

# Are people who receive chemotherapy informed of the increased risk of foodborne infection?

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## Introduction

Chemotherapy patients have an increased risk of foodborne illnesses due to immunosuppression<sup>1</sup>. Cancer patients are reported to have a five-fold increased risk for development of listeriosis<sup>2</sup>.

To minimise the risk of foodborne illness it is important that cancer patients consume foods prepared and cooked at home according to food safety recommendations and avoid risk associated food products<sup>3</sup>.

It is suggested that limited food safety information is available to chemotherapy patients in the UK and data on their food safety knowledge, practices and perceptions are lacking<sup>4</sup>.

To date, there has been no review, or evaluation of the availability and adequacy of UK food safety information accessible for chemotherapy patients and family caregivers.

## Purpose

To evaluate the provision of food safety information available to UK chemotherapy patients to assess whether appropriate and informative and explore the food-related experiences perceived importance of food safety among chemotherapy patient and family caregivers.

## Methods

A mixed methods research approach was utilised:

- Online food-related patient information resources were obtained from National Health Service (NHS) chemotherapy providers in England, Scotland and Wales, the Department of Health (DoH) and identified UK cancer charities. Resources were reviewed for the inclusion of food safety information using a content analysis approach.
- In-depth interviews ( $n=15$ ) were conducted with patients and family caregivers to establish the food related experiences of patients during treatment.
- Self-complete questionnaires (paper-based and online) were completed ( $n=172$ ) by chemotherapy patients (70%) and family-caregivers (30%) to determine the knowledge, attitudes and self-reported practices regarding food safety during chemotherapy treatment

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## Publications

The findings from this study are published in:

- Evans EW, & Redmond EC. (2017) "An assessment of food safety information provision for UK chemotherapy patients to reduce the risk of foodborne infection." *Public Health*. 153: 25-35.
- Evans EW, & Redmond EC. (2018) "Food Safety Knowledge and Self-Reported Food-Handling Practices in Cancer Treatment". *Oncology Nursing Forum*. 45:98-110.

## Acknowledgments

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The research group also wish to acknowledge the personal chemotherapy experiences of Prof. Louise Fielding (1968 – 2013) who recognised the need for food safety information during chemotherapy treatment.

## References

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## Results

### The availability and adequacy of food safety information for chemotherapy patients

In total, 45 online food-related patient information resources were obtained from 35 of 154 NHS chemotherapy providers in England, Scotland and Wales, the DoH and three of 184 UK cancer charities.

Overall, 67% of resources included one or more food safety practice, ranging from one (e.g. "Ensure eggs are thoroughly cooked") up to 43 practices. The majority (70%) included only ten practices or less.

#### Hand hygiene



Hand hygiene was the most frequently recommended practice. Washing hands before preparing food was cited in 49% of reviewed resources. Details regarding critical hand washing occasions such as after handling raw meat/poultry were lacking (see Figure 1).

