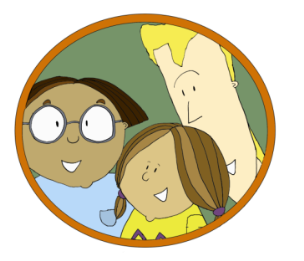
This most excellent guide has been prepared by Nadine Zeitlmann with help from Ulrike Grote (both from the Robert Koch Institute), loosely based on the German outbreak script

French translation of cards was prepared by Juliane Wunderlich of RKI

Game Rules

Facilitator’s Guide

# Material

* Card game (25 cards)
* Presentation on the steps of outbreak investigation
* National Guideline on Outbreak Investigation and Response and Annexes
* Flip chart
* Square post-it notes

# Course of action

The facilitator holds the presentation on the ‘steps of outbreak investigation’ and pauses the presentation after each step (of outbreak investigation) to play the card game. The card game helps to practically illustrate each respective step.

* Pause the presentation ‘steps of outbreak investigation’ when you reach the slides in the presentation that are marked with the sign of the game (see above)
* When there is more than one slide for the step, the sub-titles (in italics) refer to the titles of the slides in the power point presentation so the facilitators can keep track of which text links to which slide.
* Scripts in italics and speech marks are provided to help facilitators run the exercise

# Background to the Exercise

***Exercise: disease detectives***“*The card game ‘Disease detectives’ is a free-of-charge game that enables training of the steps of an outbreak investigation*.”

# Scenario background

***Background***  
“*On 14 July at 20:00 the facilitators and the participants of the workshop had dinner at the restaurant ‘Central Asia’. Potato salad, burger and chocolate mousse were offered at a buffet*.”

All cards should be distributed between the workshop participants and the facilitators. Only one pack of cards should be used. If there are more participants than cards, a card can be shared between two people.

## Step 1: Confirming the outbreak

***Worrying signal***  
“*Several of the workshop participants report that they got ill after attending the dinner*”.

**Script for more interactive facilitation:** “*On 17 July 2017, several of you developed some symptoms. Please take a look on your cards. The cards have different border colours: the players possessing a card with a yellow border, are sick. For those sick, you can see your detailed symptoms on the bottom of your card. Whoever has a card with a blue border is healthy. The food items you have consumed are also displayed on the card. Please turn to your neighbour and discuss your card with them”.*

Allow 2-3 minutes discussion among participants to allow them to get familiar with the cards. Ask 1-2 facilitators or participants to describe their symptoms (as shown on their card) to the group.

***Confirming an outbreak***The first question to everyone is: “Is this an outbreak?” Encourage group discussion. The answer is: yes, as there are more than 2 related cases of illness that are epidemiologically linked.

**Script for more interactive facilitation:** *“The first step of an outbreak investigation is the confirmation of the outbreak. We need to make sure that we are dealing with an outbreak here. How would you define an outbreak?’ You also find information on how to define an outbreak in your guideline”.* To lead to the answers moderator can ask questions such as: *“How many are sick (please raise your hand)? Did the people get sick with gastrointestinal symptoms at around roughly the same time? Which people were affected? What is the location of the cluster? So would you define this as an outbreak?”*

Using the projector screen, the facilitator together with the participants should fill out the “Line Listing”, the “Outbreak Data Collection Form” and the “Rapid Risk Assessment Tool” (in annex of national OIR guideline). The case line listing form is only filled out for the cases who generated the outbreak alert (1-2 cases, case finding will continue later) e.g. these might be the facilitator or participants who described their symptoms. Example of the filled-out linelist form is in the Annex.

The second question is: “Is there a need to send a rapid response team?” This can be determined from the results of the rapid risk assessment. The answer is: yes, as a multi-disciplinary team is required to investigate the outbreak.

***Communication***As a next step, the facilitator should initiate a discussion on further actions including communication.  *“Who needs to be informed at this stage?“* Collect answers from the plenary.

***Control measures***The facilitator should initiate a discussion on the need to implement immediate control measures.

**Script for more interactive facilitation:** *“As it was said, control measures are important to adjust after each piece of new information becomes available. After this initial step, it is important to ask the following questions:*

* *Is the outbreak over or on-going?*
* *Are immediate control measures required?*
  + *Person-to-Person transmission or food-related transmission?*
  + *Need to contact veterinary authorities /Food-controlling authorities?”*

Collect answers from the plenary on a flip chart.

