

# CARE IN PEDIATRIC ONCOLOGY



# Care in Pediatric Oncology

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# Nutritional Care

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## 1 FOOD CARE (NUTRITION)

Taking care of the diet is essential to keep a good nutritional state, as a healthy and balanced diet can be decisive for a good recovery and treatment success. Children and teenagers with cancer might show several symptoms which can interfere with food digestion, and because of that, they should be assisted by a nutritionist to ensure adequate growth and development, help improve immune response, enhance tolerance and response to treatment in addition to improving quality of life (Instituto Nacional de Câncer José Alencar Gomes da Silva - INCA, 2014, 2020; Joffe et al., 2019).

Nutritional assistance should be individualized and include nutritional assessment in the long run (Dornelles et al., 2009; INCA, 2014).



A malnourished child or a child with weight loss gets weaker (low tolerance) and might need more care and interventions, such as hospitalizations during treatment (Sala et al., 2004; Antillon et al., 2013). A malnourished child is prone to infections, and their response to treatment may be extended, or they may have other complications as the chemotherapeutic drug might weaken the child (Garófolo, 2005; Pribnow et al., 2017; Joffe et al., 2019).

When the doctor runs some bloodwork and sees that the result is not according to what is expected, it might be necessary to interrupt the treatment until the child recovers. Thus, the treatment might take longer (Sala et al., 2004; Antillon et al., 2013).

On the other hand, the child's weight gain or obesity does not necessarily mean they are well-nourished because the increase in body fat interferes with the concentration of cancer-treatment drugs in the body. The sound effects of the medications may be initially reduced because the chemotherapeutic drug hides in the fat. Later, the harmful effects increase because what is in the fat is slowly released into the body. Considering that we are talking about chemotherapeutic drugs, they can be dangerous for the child. Thus, the nutritionist and the doctor will monitor any body changes in the child and help continue healthy eating habits (NCD Risk Factor Collaboration, 2014; Ward et al., 2014; Hill et al., 2018; Wiernikowski, Bernhardt, 2020).

The treatment with the chemotherapeutic drug causes common side effects: nausea, vomiting, change in taste, loss of appetite, changed sense of smell, and pain caused by wounds in the mouth (mucositis). Nutritional follow-up will help the child consume food well (Wiernikowski, Bernhardt, 2020).

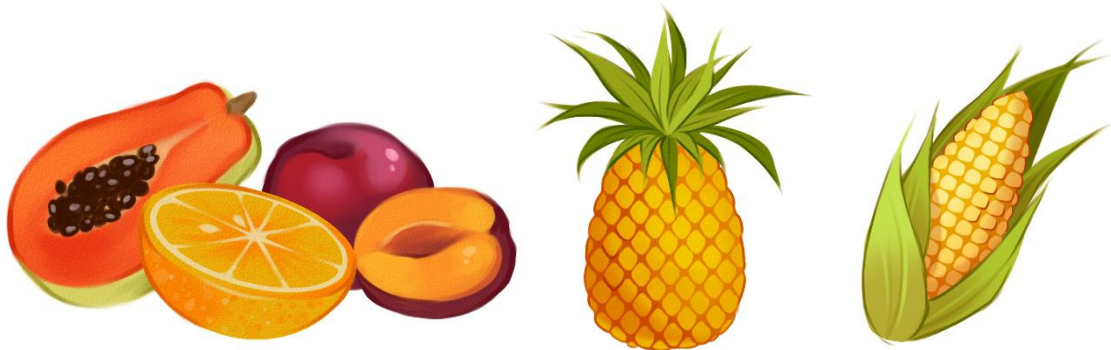
### *1.1 Eating habits*



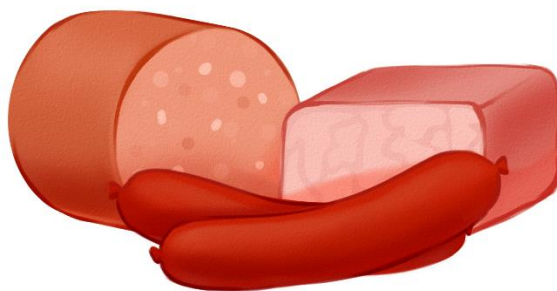
Eating habits are another essential aspect. The concern is that the whole family improves the consumption of healthy foods, so the child better adheres to the treatment

