

Eating Safely with Neutropenia. Is this the extinction of the Neutropenic Diet?

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What we will cover today

Background of neutropenic diet

What are the current practice

What does the evidence say?

Wider impact of a neutropenic diet

Current guidance from the BDA Haematology sub group committee

Useful resources and FAQ

Next steps

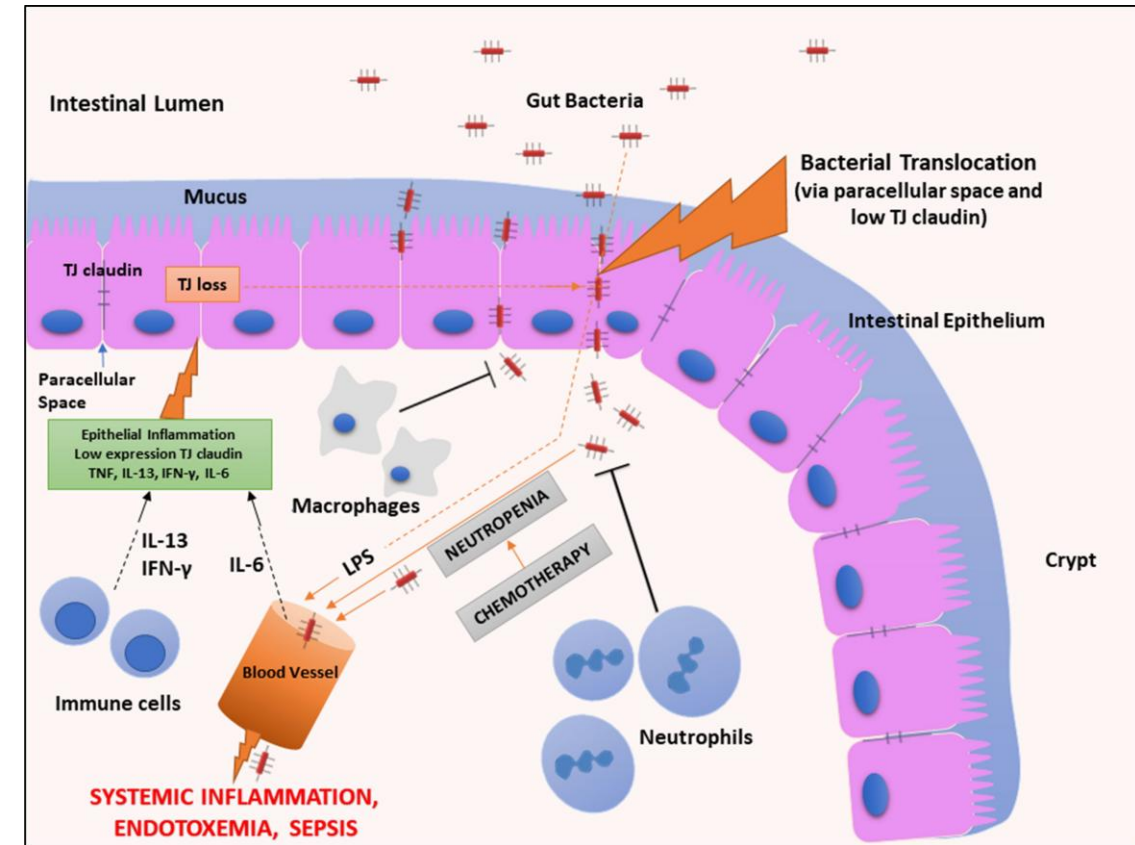
Neutropenic Diet (ND) background

- One of the attempts to reduce the risk of infection in severely immunocompromised patients
- Originally used as a therapeutic strategy to reduce the risk of acquiring systemic infection
- Dates back to 1960-80s, threat of food borne infections
- Controversial worldwide and between units



Background continued

- Rationale: ↓bacterial load to gut
 - Enterobacter
 - Pseudomonas
 - Klebsiella
 - Aspergillus
- Food can act as an external contaminating source
- Chemotherapy, mucositis
- Gut permeability & mucosal barrier disrupted
- Bacterial Translocation risk



Mechanism of bacterial translocation from increased gastrointestinal permeability (Ramamoorthy et.al, 2019)

