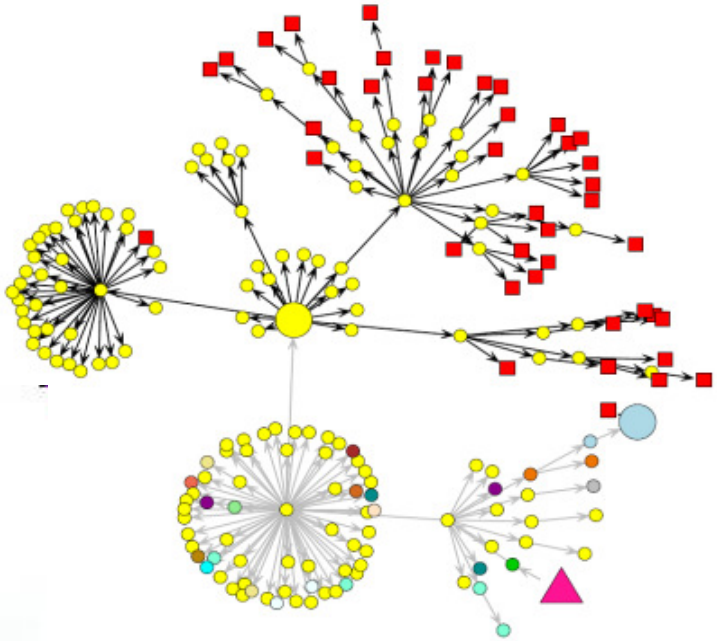
GERMAN FEDERAL INSTITUTE FOR RISK ASSESSMENT

BfR
Bundesinstitut für Risikobewertung

FoodChain-Lab: an innovative tool to increase food safety through supply chain analyses



Marion Gottschald, Alexander Falenski, Marco Rügen, Birgit Lewicki, Isaak Gerber, Dominic Tölle, Annemarie Käsbohrer and Armin A. Weiser

Globalised food supply chains

Challenges

Globalised supply chains **facilitate**

- Outbreaks/crises (fast and thorough spread of contaminated food items)
- Food fraud

Globalised supply chains **increase**

- Complexity of risk/ exposure assessments

EHEC

norovirus

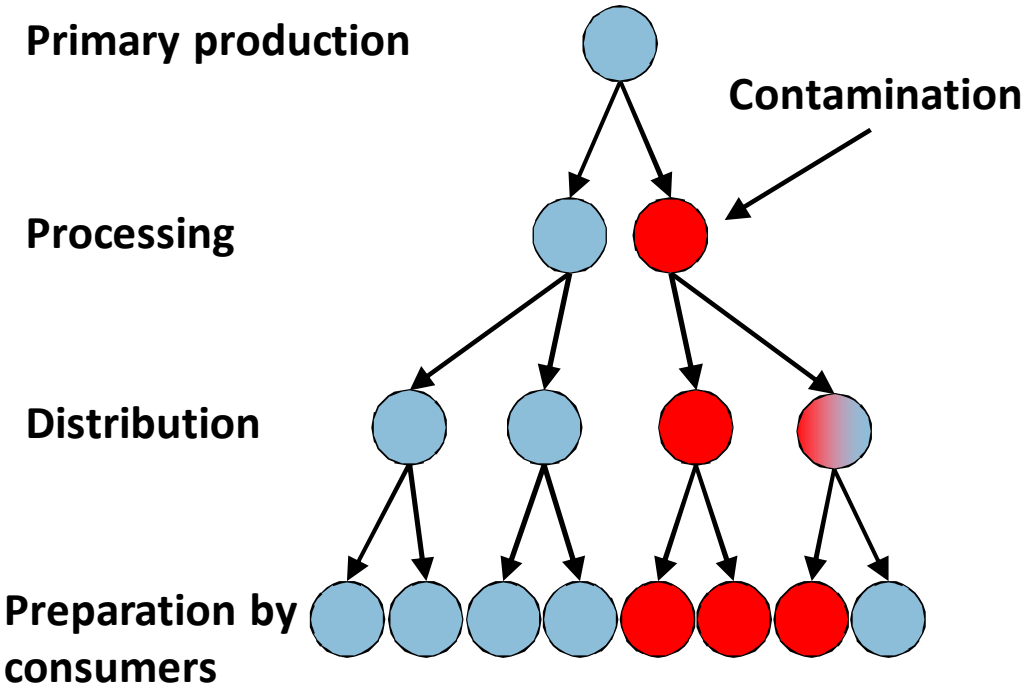
dioxin

Ercsey-Ravasz M et al. (2012) Complexity of the International Agro-Food Trade Network and Its Impact on Food Safety. PLoS ONE 7(5): e37810. doi:10.1371/journal.pone.0037810