(INCA, 2014, 2020). Here are some tips that will help you put a sound eating routine into practice:

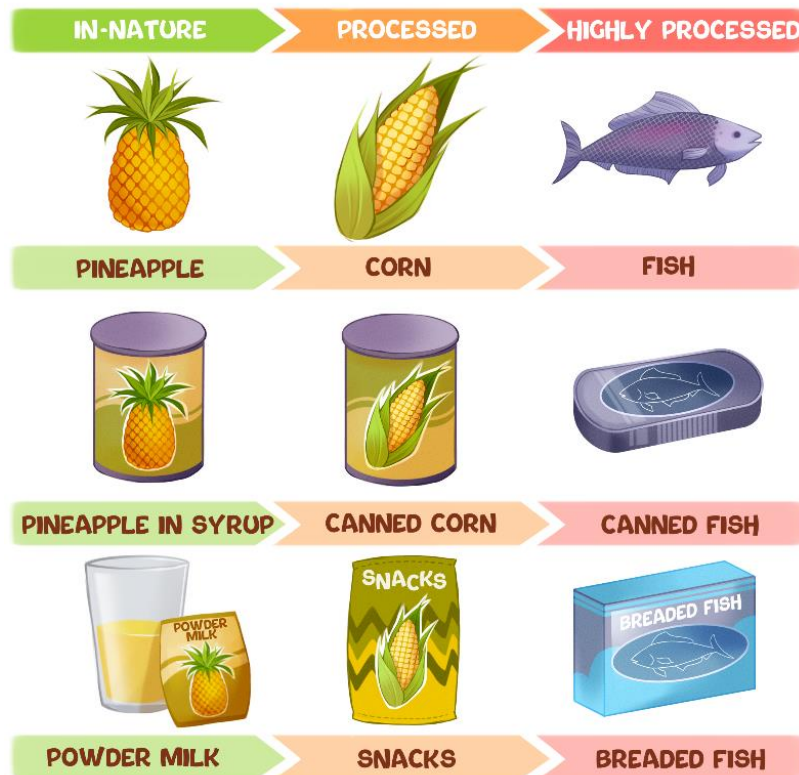
- Respect times, avoiding skipping meals and spending long periods without eating (fasting), (INCA, 2020);
- Amongst all possible recommendations, we can mention the fractionation of food into various meals to avoid nausea and vomiting (Sala et al., 2004);
- Give preference to less solid foods by including porridge, soups, and vitamins to facilitate swallowing (Sala et al., 2004);
- In cases of pain while swallowing or chewing, adjust food consistency to the level of acceptability, and use different methods to facilitate ingestion, for example, using a straw (INCA, 2014);
- Eat slowly and chew the food well (INCA, 2020);
- Include fruits and vegetables in the diet because they are rich in nutrients and will help their intestines work (INCA, 2020);



- Exclude industrialized foods, ultra-processed foods such as stuffed, cookies, canned foods, snacks, sodas, and instant noodles (INCA, 2020);



Examples of in natura, processed and ultra-processed foods:



- Always take a bottle of water and track daily water intake, observing signs of malnutrition such as dry mouth, dry lips, and constipation (INCA, 2020).

## 1.2 Lack of appetite

The child's lack of appetite may be related to various reasons, from nausea, and alteration in smell and taste (sense of flavor), to difficulty chewing and swallowing foods. Clinical management is the awareness that, even though one is not hungry, one must eat because it is essential for the treatment and helps increase disposition (INCA, 2014, 2020).