Neutropenic diet

- Clean /Low bacterial diet/ cooked food diet
- No universal definition for Neutropenic diet
- ND – dietary restriction when patients are at risk of neutropenia or undergoing blood cancer Rx
- Neutropenia in haematology patients has different aetiology to general oncology patients
 - Bone marrow infiltration and dysfunction
 - Treatments – high intensity regimens, HSCT, immunosuppression
- Raw fruits and vegetables, uncooked meat and fish and soft cheese.
- Restrictive in nature - food options, fibre, micronutrients
- Compromises nutrition status when they are at their most vulnerable stage of treatment

List of food restrictions

- All unpasteurised dairy products
- Mould ripened cheese
- Blue cheese
- Homemade paneer
- Probiotics or Bio foods
- Smoked meats, salami
- Shellfish, sushi
- Poached eggs, homemade mayonnaise
- Soft icecream
- Raw nuts
- Deli counter salads/food
- Unpeeled fruits, over ripe fruits
- Uncooked vegetables/ salads
- Pepper, herbs
- Mineral water, bottled still water, slush, ice cubes in public places
- Unpasteurised honey

Varying practices



Practices vary across centres, between physicians and within same institutions

US Survey 156 members of Association of cancer centres nearly 78% placed their patients on ND restriction and the practice was variable¹

EBMT Survey 29 countries across 6 continents, nearly 88% of centres had some version of ND diet with significant heterogeneity in practice²



Neutrophils cut off points

Severely neutropenic: $<0.5 \times 10^9/L$ neutrophil counts

Neutropenic: $0.5 - 2.00 \times 10^9/L$ neutrophil counts



Less guidance on when to stop /relax restrictions



Inconsistent practice across transferrable sites



We can never prove or design a study that subjects immunocompromised patients with high risk foods and test if that caused infection – Not ethical

What does the evidence say?



Trusted evidence
Informed decisions
Better health.

Optimization of nutrition during allogeneic hematologic stem cell transplantation

Annic Baumgartner, Katja Hoskin*, and Philipp Schuetz*

Cochrane reviews ▾

Searching for tri

Cochrane Database of Systematic reviews | [Review - In](#)

Low bacterial diet versus co patients treated with chem

Elvira C van Dalen, Arno Mank^a, Edith Leclercq, R
✉ Marianne D van de Wetering [Authors' declarati](#)

Version published: 24 April 2016 [Version history](#)

<https://doi.org/10.1002/14651858.CD006247.pub3> ↗

Purpose of review

Malnutrition before and during hematopoietic stem cell transplantation (HSCT) is an independent risk factor for mortality in patients undergoing hematopoietic stem cell transplantation. Yet, optimal use of nutritional support to improve outcomes remains controversial. Our aim was to do an up-to-date literature review regarding nutritional therapy in allogeneic HSCT, the neutropenic diet and the use of immunonutrients.

Recent findings

Several observational studies find malnutrition to be associated with poor outcome, increased complications and lower overall survival. There are, however, few interventional trials proving the benefits of nutritional therapy in this population compared with no nutritional treatment. Regarding routes of treatment, studies suggested that parenteral nutrition is associated with higher risk for complications compared with enteral nutrition. Whether the use of specific formulas, such as immunonutrition, has a beneficial effect on clinical outcome is not established yet. Strict use of neutropenic diets did not show a reduction in infection risk and clinical outcome, and can no longer be recommended.

Neutropenic diets to prevent cancer infections: updated systematic review and meta-analysis

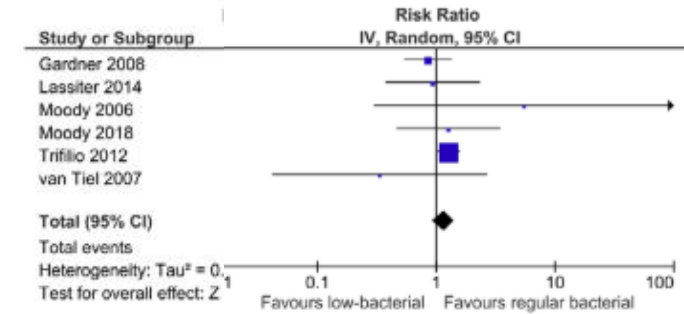
Mohamad Bassam Sonbol ¹, Tania Jain,² Belal Firwana,³ Talal Hilal,¹ Thomas Deleon,¹ Angela Murad,⁴ M Hassan Murad,⁵ Nandita Khera¹

