

OUTPUTS OF THE EURO-FBP COST ACTION (FA1408)

EURLP Annual Meeting – Rome, May 2019

Lucy Robertson, NMBU, Oslo, Norway



EURO-FBP

EUROPEAN NETWORK FOR FOODBORNE PARASITES

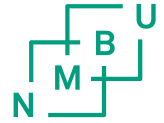
Food and Agriculture Domain Committee Hearings meeting:
26 September 2014, Limassol, Cyprus

Professor Lucy Robertson, NMBU, Oslo, Norway

European Network for Foodborne Parasites

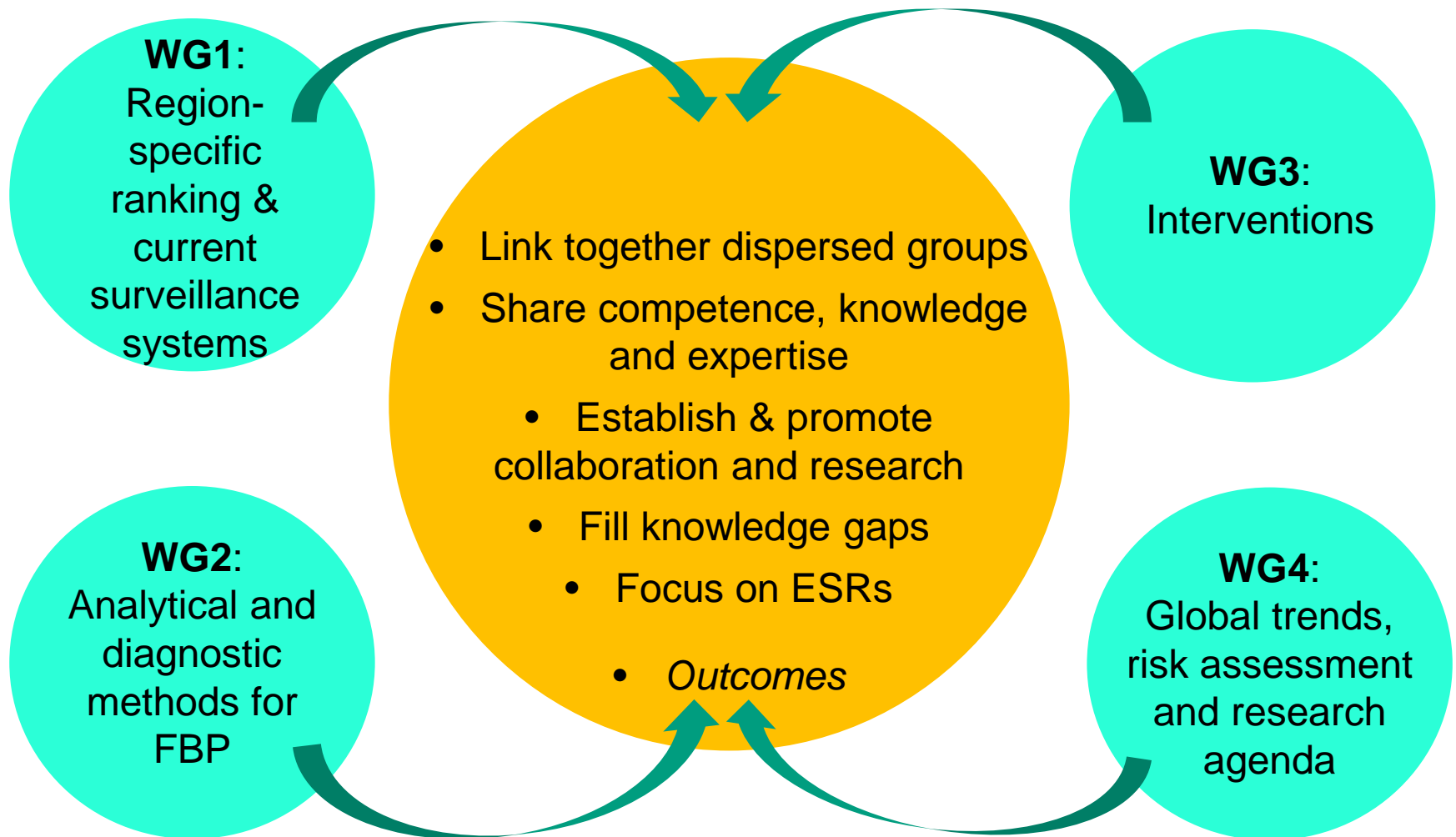
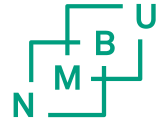
- The overall aim of EURO-FBP is to **decrease impact** on human health from FBP through establishing a **risk-based control programme** containing **robust and appropriate protective strategies**.
- EURO-FBP will use an **interdisciplinary One Health perspective** to assimilate information, coordinate research, and harmonize:
 - Diagnostics
 - Surveillance
 - Analytical methods
 - Potential interventions and mapping of global trends.
- EURO-FBP will **pinpoint knowledge gaps** and **focus resources strategically for control** of FBP in Europe, and globally

Expected Benefits and Impacts



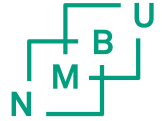
SHORT-TERM / IMMEDIATE	MEDIUM-TERM	LONG-TERM
Forum for cost-efficient collaboration, sharing, communication	Multi-disciplinary collaborative research projects	Fewer FBP-related diseases
Region-specific ranking	Evidence-based prioritisation of research	Positive effects on public health
Overview of surveillance systems for inclusion of FBP	Updatable maps with methods and QC	Positive effects on economy
Knowledge-transfer and harmonisation of techniques	Position documents and recommendations	Prolongation beyond the Action life-span by including early-stage researchers
Identification of potential interventions and consideration of future effects of global drivers	Provision of insights, action opportunities and user-oriented agenda for stakeholders, policy makers and regulators	Technology development for use globally

