IRAC Work Group
Listeria monocytogenes **Dose-Response**

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Background

Human listeriosis can manifest in two forms: invasive listeriosis (a severe illness) and febrile
gastroenteritis (a mild form of listeriosis). Invasive listeriosis is associated with a high
hospitalization rate and a high case fatality rate, leading to high health-related costs. Listeriosis
is, nevertheless, a relatively rare disease in the general population, with regard to its relatively
high frequency of isolation in food. The two major dose-response models scaled on
epidemiological data for *L. monocytogenes* were developed by FDA/FSIS/CDC in 2003 and by
FAO/WHO in 2004. Since then, knowledge about the bacteria, the host, and their interaction has
increased, notably concerning the physiopathology of the infection, the virulence of the strains,
and/or the susceptibility of individuals. New data from experimental infections in animal models
are available. However, some data and information gaps still exist relevant to *in-vitro* or animal
models and epidemiologic data.

Purpose

The purpose of the workgroup is to develop a workshop to facilitate an open dialogue among
participating experts to identify key factors and data to be considered when *L. monocytogenes*
dose-response models are updated. Outcomes of the workshop will be presented at professional
meetings and a manuscript will be developed based on outcomes of the workshop.

The workshop will seek inputs from the participants about the latest science on *L.
monocytogenes* epidemiology, pathology, interaction with the host, virulence, and dose response,
to help answer to the following questions:
- What new knowledge about *L. monocytogenes* and listeriosis could be applied to update
  the 2003 FDA/FSIS/CDC and/or 2004 FAO/WHO dose-response models?
- What approach or modeling methodology could be used to update these dose-response
  models now?
- What additional data could help to improve the *L. monocytogenes* dose-response function
  in the future?

Workshop and Web-Based Forum

The expert workshop will take places March 2011 in the Washington, DC area. Approximately 50 experts will be invited to participate in an in-depth review of new modeling framework and data and what should be the focus for research in the future. The workshop focused on scientific discussion, not policy.

A web-based forum will be established to facilitate discussion and information exchange among participants from February 28 to April 15, 2011. All participants will be encouraged to forward to the website references or new information that represent significant or latest science related to *L. monocytogenes* dose response, including published papers, poster presentations, and a brief description of unpublished work or work-in-progress.

Outcomes

The workshop on *Listeria* Dose-Response Models, co-sponsored by IRAC and the Joint Institute for Food Safety and Applied Nutrition (JIFSAN) was held in March 17-18, 2011. The expert workshop consisted of presentations and two breakout sessions, followed by a general discussion by all participants. Participants were asked to provide input about a number of questions outlined in the breakout session exercises and to provide their views on factors to be considered when *L. monocytogenes* dose-response models are updated.

Outcomes of the workshop were posted in the IRAC webpage at http://foodrisk.org/irac/events/. The posting includes the list of participating experts, agenda, background, questions for breakout groups, and summaries based on presentations and discussions at the workshop.

Summaries from the expert workshop were presented in a symposium titled "*Listeria monocytogenes* Dose-Response Data and Models: Current and Future Advancements" at the 2011 Society for Risk Analysis annual meeting.

Following the successful workshop, a small work group developed a draft manuscript based on the workshop outcomes. The manuscript was subsequently reviewed by IRAC member agencies and cleared by the co-authors' agencies. It had been published in *Risk Analysis: An International Journal*.

K. Hoelzer, Y. Chen, S. Dennis, P. Evans, R. Pouillot, B. J. Silk, and I. Walls. 2013. New data, strategies, and insights for *Listeria monocytogenes* dose-response models: summary of an interagency workshop, 2011. Risk Analysis. e-pub ahead of print: DOI: 10.1111/risa.12005. http://onlinelibrary.wiley.com/doi/10.1111/risa.12005/abstract.