

# RAISING AWARENESS OF FOOD SAFETY IN COMPANY CANTEENS

Wageningen University

CLEAN



WASH HANDS AND SURFACES OFTEN Check your steps at FoodSafety.gov SEPARATE



SEPARATE RAW MEATS FROM OTHER FOX Check your steps at FoodSafety.gov



O THE RIGHT TEMPER



REFRIGERATE FOOD PROMPTLY Shock your stops of FoodSafety gov *Kim Stenvers* 881004803120 BEC-80436

Business Economics

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# Preface

Herewith I would like to thank my supervisor, Ine van der Fels – Klerx, for her guidance and support during my thesis. I also want to thank all of the respondents and catering services, without their cooperation I would not have been able to conduct this study.

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## Abstract

**Background:** Food-borne diseases have emerged as a growing public health and economic problem in many countries during the last two decades. Several studies have indicated that approximately 70% of food-borne diseases were associated with catering or foodservices due to mishandling of food by food handlers. With respect to small foodservice businesses, a significant part does not meet the requirements of the food hygiene legislation. Therefore, improving the behaviour of food handlers of small scale canteens with respect to food safety might be vital since food handlers play a key role in ensuring safe food for consumers throughout the chain of production, storage and preparation.

**Methods:** Behaviour Change Interventions (BCI's) can be used in influencing behaviour of food handlers. BCI's can be defined as coordinated sets of activities designed to change specified behaviour patterns. The 'Behaviour Change Wheel' (BCW) was applied; this is a method for characterizing and designing BCI's. A structured closed questionnaire was set up in order to measure the level of food handler's intention to change food safety behaviour given a certain intervention of the BCW. All nine intervention categories of the BCW were taken into account; education, persuasion, coercion, training, restriction, environmental restructuring, modelling and enablement. These intervention categories were linked to more specific interventions regarding food safety in company canteens. The following food safety topics were included: personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life. The scaling method that has been used was the bipolar Likert Scale. At the end of each intervention part, participants were asked which reasons contributed to not perform the target food safety behaviour.

**Results:** The results of the questionnaire indicated that the majority of the participants answered 'yes' to all interventions that were linked to personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life. More than half of the participants disagreed with reasons to not perform the target food safety behaviour.

**Conclusion:** This study gained insight in interventions, based on the BCW, that would contribute to a positive change in food safety behaviour among food handlers of small scale canteens. The most applicable interventions were: education (booklet or flyer), persuasion (poster or video), coercion (warning or performance of additional tasks), training (training by professional), environmental restructuring (sickness of colleague, employee, costumer), modelling (colleagues perform target food safety behaviour) and enablement (enable target food safety behaviour by equipment). In addition, the results of this study indicated that the majority of the food handlers in the Netherlands are already aware of food safety. Most of the participants stated that they did not have any reasons to not perform desired food safety practices. Further research will be necessary in order to assess if independent small scale canteens run by private establishments need to be more encouraged in food safety practices since small scale canteens in this study were mostly branches of larger catering services, where employees receive food safety trainings regularly.

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### Introduction

Food-borne diseases have emerged as a growing public health and economic problem in many countries during the last two decades<sup>1,2</sup>. A joint WHO/FAO Expert Committee on food safety admitted that disease due to contaminated food is probably the most widespread health problem in the contemporary world, killing an estimated 1.9 million people annually<sup>3,4</sup>.

Food-borne diseases are attributed to a wide variety of bacteria, parasites and viruses. The bacterial agents *Campylobacter*, *Salmonella*, *E. coli* and *L. monocytogenes* constitute the greatest burden of food-borne diseases<sup>5,6</sup>. The final contamination of food products with pathogens can be affected by inadequate reheating, inadequate refrigeration and inadequate storage which<sup>7</sup>. Several studies have indicated that approximately 70% of food-borne diseases were associated with catering or foodservices due to mishandling of food by food handlers<sup>8,9</sup>.

Food handlers play a key role in ensuring safe food for consumers throughout the chain of production, processing, storage and preparation<sup>11</sup>. The mishandling of food and failure to carry out hygienic measures enables pathogens to contaminate food, where they can persist and reproduce in sufficient numbers to cause diseases in consumers<sup>11</sup>. In addition, food handlers may also be asymptomatic carriers of food poisoning organisms<sup>10</sup>. They are a common source of food-borne viruses such as hepatitis A and diarrhoea-causing viruses which are attached to infected individuals in large numbers<sup>9,12</sup>. During the acute stages of a food-borne infection, large numbers of microorganisms are excreted and are likely to be widely dispersed<sup>9</sup>. Therefore, poor sanitary practices in food storage, handling and preparation can create an environment in which bacteria and viruses can more easily disseminate<sup>9,13</sup>.

Several studies have indicated the need for training and education of food handlers and revealed that mishandling of food is mainly due to a general lack of knowledge of microbiological food hazards, cross-contamination, inadequate cooking and storage at inappropriate temperatures<sup>9,14,15</sup>. Implementation of hygienic food practices, application of procedures based on HACCP principles and training of food handlers are essential in the prevention of food-borne diseases. Food industries are obliged to apply Hazard Analysis Critical Control Point (HACCP) as a tool to ensure food safety. This strategy is widely known as an effective approach to establish good production, sanitation and manufacturing practices that produce safe foods. HACCP systems set up process control through identifying points in the production process that are most critical to monitor and control<sup>16</sup>. Since 1995, EU legislation requires food businesses to implement and maintain a food safety management system based on HACCP principles to ensure the food produced from their premises is safe to eat<sup>14,16,17</sup>.

With respect to small foodservice businesses, a significant part does not meet the requirements of the food hygiene legislation in general<sup>17</sup>. Small businesses (less than 50 employees) account for 99.8% of all food businesses within the hospitality sector. These businesses experience several challenges such as lack of specialist skills, reliance on niche markets and low cash flow. These

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shortcomings impact their ability to comply with legislative requirements, in terms of time, skills and resources required to implement improvements<sup>17,18</sup>.

Staff working for food businesses are ultimately responsible for the proper preparation of food, in order to ensure food safety to its consumers<sup>19</sup>. Training of staff might be vital in order to change behaviour of food handlers<sup>20</sup>. Although, training may contribute to an increased knowledge of food safety, it does not always result in adapting food handling behaviour<sup>21</sup>. The discrepancy between knowledge and practice arises through existing trainings, particularly formal certificated training, which are often based on the KAP (Knowledge, Attitudes and Practices) model<sup>21,22</sup>. This model assumes that an individual's behaviour or practice depends on his or her knowledge and that the supply of information directly leads to change in attitude and ultimately a change in behaviour<sup>22</sup>. It has been suggested that this approach is not efficient in its assumption that knowledge is the main precursor to behavioural change<sup>23</sup>. In order to design effective training for food handlers there is a need to fully understand all the factors underlying current food hygiene behaviour in the workplace<sup>21</sup>.

Anohter approach that can be used to influence behaviour of food handlers are Behaviour Change Interventions (BCI's). BCI's can be defined as coordinated sets of activities designed to change specified behaviour patterns<sup>24</sup>. The study of Michie et al. (2011) established the 'Behaviour Change Wheel' (BCW) as a method for characterizing and designing BCI's. This BCW considers motivation as an analytical and automatic process, including emotions and impulses that arise from associative learning of habitual behaviour. The BCW is structured in such a way that it attempts to give the best chance for successfully changing behaviour<sup>24</sup>.

It is essential to know to which extend food handlers of small scale canteens are willing to change their behaviour since they are ultimately responsible to ensure safe food for consumers. Small scale canteens might have fewer resources to make their employees aware of the importance of food safety. Therefore, the aim of this study is to evaluate which interventions, based on the BCW, would be most efficient to influence food safety behaviour of food handler of small scale canteens. This will give small scale canteens more insight in how they can use minimal resources to contribute to more awareness of food safety among their canteen staff and hereby can guarantee food safety for their consumers at all times.



# **Material & Methods**

#### The Behaviour Change Wheel

The BCW targets behaviour in terms of capability, opportunity and motivation, which interact to generate behaviour that in turn influences these components (see Figure 1.)<sup>24</sup>. The BCW divides capability into psychological and physical capability, in which psychological capability can be seen as comprehension and reasoning. With regard to opportunity, there is a distinction between physical opportunity provided by surroundings and social opportunity provided by the cultural environment which affects the way we think about things. At last, motivation is divided into reflective processes, including evaluating, planning and automatic processes, including emotions and impulses. The BCW distinguishes between nine BCI's and seven policy categories which enables the user to select the interventions most likely to be effective in influencing specific behaviour, these can then be linked to more fine-grained specific BCI's<sup>24</sup>.

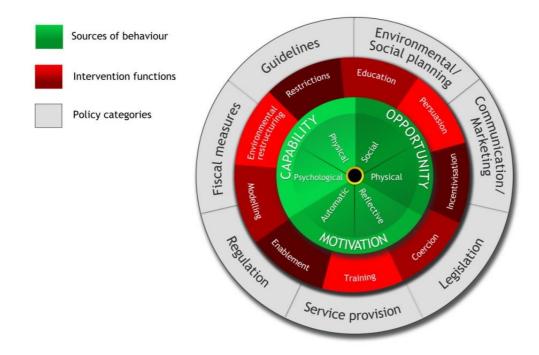


Figure 1. Behaviour change wheel (Michie et al., 2011)



#### Design and study population

In this study, small scale canteens were defined as canteens that have 1 to 8 food handlers employed. In total, 40 food handlers of small scale canteens in the Netherlands were approached by phone and e-mail to participate in this study. Some of these food handlers were approached at their workplace. The small scale canteens were included based on the catering business that managed these canteens. The catering businesses were a member of the association of small contract caterers (VOCC). A prospective cohort study was performed in the form of a questionnaire to examine which interventions according to the BCW could lead to the change of food safety behaviour of food handlers.

#### Data collection

Data was collected through structured closed questionnaires that attempted to assess the level of food handler's intention to change their behaviour given a certain intervention on interval scale. These interventions were based on the behaviour change model of Michie et al.  $(2011)^{24}$ . All nine intervention categories were included in this study as shown in Table 1. Policy interventions were excluded from this study since they apply less to behaviour change in individuals and more to changes in an organization or population.

All questions were identical and formulated in the same order to all participants to allow comparison of data from different participants. The first part of the questionnaire consisted of descriptive data such as gender, age, number of years working etc. The second part attempted to assess food safety awareness of food handlers (see Table 2).

Interventions	Definitions	Examples
Education	Increasing knowledge or understanding	Providing information to promote healthy eating
Persuasion	Using communication to induce positive or negative feelings or stimulate action	Using imagery to motivate increases in physical activity
Incentivisation	Creating expectation of reward	Using prize draws to induce attempts to stop smoking
Coercion	Creating expectation of punishment or cost	Raising the financial cost to reduce excessive alcohol consumption
Training	Imparting skills	Advanced driver training to increase safe driving
Restriction	Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviours)	Prohibiting sales of solvents to people under 18 to reduce use for intoxication
Environmental restructuring	Changing the physical or social context	Providing on-screen prompts for GPs to ask about smoking behaviour
Modelling	Providing an example for people to aspire to or to imitate	Using TV drama scenes involving safe-sex practices to increase condom use
Enablement	Increasing means/reducing barriers to increase capability or opportunity <sup>1</sup>	Behavioural support for smoking cessation, medication for cognitive deficits, surgery to reduce obesity, prostheses to promote physical activity
Policies		
Communication/ marketing	Using print, electronic, telephonic or broadcast media	Conducting mass media campaigns
Guidelines	Creating documents that recommend or mandate practice. This includes all changes to service provision	Producing and disseminating treatment protocols
Fiscal	Using the tax system to reduce or increase the financial cost	Increasing duty or increasing anti-smuggling activities
Regulation	Establishing rules or principles of behaviour practice	Establishing voluntary agreements on advertising
Legislation	Making or changing laws	Prohibiting sale or use
Environmental/ social planning	Designing and/or controlling the physical or social environment	Using town planning
Service provision	Delivering a service	Establishing support services in workplaces , communities etc.

#### Table 1 Definitions of interventions and policies (Michie et al. 2011)

Did you ever receive any information on food safety strategies?	Yes/No
Are there certain guidelines you have to comply with at your company to ensure food safety?	Yes/No
Are there certain actions you perform to ensure food safety?	Yes/No

Table 2. Questions regarding awareness of food safety



The third part of the questionnaire focused on interventions to change food safety behaviour of canteen employees. All nine intervention categories of the BCW were taken into account; education, persuasion, coercion, training, restriction, environmental restructuring, modelling and enablement<sup>24</sup>. These intervention categories were linked to more specific interventions regarding food safety in company canteens. The following food safety topics were included: personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life. The scaling method that has been used was the bipolar Likert Scale. Participants could choose from six possible answers from 1. 'strongly disagree', 2. 'disagree', 3.'maybe', 4. 'agree', 5. 'strongly agree' to 6. 'I do not know'. At the end of each part, participants were asked which reasons contributed to not perform the desired target behaviour. All questions regarding personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life were stated in the same way. The questions started with:

"Would you wash your hands before preparing food if..."