Strategy





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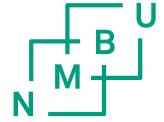
COST Action
Final Achievement Report
(30/03/2015 to 29/03/2019)

**FA1408: A European Network for Foodborne
Parasites (Euro-FBP)**



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European Network for Foodborne Parasites

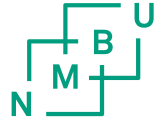
Overview of Action



- From April 2015 until 2019 (4 years)
- Around 150 members from 37 countries
- 4 WG – each with leader and deputy



WG1: Region-specific ranking & current surveillance systems



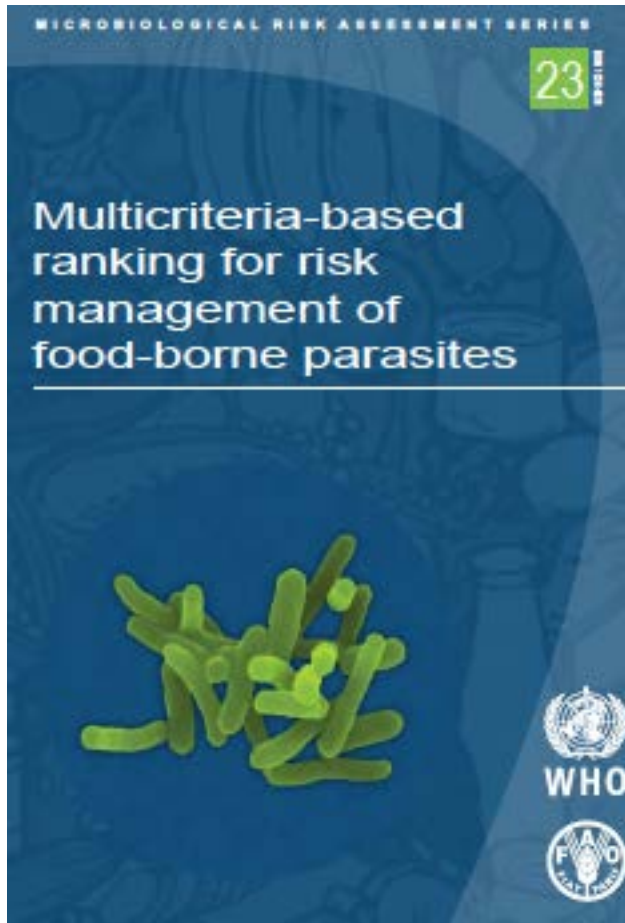
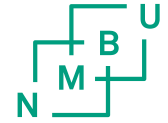
- Leader – Joke van der Giessen (RIVM, NL)
- Deputy – Jacinto Gomes (INIAV, PT)

- 3 sub-tasks
 - ST1.1: A Europe-wide ranking of FBP using the WHO/FAO methodology.
 - ST1.2: Developing a background terminology lexicon
 - ST1.3: Investigation of surveillance for FBP in Europe



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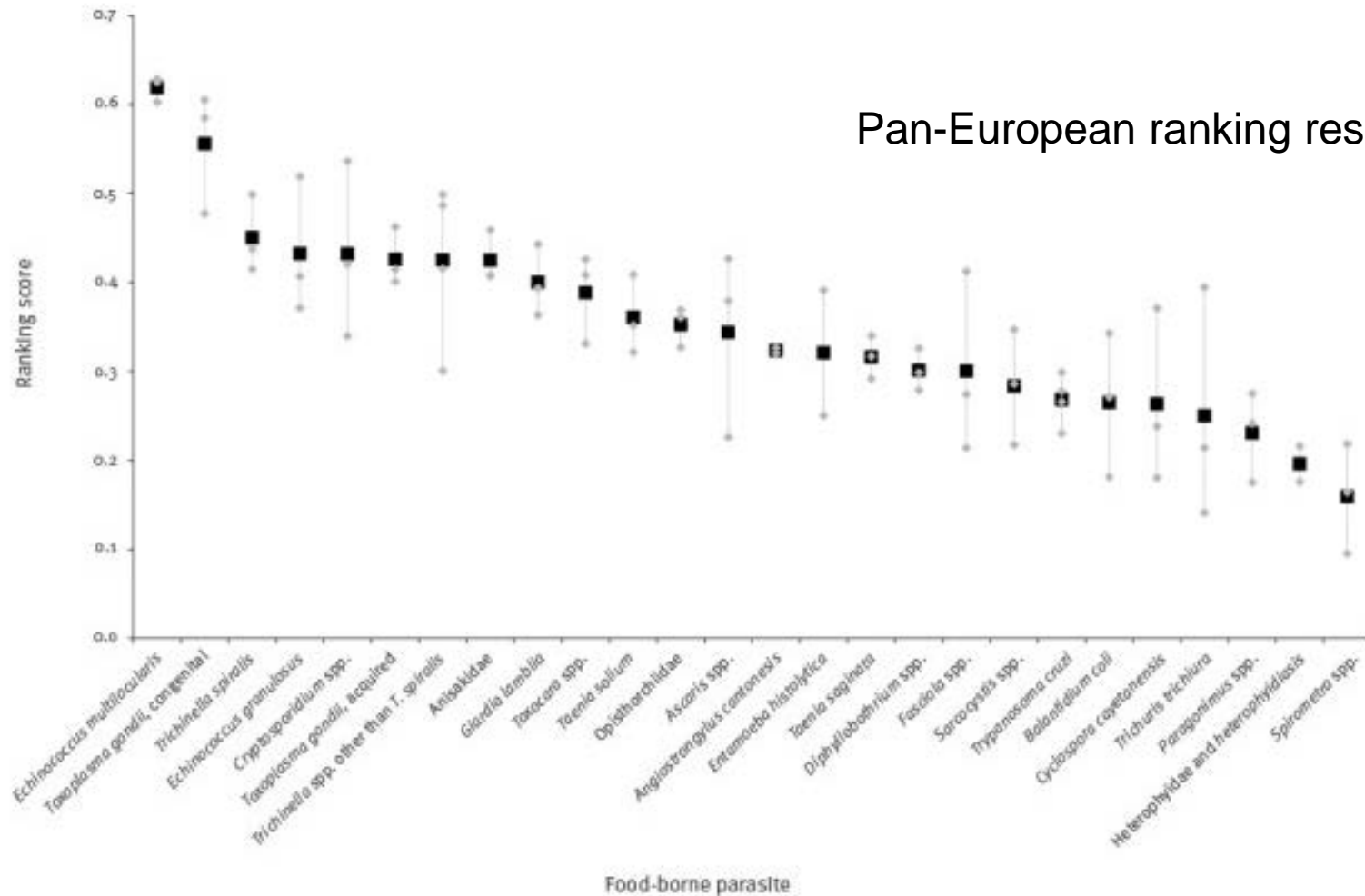
WG1, ST1.1: A Europe-wide ranking of FBP