The acceptance and stimulation of appetite are recommended. Thus, it is essential to include conversations with the child before meals to understand their preferences better and, therefore, go on adapting meal preparations. Besides, working on the presentation of the dish can give visual stimulus. So, give priority to varied and colorful dishes (INCA, 2020).



### 1.3 Nausea

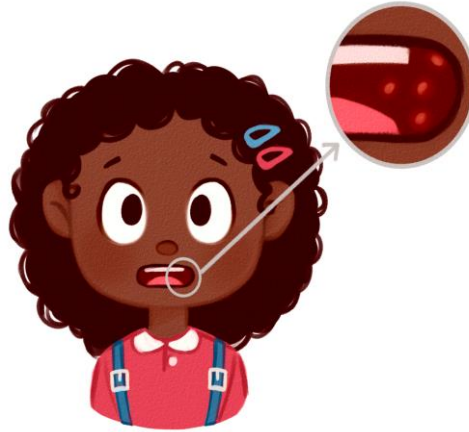


Nausea is characterized by discomfort followed or not by vomiting, being one of the most prevalent undesired effects during chemotherapy or radiotherapy. It may occur before, during, and after the sessions (McCulloch et al., 2014; Flank et al., 2017). There are several conducts for avoiding situations that cause nausea besides alternatives with medications, which are generally given prophylactically (as prevention) before the chemotherapy sessions (INCA, 2014, 2020). Some conducts that can relieve nausea are:

- Eat in a well-ventilated place and avoid the smell of the meal staying for too long in the room (INCA, 2014);
- When the child is nauseated or vomiting, offer them the meal for a second time after around 20 minutes (Sociedade Brasileira de Nutrição Oncológica – SBNO, 2021);
- Fraction the meals, offering smaller amounts many times a day, from 6 to 8 times, thus avoiding long periods without eating (INCA, 2014; SBNO, 2021);
- Avoid very hot preparations, spices with solid smell, fatty or fried foods, and very sweet foods (INCA, 2014);
- Cold foods help relieve nausea (INCA, 2014; SBNO, 2021);
- Sucking ice chips 40 minutes before meals can also help reduce nausea (INCA, 2014; SBNO, 2021);
- Be attentive after meals, keeping mouth hygiene and resting in a sitting position after meals, preferably wearing comfortable clothes (INCA, 2020);
- Keep the head of the bed elevated (45°) during and after meals for at least 30 minutes before lying down (SBNO, 2021);
- Wear light clothing which is not very tight (SBNO, 2021);
- With the health team caring for the child, adjust the prescription and times of the medications to avoid vomiting (antiemetics), (SBNO, 2021).

## 2 PROBLEMS RELATED TO INGESTION AND DIGESTIONS

### 2.1 Mucositis



Mucositis is a toxic inflammatory reaction induced by chemotherapy that can affect the whole GI tract, from the mouth to the anus. Depending on the medication plan, it affects 30 to 75% of the patients in treatment. The most common symptoms of mucositis are pain, inflammation, dry mouth, wounds, and desquamation of the oral mucosa and lips, and they can also involve bleeding (Wiernikowski, Bernhardt, 2020). Some improvements can be made to relieve the effects caused by mucositis. Here are some recommendations which can be adopted in the daily life of the child:

- Acidic, spicy, or very salty foods are contraindicated (INCA, 2014; McCulloch et al., 2014; Kuiken et al., 2015; Kuiken et al., 2017);
- Avoid hard and dry foods or foods that make it difficult to chew (McCulloch et al., 2014; Kuiken et al., 2015; Kuiken et al., 2017);
- Use room-temperature cold foods (Sala et al., 2004);
- Reduce salt in preparations (INCA, 2020);
- Avoid raw fresh vegetables (INCA, 2020);
- Keep adequate water intake, avoiding sugary drinks (INCA, 2020);
- Adjust the consistency of the foods (solid, pasty, liquid) to the child's chewing tolerance level. It is also possible to take small sips of water and juice to help swallow the food (McCulloch et al., 2014; Kuiken et al., 2015; Kuiken et al., 2017);
- Together with the health team that takes care of the child, adjust the prescription and times of pain medications (painkillers), (INCA, 2020);
- Keep good oral hygiene, according to the child's clinical conditions, from brushing teeth with an extra soft toothbrush to rinsing with water or chamomile tea, following the dentist's orders (INCA, 2020).