Importance of e-tools

Traceability in foodborne crises

Foodborne disease outbreak affecting multiple locations/countries



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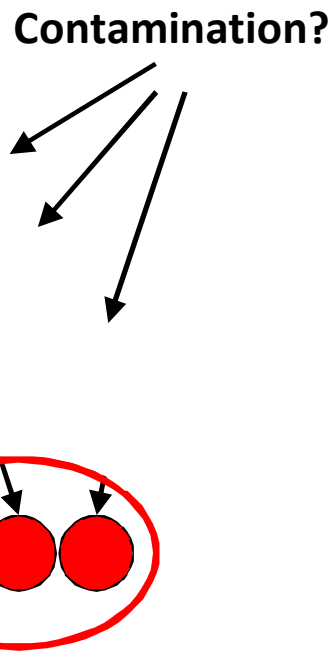

The outbreak investigation teams can only see cases

Traceability in foodborne crises

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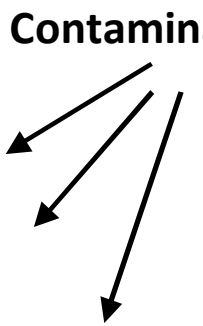

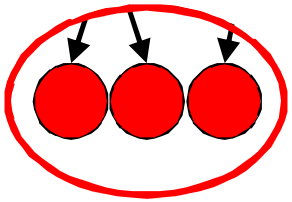

The outbreak investigation teams can only see cases

Tracing

Interview: Who ate what, when, where, how much and how?

→ Suspicious product?

Traceability in foodborne crises

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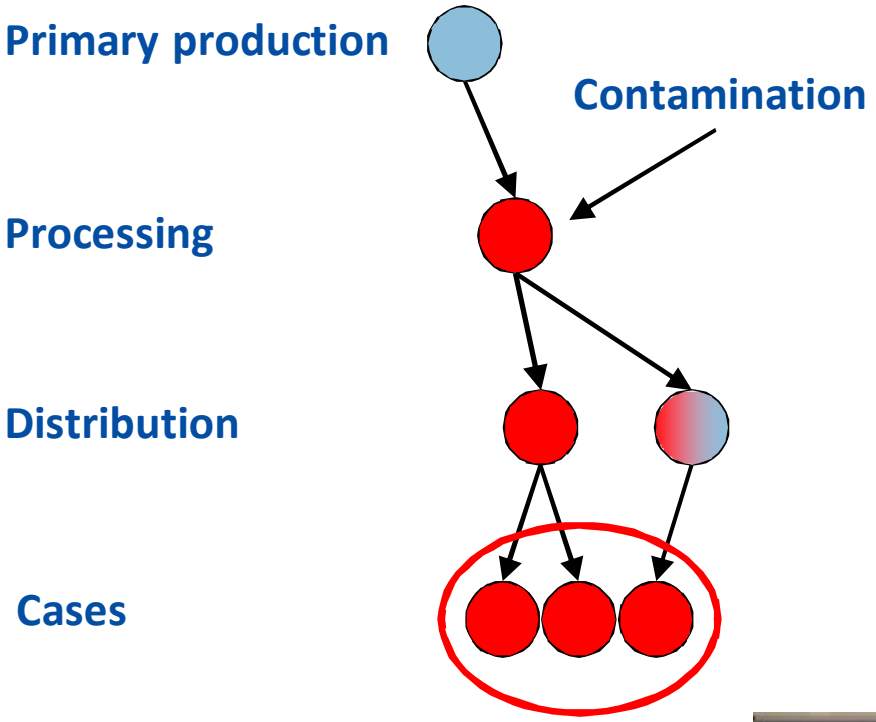
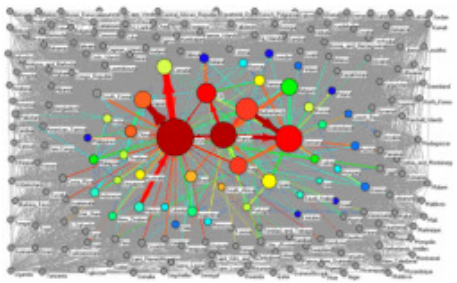


Backtracing

- Step-by-step upstream the supply chain (REGULATION (EC) No 178/2002)
- Collecting delivery data for suspicious products and their ingredients
- Combine fragmented information
- Origin of contamination?



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Food Chain Lab
Powered by BfR

FoodChain-Lab – What is it?

- Tool to trace back and forward suspicious food items along complex supply chains to help solving foodborne crises (outbreaks, chemical contaminations)
- Free open source Software

  https://foodrisklabs.bfr.bund.de

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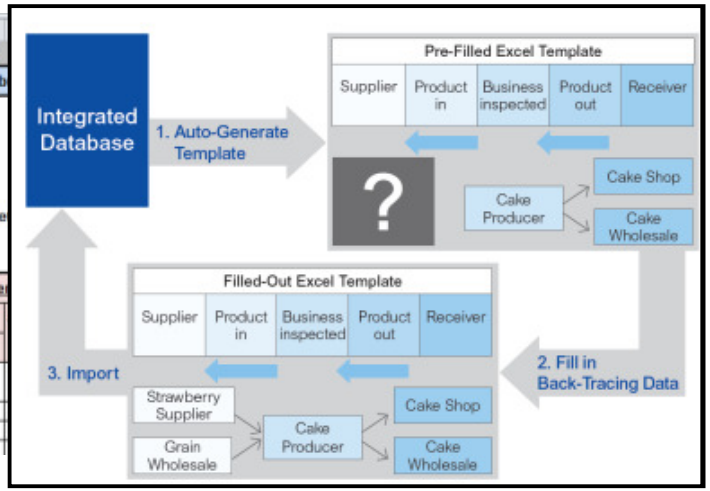
- Database for managing food tracing data

