Scenario

Food-Related Norovirus Outbreak in Southern Germany

Preliminary Events

An above-average number of gastroenteritis cases was registered in Baden-Württemberg, a federal state of Germany located in the southwest of the country. Many children in schools and day-care centres show symptoms including fever, diarrhoea and vomiting.

The responsible authorities (you!) have declared an outbreak and started an investigation. The number of cases and the fact that these appeared at the same time at different locations make a transmission via smear infection unlikely. The children have lunch in their educational institutions (schools, day-care centres) making a transmission via catering possible. Menus have been asked for as well as the methods of food preparation.

Due to information from public health authorities, noroviruses could be found in faecal samples from patients with gastroenteritis. Regarding the onset of the first symptoms and the incubation period of norovirus infections in humans, tracing activities were focused on menus eaten directly before the first symptoms became obvious.

The caterers are working closely together with you and have already sent hastily written menu names by fax. These might have contained viable pathogens because some ingredients had not been heated.

The objective is to find the contaminated food(s) and the pathogen responsible for the outbreak by tracing back the suspicious food items. If the product(s) and lot number(s) were able to be traced, they could be withdrawn from the market, minimising further spread of the pathogen as well as reducing the number of new cases.

Technical Note

The following example scenario is structured as a table with the following columns: D<small>ATE</small> and S<small>TORY</small> both depict the events of the fictitious outbreak. To investigate the outbreak certain T<small>ASKS</small> need to be done. How this can be achieved with FoodChain-Lab is explained in the column W<small>HAT</small> <small>TO DO IN</small> F<small>OOD</small>C<small>HAIN</small>-L<small>AB</small>. Options in KNIME and FoodChain-Lab are numbered in square brackets (e.g. [T15]) and can also be found in the screenshots (see *FCL Workshop Gastroenteritis 2017 Screenshots.pdf*). Data to be imported via Excel files can be found in the column F<small>ILES</small>.

To "click" means to click with the left mouse button, to "right-click" means to click with the right mouse button and to "double-click" means to click twice quickly with the left mouse button.

Case definition

<u>for an educational institution in Baden-Württemberg affected by a gastroenteritis outbreak:</u>

- The educational institution (school, day-care centre) offers menus from external caterers for all children.
- Catering is provided by an external caterer.
  - At least 10% of individuals (children, pupils) have fallen ill between 1. Sep and 7. Sep 2014 and show symptoms like diarrhoea or vomitus.

  OR

  - At least 10 individuals* (children, pupils) have fallen ill between 1. Sep and 7. Sep 2014 and show symptoms like diarrhoea or vomitus.

* Including educational institutions not fulfilling the 10% criterion but with at least ten diseased individuals considers the fact that especially in grammar schools and secondary modern schools a substantial proportion of pupils does not eat the meals offered at school. This way schools with many pupils but with a small number of pupils affected can be included in the outbreak investigation.