- 5 RCT's , 1 observational study,
- 1116 patients - adult and paediatric
- When stratified for HSCT** (from chemo) infection rates increased in ND group (RR 1.25; 95% CI 1.02 to 1.54)

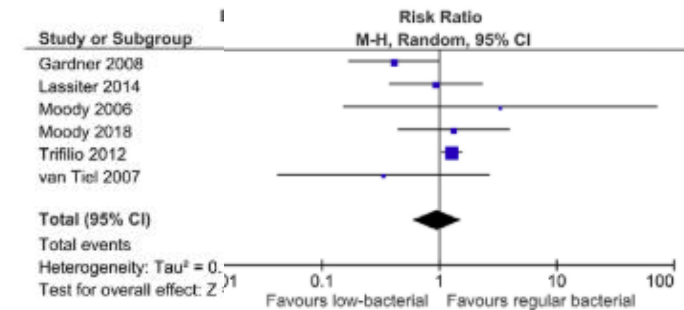
Conclusion: No evidence to support the ND or further food restrictions in neutropenic patents.

Patients and clinicians should continue to **follow the safe food handling guidelines**

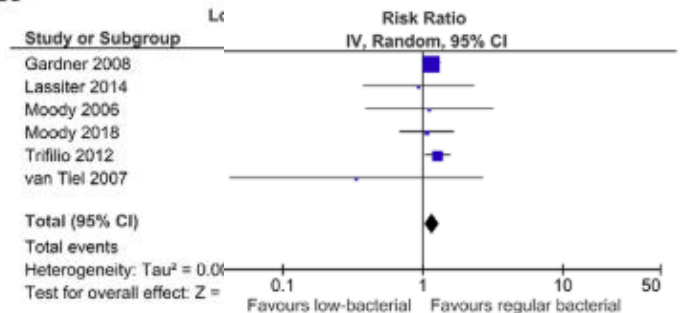
Major Infections



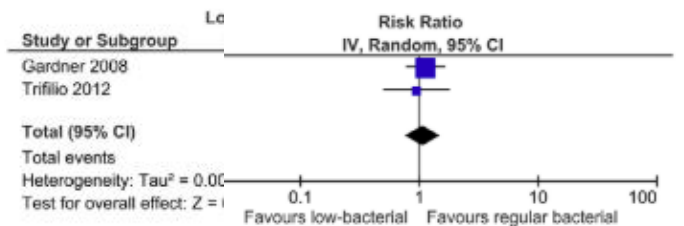
Bacteremia/Fungemia



Composite Outcomes



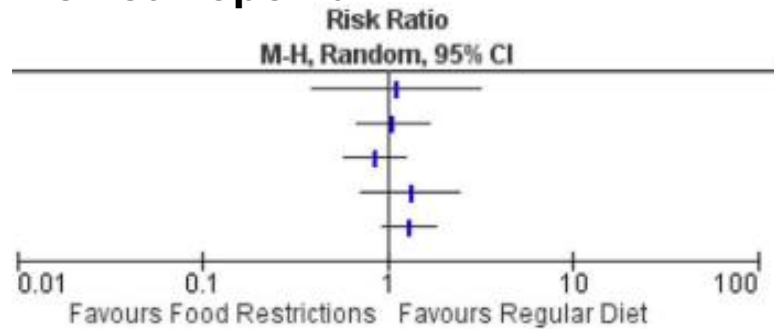
Mortality



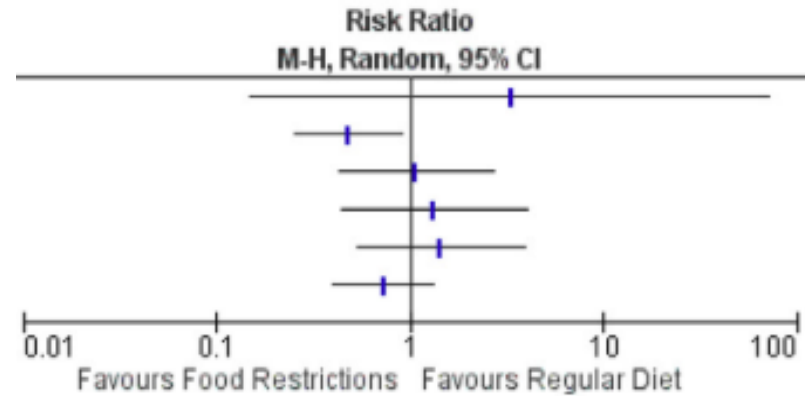
Use of food restrictions to prevent infections in paediatric patients with cancer and haematopoietic cell transplantation recipients: a systematic review and clinical practice guideline