	A	B	C	D	E	F	G	H	I	J	K
1	**Anzufragender Betrieb:**		**Fall 1**			**[Adresse]**					**[Land]**
2	Bei Rückfragen bitte einfach Kontakt aufnehmen mit dem BfR FoodRiskLabs-Team, +49 (30) 18412-4444, foodrisklabs@bfr.b										
3	**Produkte im Fokus:**	**relevanter Zeitraum des Verkaufs:**	**Erkrankungs beginn (EB):**								
4			21.07.2017								
5											
6	Bitte alle angelieferten Produkte chargengenau erfassen, auf die die Produktbeschreibungen passen und die in dem relevanten Zeitraum verkauft worden sind										
7	Sollten weitere Informationen vorliegen zurück bis zum Hersteller - bitte als neue Zeile miterfassen und im Kommentarfeld aussagekräftig vermerken auf welche Lieferke bezieht										
8	Sollte der Lieferant der Hersteller des Produktes sein, bitte im Kommentarfeld vermerken										
9	**Lieferant**				**Produkt**		**Lotinformation**		**Liefe**		
10	**Name**	**Adresse (Straße Hausnummer, PLZ Ort)**	**Land**	**Betriebsart**	**Bezeichnung**	**EAN**	**Chargennummer**	**MHD oder Verbrauchsdatum**	**Lieferdatum**		
11									**Tag**	**Monat**	**Jahr**
12	Tante Emma Laden	Musterstraße 1, 12345 Musterstadt	DE		gemischtes Hackfleisch						
13											
14											
15											



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  - Cleaning/validation (e.g. duplicate detection)
  - Enrichment (e.g. geocoding)

M	A	Y	O	N	N	A	I	S	E
=	=	=	=	=	-	=	=	=	=
M	A	Y	O	N		A	I	S	E

B	I	O	M	R	A	K	T
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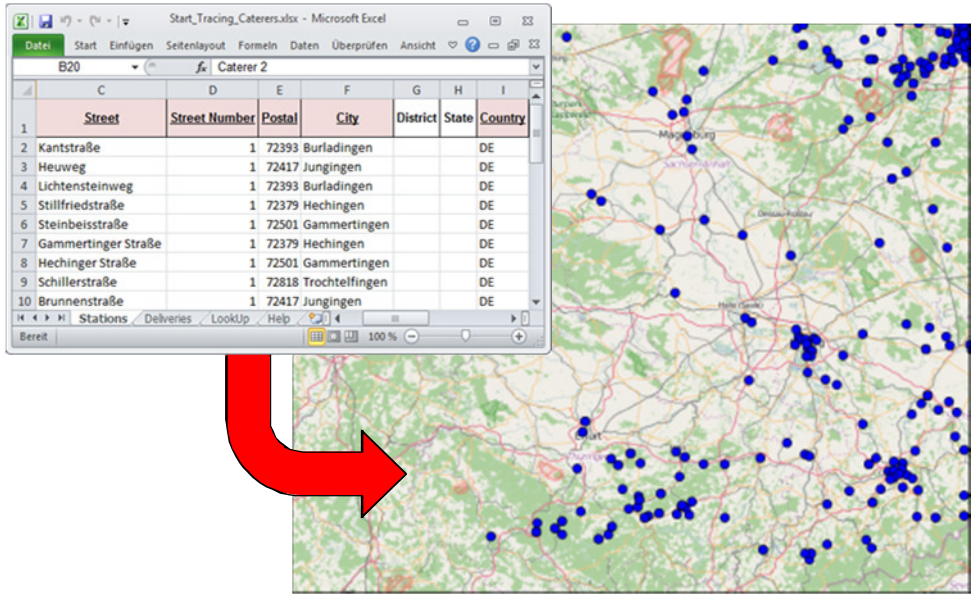