"Would you heat food products at the correct temperature if.."

"Would you cool food products at the correct temperature if..."

"Would you store food in a hygienic way (think of: foil, away from pets, dry, not outside etc.)if.."

"Would you try to prevent cross contamination if ... "

"Would you clean up your workplace if..."

"Would you pay attention to shelf life of food if..."

Subsequently, the questions were completed with different options regarding the nine intervention categories. As mentioned before, the intervention categories that were examined in this study were: education, persuasion, incentivisation, coercion, training, restriction, environmental restructuring, modelling and enablement. Some of them were not applicable to all topics. The nine intervention categories will be illustrated bellow.

#### 1. Education

This study attempted to assess how educational interventions, such as flyers and presentations, could influence the willingness to change behaviour of food handlers by asking questions as:

"Would you wash your hands before preparing food if there would be a booklet or flyer available at your work place about personal hygiene related to food?"



"Would you wash your hand before preparing food if a professional would give a presentation on personal hygiene related to food?"

#### 2. Persuasion

Persuasion can influence the action of people. In this case, a poster and a video were used as example to seduce people to perform the target behaviour. With respect to heating, participants were asked if they would heat food at the correct temperature if they would see a poster which shows the correct heating temperatures of food products. This led to the following questions:

"Would you heat food products at the correct temperature if there would be a poster available which shows the correct heating temperatures of food products?" "Would you heat food products at the correct temperature if you would watch a video about

#### 3. Incentivisation

the correct heating temperatures of food products?"

Interventions that are based on incentivisation were examined by presenting a reward if the target behaviour would have been performed. The participant could earn an award for compliance and/or a monthly bonus on the employee's salary. This yielded questions such as:

"Would you clean up your workplace if you would receive an award or a certificate for keeping it clean?"

"Would you clean up your workplace if you would receive a monthly bonus on your salary?" "Would you clean up your workplace if you could earn credits every time you would keep it clean, and these credits would lead to an award?"

#### 4. Coercion

In order to obtain compliance, coercion could be another way to influence people's behaviour. The questionnaire dealt with this by giving an example of punishment, a warning or the performance of additional tasks, if the participant would not perform the target behaviour. This led to the following three questions:

> "Would you pay attention to shelf life of food products if using food products which have expired would lead to a warning?"



"Would you pay attention to shelf life of food products if you had to perform additional tasks (extra cleaning etc) if you would use food products which have expired?"

#### 5. Training

Training is a well-known way of influencing behaviour. Therefore, participants were asked if they would change their behaviour if they would receive a training of a professional:

> "Would you try to prevent cross contamination if a professional would give training on how to prevent cross contamination?"

#### 6. Restriction

Restriction interventions are comparable to coercion, however the focus lies more on reducing the opportunity to engage in the target behaviour. The use of an inspector could restrict employees to perform unwanted behaviour. Participants were asked if they would perform the target behaviour if a supervisor could notice disobedience. With respect to cleaning, this led to the question:

> "Would you clean up if there would be an inspector present who could notice you did not kept it clean?"

#### 7. Environmental restructuring

Environmental restructuring refers to a change of physical or social context. In this case, the social environment of the employees. The participants were given three examples regarding the sickness of a colleague, the sickness of a costumer and the sickness of the participant and were asked if they would change their behaviour in this three situations:

"Would you wash your hand before preparing food if you would hear that a colleague got sick after not washing his/her hands before preparing food?" "Would you wash your hand before preparing food if you would get sick after not washing your hands before you prepared food?"



"Would you wash your hand before preparing food if a costumer got sick after eating a meal during your shift?"

#### 8. Modelling

Modelling interventions were targeted by providing an example for people to aspire. In this case, a colleague was used to give an example in the target behaviour and therefore might influence the participant's behaviour.

"Would you heat food products at the correct temperature if you would see that all of your colleagues heat food products at a certain temperature?"

#### 9. Enablement

The last interventions category that was examined was enablement, meaning the increase of opportunity to perform the target behaviour. This opportunity could be increased by providing certain materials or equipment such as refrigerators or cleaning materials. This intervention led to the following questions:

"Would you clean up your workplace if there would be different materials available to clean up? "Would you clean up your workplace if there would be a cleaning check list

available?"

In appendices I and II, a complete version of the questionnaire is presented. This questionnaire is also translated into Dutch since all participating canteens are located in the Netherlands. The following sections summarize the questions and answer options that have been used for the different topics: personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life.



Table 3 and 4 summarize the questions and possible answers that have been used to access the willingness of food handlers to wash their hands before preparing food. At the end of each section, the participants were asked possible reasons to not wash their hands before preparing food.

1. Personal hygiene			
Would you wash your hands before preparing food if (to be read at the beginning of each question)			
Intervention	Question	Answer	
Education	<ol> <li> there would be a booklet or flyer available at your workplace with information about personal hygiene and food?</li> <li> a professional would give a presentation on personal hygiene and for d?</li> </ol>		
Persuasion	food?         3 there would be a poster available which states 'do not forget to wash your hands'?		
	4you would watch a video about personal hygiene and food?	-	
Incentivisation	5you would receive an award or a certificate for personal hygiene compliance?		
	6you would receive a monthly bonus on your salary?	Scale from 1 to 6,	
	<ul><li>7 you could earn credits every time you wash your hands, and these credits would lead to an award for personal hygiene compliance?</li></ul>	where 1= strongly agree, 2= disagree,	
Coercion	<ul> <li>8 you would get a warning if you would not wash your hands?</li> <li>9 you would have to perform additional tasks (extra cleaning etc.) if you would</li> </ul>	3= neither agree or disagree, 4= agree, 5= strongly agree, 6	
Training	not wash your hands? 10 a professional would give a training about personal hygiene and food?	I do not know/n.a.	
Restriction	11there would be an inspector present who could notice that you did not washed your hands?		
	<ul> <li>12 you would hear that a colleague got sick after not washing his/her hands before preparing food?</li> <li>13 you would got sick after not washing</li> </ul>		
Environmental restructuring	<ul> <li>13 you would got sick after not washing your hand before you prepared food?</li> <li>14a costumer would got sick after eating a meal during your shift?</li> </ul>		
Modelling	15 you would see that all of your colleagues wash their hands before preparing food?	1	
Enablement	Not applicable		

Table 3 Interventions to increase personal hygiene



To what extend do the following arguments constitute a reason to not wash your hands before preparing foo		
I do not wash my hand before preparing food because (to be read at the beginnin Question 1 I think it is not necessary.	ng of each question) Answer	
2 it takes too much time.	Scale from 1 to 6, where 1= strongly agree, 2= disagree,	
3 there is no soap available.	3= neither agree or disagree, 4= agree, 5= strongly agree, 6=	
4 I wash my hands at home.	I do not know/n.a.	
5 because nobody told me why I should wash my hands.		

Table 4 Questions to asses reasons to not wash hands



Table 5 and 6 summarize the questions and possible answers that have been used to access the

willingness of food handlers to heat food products at a certain temperature. At the end of each section,

the participants were asked possible reasons to not heat food products at a certain temperature.

2. Heating			
Would you heat food products at the correct temperature if (to be read at the beginning of each question)			
Intervention	Question	Answer	
Education	<ul> <li>16 there would be a booklet or flyer available at your workplace with information on the correct heating temperatures of food products?</li> <li>17 a professional would give a presentation on the correct heating temperatures of food products?</li> <li>18 there would be a poster available</li> </ul>	-	
Persuasion	<ul> <li>18 there would be a poster available which states shows the correct heating temperatures of food products?</li> <li>19you would watch a video about the correct heating temperatures of food products??</li> </ul>		
Incentivisation	Not applicable		
Coercion	<ul> <li>20 not heating food products at the correct temperature would lead to a warning?</li> <li>21 you would have to perform additional tasks (extra cleaning etc.) if you would not comply with the correct besting</li> </ul>	Scale from 1 to 6, where 1= strongly agree, 2= disagree, 3= neither agree or	
Training	<ul> <li>not comply with the correct heating temperatures of food products?</li> <li>22 a professional would give a training about the correct heating temperatures of</li> </ul>	disagree, 4= agree, 5= strongly agree, 6=	
Restriction	food products? 23there would be an inspector present who could notice that you did not heat food products at the correct temperatures?	I do not know/n.a.	
	<ul> <li>24 you would hear that a colleague got sick after not heating food products at the correct heating temperature?</li> <li>25 you would got sick after not heating food products at the correct heating</li> </ul>		
Environmental restructuring	temperature? 26a costumer would got sick after eating a meal during your shift?		
Modelling	27 you would see that all of your colleagues heat food products at a certain temperature?	]	
Enablement	28there would be equipment available that would you allow the measure the		

Table 5 Interventions to increase heating of food products

heating temperature?



To what extend do the following arguments constitute a reason to not heat food products a	at a certain heating
temperature?	
I do not heat food products at a certain temperature because (to be read at the beginni	ng of each question)
Question	Answer
1 I think it is not necessary.	
<b>2.</b> it takes too much time.	Scale from 1 to 6,
2 it takes too much time.	where 1= strongly
	agree, 2= disagree,
	3= neither agree or
3 there is no equipment available that allows me to measure the heating	disagree, 4= agree,
temperature.	5= strongly agree, 6=
	I do not know/n.a.
4 we do not sell food products that have to be heated.	
5 because nobody told me why I should heat food products at a certain	
temperature.	

Table 6 Questions to asses reasons to not heat food products at the correct temperature



Table 7 and 8 summarize the questions and possible answers that have been used to access the willingness of food handlers to cool food products at a certain temperature. At the end of each section, the participants were asked possible reasons to not cool food products at a certain temperature.

3. Cooling		
	the correct temperature if (to be read at the beginning	
Intervention	Question	Answer
Education	<ul> <li>29 there would be a booklet or flyer available at your workplace with information on the correct cooling temperatures of food products?</li> <li>30 a professional would give a presentation on the correct cooling</li> </ul>	
Persuasion	temperatures of food products?         31 there would be a poster available which shows the correct cooling temperatures of food products?	
	32you would watch a video about the correct cooling temperatures of food products?	
Incentivisation	Not applicable	
Coercion	33 not cooling food products at the correct temperature would lead to a warning?	Scale from 1 to 6, where 1= strongly
	34 you would have to perform additional tasks (extra cleaning etc.) if you would not comply with the correct cooling temperatures of food products?	agree, 2= disagree, 3= neither agree or disagree, 4= agree,
Training	35 a professional would give a training about the correct cooling temperatures of food products?	5= strongly agree, 6= I do not know/n.a.
Restriction	36there would be an inspector present who could notice that you did not cool food products at the correct temperatures?	
	37 you would hear that a colleague got sick after not cooling food products at the correct cooling temperature?	-
Environmental restructuring	<ul> <li>38 you would got sick after not cooling food products at the correct cooling temperature?</li> <li>39a costumer would got sick after eating a meal during your shift?</li> </ul>	
Modelling	40 you would see that all of your colleagues cool food products at a certain temperature?	
Enablement	41there would be refrigerators available that would you allow the measure the cooling temperature?	

Table 7 Interventions to increase cooling of food products



To what extend do the following arguments constitute a reason to not cool food products at a certain heating temperature?         I do not cool food products at a certain temperature because (to be read at the beginning of each question         Question		
<ul> <li>2 it takes too much time.</li> <li>3 there is no equipment available that allows me to cool food products at</li> </ul>	Scale from 1 to 6, where 1= strongly agree, 2= disagree, 3= neither agree or disagree, 4= agree,	
<ul><li>a certain temperature.</li><li>4 we do not sell food products that have to be cooled.</li></ul>	5= strongly agree, 6= I do not know/n.a.	
<ol> <li> because nobody told me why I should heat food products at a certain</li> </ol>		
temperature.		

Table 8 Questions to asses reasons not to cool food products at the correct temperature



Table 9 and 10 summarize the questions and possible answers that have been used to access the

willingness of food handlers to store food products in a hygienic way. At the end of each section, the

participants were asked possible reasons to not store food products in a hygienic way.