RIVM, February 2016

WG1, ST1.1: A Europe-wide ranking of FBP

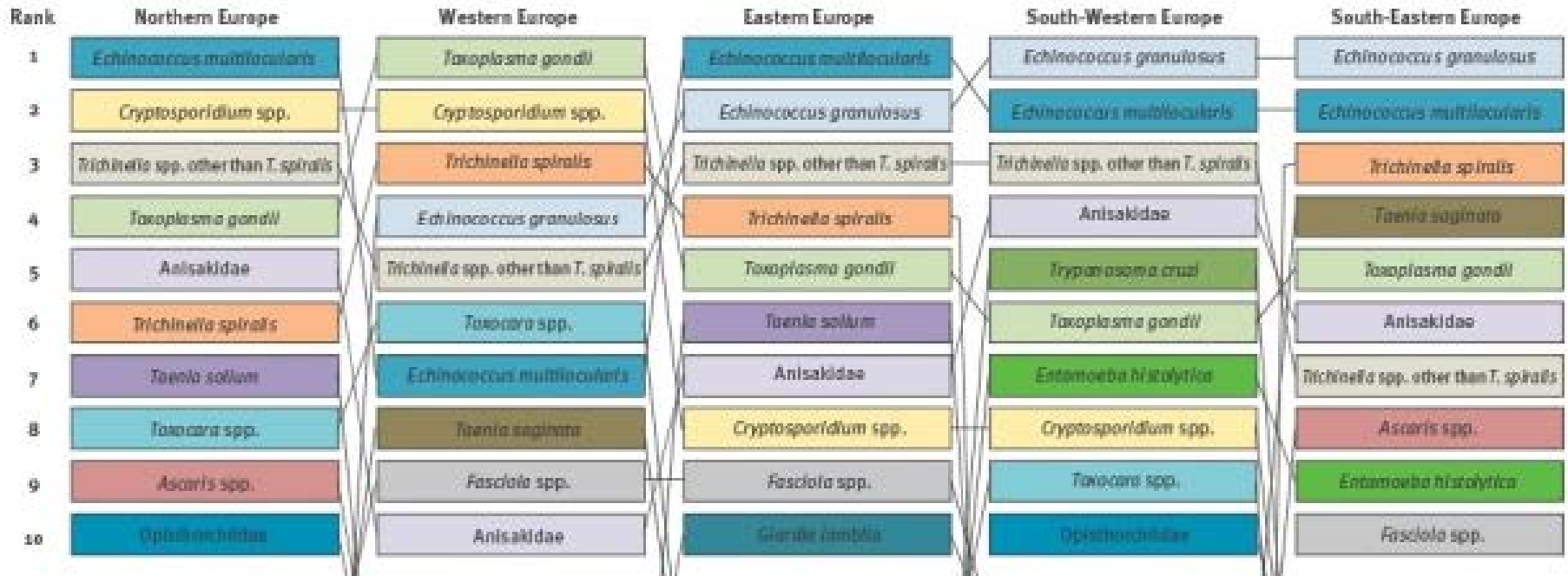
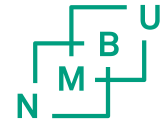
Pan-European ranking results





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WG1, ST1.1: A Europe-wide ranking of FBP



RESEARCH ARTICLE

Prioritisation of food-borne parasites in Europe, 2016

Martijn Bouwknegt¹, Brecht Devleeschauwer², Heather Graham³, Lucy J Robertson⁴, Joke WB van der Giessen¹, the Euro-FBP workshop participants⁵

WG1, ST1.2: Lexicon; ST1.3: Surveillance in Europe

- ST1.2 - Lexicon
- Agreement on terminology
- Available on homepage <https://www.euro-fbp.org/wg1-output.html>
- And also EURLP homepage <https://iss-eurlp.azurewebsites.net/2018/02/02/documents/>