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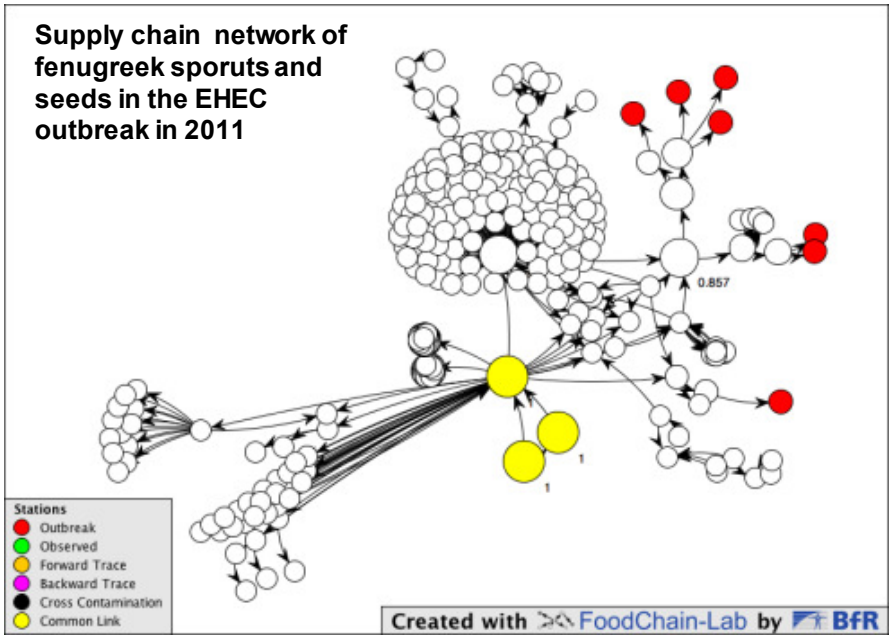
  - Automated visualisations according to nature of the delivery relations



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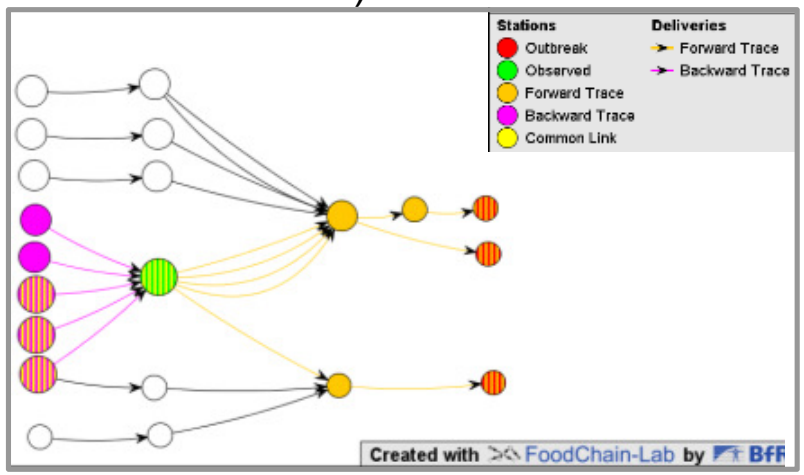
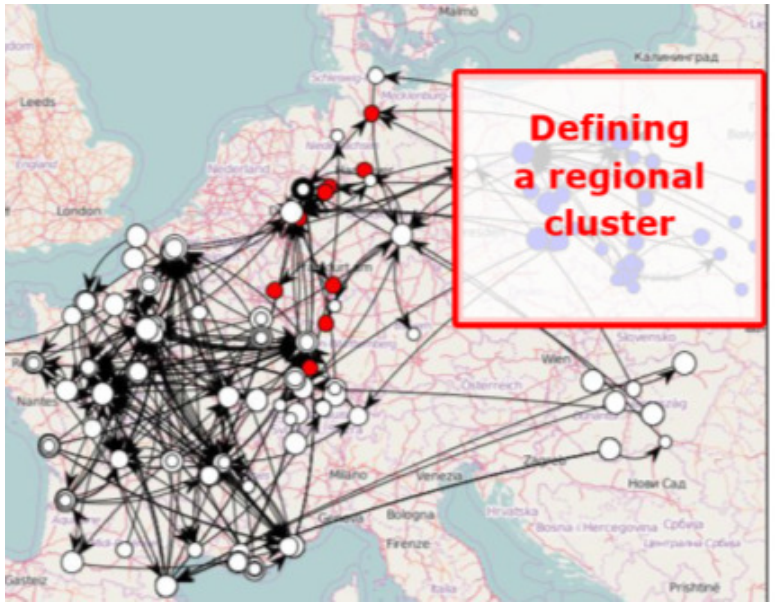
  - Automated visualisations according to nature of the delivery relations
- Analyses/simulations
  - Tracing, scoring, clustering, cross contamination, etc.