## Step 2: Preparing for the outbreak investigation

The facilitator should discuss with participants who should be part of the outbreak investigation team. “*What are the objectives of the investigation? What equipment should be taken to the field?*”

## Step 3: Verify the diagnosis (cause) of the outbreak

Facilitator asks participants about their symptoms (diarrhoea, vomiting, abdominal pain) and date of onset of symptoms.

**Script for more interactive facilitation:**  *“Among the sick people (people holding a yellow card) what detailed symptoms are there? What other information from the cards is important to make a suspected diagnosis?” - “when was the onset of symptoms?” Write* down information on flipchart (see above)

The facilitator writes on a flipchart the information which is important for the differential diagnosis:

* Symptoms
* Incubation period
* Hospitalization (degree of severity)

This is followed by brainstorming around possible pathogens causing the outbreak. Bacterial pathogens (e.g. salmonella), viral (e.g. norovirus) or toxins could be considered as a differential diagnosis.

**Script for more interactive facilitation:**  *“What pathogens can you suspect?” “With these suspected pathogens in mind, what samples should you take? Who would you co-ordinate with for specimen collection, sampling strategy and lab confirmation?”*

## Step 4: Identify the size of the outbreak

### Establishing a case definition

The participants should establish a case definition. Discussion in the plenary. Moderator writes down the suggested case definition on the flip chart.   
For example: people who attended the dinner on 14 July 2017 at the restaurant “Central Asia” and who then became ill. For further calculations a more specific case definition is needed. Hence a specific case definition should be used, e.g.: people who attended the dinner that took place on 14 July 2017 at the restaurant “Central Asia” at 20:00 who then presented with diarrhoea, vomiting or abdominal pain.

**Script for more interactive facilitation: Moderator:** *“To find out the extent of the outbreak, the case number is important. How can we define “illness” in this outbreak? How do we define a “case”? Who can suggest a case definition?”*

“*What about rare symptoms (e.g. fever)? Should you include it for your case definition of outbreak?” Should you include ‘and’ or ‘or’ between the various symptoms?* Discuss sensitivity vs. specificity of the definition.

If needed: clarify that exposure (e.g. which food they ate) should not be in the case definition.

### Active case finding

Discuss in the plenary how further cases should be identified. In this case it is not problematic as all dinner attendees are present in the room.

### Identify the size of the outbreak

Interview 2 cases with a ‘Case Report Form’ and update/ extend the ‘line list’ (both forms in national OIR guideline) with the relevant variables. This can be done on the projector so all participants can see the forms.

***Form 1: Case Line Listing Form***

The linelist on the slide is filled in for the first 9 cases as an example.

Then the overall attack rate (AR) calculation can be briefly introduced and calculated. AR = total number of cases / total number of participants.

**Script for more interactive facilitation:** *“Now, that we have defined our cases and interviewed our whole group to identify all cases, we can do our first small calculation: to calculate the overall attack rate of the outbreak. Please raise your hand if you are a case according to our case definition”* Moderator counts hands and writes down the case number on a flipchart*. “And how many overall participants did we have in total?”* Moderator writes down this number below the case number on the flipchart. Ask participants to make the calculations.

## Step 5: Describing the outbreak in time, place and person

### Describing and analysis of the outbreak

Here age, gender and symptoms of the cases should be analysed.

**Script for more interactive facilitation: Moderator:** “In this step we concentrate only on the participants who are cases”

Regarding symptoms: *“Which symptoms can be observed among the cases? How many cases had…”* Moderator counts the frequency of each symptom by asking people to raise their hands if they had this symptom. *“What does this information tell you?”* Discussion on e.g. severity or hypothesis about pathogen.

Regarding analysis by sex: *“How many men got sick? Please raise your hands. How many women? Please raise your hands now.”* Moderator counts the numbers and writes it on a flip chart as the male female ratio. *“What can this tell us in an outbreak?”* Short discussion. *“Furthermore, for person criteria, it can make sense to calculate sex-specific attack rates. This helps especially when there is an unequal ratio of men and women among all participants (e.g. it can be that there are more women among the cases cause there were more women present at the dinner).”* Moderator counts how many women in total attended the dinner and how many men and calculates the sex-specific attack rates with this numbers and the sex-specific case numbers written down previously: AR male= male cases / total male participants; AR female = female cases / total number of female participants.