8 RCT
6 adult, 2 paed, 2 both
853 patients

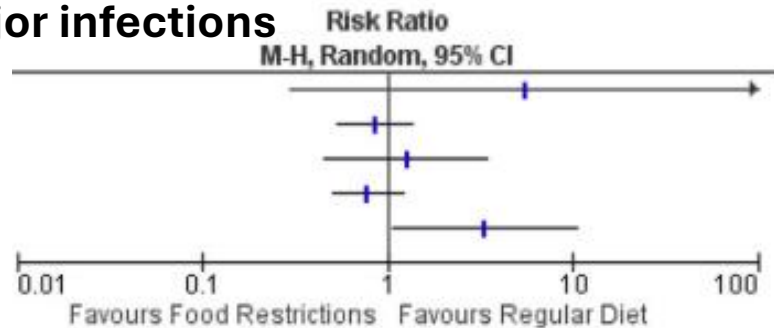
Febrile neutropenia



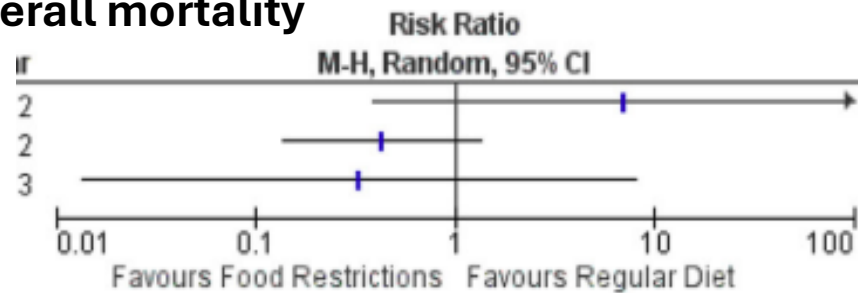
Blood stream infections



Major infections



Overall mortality



Recommendation: “**we suggest that food restrictions not be routinely used in the prevention of infections in paediatric... cancer, autologous or allogenic HSCT**”

Good practice statement: “**..importance of food safety practices for the prevention of infection**”

A Neutropenic Diet in Haemato-Oncological Patients Receiving High-Dose Therapy and Hematopoietic Stem Cell Transplantation: A Systematic Review

Luise Jahns ^{1,2,*}, Jutta Hübner ² , Christina Mensger ²  and Viktoria Mathies ² 

RCT	n.	Infection	GI infections/ complications	Nutritional parameters
Van Tiel (2007)	20	Temp LBD 3 days RD 6 days (P=0.11)	No difference in yeast colonisation or gram-negative bacilli	
Gardner (2008)	153	FUO: (P=0.07) Major Ix: (P=0.60) Minor Ix: (P=0.99)		
Lassiter (2015)	46	+ive blood culture (P=0.99)		Both groups had increasing scores on PG-SGA, 60% of both groups required PN
Radhakrishnan (2022)	69	+ive blood/fluids/ viral Ix, culture (P=0.26)	No difference in stool culture positives (P=0.13)	
Stella (2023)	222	Infection >G2, sepsis/FUO (P=0.7, 0.4, 0.1)	No difference LBD and RD Similar N+V, diarrhea	RD had less weight loss than LBD (P=0.03) after 1 month, but not at D/C (P=0.3)

- 5 RCT – all adults
- Haematology-oncology
- 510 patients

Randomized Noninferiority Trial of a Liberalized Diet Versus the Neutropenic Diet in Hematopoietic Stem-Cell Transplant Patients and Patients With Acute Leukemia

John R. Wingard, MD¹ ; Ji-Hyun Lee, DrPH^{2,3} ; Derek Li, MS
John Hiemenz, MD¹; Erin A. Dean, MD⁴ ; Randy Brown, MD¹;
Helen Leather, PharmD¹; Michele W. Sugrue, MS¹; Wendy J. Da
Debra Lynch Kelly, PhD^{8,9}

DOI <https://doi.org/10.1200/JCO-25-00889>

- 214 participants
- Neutropenic Diet (ND) vs Liberalised Diet (LD)
- Halted at 2nd interim analysis as infection rates in LD passed predefined limit
- 31.4% LD and 20.2% ND infections

