

## COVER NOTE:

# FOR INFANT AND YOUNG CHILD FEEDING IN THE FIRST THREE DAYS AFTER A NUCLEAR POWER PLANT ACCIDENT ATTACHED

There is increasing concern about nuclear accidents and emergencies recently as a result of disruption to a nuclear power plant in Ukraine.

While there is clear guidance on what to do in case of a nuclear emergency for the general population, there has been a lack of clear comprehensive guidance on infant and young child feeding for caregivers and health workers providing feeding support. Guidance has been contradictory or often focused on the risk of exposure to radioactive materials without fully balancing the risks of morbidity and mortality associated with not breastfeeding. The conflict in Ukraine adds additional complexity as resources needed to use breastmilk substitutes safely could be unavailable or difficult to obtain. After the nuclear accident in Fukushima, Japan in 2011, fear of transmitting radioactive materials to infants through breastmilk led to many mothers switching from breastfeeding to formula feeding despite being advised by health authorities to continue breastfeeding (Ishii et al, 2016). Nuclear accidents such as Fukushima demonstrate how critically important it is to provide clear and accurate information, reassurance and guidance to ensure appropriate infant and young child feeding in a nuclear emergency and especially to ensure that breastfeeding is not unnecessarily interrupted.

The IFE Core Group consists of different expert organisational bodies and individuals from across the globe who come together regularly to address policy, guidance, training and other gaps regarding infant and young child feeding in emergencies. A guidance note, "*Infant and young child feeding in the first three days after a nuclear power plant accident*" has been finalised in the context of the Ukraine conflict, for healthcare workers and emergency planners on the ground to optimally support infants and young children. This guidance should be used in conjunction with existing guidance for the general public, healthcare workers and policy makers. It does not cover infant and young child feeding in the context of nuclear warfare. Recommendations are based on the best available evidence with full consideration of the risks associated with radiation exposure and the risks of interrupting breastfeeding. This guidance reflects our collective knowledge and draws on expertise from the fields of radiation, nuclear emergency, infant and young child feeding in emergencies, and communication, among other expertise. We gratefully acknowledge the timely feedback and input from expert reviewers. We acknowledge that this guidance will evolve over time as more information becomes available and we welcome suggestions for improvement to [ife@enonline.net](mailto:ife@enonline.net).

Please check <https://www.enonline.net/ifenuclearguidance> for the most current version of this guidance.

# GUIDANCE NOTE:

## INFANT AND YOUNG CHILD FEEDING IN THE FIRST THREE DAYS AFTER A NUCLEAR POWER PLANT ACCIDENT

This document was developed by the Infant Feeding in Emergencies (IFE) Core Group<sup>1</sup> Sub-Working Group on Infant and Young Child Feeding in Emergencies (IYCF-E) in the context of chemical, biological, radiological and nuclear threats. This document is for healthcare workers and emergency response planners and provides interim operational guidance to inform emergency plans and responses on appropriate infant and young child feeding (IYCF)<sup>2</sup> in the first three days<sup>3</sup> after a nuclear emergency caused by an accident at a nuclear power plant (NPP) in the context of the current Ukraine crisis.<sup>4</sup> **It does not cover IYCF in the context of nuclear warfare.**<sup>5</sup> Recommendations are provided in this document for breastfed and non-breastfed infants. Recommendations for breastfed infants are applicable to infants who are exclusively breastfed, mixed fed (i.e., receiving both breastmilk and breastmilk substitutes) and infants over six months of age and young children who are receiving complementary foods alongside breastmilk. The recommendations are based on the best available knowledge and full consideration of the risks associated with internal contamination by radioactive materials in the first three days after an incident at an NPP as well as the importance of breastfeeding. The recommendations of other organisations may focus primarily on the risk of exposure to radioactive materials without fully balancing the risks of morbidity and mortality associated with not breastfeeding. This guidance should be used in conjunction with existing guidance for the general public, healthcare workers and policy makers. For more information, please contact [ife@enonline.net](mailto:ife@enonline.net).

<sup>1</sup> <https://www.enonline.net/ife>

<sup>2</sup> Children below two years of age.