4. Storage		
	a hygienic way (think of: foil, away from pets, dry, not	outside etc.) if (to be
read at the beginning of each ques	tion)	
Intervention	Question	Answer
Education	<ul> <li>42 there would be a booklet or flyer available at your workplace with information on hygienic storing methods of food products?</li> <li>43 a professional would give a presentation on the hygienic storing methods of food products?</li> </ul>	-
Persuasion	<ul> <li>44 there would be a poster available which shows hygienic storing methods of food products?</li> <li>45you would watch a video about hygienic storing methods?</li> </ul>	
Incentivisation	Not applicable	
Coercion	<ul> <li>46 not storing food products in a hygienic way would lead to a warning?</li> <li>47 you would have to perform additional tasks (extra cleaning etc.) if you would store food products in a hygienic way?</li> </ul>	Scale from 1 to 6, where 1= strongly agree, 2= disagree,
Training	48 a professional would give a training about the hygienic storing methods of food products?	3= neither agree or disagree, 4= agree,
Restriction	49there would be an inspector present who could notice that you did not store food products in a hygienic way?	5= strongly agree, 6= I do not know/n.a.
Environmental restructuring	<ul> <li>50 you would hear that a colleague got sick after not storing food products in a hygienic way?</li> <li>51 you would got sick after not storing food in a hygienic way?</li> <li>52a costumer would got sick after eating a meal during your shift?</li> </ul>	
Modelling	a meal during your shift? 53 you would see that all of your colleagues store food products in a certain way?	
Enablement	54there would be different materials available that would allow you to store food products in a hygienic way?	

Table 9 Interventions to increase storage in a hygienic way



I do not store food products in a hygienic way because (to be read at the beginning of each question)		
Question	Answer	
1 I think it is not necessary.		
2 it takes too much time.	Scale from 1 to 6, where 1= strongly agree, 2= disagree,	
<ol> <li> there are no materials available that allow me to store food prod a hygienic way.</li> </ol>	5= strongly agree, 6=	
4 we do not sell food products that have to be stored.	I do not know/n.a.	
<ol> <li> because nobody told me why I should store food products in a hy way.</li> </ol>	ygienic	

Table 10 Questions to asses reasons not to store food products in a hygienic way



Table 11 and 12 summarize the questions and possible answers that have been used to access the willingness of food handlers to pay more attention to cross contamination. At the end of each section, the participants were asked possible reasons to not pay attention to cross contamination.

5. Cross contamination		
Would you try to prevent cross contamination if (to be read at the beginning of each question)		
Intervention	Question	Answer
	55 there would be a booklet or flyer available at your workplace with information on cross contamination?	
Education	56 a professional would give a presentation on cross contamination?	
Persuasion	<ul> <li>57 there would be a poster available which states that preventing cross contamination is important?</li> <li>58 you would watch a video about cross</li> </ul>	-
	contamination?	-
Incentivisation	Not applicable	
Coercion	Not applicable	
Training	59 a professional would give a training on how to prevent cross contamination?	Scale from 1 to 6, where 1= strongly
Restriction	Not applicable	agree, 2= disagree, 3= neither agree or
	60 you would hear that a colleague got sick after cross contamination?	disagree, 4= agree, 5= strongly agree, 6=
	61 you would got sick after cross contamination?	I do not know/n.a.
Environmental restructuring	62a costumer would got sick after eating a meal during your shift?	
Modelling	63 you would see that all of your colleagues try to prevent cross contamination?	]
Enablement	64there would be different materials available to prevent cross contamination?	

Table 11 Interventions to increase prevention of cross contamination



do not pay attention to cross contamination because (to be read at the beginning of each question)					
Question	Answer				
1 I think it is not necessary.					
<ol> <li>2 it takes too much time.</li> <li>3 there are no materials availated</li> </ol>	Scale from 1 to 6,         where 1= strongly         agree, 2= disagree,         3= neither agree or         disagree, 4= agree,         5= strongly agree, 6=				
4 cross contamination cannot of prepacked products),	I do not know/n.a.				
5 because nobody told me why contamination.	nd how I should prevent cross				

Table 12 Questions to asses reasons to not pay attentions to cross contamination



Table 13 and 14 summarize the questions and possible answers that have been used to access the willingness of food handlers to pay more attention to cleaning their workplace. At the end of each section, the participants were asked possible reasons to not pay attention to cleaning.

6. Cleaning		
Would you clean up your workpla	ce if (to be read at the beginning of each question) Question	Answer
Intervention	-	Allswer
Education	<ul> <li>65 there would be a booklet or flyer available at your workplace with information about cleaning methods?</li> <li>66 a professional would give a presentation on cleaning methods?</li> </ul>	
Persuasion	<ul> <li>67 there would be a poster available which shows different cleaning methods?</li> <li>68you would watch a video about cleaning methods?</li> </ul>	
Incentivisation	69you would receive an award or a certificate for cleaning compliance? 70you would receive a monthly bonus on your salary?	
	71 you could earn credits every time you would keep it clean, and these credits would lead to an for cleaning compliance?	Scale from 1 to 6, where 1= strongly
Coercion	<ul> <li>72 not keeping it clean would lead to a warning?</li> <li>73 you would have to perform additional tasks (extra cleaning etc.) if you would not clean up?</li> </ul>	agree, 2= disagree, 3= neither agree or disagree, 4= agree,
Training	74 a professional would give a training about cleaning methods?	5= strongly agree, 6= I do not know/n.a.
Restriction	75there would be an inspector present who could notice that you did not kept it clean?	
	<ul> <li>76 you would hear that a colleague got sick after not cleaning up?</li> <li>77 you would got sick after not cleaning</li> </ul>	-
Environmental restructuring	up?           78a costumer would got sick after eating a meal during your shift?	
Modelling	79 you would see that all of your clean up?	
Enablement	<ul> <li>80there would be different materials available to clean up?</li> <li>81there would be a cleaning check list available?</li> </ul>	

Table 13 Interventions to increase cleaning



To what extend do the following arguments constitute a reason to not clean your wo	orkplace?
I do not clean my workplace because (to be read at the beginning of each que	stion)
Question	Answer
1 I think it is not necessary.	
2 it takes too much time.	Scale from 1 to 6, where 1= strongly
3 there are no materials available to clean.	agree, 2= disagree, 3= neither agree or disagree, 4= agree,
4 cross contamination cannot occur with our products (we only sell prepacked products),	5= strongly agree, 6= I do not know/n.a.
5 because nobody told me why and how I should clean my workplace	ce.
6 because someone else cleans up my workplace	
7otherwise, namely	

Table 14 Questions to asses reasons not to clean



At last, Table 15 and 16 summarize the questions and possible answers that have been used to access the willingness of food handlers to pay more attention to shelf life of food products. At the end of each section, the participants were asked possible reasons to not pay attention to shelf life of food products.

7. Shelf life

Intervention	Question	Answer	
Education	<ul> <li>82 there would be a booklet or flyer available at your workplace with information on shelf life of food products?</li> <li>83 a professional would give a presentation on shelf life of food products?</li> </ul>		
Persuasion	<ul> <li>84 there would be a poster available which shows the shelf life of food products?</li> <li>85 you would watch a video about shelf life of food products?</li> </ul>		
Incentivisation	Not applicable		
Coercion	86 using food products which have expired would lead to a warning?         87 you would have to perform additional tasks (extra cleaning etc.) if you would use food products which have expired?	Scale from 1 to 6, where 1= strongly agree, 2= disagree,	
Training	88 a professional would give a training about the shelf life of food products?	3= neither agree or disagree, 4= agree,	
Restriction	89there would be an inspector present who could notice that you used food products which have expired?	5= strongly agree, 6= I do not know/n.a.	
	<ul> <li>90 you would hear that a colleague got sick after eating food which has expired?</li> <li>91 you would get sick after eating food which has expired?</li> </ul>		
Environmental restructuring	92a costumer would got sick after eating a meal during your shift?		
Modelling	93 you would see that all of your colleagues do not use food products which have expired?		
Enablement	Not applicable	1	

Table 15 Interventions to decrease the usage of food products that have expired



To what extend do the following arguments constitute a reason to not pay attention to sh I do not pay attention to shelf life of food products because (to be read at the beginning	-
Question	Answer
1 I think it is not necessary.	
<ol> <li>2 it takes too much time.</li> <li>3otherwise I would waste food.</li> </ol>	Scale from 1 to 6, where 1= strongly agree, 2= disagree, 3= neither agree or disagree, 4= agree,
4 because nobody told me why and how I should pay attention to shelf life.	5= strongly agree, 6= I do not know/n.a.

Table 16 Questions to asses reasons not to pay attention to shelf life of food products

#### Statistical Analysis

A descriptive statistics analysis was performed on the data collected through the questionnaires, using SPSS software 19.0. All data collected was entered manually into a dataset.



# **Results**

#### Baseline characteristics

In total, 40 questionnaires were distributed to company canteens throughout the Netherlands. These canteens were located in six provinces. The majority of the food handlers were approached in Noord-Holland, therefore data showed that 53.8% of the food handles worked at canteens located in Noord-Holland (see Table 17). Eventually, 65% of the questionnaires were returned, resulting in 26 participants.

In which province is your canteen located?				
	Frequency	Percentage (%)		
Noord-Holland	14	53.8		
Groningen	3	11.5		
Utrecht	1	3.8		
Gelderland	1	15.4		
Noord-Brabant	1	3.8		
Friesland	3	11.5		
Totaal	26	100		

Table 17 Province of canteen

The first part of the questionnaire included questions which assessed characteristics of the canteens. Most of the small scale canteens that were included in this study belonged to educational institutions since they were the most accessible for research. Therefore, data showed that 17 of the company canteens were located in an educational institution; seven were located in a business, one in a public authority and one otherwise. Baseline characteristics for the participants, amongst others, level of education and years of experience in the food industry, are summarized in Table 18 and Table 19.

What is your highest education level?				
	Frequency	Percentage (%)		
Elementary school	0	0		
High school	5	19.2		
Lower vocational education (LBO)	1	3.8		
Secondary vocational education	12	46.2		
(MBO)				
Higher professional education	7	26.9		
(HBO)				
University (WO)	1	3.8		
Total	26	100		

**Table 18 Education level** 



How long have you been active in the food industry?							
	FrequencyPercentage (%)						
Less than 5 years	2	7.7					
5 to 10 years	6	23.1					
10 to 20 years	6	23.1					
More than 20 years	12	46.2					
Total	26	100					

Table 19 Years of experience in food industry

Food safety knowledge was assessed through five questions. This part included question on food safety in general, bacteria, spoilage organisms, pathogens and cross contamination, as shown in Table 4.

	Yes (%)	No (%)
Do you know what food safety is?	96.2	3.8
Do you know what bacteria are?	96.2	3.8
Do you know what spoilage organisms are?	96.2	3.8
Do you know what pathogens are?	53.8	46.2
Do you know what cross contamination is?	92.3	7.7

Table 20 Food safety awareness

The second part of the questionnaire consisted of questions which attempted to assess food safety awareness. 68% of the participants answered 'yes' and 32% 'no' to the question 'Did you ever receive information on food safety strategies?'. The next question was 'Are there certain guidelines you have to apply to ensure food safety', to which 96% answered 'yes' and 4% 'no'. The last question, 'Are there certain actions you have to perform to ensure safe food?', was answered with 96% 'yes' and 4% 'no'.



#### Intention to change food safety behaviour based on interventions

The third part of the questionnaire focused on interventions to change food safety behaviour of canteen employees as discussed in the material & methods section. The results of this part of the questionnaire are presented in Tables 5, 7, 9, 11, 13, 15 and 17 for each topic, being: personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life. In order to get an overall overview of the answers, the answers have been merged from 'certainly not' and 'no' into '<u>no</u>' and from 'yes' and 'certainly yes' into '<u>yes</u>'. The questions are abbreviated in the tables by only naming the intervention discussed in these questions. The complete questions can be found in the material & methods section and in the appendices I and II. At the end of each intervention part, the participants were asked which reasons contributed to not perform the target behaviour, as shown in Tables 6, 8, 10, 12, 14, 16 and 18. Each of these tables for the different topics are discussed below. After careful examination of the data, no relationship could be identified between the baseline characteristics of the participants and the results of the questionnaire since all participants answered in the same way.

#### Personal hygiene

The questionnaire started with the topic 'Personal Hygiene'. The intervention category 'enablement' was excluded for this part since it was assumed that towels, soap and other related equipment, which enables personal hygiene, were readily available in the canteens. The overall results of the 'Personal Hygiene' section are summarized in Table 21. The table shows the answers to the question 'Would you wash your hands before preparing food if ...?', which is complemented by an intervention. For all of the interventions, the majority of the participants marked these questions as '<u>Not Applicable (N.A.)</u>' (range: 57.7%-69.2%). For participants who did not chose this answer, highest 'yes' rates were found for the interventions: booklet or flyer, presentation by professional, poster, video, award for personal hygiene, monthly bonus on salary, earn credits, warning, training by professional, sickness of colleague, sickness of employee, sickness of costumer and colleagues wash hands. The percentage of participants who answered 'yes' ranged between 11.5% and 30.8% The highest 'no' rate (23.1%) was found for the intervention 'Would you wash your hands before preparing food if you would have to perform additional tasks if you not wash your hands?'.