Regarding analysis by age: *“For this analysis by age, we will ask each case how old they are. [More sensitive version: Don’t worry, I will not ask you about your age. I would like each case to tell me the age that you feel like at the moment”]* Moderator gets the answers from the participants and writes them down on the flipchart. He calculates mean, median and the age range on the flipchart. *“What can this information tell you about your outbreak?”*

### Describing and analysis of the outbreak - Epidemiological curve

### DO NOT SHOW THE SLIDE (the epidemiological curve) YET BUT DEVELOP AN EPICURVE TOGETHER WITH THE PARTICIPANTS!

The moderator gives each case a square post-it note. The moderator uses a board or sticks two flipchart papers next to each other (for more space) and draws an x- and a y-axis. Participants should discuss the labelling of the axes as well as the interval of the x-axis. The time of the dinner can be marked on the axis as incubation period. The moderator needs to be aware to draw each time interval on the board in a way that it fits the size of the post-it. The moderator asks then which of the cases got symptoms in interval 1 (e.g. on that date, or within that time period). Cases who got symptoms in interval 1 should then come to the board and stick their post-its within the interval on top of each other (to form a column). Continue with interval 2. etc. This process should be followed by a discussion and interpretation of the Epi-curve.

***Immediate action required?***

“Based on our results, is immediate action required? Who needs to know at this stage? Are immediate interventions necessary?”

## Step 6. Generate a hypothesis about the source of the outbreak

The participants should generate a hypothesis, e.g. that consumption of some dishes during the dinner is associated with the illness. “Based on the working hypothesis, are immediate actions required? Who should be informed at this stage?”

## Step 7. Evaluate the hypothesis using analytical studies

“Would you conduct an analytical study? If yes, what kind of study would you choose? How would you conduct this study?”

A cohort study will be conducted in order to confirm the hypothesis. You should use a cohort study when you know and can trace the whole group who might have got sick, for example if an outbreak occurs after a party or in a school. A cohort study is easier to do and generally gives more reliable (more powerful) results than a case control study. All dinner attendees (cases and non-cases) will need to be interviewed using a standard questionnaire about their exposures and illness. Attack rates and risk ratios should then be calculated.

### Calculate attack rates and risk ratios: It is advised that the facilitator should have a flip-chart with the two by two tables and the general formula of the Attack Rates (by exposure) (AR) and the Relative Risk (RR) prepared. The facilitator steps into the middle of the room and asks all participants to form ‘live’ two by two tables for potato salad.

**Script for more interactive facilitation:** “Please join me in the middle of the room. *Now we have our cohort (closed group of dinner attendees) for the study here. Our hypothesis was that consumption of a food-item on the buffet of the dinner caused the infection. As there are 3 food items, we need to test our hypothesis for all 3 of them.”*

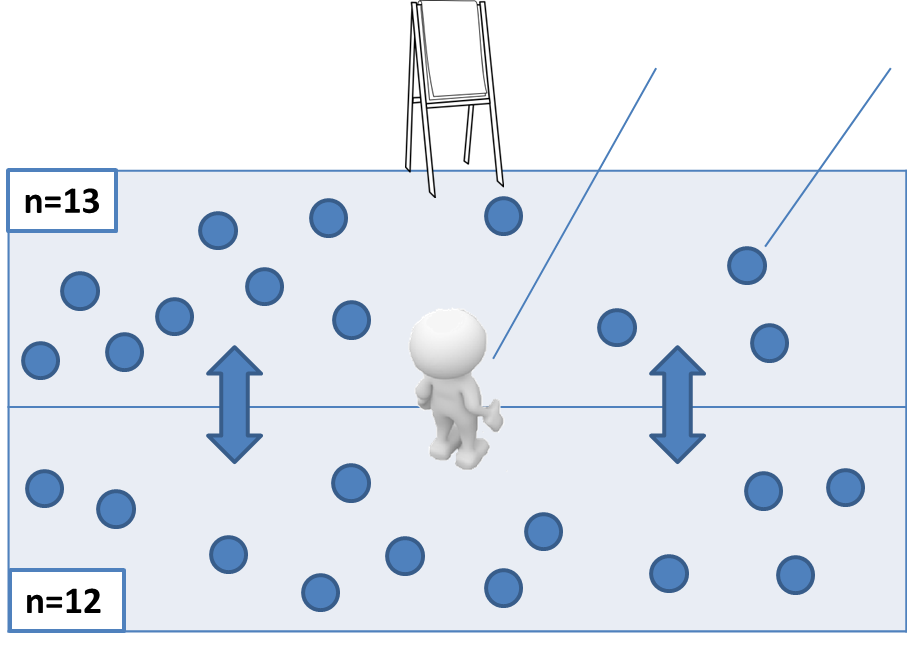
The moderator shows the pre-prepared flip chart with the two by two table and formula. *“Generally each participant of a cohort study can be sorted into one of the four boxes of this table depending on if he/she got exposed to the risk factor and he/she got ill. One can then calculate the attack rate in the exposed group and the attack rate in the unexposed group. Setting these two attack rates / risks for disease in relation to each other is called Relative Risk.” Facilitator* outlines the formula of the RR.