<sup>3</sup> Caesium and radioactive iodine are the radioactive materials that present health risks after a nuclear emergency. However, the impact of the release of caesium is managed in the medium to long term, therefore this radioactive material is not covered in this guidance note that focuses on the first three days after an NPP accident. For more information on caesium, please see **Appendix 2**.

<sup>4</sup> This guidance note is based on a factsheet developed by the IFE Core Group Sub-Working Group on infant and young child feeding in emergencies in the context of chemical, biological, radiological and nuclear threats which is available upon request.

<sup>5</sup> For information on what to do in the event of a nuclear weapon, an improvised nuclear device, a radiological exposure device or a dirty bomb, please see: <https://www.cdc.gov/nceh/radiation/emergencies/moretypes.htm#red>

## **1 In the event of an accident at a nuclear power plant (NPP), people are likely to be concerned about continuing breastfeeding.**

In the case of an abnormal event at an NPP, radioactive materials may be released into the environment (WHO, 2011).<sup>6</sup> In such circumstances, breastfeeding women are likely to be concerned about potentially transmitting radioactive materials to their infants through breastmilk. After the nuclear accident in Fukushima, Japan in 2011, many mothers switched from breastfeeding to formula feeding because of this concern despite being advised by the health authorities to continue breastfeeding (Ishii et al, 2016).

Breastfeeding provides infants with hydration, comfort, connection and high-quality nutrition. It protects them against disease and provides food security. This protection and security are critical in conflict and disaster contexts when there is often a lack of access to clean water, electricity, food supplies and healthcare. Breastfeeding is also important for maternal health and caregiving capacity. It is critically important to provide caregivers with clear and accurate information, reassurance and guidance<sup>7</sup> to protect, promote and support appropriate infant and young child feeding (IYCF) in the event of a nuclear emergency and to ensure that women do not stop breastfeeding unnecessarily.<sup>8</sup>

## **2 The potential transfer of radioactive iodine to infants through breastmilk may only be a concern in extreme circumstances such as for local populations near the area most affected by a radioactive release.**

Following an NPP event of concern, communication to the general public will indicate protective and other response actions that groups of people within a specified area should take. There is no concern of transferring radioactive materials through breastmilk among mother-infant pairs who do not live in the specified areas (WHO, 2022a). Any risk is mainly limited to situations with a large release of radioactive materials, specifically a large release of radioactive iodine (WHO, 2022a). Caesium also presents health concerns, but the impact of the release of caesium is managed in the medium to long term, therefore this radioactive material is not covered in this guidance note that focuses on the first three days after an NPP accident.<sup>9</sup> Areas of concern (called emergency zones and distances)<sup>10</sup> and protective and other response actions are established at the preparedness stage and described in each NPP's protection strategy for nuclear and radiological emergencies (IAEA, 2013; IAEA, 2017; IAEA, 2021).

## **3 The risk of mothers absorbing or being exposed to radioactive iodine can be reduced to minimise the potential exposure to an infant through breastmilk.**

For women who live in emergency zones and distances, there are actions that can be taken to reduce exposure to radioactive iodine and therefore the risk to both mother and infant. What actions to take and by whom will be communicated to the general public by the responsible authorities.

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<sup>6</sup> For an infographic on the main dangers of a nuclear power plant accident, please see: [https://www.cdc.gov/nceh/multimedia/infographics/nuclear\\_power\\_plant\\_accidents.html](https://www.cdc.gov/nceh/multimedia/infographics/nuclear_power_plant_accidents.html)

<sup>7</sup> For information on how to conduct remote IYCF-E counselling, please see: <https://iycfehub.org/document/practical-guidelines-for-conducting-and/> and <https://kayaconnect.org/course/info.php?id=4089>

<sup>8</sup> For suggested key messages for parents and caregivers, please see **Appendix 1**.

<sup>9</sup> For more information on caesium, please see **Appendix 2**.

<sup>10</sup> Emergency zones and distances are site specific and described in each NPP's protection strategy for nuclear and radiological emergencies. Emergency zones are areas where comprehensive arrangements are put in place at the preparedness stage to enable the prompt implementation of urgent protective and other response actions in the event of an NPP accident of concern. The emergency distances are areas in which actions may need to be taken during the response but for which only limited arrangements are put in place in advance. For more information on emergency zones and distances, please see: IAEA (2013) Emergency preparedness and response: Actions to protect the Public in an Emergency due to severe condition at a light water reactor. Vienna. IAEA.