Mucositis can also be severe, bringing consequences such as difficulty eating, leading to weight loss. When mucositis is severe, the child cannot eat, so tube feeding (enteral nutrition) is necessary, so the child does not lose much weight (Kuiken et al., 2015; Kuiken et al., 2017). In cases in which the child needs this supplementation through tube feeding, it is preferable to start with an enteral tube because it will preserve intestinal function, stimulating the digestive system and maintaining its normal position (Trehan et al., 2020).

Nowadays, some treatments help reduce mucositis, such as cold therapy (cryotherapy), which uses ice or cold packs in the local of the wounds as treatment, or treatment with laser (laser therapy), which reduces pain and inflammation (McCulloch et al., 2014; Vitale et al., 2017). However, prevention is still the most accessible alternative, consisting of water-based mouth rinsing and good oral hygiene. Thus, the child is less susceptible to infections by microorganisms such as bacteria and fungi, which can lead to more serious infections and demand higher care (McCulloch et al., 2014; Vitale et al., 2017; INCA, 2020).

## 2.2 Constipation

Difficulty in pooping (constipation) is often related to using medications to control pain, for example, opioids, but it can also be related to diet (INCA, 2014, 2020; SBNO, 2021). Here are some essential recommendations to avoid constipation:

- Intake of liquids as recommended by the health team responsible for the child, preferably water (INCA, 2014; SBNO, 2021);
- Add to the diet foods that ease constipation, such as prunes, papaya, orange with pulp, and foods rich in fiber (INCA, 2014; SBNO, 2021). If possible, eat these foods raw (Consenso Brasileiro de Constipação Intestinal Induzida por Opioides, 2009; Santos, 2002);
- Avoid food with the opposite effect that is, those that cause constipation, such as manzano banana and burro banana, guava, potato, cassava, etc. (INCA, 2014; SBNO, 2021);
- Fractioning in 5 to 6 meals/day with a 3 to the 4-hour interval (Lembo, Camilleri, 2003; Corrêa, Shibuya, 2007);
- Offer foods with laxative properties: papaya, avocado, mango, orange, plum, watermelon, and vegetables (5 portions/day);



- • If possible, use probiotics and prebiotics (functional foods), which help treat and prevent constipation because they normalize bowel movements and improve immunity (Marteau, Boutron-Ruault, 2002).

### 2.3 Diarrhea

Chemotherapeutic drugs can also cause diarrhea. Eating foods that constipate, such as manzano banana, guava, potato, carrot, and cassava, is suggested.



Besides adjusting the diet, it is also essential to keep hydrated. Take lots of fluids (according to the doctor's and nutritionist's directions) and prefer water, coconut water, and natural juices besides the saline (according to professional rules) to replenish electrolytes lost in constant evacuations. Food should be fractionated, and volume reduced, between 6 to 8 meals daily. Avoid laxative foods: raw vegetables, papaya, orange, avocado, beans, fried foods, and sweets (INCA, 2014, 2020; SBNO, 2021).

Even with diarrhea, the diet should be kept, but fatty foods should be avoided. Give preference to lighter low-fat foods such as skimmed milk and lean meats. Avoid foods that may cause gas, such as beans, milk, and dairy (Santana Martínez et al., 2015; Segal et al., 2014; PDQ, 2021). If diarrhea persists for over a week, a health professional should be consulted to investigate the possible cause, which may be related to intolerance to a component in the diet, such as milk or gluten, and adjust to these limitations in the diet. Washing hands before

each meal is crucial in preventing contamination that leads to intestinal infections (INCA, 2014, 2020).