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	3.8	0	30.8	61.5	3.8
	Presentation by professional	3.8	0	30.8	57.7	7.7
Persuasion	Poster	7.7	0	30.8	57.7	3.8
	Video	3.8	7.7	26.9	61.5	0
Incentivisation	Award personal hygiene	7.7	3.8	26.9	57.7	3.8
	Monthly bonus on salary	11.5	3.8	15.4	65.4	3.8
	Earn credits	11.5	7.7	15.4	61.5	3.8
Coercion	Warning	7.7	7.7	19.2	61.5	3.8
	Performance of additional tasks	23.1	0	11.5	65.4	0
Training	Training by professional	7.7	3.8	23.1	65.4	0
Restriction	Inspector	15.4	0	15.4	69.2	0
Environmental restructuring	Sickness of colleague	3.8	11.5	19.2	65.4	0
	Sickness of employee	0	11.5	26.9	61.5	0
	Sickness of costumer	7.7	7.7	23.1	61.5	0
Modelling	Colleagues wash hands	7.7	3.8	26.9	61.5	0

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Table 21 Interventions personal hygiene

Table 22 shows the answers to the question 'To what extend do the following arguments constitute a reason to not wash your hands before preparing food?'. For each of the five reasons, the answer 'strongly disagree' had the highest rate (range: 42.3% - 57.7%). Moreover, most of the remaining participants chose 'not applicable' (range: 30.8% - 38.5%) or 'I do not know' (range: 30.8% - 34.6%).

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	57.7	3.8	0	3.8	34.6	0
It takes too much time	57.7	7.7	0	3.8	30.8	0
There is no soap available	42.3	11.5	3.8	3.8	38.5	0
I wash my hands at home	61.5	3.8	0	3.8	0	30.8
Because nobody told me why I should wash my hands	57.7	3.8	0	3.8	0	34.6

Table 22 Reasons not to wash hands before preparing food



#### Heating of food products

The second topic focused on 'Heating of food products'. The intervention category 'incentivisation' was not applicable for this part because price draws are not suitable for the heating of food products. Table 23 summarizes the results for this part. The table shows the answers to the question: 'Would you heat food products at a certain temperature if ...?', completed by an intervention. The highest 'yes' rates were found for: booklet or flyer, presentation by professional, poster, video, warning, performance of additional tasks, training by professional, inspector, sickness of colleague, sickness of employee, sickness of costumer, colleagues heat food products at certain temperature and equipment available for heating products at certain temperature. The participants who answered these questions with 'yes' ranged between 53.8% and 72%. Most of the other participants answered 'N.A' (range: 24% - 36%). A higher percentage (19.2%) for 'no' was found for the intervention 'performance of additional tasks'.

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	0	3.8	65.4	30.8	0
	Presentation by professional	3.8	0	69.2	26.9	0
Persuasion	Poster	0	3.8	69.2	26.9	00
	Video	0	0	65.4	34.6	0
Coercion	Warning	0	0	72	28	0
	Performance of additional tasks	19.2	0	53.8	26.9	0
Training	Training by professional	8	0	64	28	0
Restriction	Inspector	8	0	56	36	0
Environmental	Sickness of	0	4	72	24	0
restructuring	colleague					
	Sickness of employee	0	4	72	24	0
	Sickness of costumer	0	4	72	24	0
Modelling	Colleagues heat food products at certain temperature	0	0	68	32	0
Enablement	Equipment available for heating products at certain temperature	0	0	72	28	0

Table 23 Heating of food products



Table 24 shows reasons to not heat food products at a certain temperature. Participants were asked to answer the question 'To what extend do the following arguments constitute a reason to not heat food products at a certain temperature?'. More than half of the participants answered 'strongly disagree' (range: 73.1% - 80.8%) to the reasons not to heat food products at a certain temperature. Subsequently, 15.4% of the participants marked the reasons as 'N.A.'.

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	76.9	3.8	0	3.8	15.4	0
It takes too much time	80.8	3.8	0	0	15.4	0
There is no equipment that allows me to measure the heating temperature	65.4	7.7	7.7	3.8	15.4	0
We do not sell food products that have to be heated	69.2	7.7	7.7	0	15.4	0
Because nobody told me why and how I should heat food products at a certain temperature	73.1	7.7	0	3.8	15.4	0

Table 24 Reasons not to heat food products at a certain temperature



#### Cooling of food products

The next topic which was discussed was 'cooling of food products'. For this part, the intervention category 'incentivisation' was also excluded because price draws are not suitable for the cooling of food products. Table 25 shows the results of the answers to the question 'Would you cool food products at a certain temperature if...?', completed by an intervention. For all interventions, high 'yes' rates were found , ranging between 57.7% and 76.9%. These interventions included: booklet or flyer, presentation by professional, poster, video, warning, performance of additional tasks, training by professional, inspector, sickness of colleague, sickness of employee, sickness of costumer, colleagues cool food products at certain temperature and refrigerators available for cooling products at certain temperature and refrigerators available for cooling products at certain temperature in the questions as 'N.A.' (range: 15.4% - 28%). The highest 'no' rate was found for the intervention 'performance of additional tasks' (23.1%).

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	3.8	3.8	73.1	19.2	0
	Presentation by professional	3.8	0	80.8	15.4	0
Persuasion	Poster	3.8	3.8	76.9	15.4	0
	Video	11.5	3.8	65.4	19.2	0
Coercion	Warning	4	0	76	20	0
	Performance of additional tasks	23.1	0	57.7	19.2	0
Training	Training by professional	7.7	0	73.1	19.2	0
Restriction	Inspector	4	0	68	28	0
Environmental restructuring	Sickness of colleague	7.7	0	76.9	15.4	0
U	Sickness of employee	8	0	76	16	0
	Sickness of costumer	8	0	76	16	0
Modelling	Colleagues cool food products at certain temperature	8.3	0	66.7	25	0
Enablement	Refrigerators available for cooling products at certain temperature	8.3	0	79.2	12.5	0

Table 25 Cooling food products



Table 26 summarizes the answers to the question 'To what extend do the following arguments constitute a reason not to cool food products at a certain temperature?' The majority of the participants marked the reasons as 'strongly disagree', ranging between 58.3% and 79.2%. Most of the other reasons were marked as 'N.A.' (range: 12.5% - 20.8%). A small portion of the participants marked the reason 'There is no equipment available that allows me to cool food products at a certain temperature' as 'agree' (8.3%).

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	75	8.3	0	4.2	12.5	0
It takes too much time	79.2	8.3	0	0	12.5	0
There is no equipment that allows me to cool food products at a certain temperature	58.3	8.3	8.3	4.2	20.8	0
We do not sell food products that have to be cooled	75	8.3	4.2	0	12.5	0
Because nobody told me why and how I should cool food products at a certain temperature	70.8	8.3	0	4.2	16.7	0

Table 26 Reasons not to cool food products at a certain temperature



#### Storage of food products

The following topic that was included in the questionnaire was 'Storage of food products'. This sections started with the question 'Would you store food in a hygienic way if...', completed by an intervention. The intervention category 'incentivisation' was excluded from this part because price draws are not suitable for the storage of food products. The answers to these questions are shown in Table 27. For this topic, most of the participants answered 'yes' to all interventions (range: 60% - 80%). These included: booklet or flyer, presentation by professional, poster, video, warning, performance of additional tasks, training by professional, inspector, sickness of colleague, sickness of employee, sickness of costumer, colleagues store food in a hygienic way and different materials available to store food products in hygienic way. Highest 'no' rates were found for 'performance of additional tasks' (16%) and 'different materials available to store food products in hygienic way' (12%). The rest of the participants mainly marked the questions as 'N.A.' (range: 16% - 24%).

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	8	4	72	16	0
	Presentation by professional	4	0	80	16	0
Persuasion	Poster	4	4	76	16	0
	Video	8	4	68	20	0
Coercion	Warning	8	0	76	16	0
	Performance of additional tasks	16	4	56	24	0
Training	Training by professional	8	4	68	20	0
Restriction	Inspector	8	4	64	24	0
Environmental restructuring	Sickness of colleague	8	0	72	20	0
0	Sickness of employee	8	4	72	16	0
	Sickness of costumer	8.3	0	75	16.7	0
Modelling	Colleagues store food in a hygienic way	8	4	64	24	0
Enablement	Different materials available to store food products in hygienic way	12	4	60	24	0

Table 27 Storage of food products



The next question which the participants had to answer was 'To what extend do the following arguments constitute a reason to not store food products in a hygienic way?'. The answers to this question are shown in Table 28. Most of the participants marked the reasons to this question as 'strongly disagree' (range: 64% - 80%). The rest of the participants marked the reasons as 'N.A.' (range: 12% - 24%). Twelve percent of the participants marked the reason 'There are no materials available that allow me to store food products in a hygienic way' as 'agree'.

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	76	8	0	0	12	4
It takes too much time	80	8	0	0	12	0
There are no materials available that allow me to store food products in a hygienic way	68	8	12	0	12	0
We do not sell food products that have to be stored	72	12	4	0	12	0
Because nobody told me why and how I should store food products in a hygienic way	64	4	4	4	24	0

Table 28 Reasons not to store food products in a hygienic way



#### Cross contamination

For the next topic, participants had to answer the question 'Would you try to prevent cross contamination if...?', completed by an intervention. The intervention category 'incentivisation' was not included in this part because price draws are not suitable for the prevention of cross contamination. Moreover, the intervention category 'coercion' was also excluded since the prevention of cross contamination cannot always be checked. Table 29 summarizes the answers to this question. Participants who marked all interventions as 'yes' ranged between 64% and 76%. These included the following interventions: booklet or flyer, presentation by professional, poster, video, training by professional, inspector, sickness of colleague, sickness of employee, sickness of costumer, colleagues store food in a hygienic way and different materials available to prevent cross contamination. Most of the other participants marked the questions as 'N.A.' (range: 13% - 24%). The highest 'no' rates were found for 'booklet or flyer', 'colleagues try to prevent cross contamination' (12%) and 'different materials available to prevent cross contamination' (13%).

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	12	4	64	20	0
	Presentation by professional	4	0	76	20	0
Persuasion	Poster	8	4	68	20	0
	Video	8	4	64	24	0
Training	Training by professional	4	0	72	24	0
Restriction	Inspector	8	0	72	20	0
Environmental restructuring	Sickness of colleague	8	4	68	20	0
-	Sickness of employee	8	4	68	20	0
	Sickness of costumer	8	0	76	16	0
Modelling	Colleagues try to prevent cross contamination	12	0	76	12	0
Enablement	Different materials available to prevent cross contamination	13	0	73.9	13	0

**Table 29 Cross contamination** 



Table 30 shows the answers to the question 'To what extend do the following arguments constitute a reason to not pay attention to cross contamination?'. Most of the participants marked the five reasons as 'strongly disagree; (range: 64% - 76%). The other part marked the reasons as 'N.A.' (range: 16% - 24%). A smaller portion of the participants marked the reason 'There are no materials available to prevent cross contamination' as 'agree' (8%).

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	76	8	0	0	16	0
It takes too much time	72	12	0	0	16	0
There are no materials available to prevent cross contamination	68	8	8	0	16	0
Cross contamination cannot occur with our products (we only sell prepacked products)	68	8	4	0	20	0
Because nobody told me why and how I should prevent cross contamination	64	8	0	4	24	0

Table 30 Reasons not to prevent cross contamination



#### Cleaning up

Another topic that has been assessed in the questionnaire was 'Cleaning up the workplace'. The question that needed to be answered was 'Would you clean up your workplace if ...?', completed by an intervention. Table 31 summarizes the answers that have been given to these questions. The majority of the participants answered 'yes' (range: 52% - 80%) to the following interventions: booklet or flyer, presentation by professional, poster, video, award for cleaning up, monthly bonus on salary, earn credits, warning, performance of additional tasks, training by professional, inspector, sickness of colleague, sickness of employee, sickness of costumer, all colleagues clean up and different materials available to clean up. Another part marked the interventions as 'N.A.' (range: 16% - 28%). High 'no' rates could be indicated for 'performance of additional tasks (20%), 'award for cleaning up' (20%) and 'different materials to clean up' (12%).