If radioactive iodine is inhaled or ingested, it collects in the thyroid gland resulting in internal contamination (WHO, 2022b; IAEA, 2013).<sup>11,12</sup> However, taking prescribed oral potassium iodide (KI) tablets or an oral KI solution can protect the thyroid gland from absorbing radioactive iodine (WHO, 2022b; IAEA, 2013). KI is safe for breastfeeding women, infants and young children (WHO, 2017) but should not be taken unless advised by the responsible authorities to do so. KI taken by mothers is transferred into breastmilk but the dosage is not enough to fully protect the infant (WHO, 2022b) so both non-breastfed and breastfed infants should take KI if directed to do so by the responsible authorities. Breastfeeding women, infants and young children are among the groups most likely to benefit from taking KI (WHO, 2017) and are the highest priority groups for receiving KI tablets and/or oral solution in a nuclear emergency (IAEA, 2018).

When KI administration is necessary, the responsible authorities will define the geographic area of concern, who within that area should take KI and when and how they should take it (WHO, 2022b).<sup>13</sup> People should never leave their place of shelter in search of KI. Other forms of iodine should never be taken as a substitute for KI tablets and/or oral solution. The best time to take KI is less than 24 hours before and up to two hours after the expected onset of exposure (WHO, 2017; IAEA, 2013). The sooner KI can be taken in this timeframe, the better. It is still helpful to take KI up to eight hours after exposure to radioactive iodine as some protection from radioactive iodine will still be provided (WHO, 2017). Infants and young children should take KI in an oral solution. Once the emergency phase has passed, infants who have been given KI should have their thyroid hormone levels evaluated (WHO, 2022b).

See **Appendix 3** for more information on KI doses for breastfeeding women, infants and young children.

Exposure to radioactive iodine can also be reduced by following other protective and other response actions such as evacuation under appropriate circumstances,<sup>14</sup> sheltering in place,<sup>15</sup> actions to reduce the accidental ingestion of radioactive iodine,<sup>16</sup> the prevention of the ingestion of potentially contaminated food and the decontamination of individuals (IAEA, 2013). If decontamination<sup>17</sup> is required, breastfeeding women should be advised to wash the breast and nipple with soap and warm water. If KI is required but not available, the mother infant pair should be prioritised for other protective and other response actions.

## 4 Breastfeeding is strongly recommended in most circumstances.

The risk of internal contamination by radioactive iodine is low for both mothers and infants who have taken KI as directed by the responsible authorities. Therefore, mothers should be strongly encouraged to continue breastfeeding (WHO, 2022b). Even without the administration of KI, if other protective and other response actions are in place, such as sheltering in a building where it has been possible to seal all windows and doors and evacuation under appropriate circumstances,<sup>18</sup> exposure to radioactive iodine is significantly reduced (Lyu et al, 2021) and women should be strongly encouraged to continue breastfeeding. These recommendations take into consideration the low possibility of exposure to radioactive iodine following a nuclear emergency and the known positive effects of breastfeeding.

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<sup>11</sup> Internal contamination occurs when people swallow or breathe in radioactive materials or when radioactive materials enter the body through an open wound or are absorbed through the skin.

<sup>12</sup> For an infographic on radiation exposure versus contamination, please see: <https://www.cdc.gov/nceh/radiation/emergencies/resourcelibrary/infographics.htm>

<sup>13</sup> The population that needs KI tablets in the event of a nuclear emergency is context-specific and a part of the emergency plans developed by each NPP.

<sup>14</sup> People should not evacuate unless instructed to do so by the responsible authorities.

<sup>15</sup> <https://www.cdc.gov/nceh/radiation/emergencies/getinside.htm>

<sup>16</sup> Actions to prevent accidental ingestions include: (a) not drinking, eating or smoking and keeping hands away from mouths until the hands are washed, (b) not letting children play on the ground, and (c) not conducting activities that could result in the creation of dust that could be ingested.