Cases, aggregated by Educational Institution

Educational Institution	Name	Street	House Number	Postal Code	City	Federal State[1]	Cases	First Symptoms	Laboratory Test Result	Confirmed Cases? (Y/N)-	Lunch by Caterer? (Y/N)	Name of Caterer	Caterer's Principal Office	Establishment Capacity (No. of Children)
School	Primary school 01	Heuweg	1	72417	Jungingen	BW	18	01/09/2014		Y	Y	Caterer 1	Burladingen	146
School	Primary school 02	Lichtensteinweg	1	72393	Burladingen	BW	22	02/09/2014		Y	Y	Caterer 1	Burladingen	173
School	Primary school 04	Stillfriedstraße	1	72379	Hechingen	BW	27	01/09/2014	Norovirus	Y	Y	Caterer 1	Burladingen	187
School	Primary school 05	Steinbeisstraße	1	72501	Gammertingen	BW	12	01/09/2014		Y	Y	Caterer 1	Burladingen	83
School	Primary school 06	Sonnenhalde	1	72532	Gomadingen	BW	22	03/09/2014		Y	Y	Caterer 2	Engstingen	109
School	Primary school 07	Stuttgarter Straße	1	72574	Bad Urach	BW	18	04/09/2014		Y	Y	Caterer 2	Engstingen	108
School	Primary school 08	Emil-Mörsch-Weg	1	72555	Metzingen	BW	31	03/09/2014		Y	Y	Caterer 2	Engstingen	128
School	Secondary modern school 01	Brunnenstraße	1	72417	Jungingen	BW	20	01/09/2014		Y	Y	Caterer 1	Burladingen	181
School	Secondary modern school 02	Gammertinger Straße	1	72379	Hechingen	BW	15	02/09/2014	Norovirus	Y	Y	Caterer 1	Burladingen	106
School	Secondary modern school 03	Europastraße	1	72501	Gammertingen	BW	28	02/09/2014	Norovirus	Y	Y	Caterer 1	Burladingen	175
School	Secondary modern school 04	Siemensstraße	1	72818	Trochtelfingen	BW	24	01/09/2014	Norovirus	Y	Y	Caterer 1	Burladingen	166
School	Secondary modern school 05	Auf dem Graben	1	72574	Bad Urach	BW	12	03/09/2014		Y	Y	Caterer 2	Engstingen	103
School	Secondary modern school 06	Orffweg	1	72555	Metzingen	BW	17	03/09/2014		Y	Y	Caterer 2	Engstingen	116
Day-care centre	Day-care centre 01	Weilbachstraße	1	72417	Jungingen	BW	25	01/09/2014	Norovirus	Y	Y	Caterer 1	Burladingen	149
Day-care centre	Day-care centre 03	Panoramastraße	1	72393	Burladingen	BW	31	02/09/2014		Y	Y	Caterer 1	Burladingen	180
Day-care centre	Day-care centre 04	Tübinger Straße	1	72379	Hechingen	BW	19	01/09/2014		Y	Y	Caterer 1	Burladingen	191
Day-care centre	Day-care centre 05	Friedrich-Wolf-Weg	1	72379	Hechingen	BW	16	01/09/2014		Y	Y	Caterer 1	Burladingen	96
Day-care centre	Day-care centre 06	Eichertstraße	1	72501	Gammertingen	BW	24	01/09/2014		Y	Y	Caterer 1	Burladingen	146
Day-care centre	Day-care centre 07	Kapelleschweg	1	72818	Trochtelfingen	BW	24	01/09/2014		Y	Y	Caterer 1	Burladingen	168
Day-care centre	Day-care centre 08	Sperberweg 28	1	72829	Engstingen	BW	24	03/09/2014		Y	Y	Caterer 2	Engstingen	145
Day-care centre	Day-care centre 09	Bannholz	1	72532	Gomadingen	BW	18	04/09/2014		Y	Y	Caterer 2	Engstingen	140
Day-care centre	Day-care centre 10	Eichbergstraße	1	72813	Sankt Johann	BW	32	03/09/2014		Y	Y	Caterer 2	Engstingen	122
Day-care centre	Day-care centre 11	Schillerstraße	1	72574	Bad Urach	BW	24	04/09/2014		Y	Y	Caterer 2	Engstingen	115
Day-care centre	Day-care centre 12	Im Altweck	1	72585	Riederich	BW	10	03/09/2014		Y	Y	Caterer 2	Engstingen	67
Day-care centre	Day-care centre 13	Bachstraße	1	72585	Riederich	BW	31	03/09/2014		Y	Y	Caterer 2	Engstingen	124
Day-care centre	Day-care centre 14	Wangstraße	1	72813	Sankt Johann	BW	36	03/09/2014		Y	Y	Caterer 2	Engstingen	132
School	Grammar school 01	Gammertinger Straße	1	72379	Hechingen	BW	18	01/09/2014	Norovirus	Y	Y	Caterer 1	Burladingen	110
School	Grammar school 02	Hechinger Straße	1	72501	Gammertingen	BW	19	02/09/2014		Y	Y	Caterer 1	Burladingen	110
School	Grammar school 03	Schillerstraße	1	72818	Trochtelfingen	BW	18	01/09/2014		Y	Y	Caterer 1	Burladingen	152
School	Grammar school 04	Stuttgarter Straße	1	72574	Bad Urach	BW	33	04/09/2014		Y	Y	Caterer 2	Engstingen	176
School	Grammar school 05	Im Millert	1	72555	Metzingen	BW	11	03/09/2014		Y	Y	Caterer 2	Engstingen	92