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	4	12	64	20	0
	Presentation by professional	4	8	68	20	0
Persuasion	Poster	4	8	68	20	0
	Video	4	4	68	24	0
Incentivisation	Award cleaning up	20	0	60	20	0
	Monthly bonus on salary	12	4	56	24	4
	Earn credits	12	8	56	24	0
Coercion	Warning	12	0	64	24	0
	Performance of additional tasks	20	4	52	24	0
Training	Training by professional	8	0	72	20	0
Restriction	Inspector	8	8	68	16	0
Environmental restructuring	Sickness of colleague	4	8	72	16	0
0	Sickness of employee	4	0	80	16	0
	Sickness of costumer	4	0	76	20	0
Modelling	Colleagues clean up	8	0	64	28	0
Enablement	Different materials available to clean up	12	0	64	20	4

Table 31 Cleaning up the workplace



Table 32 shows the answers to the question 'To what extend do the following arguments constitute a reason to not clean up your workplace?'. Most of the participants marked the five reasons not to clean up as 'strongly disagree', ranging between 68% and 84%. Subsequently, most of the remaining participants marked all five reasons as 'N.A.' (range: 12% - 16%).

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	84	4	0	0	12	0
It takes too much time	80	8	0	0	12	0
There are no materials available that allow me to store food products in a hygienic way	76	4	8	0	12	0
Somebody else cleans up my workplace	68	8	8	0	16	0
Because nobody told me why and how I should clean my workplace	76	8	0	4	12	4

Table 32 Reasons not to clean up



#### Shelf life

The last topic of the questionnaire was 'Shelf life of food products'. Participants had to answer the following question: 'Would you pay attention to shelf life of food products if...?', completed by an intervention. For this part, the intervention category 'incentivisation' was not included because price draws are not suitable for paying attention to shelf life of food products. Table 33 shows the answers to these questions. The majority of the participants answered 'yes' to all interventions (range: 56% - 76%). These interventions included: booklet or flyer, presentation by professional, poster, video, warning, performance of additional tasks, training by professional, inspector, sickness of colleague, sickness of employee, sickness of costumer and colleagues do not use food products which have expired. Most of the remaining participants marked the questions as 'N.A.' (range: 20% - 28%). A high 'no' rate was indicated for 'performance of additional tasks (20%).

	Intervention	No (%)	Maybe (%)	Yes (%)	N.A. (%)	I do not know (%)
Education	Booklet or flyer	4	4	72	20	0
	Presentation by professional	4	0	76	20	0
Persuasion	Poster	4	4	72	20	0
	Video	8	4	64	24	0
Coercion	Warning	12	0	68	20	0
	Performance of additional tasks	20	4	56	20	0
Training	Training by professional	4	0	68	28	0
Restriction	Inspector	8	0	68	24	0
Environmental restructuring	Sickness of colleague	8	0	72	20	0
-	Sickness of employee	8	0	72	20	0
	Sickness of costumer	8	0	72	20	0
Modelling	Colleagues do not use food products which have expired	12	0	60	28	0

Table 33 Shelf life of food products



Table 34 summarizes the answers to the question 'To what extend do the following arguments constitute a reason to not pay attention to shelf life of food products?'. The majority of the participants marked all four reasons as 'strongly disagree' (range: 68% - 72%). Most of the remaining participants marked the reasons as 'N.A.' (range: 16% - 24%).

	Strongly disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	N.A. (%)	I do not know (%)
I think it is not necessary	72	12	0	0	16	0
It takes too much time	72	12	0	0	16	0
Otherwise I would waste food	68	8	4	4	16	0
Because nobody told me why and how I should pay attention to shelf life.	68	8	8	0	24	0

Table 34 Reasons not to pay attention to shelf life of food products



#### **Discussion**

The aim of this study was to assess which interventions based on the BCW would contribute to an improvement in food safety behaviour of food handlers in small scale canteens. The completed questionnaires revealed that the majority of the food handlers are willing to change their behaviour based on the interventions of the BWC. These findings show that small scale canteens could use these interventions to increase awareness of food safety among food handlers and hereby ensure safe food for their consumers at all times.

Next to food safety interventions, the questionnaire focused on food safety consciousness among food handlers. This part showed that most of the food handlers were already aware of food safety practices and indicated that they already perform food safety related behaviour.

The first food safety theme that was addressed in the questionnaire was 'Personal Hygiene' which focused on the stimulation of washing hands before the preparation of food. Remarkably, more than half of the food handlers marked the eight intervention categories as 'not applicable'. One could assume that food handlers interpreted this topic as something they already have been aware of. The remaining part of the food handlers were willing to wash their hands if education, persuasion and/or modelling interventions would be implemented. Coercion interventions, which included aspects as warnings and performance of additional tasks if food handlers' would not have washed their hands, appeared to be a negative stimulus to affect food handler's behaviour. Moreover, most of the participants did not agree with the reasons that were given not to wash their hands before preparing food. This can most likely be explained by food handler's interpretation that they already wash their hands, which they deemed very logic to do, and that they do not see any reason why they should not wash their hands.

The next part of the questionnaire focused on interventions that stimulate the appropriate heating of food products and indicated that food handlers were open to all eight intervention categories. Interventions that were marked as most efficient in stimulating appropriate heating were coercion, environmental restructuring and enablement. However, a substantial part of the food handlers considered coercion that included the performance of additional tasks if food products were not heated at the correct temperature as a negative effect on their intention to change their behaviour. More than half of the food handlers disagreed with the reasons that were given to not heat food products at a certain temperature. This might imply that food handlers already heat food products at a certain temperature and do not see any reason that would constitute to not performing the action.

Subsequently, interventions that focused on appropriate cooling of food products were included in the next part of the questionnaire. The results of this part showed that the majority of the food handlers would cool food products at a certain temperature if all the eight interventions categories would be implemented. From these, education, persuasion, coercion, training, environmental restructuring and enablement interventions showed to have the greatest effect on food handler's

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intention to cool food products at a certain temperature. Coercion that included the performance of additional tasks if the action would not have been performed was considered as a negative influence on the change of behaviour. Food handlers indicated that they do not experience any reason to not cool products at a certain temperature.

The hygienic storage of food products was addressed in the topic 'Storage of food products'. Food handlers marked all eight intervention categories as positive stimuli that would affect their intention to store food products in a hygienic way. The most efficient interventions included education, persuasion, coercion and environmental restructuring. Coercion in the form of performance of additional tasks, when food has not been stored in a hygienic way, had the most negative effect on stimulating behaviour. Remarkably, also in this part, food handlers disagreed with any reasons that were given to not store food products in a hygienic way, indicating that they probably store food products in a hygienic way.

The next part of the questionnaire comprised the prevention of cross contamination. Food handlers were open to all seven intervention categories of which education, training, restriction, modelling and enablement interventions showed to have the most positive affect on preventing cross contamination. Moreover, they disagreed with all reasons that were given to not prevent cross contamination. One could assume that the food handlers already perform actions that prevent cross contamination and therefore have no reasons to not prevent cross contamination.

The majority food handlers would change their behaviour with regard to cleaning up their workplace if all nine intervention categories would be implemented. Interventions that would have the greatest effect on cleaning up the workplace were education, persuasion, training and environmental restructuring. Food handlers evaluated incentivisation interventions, which included an award for cleaning up compliance, as a negative stimulus in changing their behaviour. One could assume that food handlers consider an award as too exaggerated for something that needs to be done anyway. Coercion that included performance of additional tasks, if the food handler would not clean up their workplace, was also considered to be least effective in changing behaviour. More than half of the food handlers disagreed with the reasons that were given to not clean up the workplace.

The last part of the questionnaire included interventions that try to raise awareness for shelf life of food products. This part showed that most of the food handlers were open to all of the seven intervention categories. They indicated that the most positive effect on their intention to change their behaviour were education, persuasion and environmental restructuring interventions. Also for this part, a substantial amount of the food handlers marked coercion that included performance of additional tasks if they did not pay attention to shelf life of food products as a negative stimulus to change their behaviour. In addition, most of the food handlers did not see any reason to not pay attention to shelf life of food products, indicating that they probably already pay attention to shelf life.

WAGENINGENUR

Unfortunately, it was not possible to demonstrate differences or relations in the way participants answered the questions based on their gender, age, years of experience, educational level and food safety awareness since there was too much similarity in the answers of the participants.

Our results seem to be in contrast to a previous study of Sani and Siow (2014) who assessed the knowledge, attitudes and practices of food handlers on food safety in a food service operation at a University in Malaysia. They indicated that more than half of the food handlers never attended to any food safety training. In addition, the food handlers showed poor knowledge of pathogens associated with food borne diseases and critical temperatures for storage of ready to eat foods<sup>25</sup>. As compared to our study, this lack of training may be explained by policy differences in Malaysia and the Netherlands. In addition, most of the company canteens included in our study were taken by catering services, where employees undergo food safety trainings regularly.

The study of Angelillo et al (2000) evaluated the knowledge, attitudes, and behaviour concerning foodborne diseases and food safety issues among food handlers in Italy. The results of this study demonstrated that the food handlers had limited knowledge of foodborne pathogens and that although they showed positive attitudes towards food safety, they performed unacceptable behaviour. A substantial part of these food handlers did not use gloves or washed their hand before preparing food<sup>26</sup>. Moreover, Angelillo et al (2000) showed that there was a significant association between attending education courses and the usage of gloves and a better attitude towards food safety. Although, in our study, most of the participants were aware of food safety, Angelillo et al (2000) indicate that there can be a discrepancy between positive attitudes towards food safety and actual food safety behaviour. It is therefore of great importance to stimulate and to remind food handlers of the need for food safety by, for example, interventions as done in our study.

Powell et al. (2011) indicated that the impacts of food handler training programs are often inconsistent and that these programs are rarely evaluated. A large portion of food safety interventions deal with food safety knowledge, which is a poor indicator of change in practices. Powell et al. (2011) stated that in order to address food safety and change related behaviour, interventions need to focus on the actual practices of food handlers and test these interventions by observing food handlers<sup>27</sup>. This could be applied in a follow up of our study by implementing the interventions that were marked as most efficient by participants and observe if the targeted food safety behaviour actually changes.

With respect to raising awareness of the importance of food safety practices, Egan et al (2007) indicated that special mechanisms are needed to motivate action and generate positive attitudes towards food safety<sup>28</sup>. This is in line with the study of Rennie (1994) on the evaluation of food hygiene education. He concluded that an ongoing reinforcement of food safety messages in the work premises is crucial in order to maintain correct food handling practices. Enhancement of desired food handling is also influenced by a physical and social environment which enables the application of the correct food handling practices<sup>29</sup>. Rennie (1994) suggested that training activities that are closely associated

with such an environment are most likely to be more efficient than settings that are outside the workplace and only use knowledge based training techniques.

To our knowledge, this is the first study that applied the theory of the BCW to food safety interventions in the area of food safety in small scale company canteens. To date, data on effective food safety interventions in small scale canteens is limited. Literature can be found on food handler's knowledge and attitudes towards food safety in large food services, where the actual changing of behaviour is omitted. This study gained insight in which interventions, based on the BCW, would be most effective in changing food handler's behaviour. Small scale canteens can choose from a wide range of techniques which can stimulate food safety practices of their food handlers. Furthermore, almost all common food safety practices are covered in the questionnaire, enabling small scale canteens to target specific food safety behaviour.

The results of this study indicated that the majority of the food handlers in the Netherlands are already aware of food safety. The majority of the participants stated that they did not have any reasons to not perform the desired food safety practice. This demonstrates that the small scale canteens, that were included in this study, stimulate food safety among their employees up to a certain extent.

It must be noted that the majority of the food handlers answered the questionnaire in the same way. More than half were open to all interventions included in this study and marked them as positive stimuli in changing behaviour. This made it difficult to draw clear conclusion on which interventions would be less effective. The similarity of the answers can most likely be explained by interpretation errors of food handlers. One can assume that the food handlers interpreted the questions as practices that they already perform and therefore answered 'yes' and 'certainly yes' to all interventions.

Another limitation of this study is that the limited amount of participants and their representativeness for all food handlers in the Netherlands. During the distribution of the questionnaire, there was a lot of resistance among canteen employees, stating that they already have been aware of food safety practices and they do not see the need to fill in a questionnaire on food safety interventions. Most of the food handlers interpreted the questionnaire as a checking or monitoring tool rather than an assessment on which interventions would increase their willingness to change behaviour. In addition, the participants were not representative for the whole population. Food handlers of only six of the twelve Dutch provinces were included in this study. It must be also noted that more than half of the canteens were located in an educational institution, where food safety regulations and often have food safety and quality systems in place, which might have contributed to the fact that the majority of the food handlers were already aware of food safety and performed related practices. Also, the persons that were willing to fill in the questionnaire might be the ones that already have a good performance and know themselves they have. Possibly the ones with a lower/bad performance were the ones that rejected to fill out the questionnaires.