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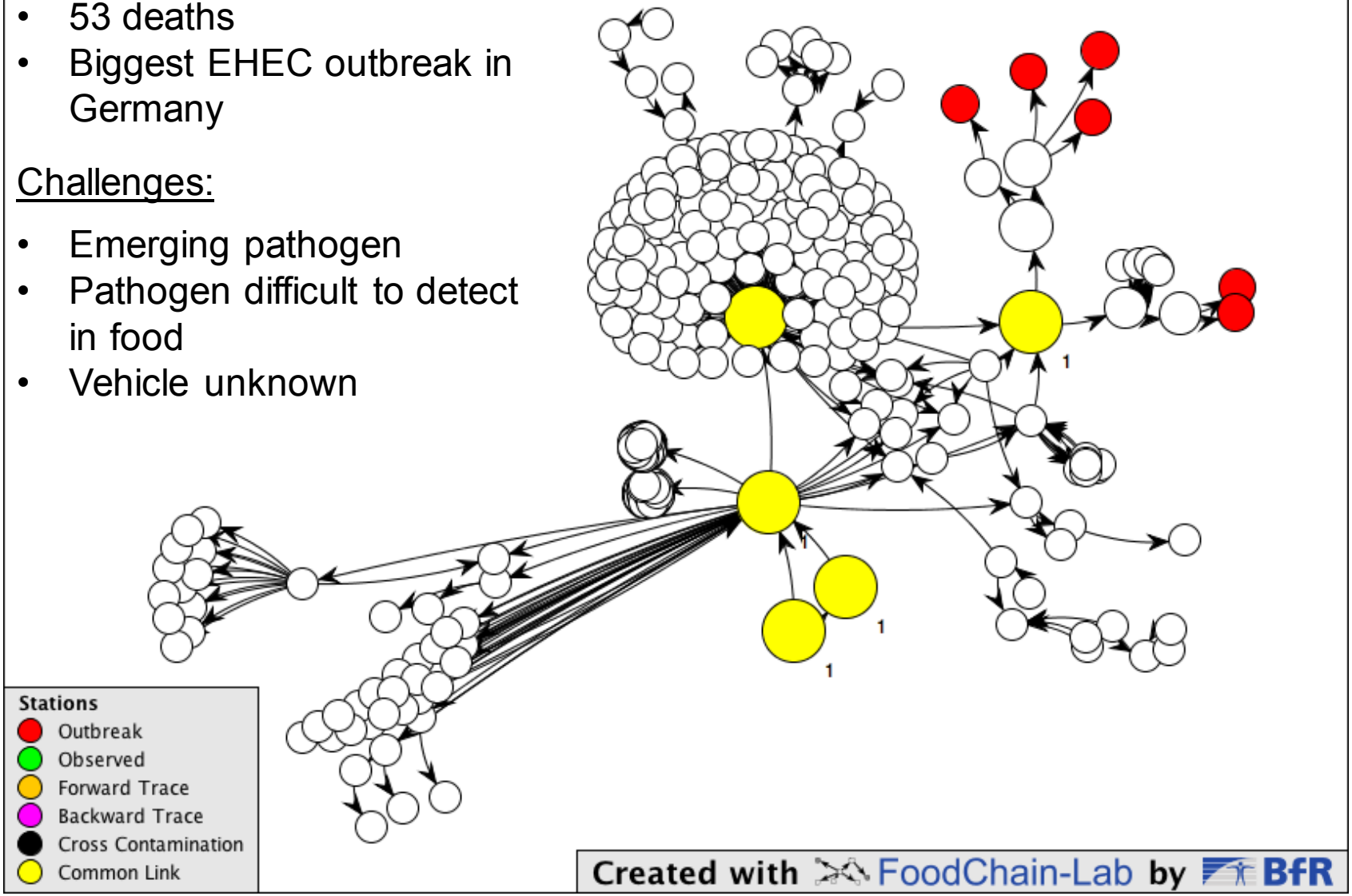
Successful applications of FoodChain-Lab

EHEC 2011

- Over 4000 cases (HUS + gastroenteritis)
- 53 deaths
- Biggest EHEC outbreak in Germany

Challenges:

- Emerging pathogen
- Pathogen difficult to detect in food
- Vehicle unknown



Other applications

DE:
Norovirus 2012
Salm M. 2015
EHEC 2017
Fipronil 2017

EU:
HAV 2013/14
C. Bot. 2017 (Plötze)
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UK:
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AT:
Listeriosis 2015-17