### 3 STEP-BY-STEP FOR WASHING AND PRESERVING FOODS IN THE FRIDGE

There are four steps when preparing and storing food:

1. **WASH:** hands, foods, utensils, equipment, and the whole environment used for cooking.

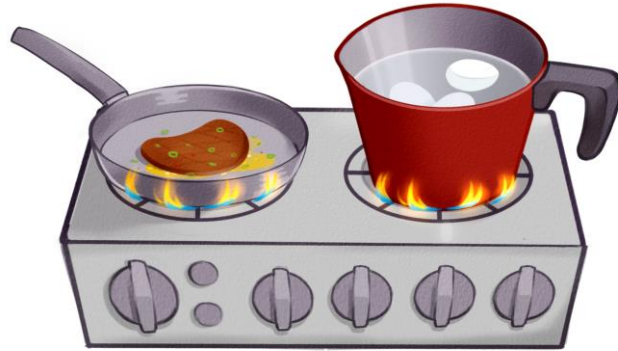


2. **SEPARATE:** raw foods such as meats, which must not get in contact with already-cooked foods or those consumed in natura, such as fruits.



3. **COOK:** eggs, meats in general, and other foods that should be cooked at high temperatures and in due time so all bacteria are eliminated. Meats must show no blood and pinkish color, for example.





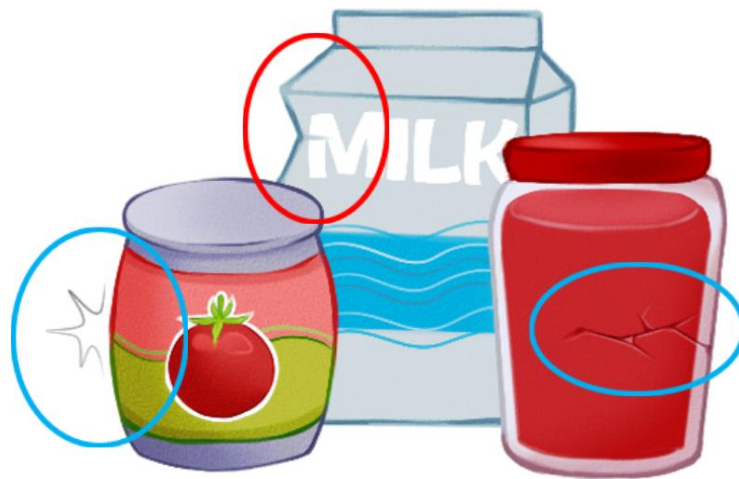
4. **REFRIGERATE:** all foods must be stored in the fridge in closed containers after preparation.



Besides the fore-mentioned four steps, it is essential to observe some directions for shopping, storing, preparation, defrosting, cooking, and leftovers.

### 3.1 Shopping

- Pick up refrigerated or frozen foods last.
- Do not buy expired foods or with different smells, colors, and textures.
- Observe if the package is sealed. Cracked glasses, swollen cans, crumpled boxes, punctured containers, and bags are signs that the food is not of perfect quality for consumption.



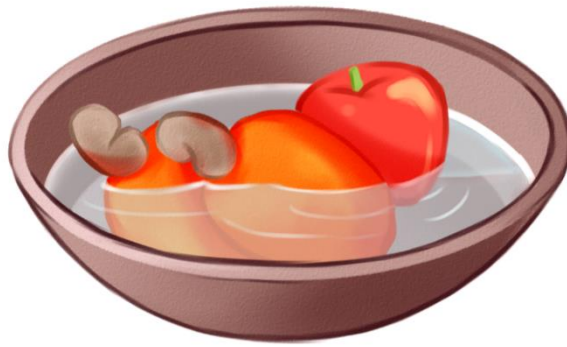
- Avoid buying foods in bulk.



### 3.2 Storing

- Store in a place at a temperature specified by the manufacturer.
- Store perishable foods (meats, dairy, fruits, and vegetables) in the fridge.
- Refrigerate perishable foods (meats, milk, dairy, eggs, fruits, and vegetables) until 1 hour after preparation or purchase.