<sup>17</sup> [https://www.cdc.gov/nceh/radiation/emergencies/selfdecon\\_wash.htm#:~:text=Gently%20blow%20your%20nose%2C%20](https://www.cdc.gov/nceh/radiation/emergencies/selfdecon_wash.htm#:~:text=Gently%20blow%20your%20nose%2C%20)

<sup>18</sup> People should not evacuate unless instructed to by responsible authorities.

## 5 If exposure or uptake of radioactive iodine cannot be reduced, the risks of interrupting versus continuing breastfeeding need to be considered before breastmilk substitutes are used.

It may be reasonable to consider interrupting breastfeeding temporarily if:

- The mother-infant pair live in an emergency zone or distance that is required to take protective and other response actions;<sup>19</sup>
- **AND** KI is not available if recommended by the responsible authorities;
- **AND** other recommended protective and other response actions such as evacuation under appropriate circumstances<sup>20</sup> and sheltering in a building where it has been possible to seal all windows and doors are not possible;
- **AND** the mother has breastmilk expressed before the nuclear emergency or a breastmilk substitute *in her place of shelter*;
- **AND** the mother has access *in her place of shelter* to hygienic preparation equipment: Safe water, soap, sterilisation of preparation/feeding tools and the ability to boil water and then cool to 70 degrees Celsius for reconstitution in the case of powdered infant formula.<sup>21</sup>

It is only when all these conditions are met that interrupting breastfeeding during a nuclear emergency should be considered. If the mother does not meet all the above conditions, breastfeeding should continue (see Appendix 5).

Before breastfeeding is temporarily interrupted, the relative risks of any additional exposure to radioactive iodine for the infant through breastmilk<sup>22</sup> versus the risks of interrupting breastfeeding need to be considered on a case-by-case basis. Interrupting breastfeeding is a last resort option. It places infants at increased risk of serious illness and food insecurity, impairs maternal health and wellbeing and weakens maternal caregiving capacity. These risks are increased in emergencies as the resources needed to use breastmilk substitutes with an adequate level of safety (including access to safe/uncontaminated water, hygiene and sanitation facilities and healthcare) could be unavailable or difficult to obtain (IFE Core Group, 2021; IFE Core Group, 2017).<sup>23</sup> Breastfeeding should be interrupted for as short a time as possible but the responsible authorities will provide context-specific advice.

## 6 Breastfeeding women need support following a nuclear emergency. If breastfeeding is temporarily interrupted, mothers and infants need support to protect their breastmilk supply and guidance from the responsible authorities about when to resume breastfeeding.

Breastfeeding women should be advised how to protect themselves and their infants from exposure to and the absorption of radioactive iodine. Strong public health messaging on the safety of breastfeeding needs to be provided in situations with a limited risk of internal contamination by radioactive iodine because protective

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<sup>19</sup> Emergency zones and distances are site specific and described in each NPP's protection strategy for nuclear and radiological emergencies.

<sup>20</sup> People should not evacuate unless instructed to do so by the responsible authorities.

<sup>21</sup> For more information on supporting infants dependent on breastmilk substitutes and the resources needed, please see: <https://www.enonline.net/ifecoregroupinfographicseries>

<sup>22</sup> For more information on exposure to radioactive iodine and KI (including side effects), please see: WHO. (2017). Iodine thyroid blocking: guidelines for use in planning for and responding to radiological and nuclear emergencies. Available at: <https://www.who.int/publications/i/item/9789241550185>

<sup>23</sup> For infographics on the early initiation of breastfeeding during emergencies, preventing and managing inappropriate donations of breastmilk substitutes, planning and managing artificial feeding interventions during emergencies and supporting infants dependent on artificial feeding during emergencies, please see: <https://www.enonline.net/ifecoregroupinfographicseries>

actions were taken or due to the distance away from the NPP accident. Women should be provided with information on the conditions in which temporarily interrupting breastfeeding might be considered including the resources they need to have in place prior to pausing breastfeeding (please see section 5). During any temporary interruption of breastfeeding, women should be supported to protect their breastmilk supply through frequent breastmilk expression (either through hand expression or pump).<sup>24</sup> Expressing breastmilk is also important to avoid discomfort and breast infections. Breastmilk expressed during a nuclear emergency should be stored in a sealed container in a refrigerator or freezer until further advice is provided by the responsible authorities.<sup>25</sup> Women should be supported to increase their breastmilk supply and resume breastfeeding when recommended by the responsible authorities.

