



FERG symposium report

Global Burden of Foodborne diseases *from data to action*

15-16 December 2015



**World Health
Organization**



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

FERG Symposium: The global burden of foodborne diseases – from data to action

Chairperson's Summary¹

On 15-16 December 2015 in Amsterdam, the World Health Organization (WHO) and the Dutch National Institute for Public Health and the Environment (RIVM) hosted a Symposium to present and discuss estimates of the global burden of foodborne diseases. These estimates resulted from an initiative of the WHO Department of Food Safety and Zoonoses launched in 2006. Development of the estimates was led by the Foodborne Disease Epidemiology Reference Group (FERG), established by WHO and chaired by Professor Arie Havelaar of RIVM.

The project and estimates have been fully described in a report published by WHO (available from: http://www.who.int/foodsafety/areas_work/foodborne-diseases/ferg/en/). This website also includes meeting reports, supplementary materials, and an online tool to examine results by region. A series of scientific papers reporting the results has also been published by the Public Library of Science and consolidated on a dedicated website: <http://collections.plos.org/ferg2015>.

The Symposium provided an opportunity to critically review the results and discuss actions needed at next steps. The presentations from the Symposium are made available at the RIVM website:

http://www.rivm.nl/en/Topics/F/Food_safety/Foodborne_diseases/FERG_symposium

These notes are intended to capture some key points made during discussions of the FERG results at the symposium.

Introduction to Symposium

Dr Keiji Fukuda, Assistant Director General WHO stressed the importance for WHO and its Member States of moving forward by using the new information provided by FERG to raise awareness amongst policymakers, and the symposium was one vehicle for achieving this. He noted that most media stories about the FERG estimates of the global human health burden of foodborne diseases have highlighted the high burden of morbidity and mortality amongst children.

Methodologies

An important discussion during the meeting was to compare the FERG estimates with those generated by other agencies, in particular the Global Burden of Disease (GBD) project. Both projects generated burden estimates using disability adjusted life years (DALYs) but the underlying approaches were different.

FERG used an incidence approach to calculating DALYs instead of the prevalence based approach used in the GBD project (<http://www.healthdata.org/gbd>). Both approaches are

¹ Professor Arie Havelaar, University of Florida, former director of WHO Collaborating Centre at RIVM, thanks Rob Lake, Fred Angulo and Joke van der Giessen for the preparation of this report.

valid. However, the incidence approach was chosen for the FERG estimates as it includes chronic sequelae, following enteric and parasitic infections as well as exposure to chemicals, as part of the future burden that could be avoided by food safety interventions. FERG wanted to focus more on future prevention rather than current medical needs, and long term outcomes from foodborne hazards are an important component of the burden. Evidence about the benefits of prevention are better studied by including more disease outcomes. For example, for *Campylobacter* spp., FERG included multiple disease outcomes whereas GBD included only the single disease outcome of the initial infection. The FERG approach were likely to provide better information on benefits from prevention for some diseases.

The Life Expectancy choice for FERG was different to that used by GBD (GBD 2010 used Japanese female LE 86.2 years). A major reason for the FERG choice was to be consistent with burden estimates developed by WHO Global Health Estimates. WHO decided that YLL standard is a normative statement, not an empirical measure. If no disease occurs, what is the projected frontier life expectancy for a person? WHO projected life expectancy to 2050 and longest life expectancy of Japanese women for 91 years was used for YLL calculations for both sexes.

Accounting for co-morbidity (as a confounder) is difficult in the incidence-based approach, and was done to only a limited extent by FERG. It was acknowledged that it was easier to account for co-morbidity using the prevalence approach.

A question was raised about the impact of assumptions in the model that might be important for policymakers to be aware of. Assumptions are always needed to estimate DALYs (DALYs are not observable, they are calculated). For example, as noted above, choice on life expectancy value is fundamental. However, if assumptions are applied consistently across studies, then the data can be used by policymakers. In particular, the methodology used by FERG is consistent with that used by the WHO Global Health Estimates.