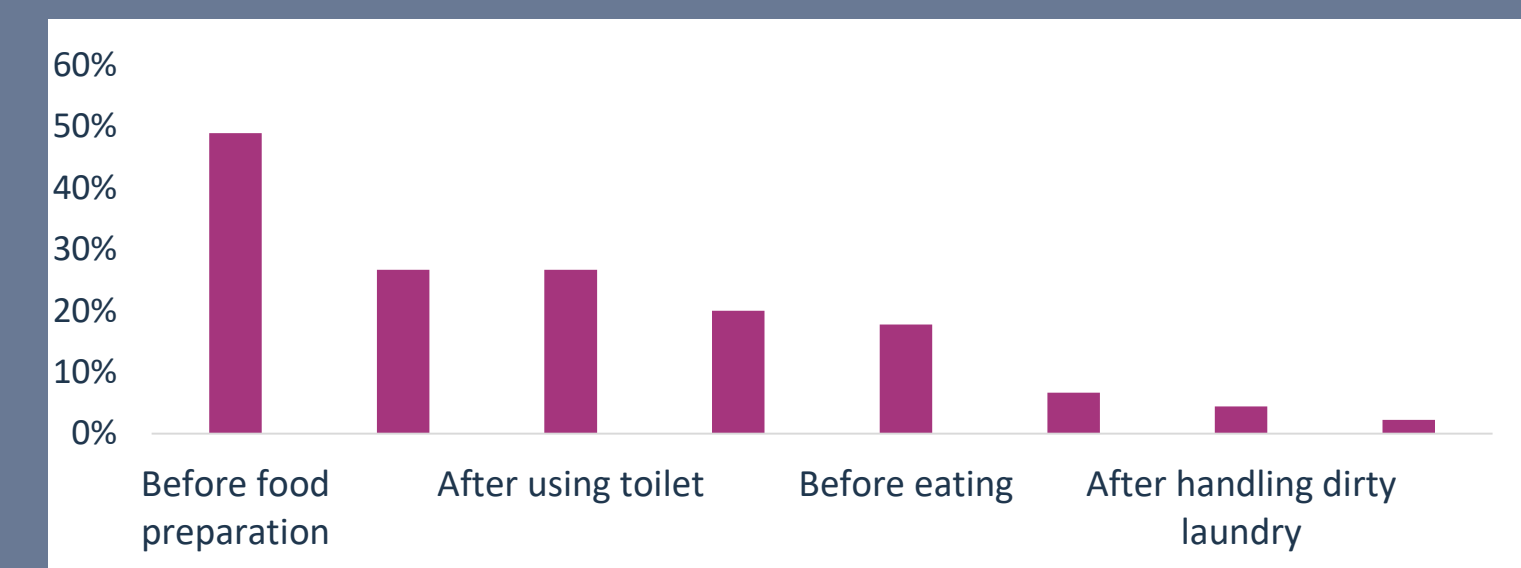


Figure 1 Inclusion of information on hand washing occasion (n=45)

Hand hygiene recommendations were insufficient:

- 20% recommended use of soap and warm/hot water
- 16% recommended a clean hand towel should be used

#### Cleaning



The most frequently included cleaning practice (included in 29%) was 'wash fruits and vegetables before eating'. Information on cleaning kitchen surfaces was lacking (18% resources). Only 9% recommended allowing kitchen equipment, crockery or cutlery to air dry instead of using a towel.

#### Listeriosis risk reducing behaviours

Inclusion of listeriosis risk reducing behaviours were lacking:

- 7% recommended that ready-to-eat foods should be consumed within two days of opening
- 22% included recommended refrigeration temperature
- 33% referred to adhering to 'use by' dates



#### Potentially unsafe recommendations



Information deemed to be potentially 'unsafe' was included in 11% of resources, including: "Eat room temperature foods." (Resource 031), "Food at room temperature may be more enjoyable than hot food, and can be as nutritious." (Resource 035). Foods should not be subjected to potentially unsafe temperatures. Such foods out of refrigeration for two hours or longer should be disposed of.

Although some information attempted to ensure food safety, messages were inadequate: "Shellfish and steamed fish must be cooked for at least seven minutes. Meat should be too hot to touch." (Resource 029) Cooking time without portion size/cooking temperature is inadequate, and external temperature will not indicate core temperature, using a thermometer is the best way ensure cooking efficacy.

#### Risk associated foods

Recommendations regarding risk-associated food products to be avoided were included in 44% of resources.

- The most frequently food products were:
- raw/undercooked eggs (42%)
  - raw/undercooked meat or poultry (42%)
  - unpasteurised dairy products (38%)

Only half of those that included risk-associated food products listed safer alternative food products (22%).



### Patient and family caregiver awareness of the risk of foodborne illness during chemotherapy treatment

Interviews with patients and family caregivers determined that many were aware of the increased risk of infection due to immunosuppression during treatment but may underestimate foodborne infection risk:

"I can remember it being made clear to us that we should avoid contact with anybody with any contagious or infectious illness." (Participant 05).