## **7 Breastmilk that was expressed and stored before the nuclear emergency is safe for use.**

Breastmilk that was expressed and stored before the emergency will not be affected by external radiation (HSE & IRR, 2015). If breastmilk is frozen, it is safe to thaw in a sealed bag in a bowl of warmed bottled water or to thaw in a refrigerator overnight. If this is not possible, it should be thawed in a sealed bag in warmed tap water if the responsible authorities advise that tap water is safe to consume (CDC, 2022c). An easy-to-clean cup (i.e., open, without a teat or spout) should be used to feed the infant expressed breastmilk as bottles, teats or cups with a lid are hard to clean in an emergency (IFE Core Group, 2017; WHO & FAO, 2007).<sup>26</sup>

## **8 Infants who need to use breastmilk substitutes can use ready-to-use infant formula (RUIF) or powdered infant formula (PIF) that were already in the home or manufactured before the nuclear emergency.**

If infants *under* six months of age are being fed breastmilk substitutes, mothers and caregivers should be advised to use RUIF if this is available in their place of shelter. RUIF carries the least risk for formula-fed infants during a nuclear emergency. If RUIF is not available, then PIF can be used (CDC, 2022c). PIF should be made by boiling bottled water and then cooling to 70 degrees Celsius before mixing. If this is not possible, tap water can be boiled and then cooled to 70 degrees Celsius if the responsible authorities advise that tap water is safe for consumption.<sup>27</sup> PIF and RUIF already manufactured before the nuclear emergency are suitable for consumption. PIF and RUIF stored in the home that were opened before the nuclear emergency are still suitable for consumption. Caregivers should not dilute breastmilk substitutes or make their own homemade recipes for breastmilk substitutes. For information on increasing breastmilk supply, please see **Appendix 4**.

<sup>24</sup> The parts of the breast pump in contact with breastmilk need to be carefully cleaned after each use with water from a safe source. Where this cannot be done, hand expression is recommended. Please see standard breast pump guidelines: <https://www.cdc.gov/healthywater/hygiene/healthychildcare/infantfeeding/breastpump.html>

<sup>25</sup> Breastfeeding women should not take lactation suppressants but instead express and store breastmilk in a sealed container in a fridge or freezer until further advice is provided by the responsible authorities. For more information on storing breastmilk, please see: [https://www.cdc.gov/breastfeeding/recommendations/handling\\_breastmilk.htm#:~:text=Freshly%20expressed%20or%20pumped%20milk,to%2012%20months%20is%20acceptable](https://www.cdc.gov/breastfeeding/recommendations/handling_breastmilk.htm#:~:text=Freshly%20expressed%20or%20pumped%20milk,to%2012%20months%20is%20acceptable)

<sup>26</sup> For more information on cup feeding, please see: <https://www.lli.org/cup-feeding/#:~:text=A%20BABY%20NOT%20FED%20AT,for%20average%20time%20per%20feed>

<sup>27</sup> For information on the safe storage and preparation of powdered infant formula, please see 1) WHO. (2007). Safe preparation, storage, and handling of powdered infant formula: Guidelines. WHO & FAO. Geneva 2) The infant formula instruction leaflet for mothers in Ukrainian, Russian and English – <https://www.humanitarianresponse.info/en/operations/ukraine/document/infant-formula-instruction-leaflet-mothers-ukrainian-russian-and-english>

<sup>28</sup> This includes cow, goat, buffalo, sheep and camel milk.

<sup>29</sup> Evaporated milk is suitable for consumption once it has been reconstituted or once water (from a safe source) has been added for infants over six months of age as evaporated milk is simply milk without its water content. However, condensed milk is not suitable for consumption as it contains other unsuitable ingredients.