TABLE 3. Types of Major and Nonmajor Infectious Events During the Study Intervention and After

			(%)
Supplementary Table 1. Allowed foods for dietary interventions.			
	Neutropenic Diet	Liberalized Diet	
Fruit	Only canned, cooked fruit, or fruit cups	Fresh fruit allowed* **	
Vegetables	Only cooked	Fresh vegetables allowed* ***	
Yogurt	Not allowed	Only pasteurized	
Milk	Only pasteurized	Only pasteurized	
Cheese	Only pasteurized	Only pasteurized	
Fish and meat	Only well cooked	Only well cooked	
Eggs	Only well cooked	Only well cooked	
Bread	Allowed	Allowed	
Dessert and ice cream	Allowed	Allowed	
Honey	Only pasteurized	Only pasteurized	
Cold cuts and sausages	Allowed	Allowed	
Oral nutritional supplements	Allowed	Allowed	
Bottled water, medical unit tap water, and soda/other bottled beverages	Allowed	Allowed	

*Handling adhered to the hygiene and common-sense advice listed in the FDA-endorsed food

Wider impact: **Quality of life**

- 2 studies looked at QOL in Systematic review – not statistically significant
- Neutropenic Diet
 - Poor diet adherence (43% of patients failed to follow it)
 - Poor diet acceptability
- Poor adherence – impacts feelings of guilt and worry
- Food can bring comfort and restrictions can exacerbate fragile states



“emphatically stated they preferred regular diet as less restrictive ...”. (1)

Wider Impact: Malnutrition

ND associated with:

- Weight loss 1-3kg ($P=0.05$)
- RD had less weight loss than LDB ($P=0.03$) after 1 month, but not at D/C ($P=0.3$)
- More likely to be '**prone to malnutrition**' or '**severe malnutrition**' during nutritional screening
- Decreased diet quality
 - Reduced intake of fibre, vitamin C, micronutrients
 - Increased consumption **ultra processed foods**

“ND causes more harm than good...”



Advancement in Food Safety, handling procedures, production and procurement

- Eggs: Source of Salmonella infection
- British Lion Mark Scheme 1998
- >90% of British produce are British Lion marked now
- 2007 EFSA report – UK egg production is one of the safest amongst the world⁷
- ACMSF 2017 – British lion mark eggs are safe to be consumed runny even by vulnerable groups⁸
- However, we need to take in to consideration
 - 10% eggs which may not have Lion mark
 - Eggs that are imported to UK – Petitions signed 61% shoppers concerned of imported eggs as of June 2025.