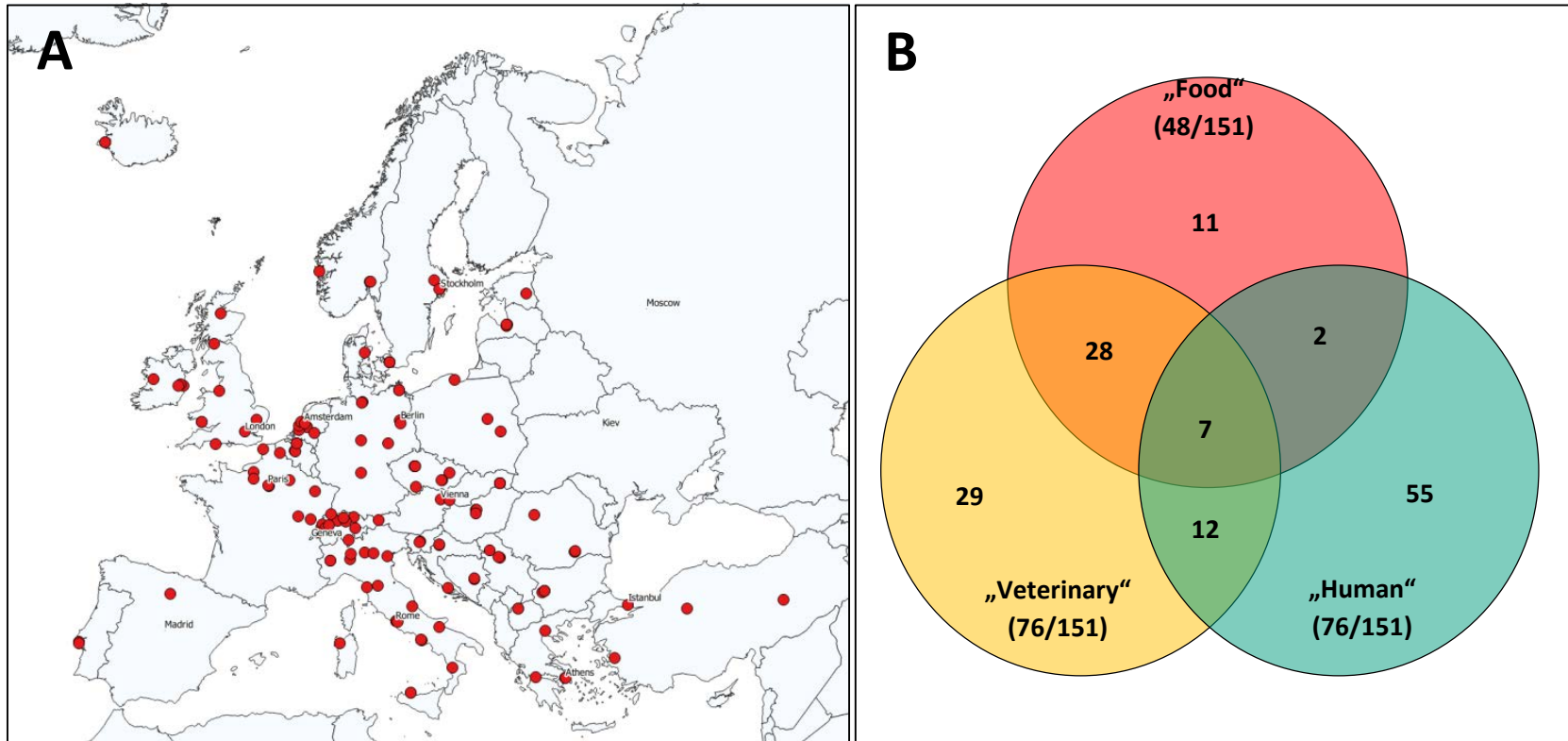
- ST1.3: Surveillance
- Concentrate on «top» parasites (*Toxoplasma*, *Echinococcus*, *Cryptosporidium*, *Trichinella*) and differences in regional surveillance.



- To be continued (FAD)

- Leader – Christian Klotz (RKI, DE)
- 4 sub-tasks
 - ST2.1: Map the various labs throughout Europe with expertise in different FBP analyses.
 - ST2.2: Enable exchange and transfer of techniques in analysis via STSM and TS.
 - ST2.3: Discussion around the need for typing
 - ST2.4: Discussion around validation, standardization and QC in analysis.

WG2, ST2.1: Lab mapping

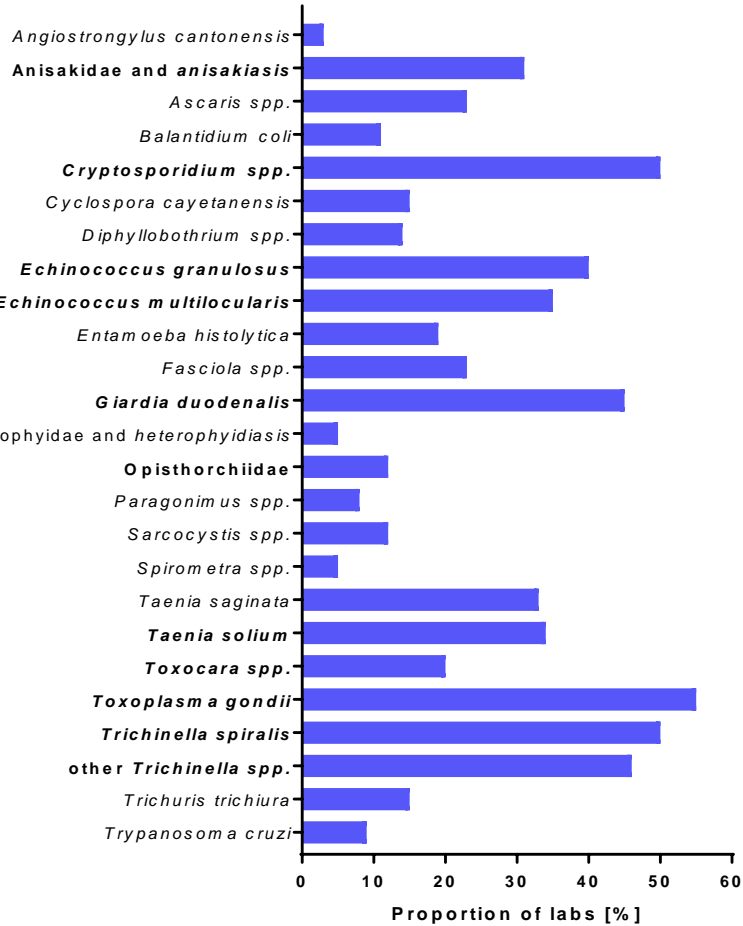


- Available on Euro-FBP homepage: <https://www.euro-fbp.org/wg2-output-mapping.html>
- And also EURLP homepage: <https://iss.eurlp.azurewebsites.net/2018/02/02/documents/>