For infants over six months of age, alternative milks that were already in the home before the nuclear emergency (such as ultra-high temperature milk, fermented milk or yogurt, pasteurised or boiled full-cream animal milks<sup>28</sup> or reconstituted evaporated (but not condensed) milk<sup>29</sup>) may be used instead of RUIF and PIF (IFE Core Group, 2017).

If there are concerns that feeding equipment and supplies may be contaminated with radioactive materials, damp cloth or towel should be used to wipe these before opening and consuming. All used cloths or towels should be put in a plastic bag or other sealable container and placed away from people and pets (CDC, 2022c). An easy-to-clean cup (i.e., open, without a teat or spout) should be used to feed the infant as bottles, teats or cups with a lid are hard to clean in an emergency (IFE Core Group, 2017; WHO & FAO, 2007).<sup>30</sup>

## **9 All food and drinks in the home or that were packaged before the nuclear emergency are safe for consumption by all in the household including breastfeeding mothers and infants over six months of age.**

All food and drinks that were packaged and sealed before the nuclear emergency, such as those that are tinned or plastic-wrapped, are safe for consumption by breastfeeding women and infants over six months of age (CDC, 2022a; Ready, 2022; WHO, 2022a). All food (including fruits and vegetables which are important for complementary feeding) and drinks that are inside the building (opened or unopened), for example stored in a refrigerator, freezer, cupboard or drawer, are also safe for consumption (CDC, 2022a; Ready, 2022). Food from the garden should not be consumed until the responsible authorities determine it is safe to do so (CDC, 2022a; IAEA, 2013). Hands should be washed with warm water and soap after touching anything potentially contaminated and before eating and drinking (IAEA, 2013). If there are concerns that a container or package may be contaminated with radioactive materials, a damp cloth or towel should be used to wipe it before opening and consuming the contents. All used cloths or towels should be put in a plastic bag or other sealable container and placed away from people and pets (CDC, 2022a).

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<sup>30</sup> For more information on cup feeding, please see: <https://www.llli.org/cup-feeding/#:~:text=A%20BABY%20NOT%20FED%20AT,for%20average%20time%20per%20feed>

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## Appendix

### Appendix 1: Key messages on IYCF after an accident at an NPP in the context of the current Ukraine crisis

Below are sample key messages for responding organisations that cover key messages for parents and caregivers on IYCF in the first three days after a nuclear emergency caused by an accident at an NPP in the context of the current Ukraine crisis. These messages should be used together with existing communication materials developed for the general public.

Table 1: Sample key messages for parents and caregivers

Subject	Key messages
<b>Protective actions to be taken upon the advice of the responsible authorities</b>	<ul style="list-style-type: none"> <li>You and your baby should take potassium iodide (KI) if advised by the local authorities. The local authorities will provide all the information on when KI should be taken, how and by whom.</li> <li>To avoid negative side effects, take only the dose that is recommended for you and/or your baby. Do not substitute KI with other products that contain iodine.</li> </ul>
<b>Breastfed infants</b>	<ul style="list-style-type: none"> <li>If you have followed the recommendations from the local authorities, such as sheltering in a building where it has been possible to seal all windows and doors, taking KI and giving KI to your baby, there is very little risk that you could pass radioactive iodine to your baby through breastmilk. Breastfeeding remains the best option for you and your baby, it helps to protect your baby from falling sick amongst other benefits. This protection is especially important during emergencies when there is a lack of access to clean water and electricity.</li> </ul>
<b>When breastfeeding is not an option</b>	<ul style="list-style-type: none"> <li>Temporary alternatives include breastmilk expressed before the nuclear emergency or ready-to-use infant formula or powdered infant formula.</li> <li>Expressed breastmilk or infant formula, if available, should be fed to your baby with a cup or spoon as bottles and teats are difficult to keep clean.</li> <li>If you were breastfeeding and you need to stop temporarily, protect your breastmilk supply and prevent breast infection by expressing breastmilk (either through hand expression or pump). Store expressed breastmilk until the local authorities provide further advice.</li> </ul>
<b>Complementary feeding</b>	<ul style="list-style-type: none"> <li>All food and drinks that were packaged and sealed before the nuclear emergency, such as those that are tinned or plastic-wrapped, are safe for consumption.</li> <li>All food items inside the home (opened or unopened) before the nuclear emergency, for example stored in a refrigerator, freezer, cupboard or drawer, are safe to use. Do not eat foods from the garden until the local authorities determine it is safe to do so.</li> </ul>