Moreover, one could argue if a Likert scale based questionnaire is suitable in assessing food safety behaviour among food handlers in small scale canteens. It gives little room to justify certain choices and thoughts. The fact that almost all questions have been answered in the same way demonstrates that this questionnaire was very sensitive to interpretation errors. More than half of the food handlers in this study had a low level of education which could have contributed to interpretation difficulties. Most likely, the level of questioning should be adjusted to MBO graduate level. In addition, more justified answers might have been obtained by filling in the questionnaire during a personal interview with the canteen personnel, rather than asking them to fill out the questionnaire and sent it back by e-mail.

Further research will be necessary to assess if independent small scale canteens run by private establishments need to be more encouraged in food safety practices since small scale canteens in this study were mostly branches of larger catering services, where employees receive food safety trainings regularly. Independent small scale canteens might have fewer resources to continuously stimulate the awareness of food safety. For this purpose, future research would have to include canteens that are not handled by catering companies in order to explore if there are differences between these types of canteens. Moreover, interpretation errors of the questionnaire could be prevented if the preferences of food safety interventions would be assessed through personal interviews and observations at the workplace. In this way, one could go more into depth in the underlying reasons why food handlers have chosen for certain interventions.



#### Conclusion

This study gained insight in which interventions, based on the BCW, would contribute to a positive change in food safety behaviour among food handlers of small scale canteens. The most applicable interventions were: education (booklet or flyer), persuasion (poster or video), coercion (warning and performance of additional tasks), training (training by professional), environmental restructuring (sickness of colleague, employee, costumer), modelling (colleagues perform target food safety behaviour) and enablement (enable target food safety behaviour by equipment). Small scale canteens could use these interventions in order to stimulate food safety behaviour among their employees.

It must be noted that most participants answered the questionnaire in the same way and indicated that they were open to all interventions. This made it difficult to draw clear conclusions on which interventions would be less effective. In addition, the results showed that the majority of the food handlers in the Netherlands are already aware of food safety. Most of the participants stated that they did not have any reasons not to perform desired food safety practices. One could conclude that the small scale canteens, included in this study, already stimulate food safety among their employees.

Further research will be necessary in order to assess if independent small scale canteens run by private establishments need to be more encouraged in food safety practices since small scale canteens in this study were mostly branches of larger catering services, where employees receive food safety trainings regularly. Independent small scale canteens might have fewer resources to continuously stimulate the awareness of food safety. Therefore, staff working in these canteens could be less informed on food safety practices, which might pose a risk to consumer's health. In addition, a personal interview with food handlers of small scale canteens could give more insight in their underlying reasoning and might contribute to more justified answers.



### **Appendix I.** Questionnaire Dutch version

### Vragenlijst voedselveiligheid gedrag in kleine bedrijfskantines

Wageningen UR, december 2015

#### TOELICHTING BIJ DEZE VRAGENLIJST

- Het invullen van deze vragenlijst duurt ongeveer 15 minuten. De vragenlijst begint met enkele algemene vragen. Hierna worden er vragen gesteld over stimuli voor het veranderen van gedrag met betrekking tot persoonlijke hygiëne, verhitting, koeling, opslaan, kruisbesmetting, schoonmaken en houdbaarheid van voedingsmiddelen. Aan het einde van deze vragenlijst is er ruimte voor opmerkingen over de vragenlijst en/of het onderzoek.
- Dit onderzoek is niet bedoeld voor controledoeleinden, het gaat puur om het inventariseren hoe voedselveiligheid in kleine kantines wordt aangepakt. Uw antwoorden zullen daarom vertrouwelijk behandeld worden en kunt u de vragenlijst anoniem invullen. De antwoorden zullen niet te herleiden zijn naar uw bedrijf.
- De meeste vragen kunt u beantwoorden door een kruisje te zetten in het hokje bij het antwoord dat voor u (het meeste) van toepassing is . In de lege (grijze) vlakken kunt u een tekst toevoegen.
- Wij verzoeken u de vragenlijst zo spoedig mogelijk terug te sturen.

Heeft u vragen of opmerkingen over dit onderzoek of deze vragenlijst? Dan kunt u contact opnemen met Kim Stenvers, Wageningen Universiteit per e-mail: <u>kim.stenvers@wur.nl</u>



# 1. Algemene informatie

1. Hoe oud bent u?	
2. Wat is uw geslacht?	Man (als u het vakje aanklikt, kunt u een selectie maken)
3. Wat is uw hoogst genoten opleiding?	Graag aankruisen wat van toepassing is Basisschool Middelbare school Lager beroepsonderwijs (LBO) Middelbaar beroepsonderwijs (MBO) Hoger beroepsonderwijs (HBO) Wetenschappelijk onderwijs (WO)
4. Hoe lang werkt u in de voedingsmiddelensector?	Graag aankruisen wat van toepassing is Minder dan 5 jaar 5 tot 10 jaar 10 tot 20 jaar Meer dan 20 jaar
5. In welke provincie ligt de kantine?	Graag aankruisen wat van toepassing is Noord-Holland Zuid- Holland Zeeland Limburg Groningen Utrecht Gelderland Noord-Brabant Friesland Drenthe Overijssel Flevoland



6.	Waar bevindt de kantine zich?	Graag aankruisen wat van toepassing is
		<ul> <li>Overheidsinstelling</li> <li>Onderwijsinstelling</li> <li>Bedrijf</li> <li>Anders, namelijk:</li> </ul>
7.	Hoeveel kantinemedewerkers heeft uw kantine in totaal?	
8.	Hoeveel kantinemedewerkers werken er in de kantine op het drukste moment van de dag (bijv. lunch)?	
9.	Wat voor type producten worden er in uw kantine aangeboden?	Graag aankruisen wat van toepassing is Alleen voorverpakte producten Maaltijden die wij in de kantine zelf bereiden Voorverpakte producten en maaltijden wie wij zelf bereiden? Anders, namelijk:
10.	Werkt u met verse producten?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
11.	Werkt u met rauwe producten?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
12.	Draagt u een haarnet?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
13.	Draagt u handschoenen tijdens voedingsmiddelen bereiding?	Ja (als u het vakje aanklikt, kunt u een selectie maken)

14. Wee u wat voedingsmiddelenveiligheid is?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
15. Weet u wat bacteriën zijn?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
16. Weet u wat voedingsmiddelenbedervers zijn?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
17. Weet u wat pathogenen zijn?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
18. Weet u wat voedingsmiddel gerelateerde ziekten zijn?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
19. Weet u wat kruisbesmetting inhoud?	Nee (als u het vakje aanklikt, kunt u een selectie maken)



1.	Heeft u wel eens informatie ontvangen over voedingsmiddelenveiligheid strategieën?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
2.	Zijn er bepaalde richtlijnen die u moet volgen van uw werkgever om voedingsmiddelenveiligheid te waarborgen?	Ja (als u het vakje aanklikt, kunt u een selectie maken)
3.	Zijn er bepaalde handelingen die u uitvoert om voedingsmiddelenveiligheid te waarborgen?	Ja (als u het vakje aanklikt, kunt u een selectie maken)



# 2. Persoonlijke hygiëne

Onderstaande vragen hebben uitsluitend betrekking tot persoonlijk hygiëne en voedingsmiddelen bereiding

2a. Zou u, uw handen wassen voordat u voedingsmiddelen bereidt als ...

N.v.t. (ik was altijd mijn handen)

	Zeker niet	Niet	Misschien	Wel	Zeker wel	Weet ik niet	N.v.t.
	1	2	3	4	5	6	7
er een brochure of flyer zou zijn op uw werkplek met informatie over							
persoonlijke hygiëne in relatie tot voedingsmiddelen?							
een deskundige een presentatie zou geven over persoonlijke hygiëne in relatie tot							
voedingsmiddelen?							
er een poster zou zijn waarop staat 'vergeet uw handen niet te wassen'?							
u een video gezien zou hebben over persoonlijke hygiëne in relatie tot							
voedingsmiddelen?							
u een onderscheiding of certificaat zou ontvangen voor naleving van persoonlijke							
hygiëne?							
u hiervoor een maandelijkse bonus op uw salaris zou ontvangen?							
u iedere keer als u uw handen wast credits zou kunnen verdienen, en deze credits							
tot een onderscheiding voor naleving van persoonlijke hygiëne zouden leiden?							
u een waarschuwing zou krijgen als u uw handen niet zou wassen?							
u extra taken (aanvullend schoonmaken etc.) zou moeten uitvoeren als u uw							
handen niet zou wassen?							
een deskundige een training zou geven over persoonlijke hygiëne en							
voedingsmiddelen?							



een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u uw handen niet gewassen heeft?				
u zou horen dat een collega ziek is geworden nadat hij/zij zijn/haar handen niet heeft gewassen voor het bereiden van voedingsmiddelen?				
u ziek zou worden nadat u uw handen niet heeft gewassen voor het bereiden van voedingsmiddelen?				
een klant ziek geworden zou zijn na het eten van een maaltijd tijdens uw dienst?				
u zou zien dat al uw collega's hun handen wassen voor het bereiden van voedingsmiddelen?				

2b. In hoeverre vormen onderstaande argumenten voor u een reden om uw handen NIE T te wassen?

Ik was mijn handen niet omdat	Zeer oneens	Oneens	Mee eens	Zeer mee	Ik weet het	N.v.t.
				eens	niet	
	1	2	3	4	5	6
ik het niet nodig vind.						
het te veel tijd in beslag neemt.						
er geen zeep aanwezig is.						
ik mijn handen thuis was.						
niemand mij verteld heeft hoe en waarom ik mijn handen zou						
moeten wassen.						



# 3. Verhitting van voedingsmiddelen

Onderstaande vragen hebben uitsluitend betrekking tot verhitting van voedingsmiddelenproducten.

3a. Zou u voedingsmiddelen op de juiste temperatuur verhitten als ...

	Zeker niet	Niet	Misschien	Wel	Zeker wel	Weet ik niet	N.v.t.
	1	2	3	4	5	6	7
er een brochure of flyer zou zijn op uw werkplek met informatie over de juiste verhittingstemperaturen van voedingsmiddelen?							
een deskundige een presentatie zou geven over de juiste verhittingstemperaturen van voedingsmiddelen?							
er een poster zou zijn met de juiste verhittingstemperaturen van voedingsmiddelen?							
u een video gezien zou hebben over de juiste verhittingstemperaturen van voedingsmiddelen ?							
u een waarschuwing zou krijgen als u voedingsmiddelen niet op de juiste temperatuur verhit heeft?							
u extra taken (aanvullend schoonmaken etc.) zou moeten uitvoeren als u voedingsmiddelen niet op de juiste temperatuur verhit heeft?							
een deskundige een training zou geven over de juiste verhittingstemperaturen van voedingsmiddelen?							
een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u voedingsmiddelen niet op de juiste temperatuur verhit heeft?							
u zou horen dat een collega ziek is geworden nadat hij/zij voedingsmiddelen niet op de juiste temperatuur verhit heeft?							
u ziek zou worden nadat u voedingsmiddelen niet op de juiste temperatuur verhit heeft?							
een klant ziek geworden zou zijn na het eten van een maaltijd tijdens uw dienst?							



u zou zien dat al uw collega's voedingsmiddelen op een bepaalde temperatuur verhitten?				
er apparatuur aanwezig zou zijn die het mogelijk maakt de verhittingstemperatuur te meten?				

#### 3b. In hoeverre vormen onderstaande argumenten voor u een reden om voedingsmiddelen NIET op een bepaalde temperatuur te verhitten?

Ik verhit voedingsmiddelen niet op een bepaalde temperatuur	Zeer oneens	Oneens	Mee eens	Zeer mee eens	Ik weet het niet	N.v.t.
omdat	1	2	3	4	5	6
ik het niet nodig vind.						
het te veel tijd in beslag neemt.						
er geen apparatuur aanwezig is die het mogelijk maakt de						
verhittingstemperatuur te meten.						
niemand mij verteld heeft hoe en waarom ik voedingsmiddelen						
op een bepaalde temperatuur zou moeten verhitten.						
wij geen producten verkopen die verhit moeten worden.						



# 4. Koeling van voedingsmiddelen

Onderstaande vragen hebben uitsluitend betrekking tot het koelen van voedingsmiddelen.

4a. Zou u voedingsmiddelen op de juiste temperatuur koelen als ...