[1]   BW – Baden-Württemberg

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
08 Sep 2014	Members of the outbreak investigation team have visited educational institutions. They found out more about the caterers and their menus. As a first bit of information you are provided with three tracing documents containing meals served in schools.	Import the three delivery lists into the FoodChain-Lab-Database.	**Data import into the database** • Choose **Food-Lab → Open DB Gui… [K2]** in the menu to open the internal FoodChain-Lab database. • In the database window 　• First, empty the database by clicking **Reset [DB9]** 　• Click the **Table import [DB1]** button in the upper-left corner. 　• A dialogue opens. Choose the files indicated in the FILES column. You find them in the **folder "Start tracing templates 1"**. To select several files press Ctrl on the keyboard while selecting them with the mouse. To select all files press Ctrl+A. Click on **Open** to import the caterer information into the database. 　• A windows pops up saying "Import successful!" → click **OK**.	Start_Tracing_Primary school 01.xlsx Start_Tracing_Primary school 02.xlsx Start_Tracing_Secondary modern school 01.xlsx
08 Sep 2014	Outbreak investigators have visited all schools and day-care centres with cases (see page 4) and have entered data into the Start Tracing template for FoodChain-Lab.	Import the delivery lists of both caterers into the FoodChain-Lab-Database. They give information about schools and day-care centres who received menus from this caterer.	**Data import into the database** See above. This time you can find the files in the **folder "Start tracing templates 2"**. Close the database window. **Establish a new KNIME workflow** • Right-click on **LOCAL [K3]** in the KNIME Explorer and choose **New KNIME Workflow**… • Enter a name and click **Finish**. The empty workflow can be seen in the workflow area which is in the centre of the KNIME desktop.	All files in folder "Start tracing templates 2"

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
			Use data from the FoodChain-Lab database in a KNIME-Workflow	

- To be able to see all FoodChain-Lab nodes click in the **Node Repository [K7]** on the small arrow next to the node group FoodChain-Lab **[K8]**.
- Drag the **Supply Chain Reader [K10]** node out of the Node Repository and drop it in the workflow area. This node has access to the internal database.
- Right-click on the node to open its **context menu** and choose **Execute [K5]** to load the database entries into the workflow. That the node has been successfully executed is shown by the traffic light changing from yellow (= configured, ready to be executed) to green (= executed).
- Imported data can be viewed as tables in the outports of the node. The Supply Chain Reader has three outports: Stations, Deliveries and Delivery Relations. These are represented by three arrows on the right of the node **[K4]** and can also be found in the context menu (right-click on the node) **[K9]**.

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
08 Sep 2014		Have a look at the graph in the Tracing View. If you zoom out far enough you will be able to see two clusters.	**Inspect the delivery network with the Tracing View node**	

- Drag the **Tracing View** node **[K11]** from the Node Repository **[K7]** into the workflow and **connect** the first outport of the Supply Chain Reader with the first inport of the Tracing View. Connecting the ports is done as follows: Click the outport and – while still pressing the left mouse button down – drag a line to the inport. Also connect the second and the third outport of the Supply Chain Reader with the second and the third inport of the Tracing View. The inports are on the left of the node **[K6]**.
- The traffic light of the Tracing View changes from red (= no data available) to yellow (= configured, ready to be executed).
- Double-click the Tracing View to inspect the delivery network.
- The editing mode **Transforming [T10]** allows you to drag the network into the preferred position while **Picking [T11]** enables selecting one or many stations and deliveries. **Details** of stations and deliveries may be viewed by double-clicking on them. This can only be done in the picking mode. **Zooming** is always possible, either by clicking the "+" or "-" buttons **[T9]** or by turning the mouse wheel.