Enteric hazards

FERG made no adjustment for asymptomatic carriage of enteric pathogens in the meta-analysis it used to generate estimates of the etiology of diarrheal diseases. FERG considered that there was not sufficient justification for deducting asymptomatic cases as is done in other studies (e.g. MAL-ED and GEMS).

The low burden due to STEC was noted. FERG included both O157 and non-O157 serotypes of STEC, but compared to EPEC and ETEC, STEC has a low incidence in diarrheal stools.

Parasites

Although it was not included as a clinical outcome for burden estimates, a link between *Toxoplasma* infection and schizophrenia has been made in recent reviews. This might increase the estimated burden due to this hazard.

The higher incidence of toxoplasmosis in the Netherlands compared to neighbouring countries was queried. The difference was attributed to better data in Netherlands, while higher incidence in immigrants was also suggested.

There is a marked difference between the burden due to *Trichinella* and that due to *Taenia solium*, despite both being transmitted by pork. Several factors may contribute to this such as difference in biology, distribution or control.

A concern was raised that for the pork industry in certain countries the motivation to improve biosecurity is primarily driven by concern about *Trichinella*, but the FERG data show the burden from this parasite is very low. There is a danger that this finding may reduce the motivation for industry to improve biosecurity. Controls need to be maintained to address other pathogens such as *Toxoplasma gondii*.

Chagas disease, usually considered vector borne, is now being reviewed for foodborne transmission and could be included in future work to estimate foodborne disease burden.

Chemical hazards

The question was raised about why were cancer outcomes not included for dioxins? It was explained that population exposure to dioxin in food is generally below what is considered to be a threshold for cancer.

Concern was also raised about the lack of data on high dioxin exposures in Africa. However, primary data on dioxin exposure are from global surveys of dioxins in breast milk which includes good data from Africa.

Source attribution

The question was raised regarding whether the differences in source attribution by FERG compared to previous national foodborne disease studies (in developed countries) could be explained by differing methodologies? In fact the (wide) confidence intervals generated by the FERG expert elicitation study do include existing national estimates.

The problem of disentangling waterborne from foodborne transmission was discussed. While foodborne disease was the FERG mandate, contaminated water can be an important contributor to food contamination, and risk management addressing water and sanitation in addition to food can be more effective to prevent foodborne disease, in particular in developing countries.

For the country study in Uganda, this attribution issue was particularly important for the study team. The expert elicitation by FERG focused attribution at point of exposure so experts were asked to try and distinguish food from water transmission. The amount of food consumed does not influence attribution.

Follow up to FERG

Two major issues were raised during discussions about future activity.

1. *Translation of data into action:*

The ultimate goal of the Initiative is to reduce the burden of foodborne diseases. Although there were data gaps and many foodborne hazards were not addressed (especially chemicals) by the FERG study, the current estimates were sufficient to promote action. Trade makes food safety a global issue. Steps that could be taken to promote action include:

- a) Communicate global and regional results to all sectors of the food chain including stakeholders
- b) Find a way to promote understanding of the DALY metric
- c) Focus on country level estimates – promote country burden of disease studies (especially in developing countries) so that countries prioritise food safety amongst other issues, and set goals based on burden of disease estimates
- d) Use incidence data to generate data on societal costs to inform policy decisions (costing including health outcomes) – estimating economic impacts of foodborne diseases may be the best way to influence governments
- e) If governments are to take the lead, this will require collaboration between the agencies in country
- f) Include food as a risk factor in burden of disease studies and discuss with IHME how this could be included in the GBD.
- g) Recognise that food safety, nutrition and food security are closely linked
- h) Engage with the food industry through closed stakeholder meetings - Focus on the food industry to implement change – their knowledge of processes to create interventions has the greatest power to achieve change
- i) Promote food safety research to national and international funding agencies.