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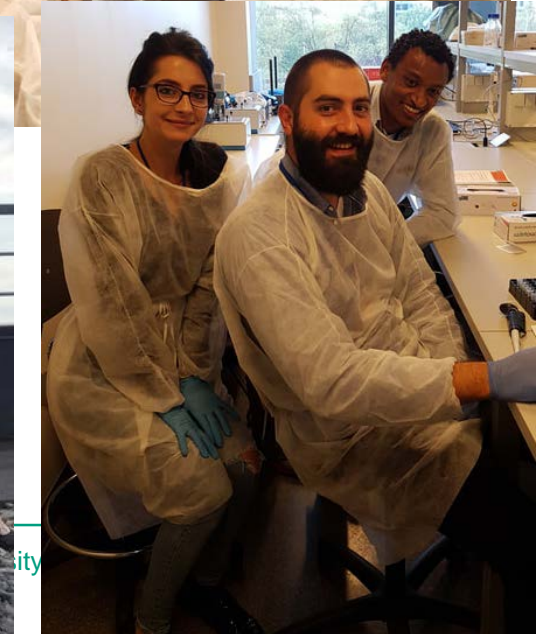
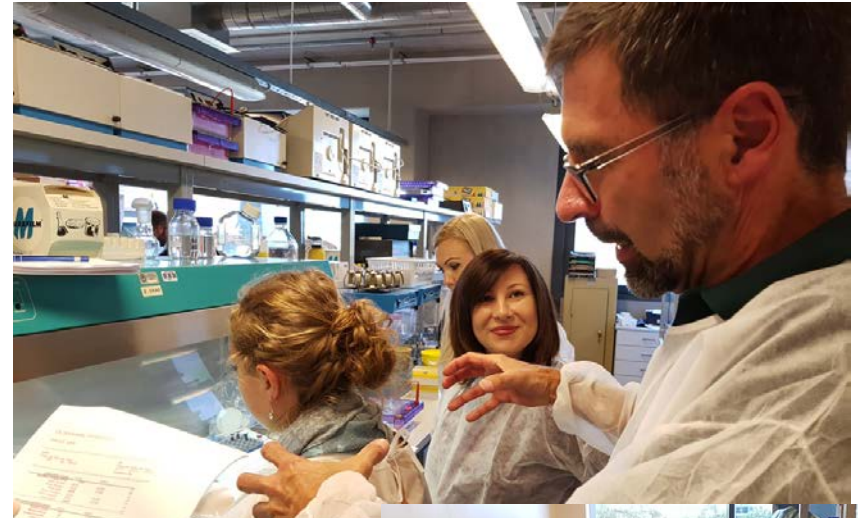
WG2, ST2.1: Lab mapping



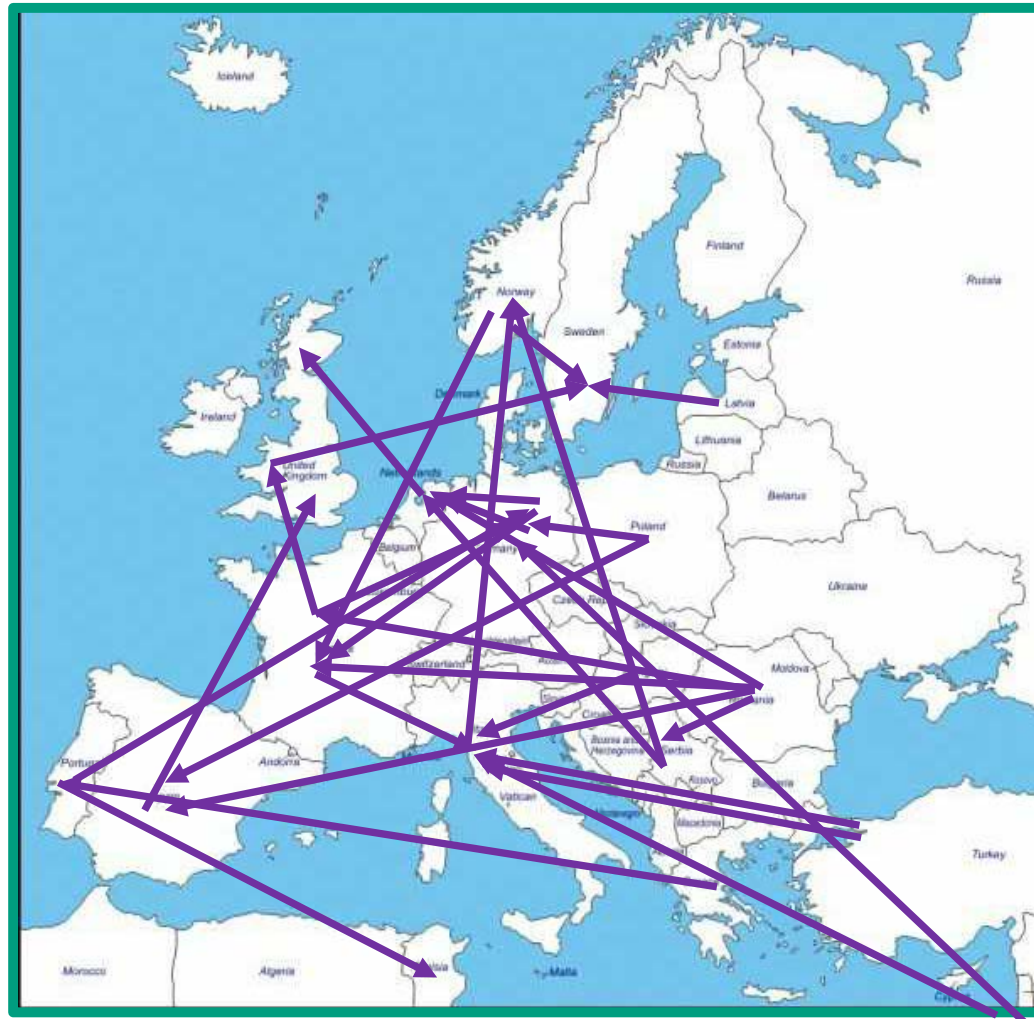
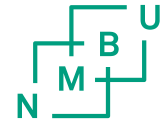
1	List of all FBP covered by the department/group	Competence/Work area (specify your competence in short description)	Level of expertise on covered FBPs (basic, advanced, expert)	Special tools/competence (highlight your special competence in short description)	Comments	Parasites based on Euoep mark accordingly (1)
2	Trichinella, Echinococcus	diagnostics and epidemiology	expert	strain collection, typing (PCR)		Angiostrongylus cantonensis Anisakidae and anisakiasis Ascaris spp. Balantidium coli
3	Trichinella, Toxoplasma, Echinococcus, Anisakis (PCR only)	diagnostics and epidemiology	expert	strain collection serology (ELISA, WB) typing (PCR)		1 1 1
4	Cryptosporidium, Cyclospora, Entamoeba, Giardia, Echinococcus, Taenia, Strongyloides	diagnostics, epidemiology	expert	see column U	cryptosporidium antigen in feces by ELISA; Giardia lamblia antigen in feces by ELISA; E. histolytica/dispar	ECHINOCOCCUS GRANULOSUS, RECHERCHE D'ANTICORPS ANTI-, SERUM ECHINOCOCCUS
5	Echinococcus multilocularis, Echinococcus granulosus		expert	see column U	reference lab for human Echinococcus multilocularis	FOOD BORNE PATHOGENS Mission The service Food borne pathogens is responsible for scientific research, laboratory detection and
6	Food-borne outbreaks and Food Microbiology; Toxoplasma gondii (SD; NRC "Congenital infections")		expert	see https://www.wiv-isp.be/Programs/communicable-infectious-diseases/Pages/EN-foodpathogens.aspx; see column U	In 2007, the Federal Food Agency expanded the mandate of the laboratory of	
7	Trichinella and other zoonotic parasites	diagnostics, epidemiology	expert	digestion, microscopy, ELISA, Western Blot, molecular tests, and adapted reference test for Echinococcus multilocularis in		1