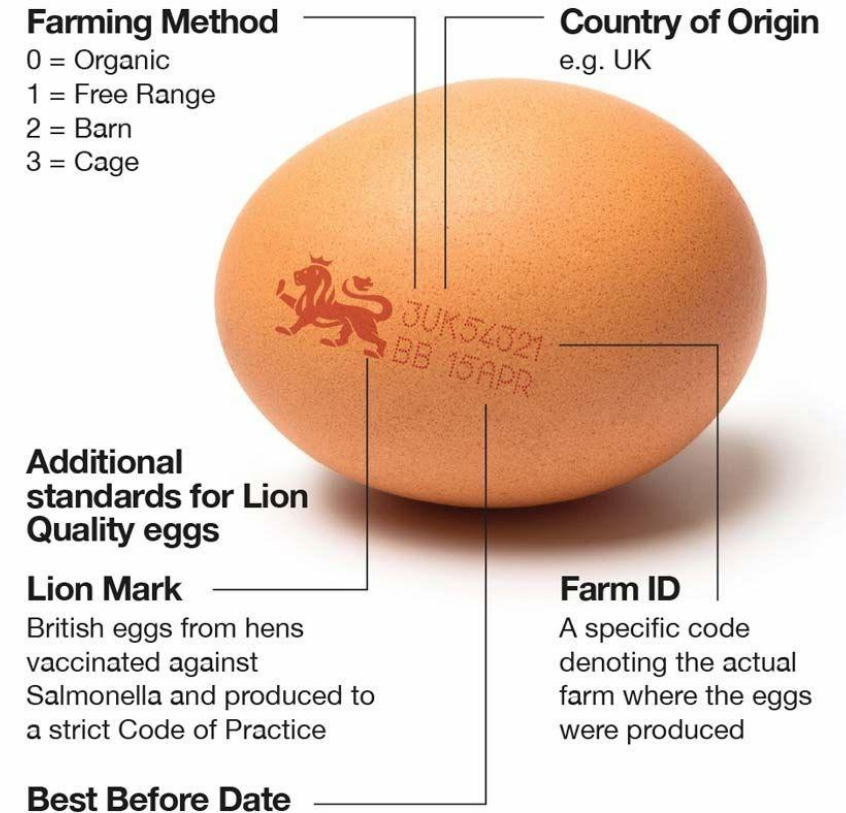
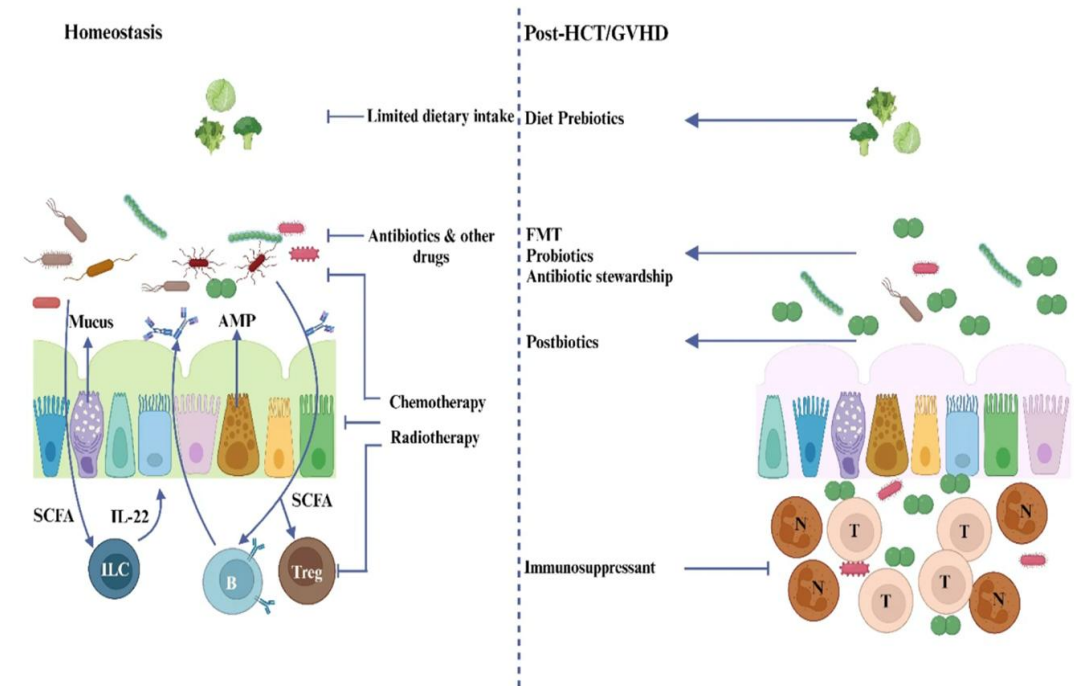


Image source: <https://www.egginfo.co.uk/british-lion-eggs>

<https://www.egginfo.co.uk/news/new-government-advice-british-lion-eggs-safe-mums-be-babies-and-elderly-people>

Gut microbiome

- Dietary fibre – important role in enhancing the immune function
- ↓ bacterial translocation
- ↑ balance of intestinal flora
- Bacterial Diversity and Balance is important in immunosuppressive patients
- ND may pose severe restrictions on fibre and micronutrients



Role of BDA Specialist Haematology Committee



Haematology
Specialist Sub-
Group

BDA

The Association
of UK Dietitians

Professional Consensus statement on use of clean diets in Immunocompromised patients (BDA, 2005)

Policy statement on neutropenic dietary advice for haematology patients (BDA, 2011)