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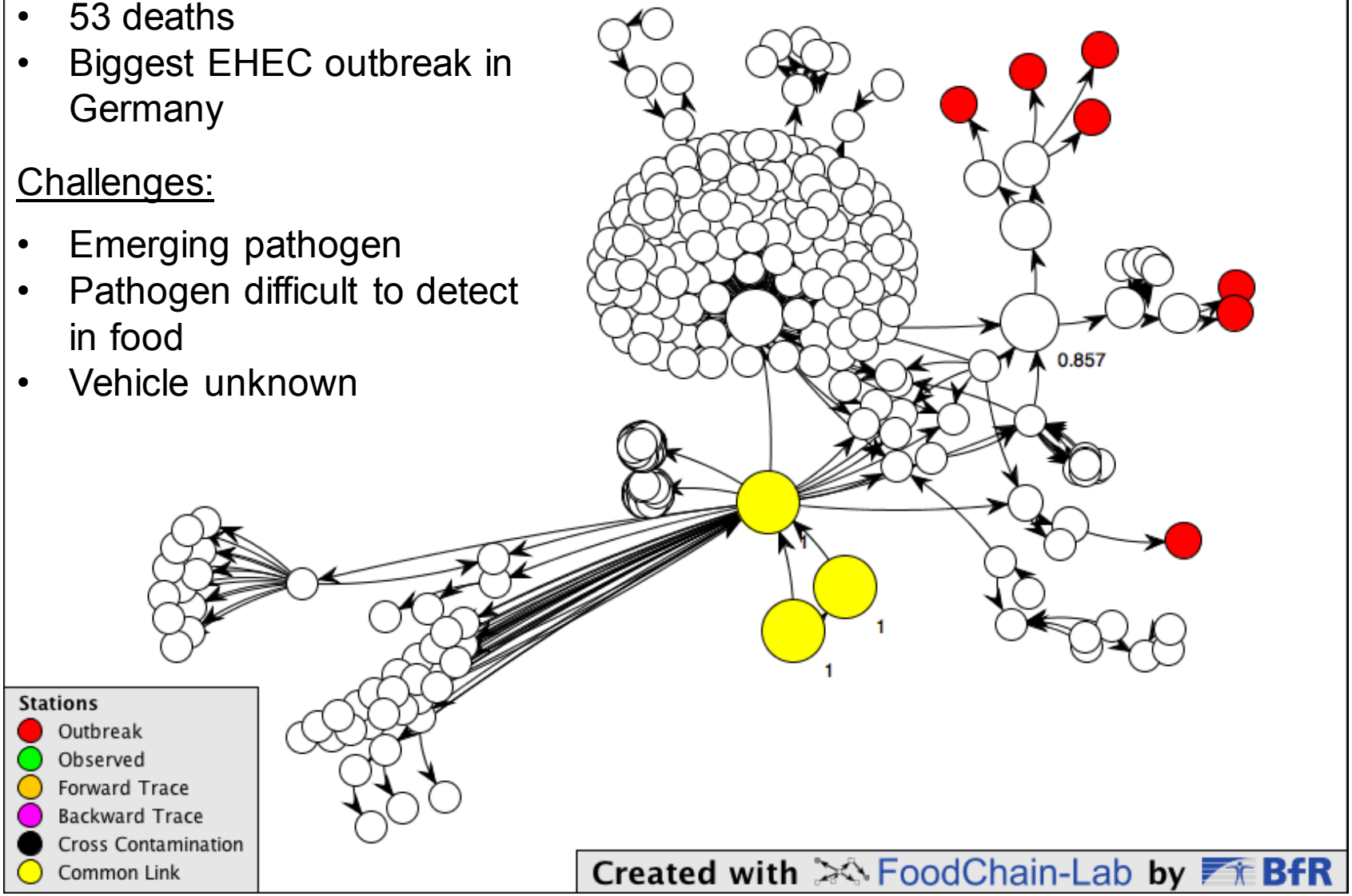

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FCL support team

→ in the framework of EFSA-BfR cooperation

Autonomous application of FCL during outbreak investigations:
→ UK, AT, HU

Recent:

- 2017: forward tracing of eggs and egg products contaminated with fipronil
- 2017: backtracing of minced meat and sausages during EHEC outbreak in Germany
- 2018: forward tracing analysis in listeriosis outbreak in Austria to associate location of cases with distribution of the suspect products

Current:

- tracing analysis in multicountry Salmonella Enteritidis outbreak (NO, DE, LU, UK)

Near future (decision pending):

- forward tracing analysis in listeriosis outbreak in North Rhine-Westphalia;
- multicountry HAV outbreak
- listeriosis outbreak in Germany

Support needed?
Please contact foodrisklabs@bfr.bund.de or +49 30-18412-88888

Outlook

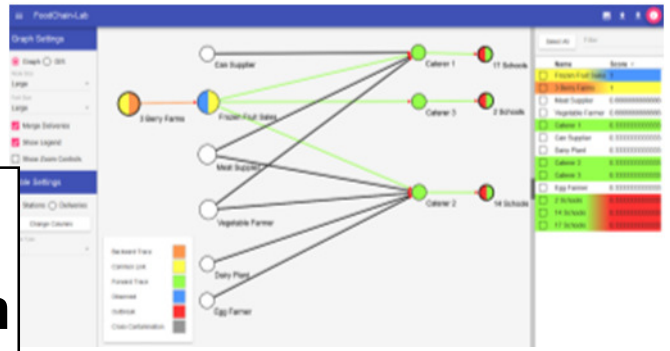
FoodChain-Lab – Where does the road take us?