	Zeker niet	Niet 2	Misschien 3	Wel	Zeker wel	Weet ik niet 6	N.v.t. 7
er een brochure of flyer zou zijn op uw werkplek met informatie over de juiste	1	2	5	4	5	0	,
koeltemperaturen van voedingsmiddelen?							
een deskundige een presentatie zou geven over de juiste koeltemperaturen van voedingsmiddelen?							
er een poster zou zijn met de juiste koeltemperaturen van voedingsmiddelen?							
u een video gezien zou hebben over de juiste koeltemperaturen van voedingsmiddelen?							
u een waarschuwing zou krijgen als u voedingsmiddelen niet op de juiste temperatuur gekoeld heeft?							
u extra taken (aanvullend schoonmaken etc.) zou moeten uitvoeren als u voedingsmiddelen niet op de juiste temperatuur gekoeld heeft?							
een deskundige een training zou geven over de juiste koeltemperaturen van voedingsmiddelen?							
een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u voedingsmiddelen niet op de juiste temperatuur gekoeld heeft?							
u zou horen dat een collega ziek is geworden nadat hij/zij voedingsmiddelen niet op de juiste temperatuur gekoeld heeft?							
u ziek zou worden nadat u voedingsmiddelen niet op de juiste temperatuur gekoeld heeft?							
een klant ziek geworden zou zijn na het eten van een maaltijd tijdens uw dienst?							

u zou zien dat al uw collega's voedingsmiddelen op een bepaalde temperatuur				
koelen?				
er koelkasten aanwezig zouden zijn die koeltemperaturen weergeven?				

4b. In hoeverre vormen onderstaande argumenten voor u een reden om voedingsmiddelen NIET op een bepaalde temperatuur te koelen?

WAGENINGEN UR For quality of life

Ik koel voedingsmiddelen niet op een bepaalde temperatuur	Zeer oneens	Oneens	Mee eens	Zeer mee	Ik weet het	N.v.t.
				eens	niet	
	1	2	3	4	5	6
ik het niet nodig vind.						
het te veel tijd in beslag neemt.						
er geen apparatuur aanwezig is die het mogelijk maakt						
voedingsmiddelen op een bepaalde temperatuur te koelen.						
niemand mij verteld heeft hoe en waarom ik voedingsmiddelen op						
een bepaalde temperatuur zou moeten koelen.						
wij geen producten verkopen die gekoeld moeten worden.						



# 5. Opslag van voedingsmiddelen

Onderstaande vragen hebben uitsluitend betrekking tot het hygiënisch opslaan van voedingsmiddelen (denk aan: folie, uit de buurt van dieren, droog, niet buiten, etc.).

5a. Zou u voedingsmiddelen hygiënisch opslaan als...

	Zeker niet	Niet	Misschien	Wel	Zeker wel	Weet ik niet	N.v.t.
	1	2	3	4	5	6	7
er een brochure of flyer zou zijn op uw werkplek met informatie over het hygiënisch opslaan van voedingsmiddelen?							
een deskundige een presentatie zou geven over het hygiënisch opslaan van voedingsmiddelen?							
er een poster zou zijn die hygiënische opslagmethoden van voedingsmiddelen weergeeft?							
u een video gezien zou hebben over het hygiënisch opslaan van voedingsmiddelen ?							
u een waarschuwing zou krijgen als voedingsmiddelen niet op een hygiënische opgeslagen heeft?							
u extra taken (aanvullend schoonmaken etc.) zou moeten uitvoeren als u voedingsmiddelen niet hygiënisch heeft opgeslagen?							
een deskundige een training zou geven over het hygiënisch opslaan van voedingsmiddelen?							
een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u voedingsmiddelen niet hygiënisch opgeslagen heeftt?							
u zou horen dat een collega ziek is geworden nadat hij/zij voedingsmiddelen niet op hygiënisch opgeslagen heeft?							
u ziek zou worden nadat u voedingsmiddelen niet hygiënisch opgeslagen heeft?							



een klant ziek geworden zou zijn na het eten van een maaltijd tijdens uw dienst?				
u zou zien dat al uw collega's voedingsmiddelen hygiënisch opslaan?				
er materialen aanwezig zouden zijn die het mogelijk maken voedingsmiddelen				
hygiënisch op te slaan?				

#### 5b. In hoeverre vormen onderstaande argumenten voor u een reden om voedingsmiddelen NIET hygiënisch op te slaan?

Ik sla voedingsmiddelen niet hygiënisch op omdat	Zeer oneens	Oneens	Mee eens	Zeer mee	Ik weet het	N.v.t.
				eens	niet	
	1	2	3	4	5	6
ik het niet nodig vind.						
het te veel tijd in beslag neemt.						
er geen materialen aanwezig zijn die het mogelijk maken						
voedingsmiddelen hygiënisch op te slaan.						
niemand mij verteld heeft hoe en waarom ik voedingsmiddelen						
hygiënisch moet opslaan.						
wij geen producten verkopen die moeten worden opgeslagen.						



# 6. Kruisbesmetting van voedingsmiddelen

Onderstaande vragen hebben uitsluitend betrekking tot kruisbesmetting (overdracht van een bacteriële besmetting van het ene naar het andere voedingsmiddel)

6a. Zou u kruisbesmetting voorkomen als ...

	Zeker niet	Niet	Misschien	Wel	Zeker wel	Weet ik niet	N.v.t.
	1	2	3	4	5	6	7
er een brochure of flyer zou zijn op uw werkplek met informatie over							
kruisbesmetting en voedingsmiddelen?							
een deskundige een presentatie zou geven over kruisbesmetting en							
voedingsmiddelen?							
er een poster zou zijn waarop aangegeven wordt dat het voorkomen van							
kruisbesmetting belangrijk is?							
u een video gezien zou hebben over kruisbesmetting en voedingsmiddelen?							
een deskundige een training zou geven over het voorkomen van kruisbesmetting?							
een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u niet rekening							
heeft gehouden met het voorkomen van kruisbesmetting?							
u zou horen dat een collega ziek is geworden na kruisbesmetting?							
u ziek zou worden kruisbesmetting?							
een klant ziek geworden zou zijn na het eten van een maaltijd tijdens uw dienst?							
u zou zien dat al uw collega's kruisbesmetting voorkomen?							



er materiaal aanwezig zou zijn die het mogelijk maakt kruisbesmetting te				
voorkomen?				

6b. In hoeverre vormen onderstaande argumenten voor u een reden om GEEN rekening te houden met kruisbesmetting?

Ik houd geen rekening met kruisbesmetting omdat	Zeer oneens	Oneens	Mee eens	Zeer mee	Ik weet het	N.v.t.
	1	2	3	eens 4	niet 5	6
ik het niet nodig vind.						
het te veel tijd in beslag neemt.						
er geen materiaal aanwezig is die het mogelijk maakt						
kruisbesmetting te voorkomen.						
niemand mij verteld heeft hoe en waarom ik kruisbesmetting kan						
voorkomen.						
kruisbesmetting niet kan optreden bij de producten die wij						
verkopen (wij verkopen alleen voorverpakte producten).						



# 7. Schoonhouden van uw werkplek

Onderstaande vragen hebben uitsluitend betrekking tot het schoonmaken en schoonhouden van uw werkplek.

7a. Zou u, uw werkplek schoonhouden als ...

	Zeker niet	Niet	Misschien	Wel	Zeker wel	Weet ik	N.v.t.
	1	2	3	4	5	niet 6	7
er een brochure of flyer zou zijn op uw werkplek met informatie over schoonmaken?							
een deskundige een presentatie zou geven over schoonmaakmethoden?							
er een poster zou zijn waarop verschillenden schoonmaakmethoden weergegeven zijn?							
u een video gezien zou hebben over schoonmaakmethoden?							
u een onderscheiding of certificaat zou ontvangen voor het schoonhouden van uw werkplek?							
u hiervoor een maandelijkse bonus op uw salaris zou ontvangen?							
u iedere keer als u uw werkplek schoonhoudt credits zou kunnen verdienen, en deze credits tot een onderscheiding zouden leiden?							
u een waarschuwing zou krijgen als u uw werkplek niet schoon gehouden heeft?							
u extra taken (aanvullend schoonmaken etc.) zou moeten uitvoeren als u uw werkplek niet schoon gehouden heeft?							
een deskundige een training zou geven over schoonmaakmethoden?							
een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u uw werkplek niet schoon gehouden heeft?							



u zou horen dat een collega ziek is geworden nadat hij/zij zijn/haar werkplek niet schoon gehouden heeft?				
u ziek zou worden nadat u uw werkplek niet schoon gehouden heeft?				
een klant ziek geworden zou zijn na het eten van een maaltijd tijdens uw dienst?				
u zou zien dat al uw collega's hun werkplek schoonhouden?				
er schoonmaak materialen aanwezig zouden zijn?				

#### 7b. In hoeverre vormen onderstaande argumenten voor u een reden om uw werkplek NIET schoon te houden?

Ik houd mijn werkplek niet schoon omdat	Zeer oneens	Oneens	Mee eens	Zeer mee eens	lk weet het niet	N.v.t.
	1	2	3	4	5	7
ik het niet nodig vind.						
het te veel tijd in beslag neemt.						
er geen schoonmaakmaterialen aanwezig zijn.						
iemand anders dat voor mij doet.						
niemand mij verteld heeft hoe en waarom ik mijn werkplek zou						
moeten schoonhouden.						
anders, namelijk:						



### 8. Houdbaarheid van voedingsmiddelen

Onderstaande vragen hebben uitsluitend betrekking tot de houdbaarheid van voedingsmiddelen.

8a. Zou u rekening houden met houdbaarheid van voedingsmiddelen als ...

	Zeker niet	Niet	Misschien	Wel	Zeker wel	Weet ik niet	N.v.t.
	1	2	3	4	5	6	7
er een brochure of flyer zou zijn op uw werkplek met informatie over de houdbaarheid van voedingsmiddelen?							
een deskundige een presentatie geeft over de houdbaarheid van voedingsmiddelen?							
er een poster zou zijn waarop de houdbaarheid van verschillende voedingsmiddelen weergegeven is?							
u een video gezien zou hebben over houdbaarheid van voedingsmiddelen?							
u een waarschuwing zou krijgen als u voedingsmiddelen zou gebruiken die over datum zijn?							
u extra taken (aanvullend schoonmaken etc.) zou moeten uitvoeren als u voedingsmiddelen zou gebruiken die over datum zijn?							
een deskundige een training zou geven over de houdbaarheid van voedingsmiddelen?							
een inspecteur aanwezig zou zijn die zou kunnen opmerken dat u voedingsmiddelen heeft gebruikt die over datum zijn?							
u zou horen dat een collega ziek is geworden nadat hij/zij voedingsmiddelen die over datum zijn gegeten heeft?							
u ziek zou worden nadat u voedingsmiddelen die over datum zijn gegeten heeft?							



een klant ziek geworden zou zijn na het eten van een maaltijd die producten bevatte die over de datum waren, tijdens uw dienst?				
u zou zien dat al uw collega's geen voedingsmiddelen gebruiken die over datum zijn?				

#### 8b. In hoeverre vormen onderstaande argumenten voor u een reden om geen rekening te houden met houdbaarheid van voedingsmiddelen?

Ik maak houd geen rekening met houdbaarheid van voedingsmiddelen omdat	Zeer oneens	Oneens	Mee eens	Zeer mee eens 4	Ik weet het niet	N.v.t.
ik het niet nodig vind.				4		
het te veel tijd in beslag neemt.						
ik anders voedsel verspil als ik het weggooi.			$\boxtimes$			
niemand mij verteld heeft hoe en waarom ik rekening moet houden met houdbaarheid van voedingsmiddelen.						



# 9. Opmerkingen

Heeft u nog opmerkingen over deze vragenlijst of over dit onderzoek in het algemeen?

#### DIT IS HET EINDE VAN DE VRAGENLIJST

#### HARTELIJK DANK VOOR UW MEDEWERKING



### **Appendix II. Questionnaire English version**

### Questionnaire food safety behaviour in company canteens

Wageningen UR, December 2015

#### NOTES TO THIS QUESTIONNAIRE

- The questionnaire will take about 15 minutes to complete. The questionnaire will start with some general questions. Hereafter, there will be questions about incentives to change behaviour regarding personal hygiene, heating, cooling, storage, cross contamination, cleaning and shelf life. At the end of this questionnaire there is room for remarks on the questionnaire and/or the research.
- This study is not intended for monitoring purposes, it is purely about identifying how food safety is handled in small canteens. Your answers will therefore remain confidential and you can fill in the questionnaire anonymously. The answers will not be traced back to your business.
- Most questions can be answered by placing a cross in the box with the answer that applies to you (most). You can add a text in the empty boxes.
- Please return the questionnaire as soon as possible.

