).

Outpatient Follow up

Within 3-5 days: Review in clinic, assess adherence and toxicity, decide whether PEP should continue for the full four-week course. Document and give baseline HIV, HBV, HCV Ab results. Arrange psychological support as necessary.

Newly diagnosed Hepatitis B infection: If the exposed patient is HBsAg positive there is a risk of flare of hepatitis after tenofovir and/or lamivudine/emtricitabine are stopped and specialist advice should be sought prior to the cessation of PEP.

Day 14: Review in clinic, assess adherence and toxicity, check FBC, U&E, LFTs.

Day 28: Review in clinic, assess adherence and toxicity, check FBC, U&E, LFTs only if abnormalities on previous blood tests or clinically indicated.

A minimum of 4-6 weeks AFTER PEP completion (8 -10 weeks from exposure): For all exposures in non-breast/chest fed infants, follow-up HIV testing should be undertaken with a fourth generation combined HIV antibody/ antigen assay 4-6 weeks after the exposure. For HIV exposed breast/chest fed infants, HIV RNA / DNA testing should be undertaken 4 and 8 weeks after cessation of PEP and routine follow up of HIV exposed uninfected infants continued until 22 months of age to ensure waning of transplacentally acquired maternal antibody.[1]

Repeat screening for Hepatitis B and C is also recommended, except in the infant exposed to HIV breast/chest via breast/chest milk. Optimally this should be performed 4-8 weeks after completing the 3 doses of HBV vaccine, so that infection can be excluded (HBsAg and HBcAb) and to ascertain that the vaccine response was satisfactory (HBsAb >10mIU/ml). If ongoing risk of exposure to HBV then a 4th dose of HBV vaccine should be given at 12 months. If further HBV vaccination required arrange appropriate follow up (either clinic or GP based).

Adolescents at ongoing risk of HIV acquisition through ongoing high risk sexual activity should be referred to appropriate Genitourinary Medicine services for discussions around pre-exposure prophylaxis (PREP).

Acknowledgments With thanks to members of the Family Clinic team at Imperial College Healthcare NHS Trust particularly Penny Fletcher (Lead Pharmacist Women & children), Rosy Weston (Lead HIV Pharmacist), David Muir (Consultant Virologist), and Senthuran Thillainathan (Medical Undergraduate at time of 2019 guidelines). Thanks also to Nicola Husain (Highly Specialised Paediatric Pharmacist) at Evelina London Children's Hospital.

References

1. Gilleece DY, Tariq DS, Bamford DA, et al. British HIV Association guidelines for the management of HIV in pregnancy and postpartum 2018. *HIV Med.* 2019;20 Suppl 3:s2-s85.

2020 third interim update https://www.bhiva.org/pregnancy-guidelines (accessed 2nd June 2023).

2. Clinical Effectiveness Group BASHH (British Association of Sexual Health and HIV). UK Guideline for The Use of Post-Exposure Prophylaxis for HIV Following Sexual Exposure (2021). https://www.bashhguidelines.org/media/1269/pep-2021.pdf (accessed 20th May 2023).
3. HIV testing, PrEP, new HIV diagnoses and care outcomes for people accessing HIV services: 2022 report. https://www.gov.uk/government/statistics/hiv-annual-data-tables/hiv-testing-prep-new-hiv-diagnoses-and-care-outcomes-for-people-accessing-hiv-services-2022-report#hiv-care-outcomes (accessed 2nd June 2023).
4. Rodger AJ, Cambiano V, Bruun T, et al; PARTNER Study Group. Sexual Activity Without Condoms and Risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner Is Using Suppressive Antiretroviral Therapy. JAMA. 2016 Jul 12;316(2):171-81.
5. Seña AC, Hsu KK, Kellogg N, Girardet R, Christian CW, et al. Sexual Assault and Sexually Transmitted Infections in Adults, Adolescents, and Children. Clin Infect Dis. 2015 Dec 15;61 Suppl 8:S856-64. doi: 10.1093/cid/civ786.
6. Cresswell FV, Ellis J, Hartley J, Sabin CA, Orkin C, Churchill DR. A systematic review of risk of HIV transmission through biting or spitting: implications for policy. HIV Med. 2018 Apr 23;19(8):532–40. doi: 10.1111/hiv.12625.
7. Makwana N, Riordan FA. Prospective study of community needlestick injuries. Archives of disease in childhood. 2005;90(5):523-4.
8. Nyatsanza F, Gubbin J, Gubbin T, et al. Over a third of childbearing women with HIV would like to breastfeed: A UK survey of women living with HIV. *Int J STD AIDS.* 2021;32(9):856-860.
9. Tuthill EL, Tomori C, Van Natta M, Coleman JS. "In the United States, we say, 'No breastfeeding,' but that is no longer realistic": provider perspectives towards infant feeding among women living with HIV in the United States. *J Int AIDS Soc.* 2019;22(1):e25224.
10. Lees EA, Tickner N, Lyall H, et al. Infant postnatal prophylaxis following maternal viraemia during breastfeeding. *AIDS.* 2023;37(7):1185-1186.
11. Bechtel K. Sexual abuse and sexually transmitted infections in children and adolescents. Curr Opin Pediatr. 2010 Feb;22(1):94-9.
12. Key Data 2021 Sexual health and Identity. https://ayph-youthhealthdata.org.uk/key-data/sexual-health-and-identity/sexual-activity/ (accessed 2nd June 2023).
13. Brooks et al (2020) *Health Behaviour in School-aged Children (HBSC): World Health Organization Collaborative Cross National Study Findings from the 2018 HBSC study for England* http://hbscengland.org/wp-content/uploads/2020/01/HBSC-England-National-Report-2020.pdf.
14. CHIPS- Collaborative HIV Paediatric Study; Summary data to end March 2021. http://www.chipscohort.ac.uk/patients/summary-data/ (accessed 20th May 2021).
15. Foster C, Ayers S, Mcdonald S, Frize G, Chhabra S, Pasvol TJ, Fidler S. Clinical outcomes post transition to adult services in young adults with perinatally acquired HIV infection: mortality, retention in care and viral suppression. AIDS. 2020 Feb 1;34(2):261-266.