2021

Food safety Recommendations 2022

Good hygiene, food safety and storage guidance

2023

Raise awareness through Networking

EBMT 17th Educational Meeting for Nurses
Blood Cancer UK Resources

2005- 2016

2022

2025

Guidance for Safer Eating with Neutropenia

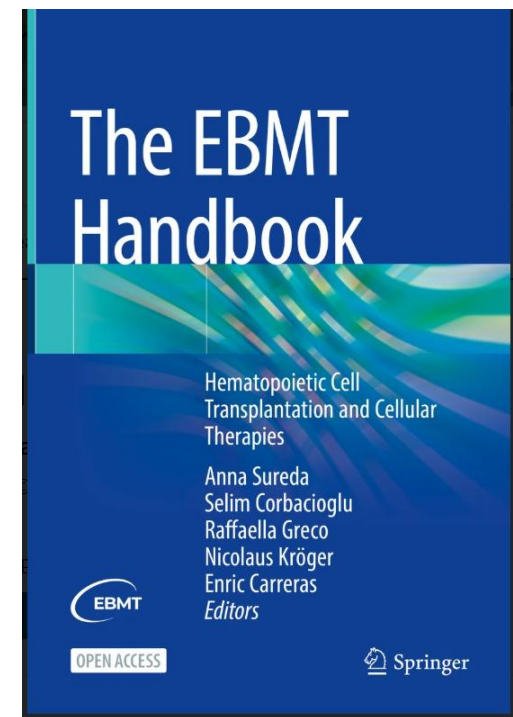
Neutrophil count ($<1 \times 10^9/L$), relaxed restrictions on fresh fruits & vegetables, RTE vacuum packed foods & icecream

Guidance for Safer Eating with Neutropenia updated further 2024-2026

What now?

- Patients still need some guidance on minimising the risk.
 - Risks may arise: Listeria Monocytes outbreak linked to smoked fish in April-May 2022, FSA alerts, NHS Digital amendments (12 cases in England & Wales) – Ready To Eat smoked fish <5° C, follow manufacture's storage, thoroughly cooking
- **EBMT handbook:** Safe food handling and strict hand hygiene over ND diet (Baumgartner and Schuetz, 2024)
- **Food Standard Agency & Food Standards Scotland-** aware that there is a need to prevent the vulnerable groups of people from high-risk food groups.
- **FSA Strategy** – Food you can Trust 2022-2027
- **BDA Specialists Haematology Committee** - Guidance for safer eating with Neutropenia 2023-2026

Image source: <https://www.ebmt.org/education/ebmt-handbook>,: <https://www.food.gov.uk/node/8851?print=1>



BDA- Safer eating with Neutropenia

- Avoid contamination of food – hand washing before handling
 - Food handling – different chopping boards, not touching nose/mouth, keep pets away in the preparation area
 - Food storage – raw and cooked food stored separately, chopping boards, not overloading.
 - Defrost in fridge and not at room temperature,
 - Cool at room temperature before storing in fridge or freezer
 - No reheating of rice
 - Check use-by dates & best before dates
 - Eating out check food hygiene rating
- ✓ Fruits, vegetables, and salads washed well & fresh
 - ✓ All pasteurised milk and cheese and icecream
 - ✓ Well-cooked shellfish, fish, meat, eggs and poultry
 - ✓ Vacuum-packed cold meat stored below 3°C
 - ✓ Honey, Nuts
 - ✓ Natural Yoghurt, Greek and Fruit yoghurts
 - ✗ Unpasteurised dairy, live yoghurt
 - ✗ Soft unpasteurised cheese and mould-ripened not cooked to steaming hot temperature.
 - ✗ Lightly cooked shellfish
 - ✗ Raw eggs, undercooked meat shellfish,

Cheese

- ✓ Cheese – Hard Cheese – safer
- ✓ Pasteurised Soft cheese - mozzarella, feta and cream cheese
- 😊 Relaxed – thoroughly cooked soft unpasteurised cheese until steaming hot.
- 😊 Thoroughly cooked soft blue cheese until steaming hot.
- ❌ uncooked Mould-ripened soft cheese Brie, Camembert and Roquefort

Eggs

- ✓ Fully Cooked eggs
- 😊 Relaxed – poached BL eggs.
- 😊 Mousse made of BL eggs
- 😊 Mayonnaise - Pasteurised
- ❌ Raw eggs or partially cooked without BL mark
- ❌ Duck, goose , quail eggs partially or uncooked.
- ❌ Home-made mayonnaise

Veg &Fruits

- ✓ Cooked vegetables & fruits
- 😊 Relaxed – washed and fresh Vegetables & fruit (running tap water)
- 😊 Cooked sprouted seeds
- 😊 Vegetable sushi
- ❌ Damaged veg & fruits
- ❌ Bruised Veg & Fruits
- ❌ Uncooked sprouted seeds
- ❌ Over ripe fruits

Smoked fish

- Smoked fish – not heated during cooking process
- **Listeria Monocytogenes** - fever, vomiting, diarrhoea and even death
- Listeria can survive and multiply at refrigerated temperatures.
- 19 cases from smoked salmon between 2020-2024
- If cooked to steaming hot then bacteria can be killed and then safe for use.