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES

08 Sep 2014	Caterers 1 and 2 delivered lunches to 29 schools and day-care centres. In all educational institutions several children had symptoms of gastroenteritis.	Have a look at the data set in the Tracing View and set "Weight" = 1 for all schools and day-care centres to indicate that disease cases were registered there. Additionally, add a legend.	**Set the weight of a station**
			
			• Choose editing mode **Picking [T11].**
			• Open **context menu [T2]** via right-click in the **Tracing View**, then choose **Set Selected Stations [T7]**:
			   • Property **[T3]** = Type of business
			   • Value **[T4]** = Educational institution (choose in the drop-down menu) → OK. Selected stations are now highlighted in blue.
			   • Afterwards right-click → station selection → show properties → set all weight → 1.0 → OK → OK.
			   • If you would like to deselect the selected stations or deliveries click somewhere into the empty space in the Tracing View window.
			   • By double-clicking on an Educational institution you will see the new weight 1.0 in the upmost cell.
			• Mark institutions with disease cases red via right-click → **Set default highlighting [T8]** → OK.
			• To show the **Legend** click on **Activate** below **Show Legend [T12]** in the grey menu bar at the bottom of the Tracing View window.
			• Click **OK [T14]** to save the current view status of the Tracing View node and to close the node. To save all changes of the workflow permanently you need to press the save button in KNIME **[K1]**.	

09 Sep 2014	You notice that two more educational institutions with gastroenteritis cases exist in the list on page 4 of this scenario script. You ask the two day-care centres and get to know that they received meals from Caterer 1. Finally, the two missing Excel sheets can be filled in and used in FoodChain-Lab.	Import the two additional 'Start tracing' templates.	• Import the templates into the database as before (Choose **Food-Lab → Open DB Gui… [K2]**…see above). You can find them in the **folder "Start tracing templates 3"**. • **Reset** and **execute** the Supply Chain Reader with right-click on this node to import the new data sets from the database into the workflow. This step is necessary whenever the database has been updated. • Open the Tracing View. If the graph is not well-arranged, open the context menu with a right-click and choose a layout from **Apply Layout [T5]**, for example Fruchterman-Reingold. • Zoom until you can see both clusters. Set "Weight" = 1.0 for the two newly added educational institutions. • Close the Tracing View with OK.	Start_Tracing_Day-care centre 03.xlsx Start_Tracing_Day-care centre 04.xlsx

Catering Menus on Outbreak Days
(First Forwarding by Kitchens)

Caterer 1

Menu 1 on 1st September 2014

Pasta with ground beef and
tomato sauce

Vanilla pudding with strawberries

Menu 2 on 3rd September 2014

Potato soup with bread

Fruit yoghurt

Caterer 2
3/9/14

Menu 1

Semolina pudding with
strawberry compote

Menu 2

Turkey goulash with
rice
Fruit quark

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
09 Sep 2014	Data on meals from two caterers have been imported. We know now which caterer provided menus to which day-care centre or school. Now, we need to know the ingredients of the menus and who supplied these to the caterers.	Generate an Excel document to collect the menu ingredients and suppliers. The generated files concerning the caterers can be completed either by local food inspectors or by the caterers themselves.	• Open the DB GUI • Click on icon **Generate backward tracing templates - for a specific type of business (or all) [DB3]**. • Choose for which business types templates should be generated (default = all) **[DB7]**. To find knowledge gaps it is best to keep all boxes ticked. • You are asked for an output folder for the templates. Choose or create a folder and click **Save**. A message will be displayed as soon as the templates have been created in the chosen folder.	
09 Sep 2014	Send the generated backward tracing templates to the caterers to have them filled.			
09 Sep 2014	While you are tracing the food chain, interviews are conducted: Children from schools and day-care centres are asked which menus they have eaten on the days of disease onset.			
10 Sep 2014	A day later the caterers send the filled backward tracing templates of the menus including food component suppliers.	Import the completed backward tracing templates.	• Use the table import in the DB GUI as before. You can find the files in the **folder "Backward tracing templates 1"**	StationBacktrace_request_Caterer 1_complete.xlsx StationBacktrace_request_Caterer 2_complete.xlsx

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
10 Sep 2014	Mistakes can always slip in – be it a table created by human beings or the automatically generated export from a business database. You want to be sure and this is why you check all the data collected in the database.	A similarity search is recommended after importing data into the database. Investigate for faulty addresses or duplicate entries. Correct the mistakes.	**Similarity search in the FoodChain-Lab database** • After the data import click the button **Similarity Search [DB2]** in the database window. Tick Station, Product, Lot and Delivery **[DB8]**, keep the default settings and click OK. • Please have in mind that the algorithm searches for small differences. These do not need to be mistakes, but may also be desired differences between two similar data sets. In such a case, click OK to skip a search result and switch to the next result. Clicking Cancel closes the search results window. • You find duplicate entries. These can be **merge**d as follows: left-click the ID of the data row you would like to keep and press Ctrl+C to copy it. Then right-click on the ID to be deleted and enter the ID of the other data set in the new window by pressing Ctrl+V. Click OK -> Yes -> OK. • Check one duplicate after another and close each by clicking OK. • Close the database window.	