16. Bamford A, Tudor-Williams G, Foster C. Post-exposure prophylaxis guidelines for children and adolescents potentially exposed to HIV. Arch Dis Child. 2017 Jan;102(1):78-83.
17. Shooting Up: infections and other injecting-related harms among people who inject drugs in the UK, data to end of 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1053202/Shooting_Up_2021_report_final.pdf (accessed 20th May 2023).
18. Drake AL, et al. (2014) Incident HIV during Pregnancy and Postpartum and Risk of Mother-to-Child HIV Transmission: A Systematic Review and Meta-Analysis. PLOS Medicine 11(2): e1001608.
19. Flynn PM, Taha TE, Cababasay M, et al. Prevention of HIV-1 Transmission Through Breastfeeding: Efficacy and Safety of Maternal Antiretroviral Therapy Versus Infant Nevirapine Prophylaxis for Duration of Breastfeeding in HIV-1-Infected Women With High CD4 Cell Count (IMPAACT PROMISE): A Randomized, Open-Label, Clinical Trial. *J Acquir Immune Defic Syndr.* 2018;77(4):383-392.
20. Abdala N, Stephens PC, Griffith BP, Heimer R. Survival of HIV-1 in syringes. J Acquir Immune Defic Syndr Hum Retrovirol 1999; 20:73 – 80.
21. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Post-exposure Prophylaxis. *MMWR* 2001; 50: (RR-11): 1-52.
22. SmPC for Dostinex (cabergoline) 0.5mg tablets. Last updated 9th November 2020. https://www.medicines.org.uk/emc/product/1691/smpc#gref.
23. La Fon SW, Mooney BD et al. A double-blind, placebo-controlled study of the safety and efficacy of Retrovir (Zidovudine) as a chemoprophylactic agent in health care workers. 30th Interscience Conference on Antimicrobial Agents and Chemotherapy. Washington DC, 1990; Abstr 489.
24. Peters H, Francis K, Sconza R, Horn A, S Peckham C, Tookey PA, Thorne C. UK Mother-to-Child HIV Transmission Rates Continue to Decline: 2012-2014. Clin Infect Dis. 2017 Feb 15;64(4):527-528.
25. Tsai CC, Emau P, Follis KE, Beck TW, Benveniste RE, Bischofberger N, et al. Effectiveness of postinoculation (R)-9-(2-phosphonylmethoxypropyl) adenine treatment for prevention of persistent simian immunodeficiency virus SIVmne infection depends critically on timing of initiation and duration of treatment. Journal of virology. 1998;72(5):4265-73.
26. World Health Organisation. Update of recommendations on first and second-line antiretroviral regimens. https://www.who.int/publications/i/item/WHO-CDS-HIV-19.15 (accessed May 2021).
27. Pereira GFM, Kim A, Jalil EM, Fernandes Fonseca F, Shepherd BE, et al; National Cohort Study of Dolutegravir and Pregnancy Outcomes in Brazil. Dolutegravir and pregnancy outcomes in women on antiretroviral therapy in Brazil: a retrospective national cohort study. Lancet HIV. 2021 Jan;8(1):e33-e41.

28. Mayer KH, Gelman M, Holmes J, Kraft J, Melbourne K, Mimiaga MJ. Safety and Tolerability of Once Daily Coformulated Bictegravir, Emtricitabine, and Tenofovir Alafenamide for Postexposure Prophylaxis After Sexual Exposure. J Acquir Immune Defic Syndr. 2022 May 1;90(1):27-32. doi: 10.1097/QAI.0000000000002912. PMID: 34991141.
29. Human Hepatitis B specific immunoglobulin for Hepatitis B post exposure prophylaxis. Hepatitis B immunoglobulin (issued September 2022) - GOV.UK (www.gov.uk) (accessed 7th June 2023).
30. Parasarmpuria R AK WA, Barthel S, Davies M, Buchanan A, Singh R. Comparison of Relative Bioavailability of TIVICAY Immediate Release and Dispersible Pediatric Tablets to Immediate Release TIVICAY Adult Tablets. Paper presented at: 19th International Workshop on Clinical Pharmacology of Antiviral Therapy. 2018; Baltimore, MD.