### Appendix 2: Caesium and breastfeeding women, infants and young children

The impact of the release of caesium during a nuclear emergency is managed in the medium to long term through evacuation, the removal or immobilisation of soil and by banning the consumption of local produce. There is no substance that can be taken to block caesium uptake. Prussian Blue is used for decontamination and is safe for children above two years of age. A safe dose of Prussian Blue for children under two years of age has not yet been determined (CDC, 2021; US Department of Health and Human Service, 2022). Caesium can be transferred from the mother to the infant through breastmilk; however, exposure is unlikely if protective actions such as monitoring caesium levels in local food and water and controlling their distribution and consumption are in place. It is unknown if Prussian Blue can also be transferred from the mother to the infant through breastmilk. Any breastfeeding mother requiring medical care due to exposure to caesium should temporarily interrupt breastfeeding while under care and follow expert guidelines (IAEA, 2018).

### Appendix 3: KI doses for breastfeeding women, infants and young children

When advised by the responsible authorities, breastfeeding women, infants and young children should take KI in age-specific doses (see **Table 2**). Breastfeeding women can take doses recommended for adults (WHO, 2017). Unless otherwise instructed, breastfeeding women and neonates (birth to 1 month of age) should only take a single dose of KI due to the risk of iodine-induced side effects such as iodine-induced transient hyper- or hypo- thyroidism and allergic reactions (WHO, 2022b; IAEA, 2013). Only in the event of an extreme exposure incident will a second dose of KI be recommended by the responsible authorities. If the responsible authorities recommend a second dose of KI, breastfeeding infants should be monitored and mothers should follow expert guidelines (FDA, 2001). Breastfeeding should only be temporarily interrupted if the mother has access to breastmilk expressed before the nuclear emergency or an appropriate breastmilk substitute and the required hygienic preparation equipment (please see section 5).<sup>31</sup> For an infographic on how to take KI, please see: <https://www.cdc.gov/nceh/radiation/emergencies/resourcelibrary/infographics.htm>

Table 2: Recommended dosage of stable iodine according to age (WHO, 2017)

Age group	Fraction of 100mg tablets	Fraction of 50mg tablets
Neonates (birth to 1 month)	1/8*	1/4*
Infants and young children (1 month to 3 years)	1/4*	1/2*
Children 3 to 12 years	1/2	1
Adults, adolescents (over 12 years) and breastfeeding women	1	2