Do you have any questions about this questionnaire or this study? Please contact Kim Stenvers, Wageningen University via e-mail: <u>kim.stenvers@wur.nl</u>



# 1. General Questions

20. How old are you?	
21. What is your gender?	Male/Female (cross out what does not apply)
22. What is your highest level of education?	<ul> <li>Please mark all that apply</li> <li>Elementary school</li> <li>High school</li> <li>Lower vocational education</li> <li>Secondary vocational education</li> <li>Higher professional education</li> <li>University education</li> </ul>
23. How long are you working in the food industry?	Please mark all that apply           Less than 5 years           5 to 10 years           10 to 20 years           More than 20 years
24. In Yeske provincie ligt de kantine?	Please mark all that apply   North-Holland   South - Holland   Zeeland   Limburg   Groningen   Utrecht   Gelderland   North-Brabant   Friesland   Drenthe   Overijssel   Flevoland



25. Where is the canteen located?	Please mark all that apply
	<ul> <li>Public Authority</li> <li>Educational institution</li> <li>Business</li> <li>Otherwise:</li> </ul>
26. How much canteen staff do you have in your canteen in total?	
27. How much canteen staff is working at the busiest time of the day (for example lunch)?	
28. What type of products are served in your canteen?	Please mark all that apply
	Only pre-packaged products
	Meals we prepare in the canteen itself
	Pre-packed products and meals that we preapre
	in the canteen itself
	Otherwise:
29. Do you work with fresh products?	Yes/No (cross out what does not apply)
30. Do you work with raw materials?	Yes/No (cross out what does not apply)
31. Do you wear a hairnet?	Yes/No (cross out what does not apply)
32. Do you wear gloves during preparation of food?	Yes/No (cross out what does not apply)

33. Do you know what food safety is?	Yes/No (cross out what does not apply)
34. Do you know what bacteria are?	Yes/No (cross out what does not apply)
35. Do you know what spoilage organisms are?	Yes/No (cross out what does not apply)
36. Do you know what pathogens are?	Yes/No (cross out what does not apply)
37. Do you know what food-borne diseases are?	Yes/No (cross out what does not apply)
38. Do you know what cross contamination is?	Yes/No (cross out what does not apply)

4.	Have you ever received information on food safety strategies?	Yes/No (cross out what does not apply)
5.	Are there certain guidelines you have to	Yes/No (cross out what does not apply)



	apply to ensure food safety?	
6.	Are there certain actions you perform to	Yes/No (cross out what does not apply)
	ensure safe food?	



## 2. Personal hygiene

The following question only concern personal hygiene and food preparation.

2a. Would you wash your hands before preparing food if ...

N.A. (I always wash my hands)

	Certainly not	No	Maybe	Yes	Certainly Yes	l do not know	N.A.
	1	2	3	4	5	6	7
there would be a booklet or flyer available at your workplace with information							
about personal hygiene and food?							
a professional would give a presentation on personal hygiene and food?							
there would be a poster available which states 'do not forget to wash your							
hands'?							
you would watch a video about personal hygiene and food?							
you would receive an award or a certificate for personal hygiene compliance?							
you would receive a monthly bonus on your salary?							
you could earn credits every time you wash your hands, and these credits would							
lead to an award for personal hygiene compliance?							
you would get a warning if you would not wash your hands?							
you would have to perform additional tasks (extra cleaning etc.) if you would not							
wash your hands?							
a professional would give a training about personal hygiene and food?							



there would be an inspector present who could notice that you did not washed your hands?				
you would hear that a colleague got sick after not washing his/her hands before preparing food?				
you would got sick after not washing your hand before you prepared food?				
a costumer would got sick after eating a meal during your shift?				
you would see that all of your colleagues wash their hands before preparing food?				

2b. To what extend do the following arguments constitute a reason to not wash your hands before preparing food?

I do not wash my hand before preparing food because	Strongly disagree	Disagree	Agree	Strongly Agree	I do not know	N.A.
	1	2	3	4	5	6
I think it is not necessary.						
it takes too much time.						
there is no soap available.						
I wash my hands at home.						
because nobody told me why I should wash my hands.						



## **3.** Heating of food products

*The following question only concern heating of food products.* 

3a. Would you heat food products at the correct temperature if...

	Certainly not 1	No 2	Maybe 3	Yes 4	Certainly Yes 5	l do not know 6	N.A. 7
there would be a booklet or flyer available at your workplace with information on the correct heating temperatures of food products?							
a professional would give a presentation on the correct heating temperatures of food products?							
there would be a poster available which states shows the correct heating temperatures of food products?							
you would watch a video about the correct heating temperatures of food products??							
not heating food products at the correct temperature would lead to a warning?							
you would have to perform additional tasks (extra cleaning etc.) if you would not comply with the correct heating temperatures of food products?							
a professional would give a training about the correct heating temperatures of food products?							
there would be an inspector present who could notice that you did not heat food products at the correct temperatures?							
you would hear that a colleague got sick after not heating food products at the correct heating temperature?							
you would got sick after not heating food products at the correct heating temperature?							
a costumer would got sick after eating a meal during your shift?							

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you would see that all of your colleagues heat food products at a certain temperature?				
there would be equipment available that would you allow the measure the heating temperature?				

### 3b. To what extend do the following arguments constitute a reason to not heat food products at a certain heating temperature?

I do not heat food products at a certain temperature because	Strongly disagree	Disagree	Agree	Strongly Agree	I do not know	N.A.
	1	2	3	4	5	6
I think it is not necessary.						
it takes too much time.						
there is no equipment available that allows me to measure the						
heating temperature.						
we do not sell food products that have to be heated.						
because nobody told me why I should heat food products at a						
certain temperature.						



## 4. Cooling of food products

*The following question only concern cooling of food products.* 

4a. Would you cool food products at the correct temperature if...

	Certainly not	No	Maybe	Yes	Certainly Yes	l do not know	N.A.
	1	2	3	4	5	6	7
there would be a booklet or flyer available at your workplace with information on the correct cooling temperatures of food products?							
a professional would give a presentation on the correct cooling temperatures of food products?							
there would be a poster available which shows the correct cooling temperatures of food products?							
you would watch a video about the correct cooling temperatures of food products?							
not cooling food products at the correct temperature would lead to a warning?							
you would have to perform additional tasks (extra cleaning etc.) if you would not comply with the correct cooling temperatures of food products?							
a professional would give a training about the correct cooling temperatures of food products?							
there would be an inspector present who could notice that you did not cool food products at the correct temperatures?							
you would hear that a colleague got sick after not cooling food products at the correct cooling temperature?							
you would got sick after not cooling food products at the correct cooling temperature?							
a costumer would got sick after eating a meal during your shift?							

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you would see that all of your colleagues cool food products at a certain temperature?				
there would be refrigerators available that would you allow the measure the cooling temperature?				

### 4b. To what extend do the following arguments constitute a reason to not cool food products at a certain heating temperature?

I do not cool food products at a certain temperature because	Strongly disagree	Disagree	Agree	Strongly Agree	I do not know	N.A.
	1	2	3	4	5	6
I think it is not necessary.						
it takes too much time.						
there is no equipment available that allows me to cool food						
products at a certain temperature.						
we do not sell food products that have to be cooled.						
because nobody told me why I should heat food products at a						
certain temperature.						



## 5. Storage of food products

The following question only concern storage of food products in a hygienic way (think of: foil, away from pets, dry, not outside etc.).

5a. Would you store food products in a hygienic way if...

	Certainly	No	Maybe	Yes	Certainly	I do not	N.A.
	not 1	2	3	4	Yes 5	know 6	7
there would be a booklet or flyer available at your workplace with information on	-	2	5		5	Ŭ	,
hygienic storing methods of food products?							
a professional would give a presentation on the hygienic storing methods of food products?							
there would be a poster available which shows hygienic storing methods of food products?							
you would watch a video about hygienic storing methods?							
not storing food products in a hygienic way would lead to a warning?							
you would have to perform additional tasks (extra cleaning etc.) if you would store food products in a hygienic way?							
a professional would give a training about the hygienic storing methods of food products?							
there would be an inspector present who could notice that you did not store food products in a hygienic way?							
you would hear that a colleague got sick after not storing food products in a hygienic way?							
you would got sick after not storing food in a hygienic way?							
a costumer would got sick after eating a meal during your shift?							



you would see that all of your colleagues store food products in a certain way?				
there would be different materials available that would allow you to store food				
products in a hygienic way?				

5b. To what extend do the following arguments constitute a reason to not store food products in a hygienic way?

I do not store food products in a hygienic way because	Strongly disagree	Disagree	Agree	Strongly Agree	I do not know	N.A.
	1	2	3	4	5	6
I think it is not necessary.						
it takes too much time.						
there are no materials available that allow me to store food						
products in a hygienic way.						
we do not sell food products that have to be stored.						
because nobody told me why I should store food products in a						
hygienic way.						



### 6. Cross contamination of food products

The following questions only concern cross contamination of food products (the transfer of harmful bacteria from food to other foods)

6a. Would you try to prevent cross contamination if ...

	Certainly not 1	No 2	Maybe 3	Yes 4	Certainly Yes 5	l do not know 6	N.A. 7
there would be a booklet or flyer available at your workplace with information on cross contamination?							
a professional would give a presentation on cross contamination?							
there would be a poster available which states that preventing cross contamination is important?							
you would watch a video about cross contamination?							
a professional would give a training on how to prevent cross contamination?							
you would hear that a colleague got sick after cross contamination?							
you would got sick after cross contamination?							
a costumer would got sick after eating a meal during your shift?							
you would see that all of your colleagues try to prevent cross contamination?							
there would be different materials available to prevent cross contamination?							
there would be a booklet or flyer available at your workplace with information on cross contamination?							



#### 6b. To what extend do the following arguments constitute a reason to not pay attention to cross contamination?

I do not pay attention to cross contamination because	Strongly disagree	Disagree	Agree	Strongly Agree	l do not know	N.A.
	1	2	3	4	5	6
I think it is not necessary.						
it takes too much time.						
there are no materials available to prevent cross contamination.						
cross contamination cannot occur with our products (we only sell						
prepacked products),						
because nobody told me why and how I should prevent cross						
contamination.						



# 7. Cleaning your workplace

The following questions only concern cleaning your workplace.

7a. Would you clean up your workplace if...

	Certainly not	No	Maybe	Yes	Certainly Yes	l do not know	N.A.
there would be a booklet or flyer available at your workplace with information	1	2	3	4	5	6	7
about cleaning methods?							
a professional would give a presentation on cleaning methods?							
there would be a poster available which shows different cleaning methods?							
you would watch a video about cleaning methods?							
you would receive an award or a certificate for cleaning compliance?							
you would receive a monthly bonus on your salary?							
you could earn credits every time you would keep it clean, and these credits							
would lead to an for cleaning compliance?							
not keeping it clean would lead to a warning?							
you would have to perform additional tasks (extra cleaning etc.) if you would not							
clean up?							
a professional would give a training about cleaning methods?							
there would be an inspector present who could notice that you did not kept it							
clean?							



you would hear that a colleague got sick after not cleaning up?				
you would got sick after not cleaning up?				
a costumer would got sick after eating a meal during your shift?				
you would see that all of your clean up?				
there would be different materials available to clean up?				

7b. To what extend do the following arguments constitute a reason to not clean your workplace?

I think it is not necessary.	Strongly disagree	Disagree	Agree	Strongly Agree	I do not know	N.A.
	1	2	3	4	5	7
it takes too much time.						
there are no materials available to clean.						
cross contamination cannot occur with our products (we only sell	_	_				
prepacked products),						
because nobody told me why and how I should clean my						
workplace.						
because someone else cleans up my workplace						
otherwise, namely						



## 8. Shelf life of food products

The following questions only concern shelf life of food products.

8a. Would you pay attention to shelf life of food products if ...

	Certainly not	No	Maybe	Yes	Certainly Yes	l do not know	N.A.
	1	2	3	4	5	6	7
there would be a booklet or flyer available at your workplace with information on shelf life of food product?							
a professional would give a presentation on shelf life of food products?							
· · · · · · · · · · · · · · · · · · ·							
there would be a poster available which shows the shelf life of food products?							
you would watch a video about shelf life of food products?							
using food products which have expired would lead to a warning?							
you would have to perform additional tasks (extra cleaning etc.) if you would use							
food products which have expired?							
a professional would give a training about the shelf life of food products?							
there would be an inspector present who could notice that you used food							
products which have expired?							
you would hear that a colleague got sick after eating food which has expired?							
you would get sick after eating food which has expired?							
a costumer would got sick after eating a meal during your shift?							



you would see that all of your colleagues do not use food products which have				
expired?				

8b. To what extend do the following arguments constitute a reason to not pay attention to shelf life of food products?

I do not pay attention to shelf life of food products because	Strongly disagree	Disagree	Agree	Strongly Agree	l do not know	N.A.
	1	2	3	4	5	7
I think it is not necessary.						
it takes too much time.						
otherwise I would waste food.						
because nobody told me why and how I should pay attention to						
shelf life.						



### 9. Remarks

Do you have any remarks on this questionnaire or this study in general?

### THIS IS THE END OF THE QUESTIONNAIRE

#### THANK YOU FOR YOUR COOPERATION



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