- ✓ Fully Cooked Fish and Seafood
- ✓ Well-cooked shellfish mussels, lobster, crab and prawns, sushi made with cooked fish
- ✓ Smoked Salmon that has been cooked
- ✗ Raw fish and shellfish
Smoked / cured fish

Cured meat

- Risk of listeria
- Dry-cured poses highest risk
- Can be cooked to kill any potential bacteria and then very safe for use.



Yoghurt



- Pasteurised yoghurt
- Live Yoghurt
 - Lactobacillus considered safe bacteria – added after pasturisation
 - Pasteurisation is required for all commercially produced yoghurt
 - Safe in neutropenia



- Raw yoghurt or unpasteurized yoghurt



Resources – BDA

<https://www.bda.uk.com/static/9f7e021a-2edf-4d62-9bd5fba841d7472c/52d14410-d3b7-45cb-a3a0e09e15eeda2b/Neutropenic-Diets-Guidance-Jan-2020.pdf>

LINK to Resources on
Haematology sub group
homepage



BDA Policy statement: Safer eating with Neutropenia

Summary

This BDA Policy Statement provides guidance for the provision of consistent advice on food safety and food hygiene for neutropenic haematology patients. It provides evidence/best practice guidance for haematology patients undergoing chemotherapy/CAR-T treatment as well as those with more profound neutropenia undergoing stem cell/bone marrow transplantation. This is a guideline for those units who chose to continue to advise dietary restrictions during neutropenia. It is not intended for people with neutropenia of a non- haematological cause.

Patient friendly resource

- <https://bloodcancer.org.uk/understanding-blood-cancer/treatment/infection-neutropenia-sepsis/neutropenia/eating-safely-neutropenia/>



Next steps

1. Talk to your MDT
 - Consultant
 - Quality Manager
 - CNS
 - Catering
2. Set up food safety alerts
 - <https://www.food.gov.uk/news-alerts> and subscribe
 - Weekly alerts



Update from the Food Standards Agency 23 March 2026

Food alert – 20 March 2026:

Dunnes Stores recalls Dunnes Stores 8 Plain Tortilla Wraps because they may contain metal pieces

Read more: <https://www.food.gov.uk/news-alerts/alert/fsa-prin-12-2026>

Food alert – 22 March 2026:

MOMA Foods is recalling various porridge pots and sachet products because of possible mouse contamination

Read more: <https://www.food.gov.uk/news-alerts/alert/fsa-prin-13-2026>

...
A news and

Food consultations

Deliver

Food allergy alerts by email or SMS.

Summary:

Food restrictions impact diet quality (fibre, vitamin C, potassium, ultra processed foods)

Food restrictions impact diet quantity (increase malnutrition)

Weight loss and malnutrition in HSCT associated with decreased overall survivorship

Unable to find any clinical study that supports ND

Focus on FOOD SAFETY, and avoiding high risk foods

Call to action: spread the word 'SAFER EATING WITH NEUTROPENIA'

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Thank you for listening



Any questions?

Safer food, better health



Thank You & Any Questions?
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Add Victoria

and Haematology Sub-committee

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<https://www.macmillan.org.uk/cancer-information-and-support/impacts-of-cancer/healthy-eating-and-cancer/food-safety-when-your-immunity-is-low>

<https://acuteleuk.org/downloads/infographics/?2746>

- [Food Standards Agency and Food Standards Scotland issue updated advice to higher risk consumers on ready-to-eat cold-smoked and cured fish following publication of a risk assessment | Food Standards Agency 2023](#)
- [Smoked fish and risk of listeriosis in high risk groups, including pregnancy and the immunocompromised - GOV.UK 2023](#)
- <https://www.gov.uk/government/publications/listeria-monocytogenes-surveillance-reports/listeriosis-in-england-and-wales-summary-for-2024#:~:text=National%20outbreak%20of%20listeriosis%20in,have%20occurred%20following%20this%20action.>