**WARNING!!** Fruits and vegetables must be sanitized using one tablespoon of chlorine solution (specially made for foods) in 1 liter of water for 10 minutes and rewashing them in running water (Agência de Nacional de Vigilância Sanitária, 2004).



### 3.3 Defrosting

There are three ways to defrost:

- **In the fridge:** take the food from the refrigerator and put it in the fridge right away until it is defrosted. Ensure that the meats' "juices" do not drip over other foods.
- **In the microwave oven:** put the food directly in the microwave oven after taking them from the freezer.
- **Directly in the stove:** take the frozen foods out of the freezer and put them in a pan to cook them immediately.

### 3.4 Consumption

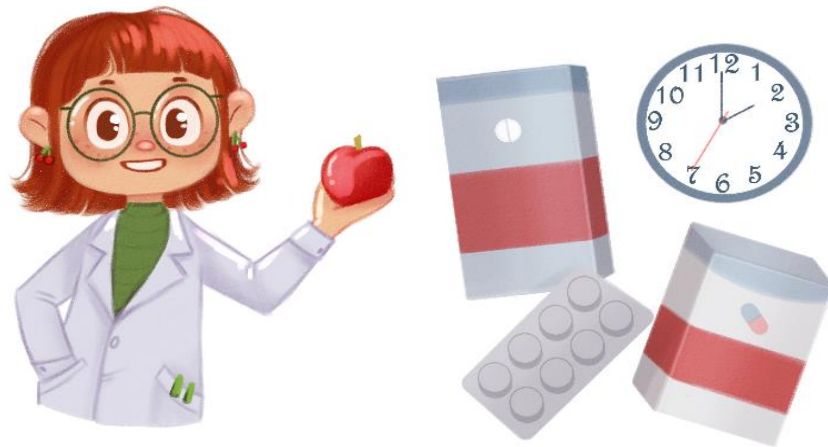
- Throw away any food with mold (cutting off the mold will not remove microorganisms that can harm health).
- Do not eat foods after their expiration date.



### 3.5 Leftovers

- Throw away any food that has been at room temperature for more than one hour.
- Use cooked leftovers for up to 24 hours.

## 4 FOOD AND MEDICATION CARE



Medications have a vital role in the treatment. Thus, they need attention in their administration. Some medicines should be taken on an empty stomach; others, after or together with meals; and there are others with precise intervals according to the time they take to be absorbed, that is, get into the bloodstream (Santana Martínez et al., 2015; Segal et al., 2014). The recommendations must be individualized for each medication taken through the mouth (oral administration) because there are medications that like food, which means they can be taken on a full stomach since their concentration will not decrease- it can even boost their effect; some medications administered with food, or some specific foods may have their attention in the blood decreased. In this case, having a pharmacist and a nutritionist around is crucial to determine which foods are inappropriate or should be taken with care.



Following the instructions passed on is essential for the success of the treatment (therapeutic success). Some foods directly affect the medication's chemical transformation, which happens inside the body (metabolization), and the medication's characteristics, leading to loss of the effect and the increase of harmful effects (Segal et al., 2014; Santana Martínez et al., 2015). Thus, during the consult, it is helpful to be clear as to which foods interfere with the medications, bearing in mind that teas, juices, vitamin supplements, and spices are also included in the care.

Those are some of the most known examples that affect the medications' breakdown to be eliminated, which can increase the concentration of the chemotherapeutic drug in the blood or even decrease their effects. Amongst the natural products and vitamins are grapefruit, St. John's wort, green tea, ginkgo biloba, ginseng, vitamins C and E (PDQ, 2021; Cancer Research UK, 2019).