10 Sep 2014	Obviously, several component suppliers delivered products / ingredients to both caterers. Which of these may have been contaminated with the pathogen?
	
	Noroviruses could be detected in some cases (see page 4), but not yet in food items. Noroviruses are known to stay intact in poorly heated or non-heated foods. As the virus was ingested via salad, berries, raw vegetables and also bivalve molluscs in past outbreaks, these foods are of special interest when screening the ingredients lists.
		Visualise the delivered foods in the Tracing View. Are there any foods which were sent to both caterers? In these food items the supplier might have delivered the agent as well. For an easier tracing of foods label the arrows with the food name.	• **Reset** and **execute** the Supply Chain Reader, if you have not done so after the last data import into the database.
			• Open the Tracing View by double-clicking the node.
			
			Highlighting the flow of products / ingredients in the Tracing View
			• Right-click for context menu → Delivery Highlighting **[T6]** → Edit → Add:
			  • Type = Apply to all
			  • Name = Food items
			  • Deselect "Use Color"
			  • Label = Name
			  • OK
			  • To close the Highlight Condition List click OK
			• If you cannot read the ingredient names, open the context menu with a right-click and choose a layout from **Apply Layout [T5]**, for example Self-Organizing Map or Fruchterman-Reingold. You could also zoom in, either by clicking the "+" button **[T9]** or by turning the mouse wheel.	

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
10 Sep 2014	From caterers 1 and 2 you learn that vanilla pudding, fruit quark and frozen strawberries had not been heated during the preparation of the meals.	Test the hypothesis that one of the ingredients is contaminated to get an idea what impact this could have on stations of the food chain. To do so, set these products "observed" one after another and have a look at the forward and backward trace. Please keep in mind that despite affirmation the menus might not have been heated enough to kill noroviruses. In this case additional suppliers and products might be the source of the pathogen. Questions: • Due to the type of ingredient and the supply relationships, which of the suppliers could have delivered products contaminated with noroviruses? • Is there a product or an ingredient from which the forward trace (orange) leads to most or even all outbreak cases (red)? • What are your next steps? Tracing? Sampling? • In which company would you take samples first if you had too few outbreak investigators to take samples in all suspicious companies?	**Mark deliveries "observed"** • Right-click → set selected deliveries: • Property = Name • Value = e.g. "Frozen Strawberries" (select in drop-down menu or start typing and choose from the suggestions) • OK • Afterwards, right-click → delivery selection → show properties → set all observed = true → OK →OK • You could also define "Observed" by double-clicking on an arrow and activating "Observed" For comparison, repeat this procedure with the other suspicious products. Before observing another product click "Reset Observed" **[T1]** and mark the next product as described above. • Close the Tracing View with OK.	