Food Chain Lab
Powered by BfR

The Tracing (Web-) Portal

Data Collection
RASFF
Local
Bulk

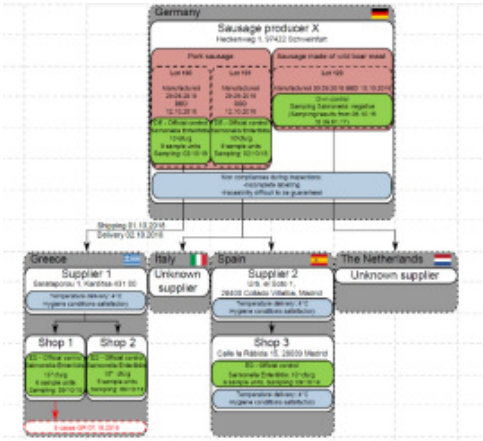
Data Analysis & Visualization



Reporting

Sync with Desktop App

KNIME



https://fcl-portal.bfr.berlin/

Outlook

FoodChain-Lab – Where does the road take us?

- **Implementation as FCL web application**
  - Browser-based
  - Easy and intuitive user interface, visualisation and analysis tools
  - Additional automated layout styles
  - JSON-based data exchange with FCL desktop version
  - Data remains on client side to ensure data protection (future: central data management)

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Outlook

FoodChain-Lab – Where does the road take us?

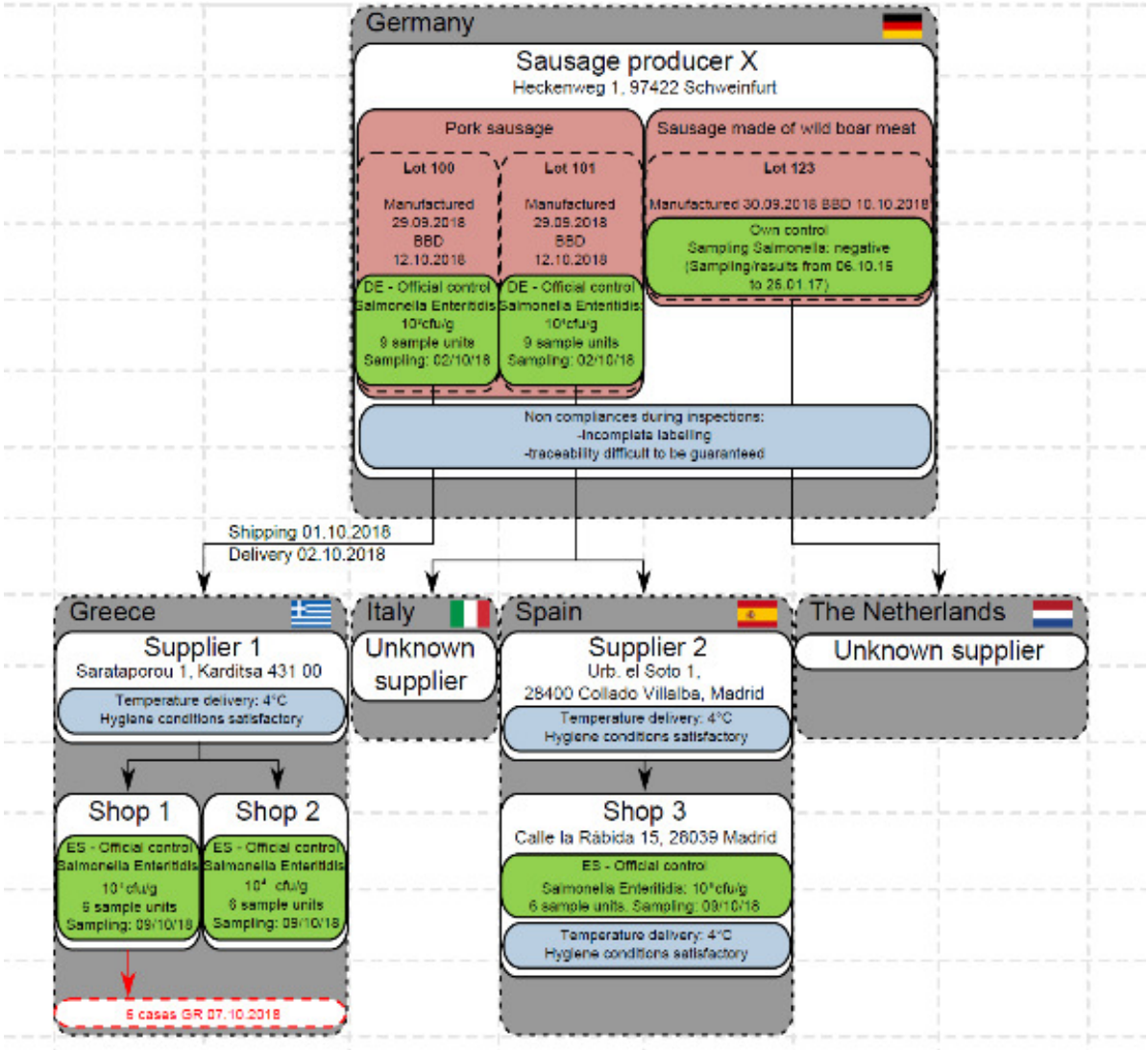
The local view – Improved quality of tracing data through guided data assessment (local authorities):

Development of a browser-based data collection form

- Initiative of German Federal State North-Rhine Westphalia in cooperation with BfR, EFSA, BVL
- Guided data assessment
- On-site plausibility checks
- Interfaces to registers providing master data and RASFF system
- To be applied during foodborne events/crises
- Developed in a way to allow a potential German-wide/EU-wide application if requested
- 2019: test pilot version data entry mask in real-world tracing exercise

Outlook

FoodChain-Lab – Where does the road take us?