- Searchable Excel database – divided by country, expertise, accreditation, NRL, etc.etc.

WG2, ST2.2: Exchange and transfer of techniques (TS)



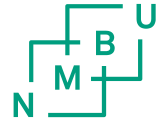
WG2, ST2.2: Exchange and transfer of techniques (STSM)





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WG2, ST2.3: the need for Typing



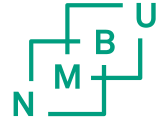
- Primary focus on Crypto as a model
- Online questionnaire on “needs”
- Specific workshop at RIVM, Berlin (2016)
 - Chalmers & Cacciò (2016) Towards a consensus on genotyping schemes for surveillance and outbreak investigations of *Cryptosporidium*, Berlin, June 2016. *Euro Surveill.* 15;21(37).





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WG2, ST2.3: the need for Typing



- Follow-up WG2 discussions during co-meeting in Ljubljana (Sept 2016)
- Presentation during IGCC in Havana in April 2017
 - Chalmers et al (2018) *Cryptosporidium* genotyping in Europe: the current status and processes a harmonized multi-locus genotyping scheme. *Exp. Parasitol.* 191;25-30.



Experimental Parasitology 191 (2018) 25–30



ELSEVIER

Contents lists available at ScienceDirect

Experimental Parasitology

journal homepage: www.elsevier.com/locate/yexpr

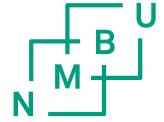
Cryptosporidium genotyping in Europe: The current status and processes for a harmonised multi-locus genotyping scheme[☆]

Rachel M. Chalmers^{a,b,*}, Gregorio Pérez-Cordón^a, Simone M. Cacció^c, Christian Klotz^d, Lucy J. Robertson^e, on behalf of the participants of the *Cryptosporidium* genotyping workshop (EURO-FBP)



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WG2, ST2.4: Validation and QC etc. in food analyses



- Concentrate on «top» parasites: *Echinococcus* spp., *Taenia saginata*, *Trichinella* spp., Anisakidae, *Toxoplasma gondii*, *Cryptosporidium* spp., and *Giardia duodenalis*).
- Meeting in Brussels (*Guideline development with emphasis on validation, standardisation, and QC*) – July 2018.
- Draft undergoing revision by group - FAD



- Leader – Cédric Gérard (Nestlé Research, CH)
- Deputy – Peter Paulsen (VetMedUni Vienna, AU)

- 3 sub-tasks
 - ST3.1: Identify interventions for different parasites in different food matrices.
 - ST3.2: Determining approaches for ascertainment of viability or inactivation.
 - ST3.3: STSM / TS for transfer of methods and techniques

WG3: Inactivation techniques and viability assessment

- Relatively small WG
- WG meetings during «major» meetings (Zagreb, Ljubljana, Rome) and two «dedicated» WG3 meetings in Lisbon. (Nov 2016 & 2017)

- Outputs

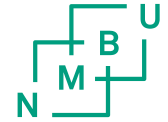
- Scientific publications
- Industry-directed publications
- Searchable database
- Only one STSM on viability assessment (Reims Champagne-Ardenne University, FR)
 - The use of molecular markers for viability assessment of foodborne parasites by RTqPCR





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WG3: Inactivation techniques and viability assessment