*“As said, for this outbreak we need to test our hypothesis for each food item.”*

Moderator draws a 2 by 2 table on the flip chart.

“*To sort each cohort member in one of the 4 boxes, we will use this 4 tables /corners of this room as the 4 boxes of this table.”*

*“For potato salad, we will split the people first into exposed and not exposed to the risk factor of interest (having consumed the potato salad). So, go to the top half of the room (in front of me) if your card says that you have eaten potato salad at the dinner. If you haven’t, go to the bottom half of the room (behind me). So we have 13 people exposed and 12 people not exposed to the risk factor of interest - the potato salad. .”*

**

Ate potato salad

Ate no potato salad

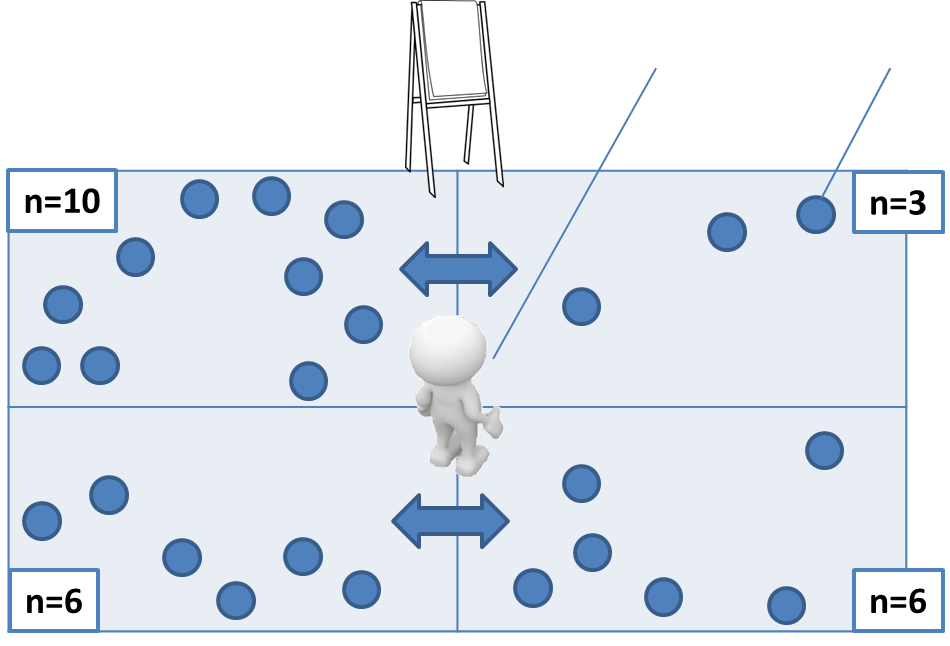
Participants

Facilitator

*“Now if you are a case / got ill move to the left of me, if you stayed healthy/ non-case, go right of me. So those of you in the left top are box a, those in the top right the box b, those in the bottom left are box c and those in the bottom right are d.”*

Participants

Facilitator

**

A

C

D

B

Ate no potato salad and stayed healthy

Ate potato salad and stayed healthy

Ate no potato salad and got ill

Ate potato salad and got ill

Moderator fills in the 2x2 table according to the people in a (10), b (3), c (6), d (6) and collects participants in the middle. *“Can anyone now calculate the relative risk for the consumption of potato salad?”* Answer: 1,54.

*“How is this relative risk interpreted? Answer: Logically, as we are comparing two risks for becoming a case we can say the risk to become a case when having consumed potato salad is 1.54 times higher than the risk to become a case when not having consumed potato salad. Should the relative risk be 1, then the risk to become a case when having consumed potato salad would be the same as when not having consumed potato salad. Should it be smaller than one then the risk of becoming a case when having consumed the potato salad would be smaller than when not having consumed the salad (protective factor)“*

According to time, the 2x2 table can be repeated for the other food items.

## *Results of the cohort study*

The results can be shown to participants on the Powerpoint slides and compared to their 2x2 tables on the flipchart.