2. *Better estimates of burden of foodborne diseases:*

The discussion also identified ways in which the FERG estimates could become more accurate, more comprehensive and more useful. The following can be considered:

- a) Improve surveillance, including making more foodborne diseases notifiable.
- b) Improve surveillance connectivity – human and animal notifiable disease systems
- c) Fill data gaps - we have a framework, now need to increase available data
- d) Capacity building to improve surveillance
- e) Need epidemiological studies to better understand sequelae and chronic disease
- f) Sensitivity analysis would be helpful to highlight the data gaps which were most influential
- g) Improve expert elicitation since these estimates are highly influential.
- h) Develop burden estimates for specific foods, particularly principal transmission vehicles such as meats and produce; these can have more impact in risk management
- i) Understand the reasons behind regional differences

Suggested action points for WHO and its Member States are summarised in the attached Table.

Stakeholder and other presentations

Awilo Ochieng Pernet, Chair of the Codex Alimentarius Commission, called for establishment of a World Food Safety Day – to raise the profile of food safety. She suggested that representatives from the four pilot country studies present at the 39th session of the Codex Alimentarius Commission in Rome, June 2016

Markus Lipp from the Food and Agriculture Organization of the United Nations (FAO) described the FAO Mandate: food security and sustainable agricultural development (food safety, food security, poverty). Alleviating poverty addresses all these issues.

Leon Gorris from Unilever pointed out that for industry the interest is in root causes of contamination. For example, the effect of unsafe water is still not well quantified. Information based on exposure at the point of attribution at consumption may be less useful. Burden estimates at different parts of the supply chain are helpful, but may need methodology development. The impact of foodborne diseases on the workforce (lost productivity) is influential for decision makers.

Barabara Kowalczyk, Research Triangle International (RTI) echoed the call for a World Food Safety Day and described the difference between advocacy (for causes/issues) versus lobbying (to do with legislation). She considered that DALYs were not useful for advocacy, but illnesses and deaths have more impact, especially when illustrated by individual cases.

Gillian Mylrea, World Health Organisation for Animal Health (OIE), described how OIE will use the information: to support the evidence base and collaboration. OIE International standards (Terrestrial Animal Health Code) address zoonoses even if they don't affect animal health. The 80 OIE Listed Diseases includes 8 foodborne pathogens addressed by FERG.

Kazuaki Miyagashima, WHO, commented that WHO needs collaboration from many actors to take FERG studies forward. WHO will take every opportunity to have the global estimates known to the wider public as well as policy makers, while finalising the remaining FERG work threads on country tools and on several chemicals. WHO will keep the initiative open and active for foreseeable future as WHO anticipates the requests from countries to support their attempt to develop national estimates of diseases burden. WHO is hoping to see 1-2 countries per region in initiating a national study each coming year. WHO will count on continued assistance from FERG experts.

The symposium recognised the invaluable contributions made by the FERG Chair and Task Force leads, and all experts involved.

Suggested actions for future

1. Member States:

- To use the estimated burden of foodborne diseases burden as a basis for setting priorities and implementing interventions to reduce the disease burden;
- To enhance the collection of foodborne disease data such as exposure to key hazards (e.g. considering making certain foodborne diseases notifiable);
- To enhance inter-sectoral collaboration in food safety, especially between animal and human health sectors (“One Health”);
- To conduct national burden of foodborne disease studies to fully assess the national situation, including source attribution;
- To integrate food safety with other related areas such as nutrition and food security;
- To call for more research funding into food safety, including attracting and building capacity among young scientists in food safety;
- To collaborate with industry and academia in translating knowledge into action; and
- Provide financial and in-kind support to WHO to enable the following actions.

2. World Health Organization:

- To communicate clearly about the relevance of the global foodborne disease burden estimates to Member States, other international organizations and partners;
- To advocate on the critical need for inter-sectoral and inter-agency working in food safety at global, regional and national level;
- To assist and support Member States in the conducting of national foodborne disease studies and in translating the evidence into policy to reduce the disease burden; and
- To continue working with Collaborating Centres and their experts to monitor trends in the burden of foodborne diseases.