Trends in Food Science & Technology 83 (2019) 114–128

Contents lists available at ScienceDirect

Trends in Food Science & Technology

journal homepage: www.elsevier.com/locate/tifs

Review

Inactivation of parasite transmission stages: Efficacy of treatments on food of animal origin

Frits Franssen^{a,*}, Cédric Gerard^b, Anamaria Cozma-Petruț^c, Madalena Vieira-Pinto^d, Anet Režek Jambrak^e, Neil Rowan^f, Peter Paulsen^g, Mirosław Rozycki^h, Kristoffer Tysnesⁱ, David Rodriguez-Lazaro^j, Lucy Robertson^k

Parasite 25, 14 (2018)

© A. Rousseau et al., published by EDP Sciences, 2018
<https://doi.org/10.1051/parasite/2018009>

PARASITE

Available online at:
www.parasite-journal.org

REVIEW ARTICLE OPEN ACCESS

Assessing viability and infectivity of foodborne and waterborne stages (cysts/oocysts) of *Giardia duodenalis*, *Cryptosporidium* spp., and *Toxoplasma gondii*: a review of methods

Angélique Rousseau^{1,2,5}, Stéphanie La Carbona^{2,*}, Aurélien Dumètre³, Lucy J. Robertson⁴, Gilles Gargala⁵, Sandie Escotte-Binet⁴, Loïc Favennec⁵, Isabelle Villena¹, Cédric Gérard⁶, and Dominique Aubert¹

Inactivation of parasite transmission stages: efficacy of treatments on foods of non-animal origin Gérard et al. *Trends in Food Science & Technology*. In press.

FLEISCHWIRTSCHAFT

Von der Erzeugung bis zur Vermarktung
von Lebensmitteln tierischen Ursprungs

2_2019

CONVENIENCE
Das Patty macht den Burger

SAS Ein Maß für Kundenzufriedenheit

CLEAN MEAT Fleisch aus Zellkulturen

RESEARCH Status on control of meatborne parasites

SCHWERPUNKTE

96
Forschung und Entwicklung

Current status on the control of meatborne parasites in the food industry

By Peter Paulsen, Frits Franssen, Cédric Gerard, Stéphanie La Carbona and Lucy J. Robertson

Control of Fishborne Parasites in the Food Industry

332 Food Protection Trends July/August

Frits Franssen,^{1*} Cedric Gerard,² Stéphanie La Carbona,³ Lucy J. Robertson⁴ and Peter Paulsen⁵

¹Centre for Zoonotic Diseases and Environmental Microbiology, National Institute for Public Health and the Environment, Antonie van Leeuwenhoeklaan 9, 3721

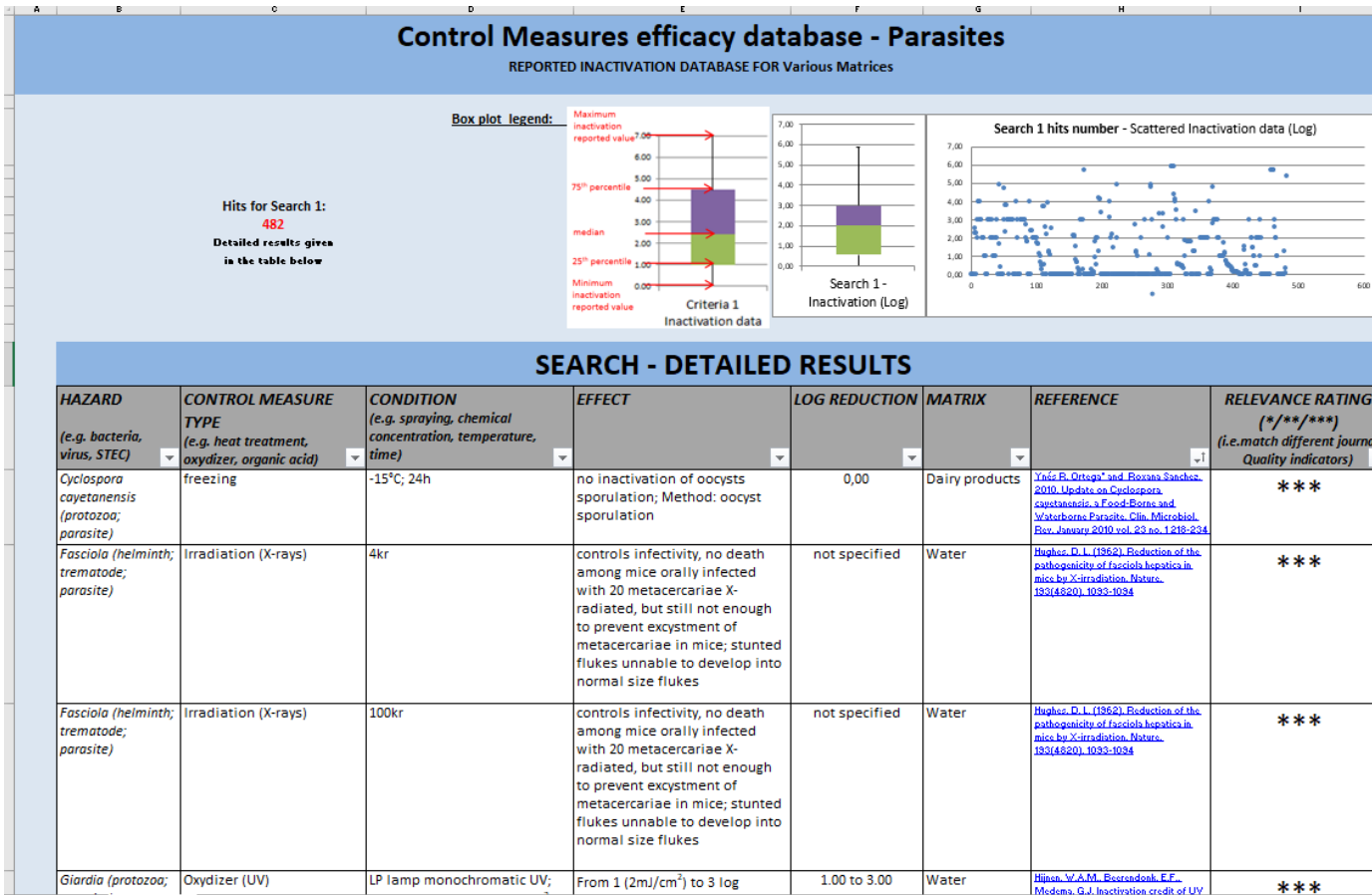


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WG3: Inactivation techniques and viability assessment