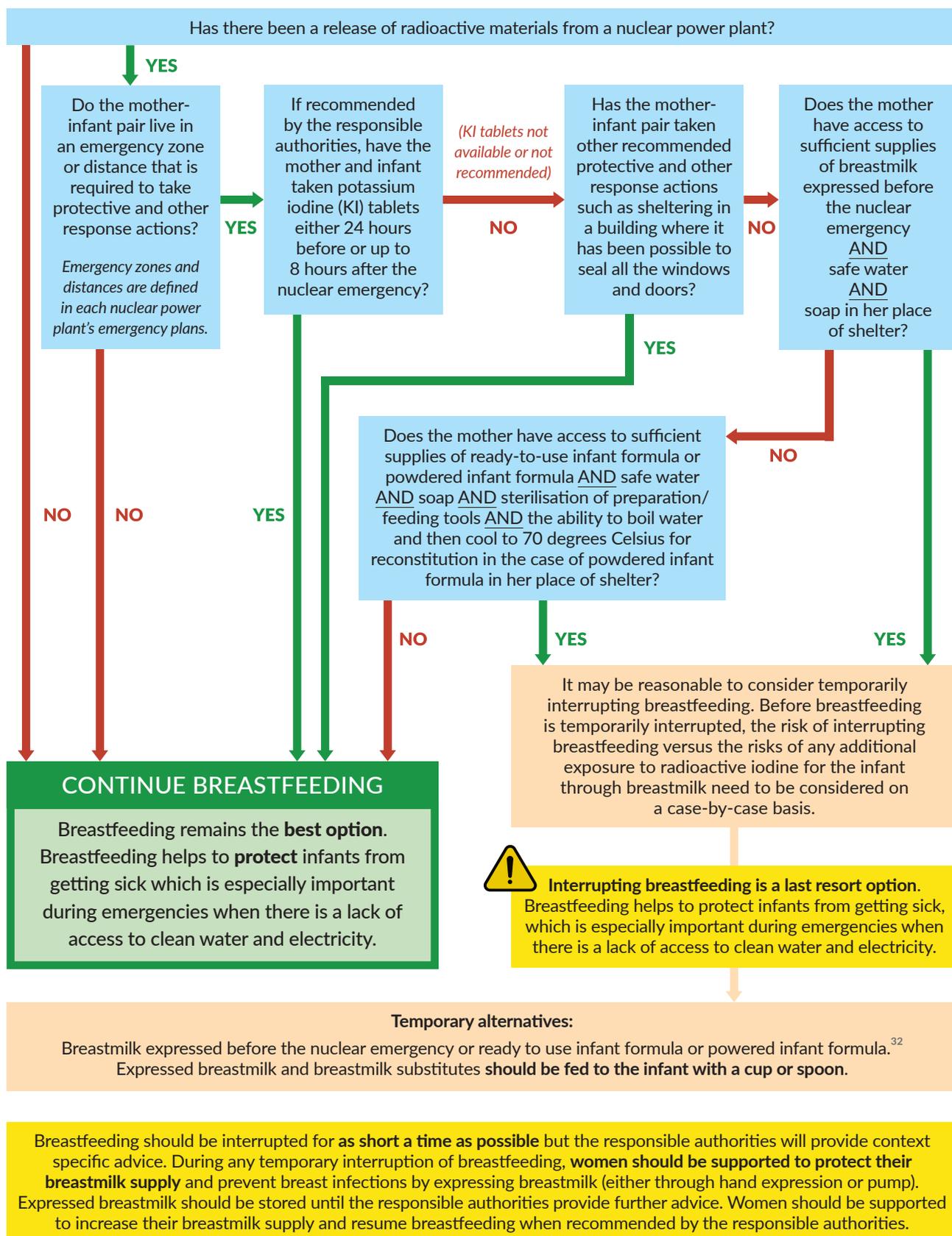
\*Use oral KI solution

### Appendix 4: Resources on increasing breastmilk supply

- La Leche League International increasing breastmilk supply poster available in multiple languages including Russian and Ukrainian  
<https://www.llli.org/increasing-breastmilk-supply/>
- La Leche League International resuming breastfeeding after an interruption  
<https://www.llli.org/breastfeeding-info/relactation/>
- La Leche League International drip drop feeding, method for moving towards breastfeeding poster  
<https://www.llli.org/wp-content/uploads/Drip-Drop-Method-Colour-Poster-1.pdf>
- WHO, relactation review of experiences and recommendations for practice  
[http://apps.who.int/iris/bitstream/handle/10665/65020/WHO\\_CHS\\_CAH\\_98.14.pdf?sequence=1](http://apps.who.int/iris/bitstream/handle/10665/65020/WHO_CHS_CAH_98.14.pdf?sequence=1)
- Save the Children, TOPS, USAID, IYCF-E toolkit including information on supporting relactation  
[https://resource-centre-uploads.s3.amazonaws.com/uploads/a.\\_how\\_to\\_help\\_a\\_woman\\_relactate.doc](https://resource-centre-uploads.s3.amazonaws.com/uploads/a._how_to_help_a_woman_relactate.doc)

<sup>31</sup> For more information on the supporting infants dependent on breastmilk substitutes and the resources needed, please see: <https://www.enonline.net/ifecoregroupinfographicseries>

**Appendix 5: Decision tree for healthcare workers: Advising breastfeeding mothers on breastfeeding practices in the first three days after an NPP accident in the context of the current Ukraine crisis**



<sup>32</sup> For more information on the supporting infants dependent on breastmilk substitutes and the resources needed, please see: <https://www.enonline.net/ifecoregroupinfographicseries>



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