Precautions to avoid crowded spaces or public transport, to reduce the risk of communicable diseases were reported by many, however food safety was not considered a priority:

"I knew there was increased risk of picking up infections so I was especially careful about hand washing after being in public space, I didn't think about a risk of food poisoning." (Participant 01).

"That would have just given you something else to worry about! Well knowing fully well that the food we were cooking was good healthy food, we didn't specifically think about safety at that time." (Participant 04).

Many could not recall receiving food safety information prior to/during chemotherapy treatment. Some suggested if advice had been provided, they might not have paid attention to it due to other concerns:

"I had much bigger things to worry about. But I do equally from talking to you now understand the need for people to prepare food safely and things of this nature, but I had much bigger things to worry about." (Participant 10).

Food safety was of minimal concern compared to being able to cook or eat. Problems associated with chemotherapy side effects were reported including appetite loss, dry/sore mouth, nausea, dysgeusia and cachexia:

"I felt nausea all the time, I felt really ill and I couldn't even bare the smell of cooking." (Participant 09).

"I found it very difficult to sit down and eat meals, I think that was psychological as much as anything else." (Participant 02).

The questionnaires determined that the majority of patients (61%) reported being more concerned about diet and nutrition than food safety during treatment.

Furthermore, significantly greater proportions ( $p<0.05$ ) reported receiving information on healthy eating and keeping active (67 – 69%) than on food safety (49%) during chemotherapy treatment (Figure 2). Neutropenic, blood-related cancer and transplant patients were significantly more likely ( $p<0.05$ ) of receiving food safety information.



Figure 2. Recall of health related information received during chemotherapy (n=130)

Overall, weak positive attitudes were expressed towards the importance of food safety during chemotherapy treatment.

As indicated in Table 1, attitudinal scores were determined to be significantly ( $p<0.05$ ) more positive among carers than patients, and among females than males. Those that reported they/the person they care for received a transplant, were neutropenic or treated for a blood-related cancer, had significantly ( $p<0.05$ ) more positive attitudes towards food safety, as were those that had received food safety information.

Table 1 Significant differences ( $p<0.05$ ) in attitudes towards food safety determined according to respondent demographic characteristics/treatment details.

Demographic	Mean scores Min: 12 (-ve), Max: 55(+ve)	Attitudinal finding
Patient/Carer (n=160)	Carers = 50 Patients = 47	Significantly ( $p<0.05$ ) more positive among carers than patients
Gender (n=159)	Female = 49 Male = 46	Significantly ( $p<0.05$ ) more positive among female patients/carers
Neutropenic (n=119)	Neutropenic = 50 Non-neutropenic = 46	Significantly ( $p<0.05$ ) more positive among neutropenic patients/carers
Received a transplant (n=158)	Transplant = 53 Non-transplant = 48	Significantly ( $p<0.05$ ) more positive among transplant patient/carers
Blood related cancer (n=157)	Blood related = 53 Non-blood = 47	Significantly ( $p<0.001$ ) more positive among blood-related cancer patient/carers
Food safety information (n=160)	Received = 52 Did not received = 45	Significantly ( $p<0.001$ ) more positive among those that received information

## Significance of study

Findings from this study have determined that:

- Although information is available, access to specific food safety information for patients and caregivers is limited, considerable gaps exist and information provided varies greatly between sources
- The most comprehensive sources of food safety information were tailored for neutropenic patients
- The risk of food poisoning was often underestimated by patients and family-caregivers
- Overall, weak positive attitudes were expressed towards the importance of food safety during chemotherapy treatment. Attitudes were significantly more positive among the most 'at-risk' patients/caregivers and those that had received food safety information.

Completion of the study has determined there is an identified need for a standardized and specifically targeted food safety intervention, using a patient-orientated approach for chemotherapy patients and family caregivers to reduce the risk of foodborne infection during chemotherapy treatment.