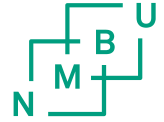


- Intuitive, searchable Excel database - divided by parasite, control measure, effect, reference etc.etc.



- Available on Euro-FBP homepage: <https://www.euro-fbp.org/wg3-output.html>
- And also EURLP homepage: <https://iss.eurlp.azurewebsites.net/2018/02/02/documents/>

WG4: Trends/drivers, impact, risk, and research



- Leader – Paul Torgerson (UZH, CH)
- Deputy – Chiara Trevisan (ITM, BE)

- 4 sub-tasks
 - ST4.1: Identify trends that may impact on FBP in Europe, and investigate impact.
 - ST4.2: Conduct a risk-ranking of FBP for the future
 - ST4.3: Develop a risk framework for different FBP-food matrix combinations
 - ST4.4: Develop a research agenda.

- In combination with WG1 and with Dutch Toxoscan Project, a workshop on social cost-benefit (SCBA) analyses (RIVM, Jan 2018).



Trends in Parasitology

CellPress
REVIEWS

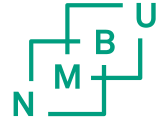
Science & Society

Foodborne Parasitic
Diseases in Europe:
Social Cost-Benefit
Analyses of
Interventions

Lucy J. Robertson,^{1,*}
Paul R. Torgerson,² and
Joke van der Giessen³

Trends in Parasitology, November 2018, Vol. 34, No. 11 919

WG4, ST4.2/ST4.3: Trends and Risk



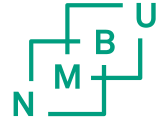
- Systematic review approach, with focus on «top» parasites and looking at:
 - Source attribution
 - Available models
- “Systematic Reviews” Meeting in Brussels to develop protocols – April 2018.
- Work in progress by sub-groups - FAD





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WG4, ST4.1/ST4.4: drivers/research



- «Free text» on-line questionnaire to the whole of Euro-FBP prior to final meeting in Feb 2019
 - Top drivers of infections with FBP in Europe
 - Current research priorities on FBP in Europe
 - Anticipated future research priorities on FBP in Europe
- Follow-up of questionnaire at the meeting (choice of options harmonised from response) and afterwards for non-attendees
- Invited Opinon article under review at Trends (Trevisan et al).

Tools and methods for FBP

- 1 Standardization, validation, and harmonization of analytical methods including typing schemes
- 2 Tools for inactivation, including survival and disinfection studies
- 3 Tools for improved diagnostics (more sensitive)
- 4 Viability/infectivity assay development (not using animals)
- 5 Tools for outbreak investigation (e.g., Maldi-TOF, WGS, nano-sequencing, epidemiological tools)

Surveillance, sources and routes of transmission FBP

- 6 Optimization of surveillance systems
- 7 Role of contaminated water in FBP transmission
- 8 Source attribution for different parasites, identification of risk factors

The impact of FBP

- 9 Estimating burden and economic burden

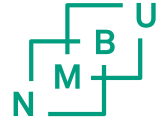
More than a gut feeling

- 10 Foodborne parasites and the microbiome



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Other outputs / effects.....



- Different meetings and workshops, networking and exchange (STSM/TS)
- Dissemination at scientific meetings
- Various publications – to date ca. 25 scientific, and several other trade/industry oriented articles; others in the pipeline
- Improved collaboration for grant proposals – 3 funded, 3 under evaluation
- Influence on EFSA (?) – Opinion on FBP



<https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2018.5495>

SCIENTIFIC OPINION

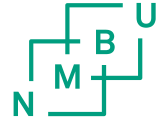
ADOPTED: 25 October 2018
doi: 10.2903/j.efsa.2018.5495

Public health risks associated with food-borne parasites

EFSA Panel on Biological Hazards (BIOHAZ),
Kostas Koutsoumanis, Ana Allende, Avelino Alvarez-Ordóñez, Declan Bolton, Sara Bover-Cid,
Marianne Chemaly, Robert Davies, Alessandra De Cesare, Lieve Herman, Friederike Hilbert,
Roland Lindqvist, Maarten Nauta, Luisa Peixe, Giuseppe Ru, Marion Simmons,
Panagiotis Skandamis, Elisabetta Suffredini, Simone Cacciò, Rachel Chalmers, Peter Deplazes,
Brecht Devleeschauwer, Elisabeth Innes, Thomas Romig, Joke van der Giessen,
Michaela Hempen, Yves Van der Stede and Lucy Robertson

<https://www.newfoodmagazine.com/article/82118/new-food-issue-2-2019/>

Expected Benefits and Impacts



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Overview of surveillance systems for inclusion of FBP	Updatable maps with methods and QC	Positive effects on economy
Knowledge-transfer and harmonisation of techniques	Position documents and recommendations	Prolongation beyond the Action life-span by including early-stage researchers
Identification of potential interventions and consideration of future effects of global drivers	Provision of insights, action opportunities and user-oriented agenda for stakeholders, policy makers and regulators	Technology development for use globally

Thanks for your attention and special thanks to Euro-FBP, especially WG leaders and other central people for a fun (?) 4 years