## Step 8: Additional studies

The facilitator discusses with the participants which additional studies could be conducted to support the epidemiological findings. For foodborne outbreaks further microbiological investigations (e.g. comparison of isolates detected in humans and food) or the trace back of food items should be taken into account.

## Step 9: Implement control and prevention measures

The facilitator discusses with the participants control and prevention measures that are applicable to this outbreak (e.g. inspection of the kitchen, disinfection of kitchen, hygiene training of staff, withdrawal of food item (if found), risk communication). The facilitator presents the main concepts of risk and outbreak communication.

## Step 10: Communicate findings

*Outbreak Report*The need for an outbreak investigation report is discussed. The participants receive an example of an outbreak report based on this scenario.

# Appendices

## Case line listing form

| Village/town:  Administrative – territorial unit: City Centre  Total population of the affected locality:  Region: Capital  Type of outbreak: probably foodborne  Main signs and symptoms: diarrhea, vomiting, abdominal cramps, fever | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID number1** | **Name** | **Address** | **Age** | **Sex** | **Symptoms 2** | **Onset date** | **Specimens collected** | **Health status3** | **Remarks4** |
| 1 |  |  | 35 | F | Vomiting, Fever | 15.07.2017 8 am | 1 stool sample | inpatient |  |
| 2 |  |  | 61 | M | Diarrhea, abdominal cramps | 16.07.2017 8 am | 1 stool sample | outpatient |  |
| 3 |  |  | 42 | F | Diarrhea, fever | 15.07.2017 8pm | 1 stool sample | outpatient |  |
| 4 |  |  | 51 | F | Diarrhea, fever, abdominal cramps | 16.07.2017 8 am | 1 stool sample | outpatient |  |
| 5 |  |  | 66 | M | Diarrhea, vomiting, abdominal cramps | 16.07.2017 8 am | 1 stool sample | outpatient |  |
| 6 |  |  | 58 | M | Diarrhea, vomiting | 16.07.2017 8 am |  | outpatient |  |
| 7 |  |  | 37 | F | Diarrhea, fever, abdominal cramps | 16.07.2017 8 pm | 1 stool sample | outpatient |  |
| 8 |  |  | 39 | F | Diarrhea, abdominal cramps | 17.07.2017 8 am | 1 stool sample | outpatient |  |
| 9 |  |  | 48 | F | Diarrhea, fever | 16.07.2017 8 pm |  | inpatient |  |
| 10 |  |  | 29 | F | Diarrhea, abdominal cramps, vomiting | 17.07.2017 8 pm | 1 stool sample | outpatient |  |
| 11 |  |  | 44 | F | None |  | 1 stool sample |  |  |
| 12 |  |  | 47 | M | None |  |  |  |  |
| 13 |  |  | 49 | F | None |  |  |  |  |
| 14 |  |  | 60 | M | None |  |  |  |  |
| 15 |  |  | 40 | F | None |  | 1 stool sample |  |  |
| 16 |  |  | 53 | M | Diarrhea, abdominal cramps, vomiting | 16.07.2017 8 am | 1 stool sample | outpatient |  |
| 17 |  |  | 42 | M | Abdominal cramps, fever | 15.07.2017 8pm | 1 stool sample | inpatient |  |
| 18 |  |  | 38 | M | Diarrhea, fever, abdominal cramps | 16.07.2017 8 am | 1 stool sample | outpatient |  |
| 19 |  |  | 46 | M | Diarrhea, fever | 16.07.2017 8 pm | 1 stool sample | outpatient |  |
| 20 |  |  | 38 | M | Diarrhea, vomiting, abdominal cramps | 17.07.2017 8 am | 1 stool sample | outpatient |  |
| 21 |  |  | 34 | M | Diarrhea, fever | 15.07.2017 8 pm | 1 stool sample | inpatient |  |
| 22 |  |  | 50 | M | None |  |  |  |  |
| 23 |  |  | 31 | M | None |  |  |  |  |
| 24 |  |  | 42 | M | None |  | 1 stool sample |  |  |
| 25 |  |  | 33 | M | None |  | 1 stool sample |  |  |

**1 *ID number*** *– is the number written on the Epidemiological Investigation Card of the patient*

***2 Symptoms*** *– it is recommended that a separate column be allocated for each symptom*

*3****Health Status*** *– 1) recovered; 2) illness ongoing; 3) hospitalized; 4) died*

***4 Remarks*** *– could include any relevant information to the current outbreak (e.g. immunization status in a vaccine preventable disease, outbreak, occupation, date of death or recovery, laboratory testing results*