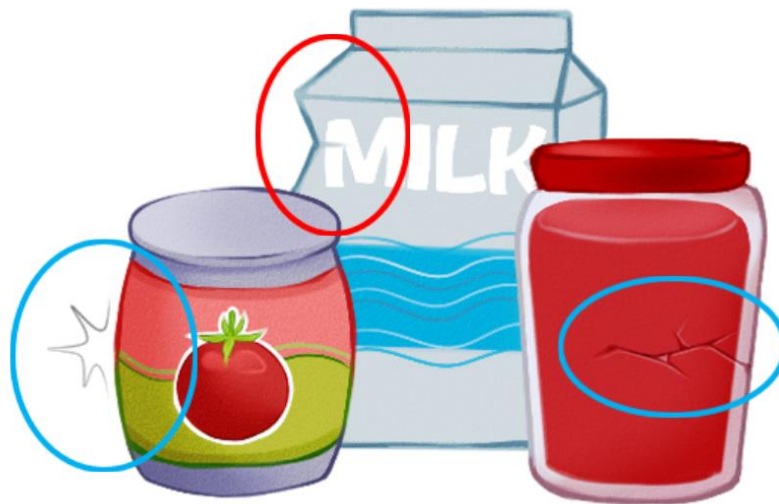
So, the intake of any houseplant, including tea, must be informed to the pharmacist, doctor, and nutritionist so they can check if these natural products are compatible with the chemotherapeutic drugs the child is taking. Be careful with the myth that says, “If it does not do good, it will not do bad either.” This is usually a largely used statement for the consumption of natural products.

## 5 DECREASE IN THE DEFENSE OF THE BODY (LOW IMMUNITY)

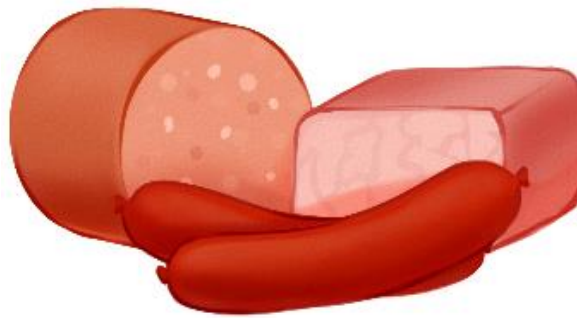
### 5.1 *Neutropenia/leukopenia*

Neutropenia and leukopenia (low levels of the defense cells of the body that help fight infections) are changes in which the body's defenses are down, increasing the chances of infections. Thus, the child should have a safe diet since many bacteria and other microorganisms may contaminate the food and proliferate (INCA, 2020; SBNO, 2021). There are some precautions below:

- Always check, before buying, if the package is not damaged and if the food is before its use-by date, always keeping it at the temperature shown on the label (INCA, 2020; SBNO, 2021);



- Buy fresh foods, and avoid processed foods (such as mortadella, sausage, and ham), (INCA, 2020; SBNO, 2021);



- Wash the packages with coconut or mild soap before they go into the fridge or freezer (INCA, 2020);



- Drink only drinking water, boiled or mineral water (INCA, 2020; SBNO, 2021);
- Wash hands well before eating or preparing food. Do not prepare food if hands are injured (SBNO, 2021);
- Eat well-cooked eggs and meats (INCA, 2020);
- Do not eat oleaginous foods (nuts, almond), (SBNO, 2021);



- Have sterilized or pasteurized milk and pasteurized dairy only (SBNO, 2021);



- Eat pasteurized honey only (SBNO, 2021). However, it is contraindicated to give honey to children younger than one year old due to their low immunity against a bacterium (*Clostridium botulinum* - *C. botulinum*), which can cause botulism in its severe because of the toddlers' fragile immune system (Oduwole et al., 2018);



- When eating out, prefer restaurants you already know and are careful with hygiene and food safety. Besides, avoid eats foods that have not been well-cooked and raw salad (SBNO, 2021);
- Avoid drinking chimarrão (a Brazilian drink) because of the inhalation of dry yerba mate (SBNO, 2021);



- Wash dishes well with soap and change the sponge every seven days (INCA, 2020).



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