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
11 Sep 2014	You have the strong suspicion that *Frozen Fruit Sales*, the company which produced bags of frozen strawberries, might be the key to the gastroenteritis outbreak. Both caterers received frozen strawberries with the same lot number. You examine the whole company, take samples and ask for the supplying strawberry farms. Also, the other recipients of the strawberries are of interest. In the evening, the samples are sent to the laboratory.	Export a <u>backward</u> tracing template for *Frozen Fruit Sales* to collect information on the suppliers of this company.	Open the DB GUI • Click on the icon *Generate backward tracing templates - for a specific station* **[DB4]**. • In order to find *Frozen Fruit Sales* in the new window *Select Station*, you can either start typing "frozen" into the search box at the top or you can scroll through the list. It can be sorted by clicking on a the column headline. • Export a template for *Frozen Fruit Sales* by clicking the *Select* button at the beginning of the row. Then choose or create a folder and click **Save**.	
		Export a <u>forward</u> tracing template for *Frozen Fruit Sales* to collect information on the customers of this company.	In the DB GUI • Deselect *Generate only the missing data* **[DB5]**. Because there is already information on *Frozen Fruit Sales* in the database, no forward tracing template would be generated without deselecting this option. • Click on the icon *Generate forward tracing templates - for a specific station* **[DB6]** and export a template for *Frozen Fruit Sales*.	
11 Sep 2014	You send the generated backward and forward tracing templates to Frozen Fruit Sales to have them filled. The same day, the company provides you with the desired information.	Import the completed backward tracing templates.	In the DB GUI • Import the completed backward tracing template for *Frozen Fruit Sales*. You can find the file in the **folder "Backward tracing templates 2"**	Stationbacktrace_request_Frozen Fruit Sales_complete.xlsx
		Import the completed forward tracing templates.	In the DB GUI • Import the completed forward tracing template for *Frozen Fruit Sales*. You can find the file in the **folder "Forward tracing templates 1"** To do in KNIME • **Reset** and **execute** the Supply Chain Reader to get the imported data into the workflow. • Open the Tracing View.	StationFwdtrace_request_Frozen Fruit Sales_complete.xlsx

DATE	STORY	TASKS	WHAT TO DO IN FOODCHAIN-LAB	FILES
12 Sep 2014	According to the information from *Frozen Fruit Sales*, Caterer 3 received the same frozen strawberry lot as Caterers 1 and 2. You ask Caterer 3 to which addresses lunches were delivered.	Generate a forward tracing template, send it to Caterer 3 and let him fill it.	In the DB GUI • Click on the icon *Generate forward tracing templates - for a specific station* **[DB6]** and export a template for Caterer 3. • Select an output folder for the templates.	
		Import the completed delivery list from Caterer 3 and have a look at the trace.	In the DB GUI • Import the completed forward tracing data sheet into the database. You can find the file in the **folder "Forward tracing templates 2".** • Close the database window To do in KNIME • **Reset** and **execute** the Supply Chain Reader to get the imported data into the workflow. • Open the Tracing View. If the frozen strawberries have not been marked "observed", yet, do so now (see above).	StationFwdtrace_request_Caterer 3_complete.xlsx
12 Sep 2014	According to the trace, the two additional educational institutions should have reported gastroenteritis cases. However, two quick phone calls later you know that nobody is ill. You interview Caterer 3 again and learn that the fruits were processed to strawberry purée and boiled. By boiling the strawberry purée Caterer 3 has obviously inactivated the included noroviruses and prevented the spread of the disease.	Change the network status so that educational institutions connected to Caterer 3 are not predicted to have gastroenteritis cases.	**Telling FoodChain-Lab that a pathogen is inactivated in a station** • Double-click the station "Caterer 3". • Activate the checkbox **Kill Contamination [T15]**.	

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13 Sep 2014	From the interviews with children you learn that the majority of cases have eaten menu 1 from Caterer 1 or menu 1 from Caterer 2. Both menus contained frozen strawberries, so the current assumption that these fruits might be contaminated is backed. Menu ingredients are tested for noroviruses. In the kitchen of Caterer 1 noroviruses could be detected in a closed bag of frozen strawberries with the Lot No. 108. Caterer 2 used the same lot, but unfortunately, he could not provide a retained sample. Frozen strawberries sampled at *Frozen Fruit Sales* showed a contamination in one sample, but the signal was very weak and could not be confirmed in a repeated test run. However, it is essential to prevent additional disease cases. Evidence is strongest for frozen strawberries with Lot No. 108. The supplier is asked to withdraw this lot from the market.			

Final Remark

It remains unclear how the frozen strawberry lot became contaminated. One suggestion is, that an ill staff member and poor hygiene in the company *Frozen Fruit Sales* might be the reason. Another one might be that one of the three strawberry farmers has delivered contaminated fruits and that during the washing procedure in *Frozen Fruit Sales* the noroviruses were spread onto all strawberries. Unfortunately, no strawberries were kept as retained sample by *Frozen Fruit Sales*.

Disclaimer

This scenario was inspired by the Norovirus outbreak in Germany in 2012. However, all stations and deliveries are fictitious. If there is by chance any similarity to existing food businesses, this was not intended