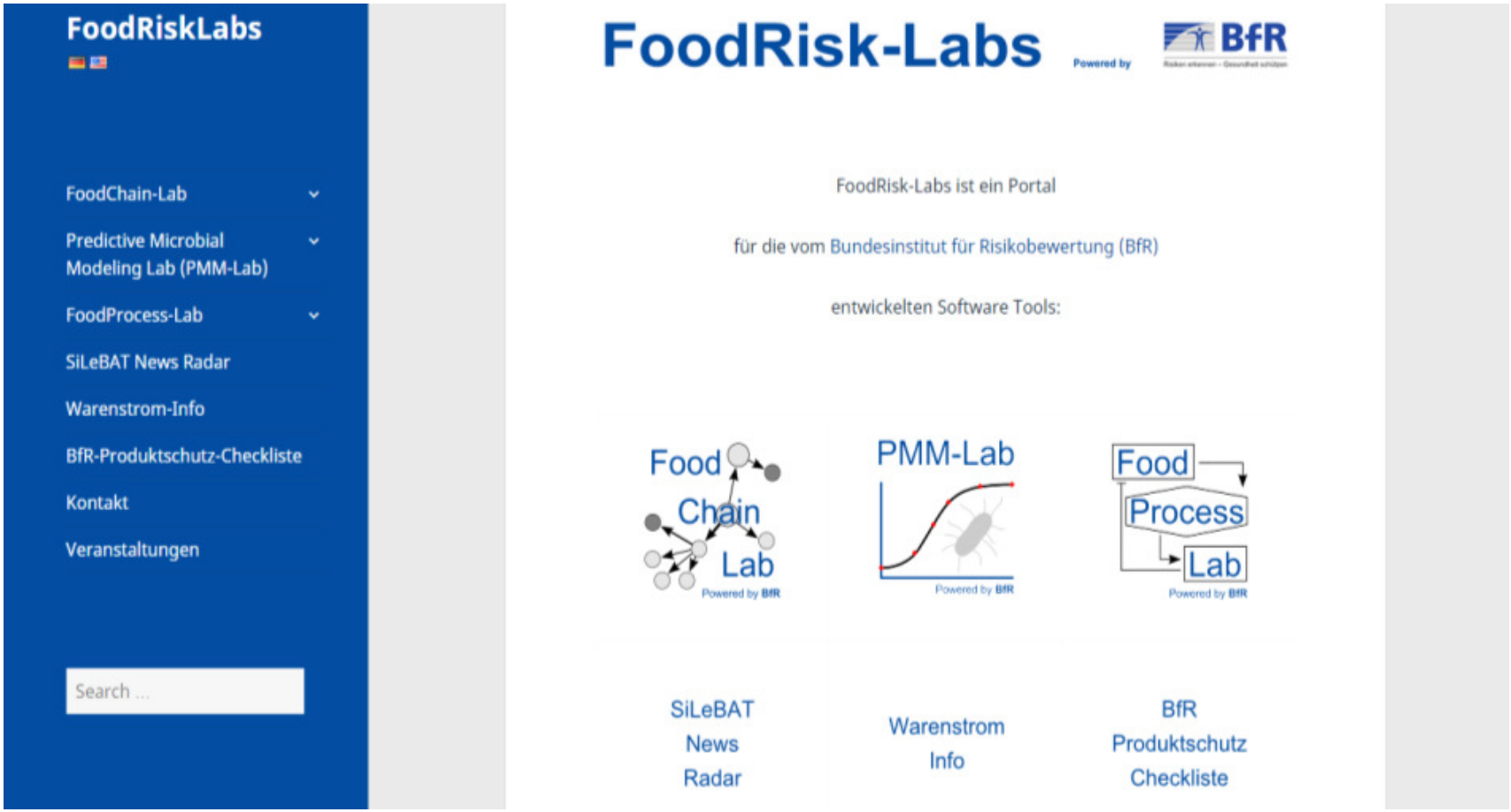


Benefits of using FoodChain-Lab

- Unifies all available tracing information in one database and visualization
- All steps integrated in one modular framework
  - Data Management
  - Data Cleaning
  - Data Analysis (automated, calculation of scores)
- Helps during Outbreak Investigation
  - Assists in Brainstorming / Prioritizing
  - Identifies missing data
  - Tests hypotheses and generates new ones
- Support through FCL support team

https://foodrisklabs.bfr.bund.de

FoodChain-Lab software to download
Tutorials, scenario, events/workshops



FoodChain-Lab Team
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Thank you for your attention

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