Salmonella Rapid Detection Interagency Group
Subject Matter Expert Meeting
Executive Summary (Public Version)

Thursday, March 19, 2009, 8:00 a.m. – 3:00 p.m.
U.S. Food and Drug Administration,
White Oak Building 2, Room 2058
10903 New Hampshire Ave
Silver Spring, MD 20993

Federal Agency Participants:
The Food and Drug Administration
The Centers for Disease Control and Prevention
The United States Department of Agriculture
The Department of Homeland Security
The Defense Advanced Research Projects Agency
The National Institute of Standards and Technology

Setting the Stage

Dr. Frank M. Torti, Acting Commissioner of the Food and Drug Administration, opened the meeting by defining the scientific problem and identifying a path forward in evaluating rapid methods for *Salmonella*. Dr. Torti stressed the importance of interagency collaboration on this task. He stated that the purpose of the meeting was 1) to discuss what agencies are currently developing for rapid detection of *Salmonella* and 2) to develop cross-agency criteria by which new methods for rapid detection might be evaluated.

The goal of this effort is to develop methods that compress the current 14-20 days needed for *Salmonella* testing (depicted as a three step process of detection, identification and subtyping) during an outbreak to 2-3 days.[1] Though ideally the new method(s) would take 2-3 days, technologies that shorten the time frame for any of the three steps are of interest.

Dr. Torti described a four component strategy (see Appendix 1) for approaching challenge of evaluating rapid *Salmonella* identification techniques.

[1] Scope of this effort is to look at the methodology after the enrichment step. However, many participants noted the need for separate future discussions on sample collection and preparation, epidemiology, and traceback. It was also noted that there is very little in the public domain about environmental sampling and the *Salmonella* diversity that exists in the environment.

Background Issues

For an outbreak investigation, *Salmonella* testing is currently a 3-step process: Detection (genus, species), Identification (serotype), and Subtyping (PFGE). There are several issues associated with testing for *Salmonella*, including

- The number of serotypes (analytical tools usually focus on Top 100 serovars),
- High genetic homology = absence of probes for the serovars,
- Need for enrichment,
- Sampling issues (contamination not uniform, volume of product), and
- Length of time for analysis (10-14 days for detection, isolation, and subtyping).

Current Technologies and Agency Needs

Methods currently being used for some or all of the steps in *Salmonella* detection/identification/subtyping were described. FDA is primarily interested in faster technologies for detecting and typing *Salmonella*. CDC expressed interest in better tests for *Salmonella*, rather than faster tests. To increase efficiency, CDC is looking at minimizing shipping time of isolates, rather than shortening analytical steps. USDA noted that it does not need a rapid method for *Salmonella* detection because *Salmonella* in raw product is not an adulterant under USDA regulation. However, USDA noted that a faster method would be useful when investigating outbreaks and it is working toward shortening the enrichment step. USDA representatives also reported on 1) NACMCF work looking at new technologies for *Salmonella* detection, 2) a USDA white paper on subtyping and 3) an initiative to improve collection, use, and sharing of subtyping data.

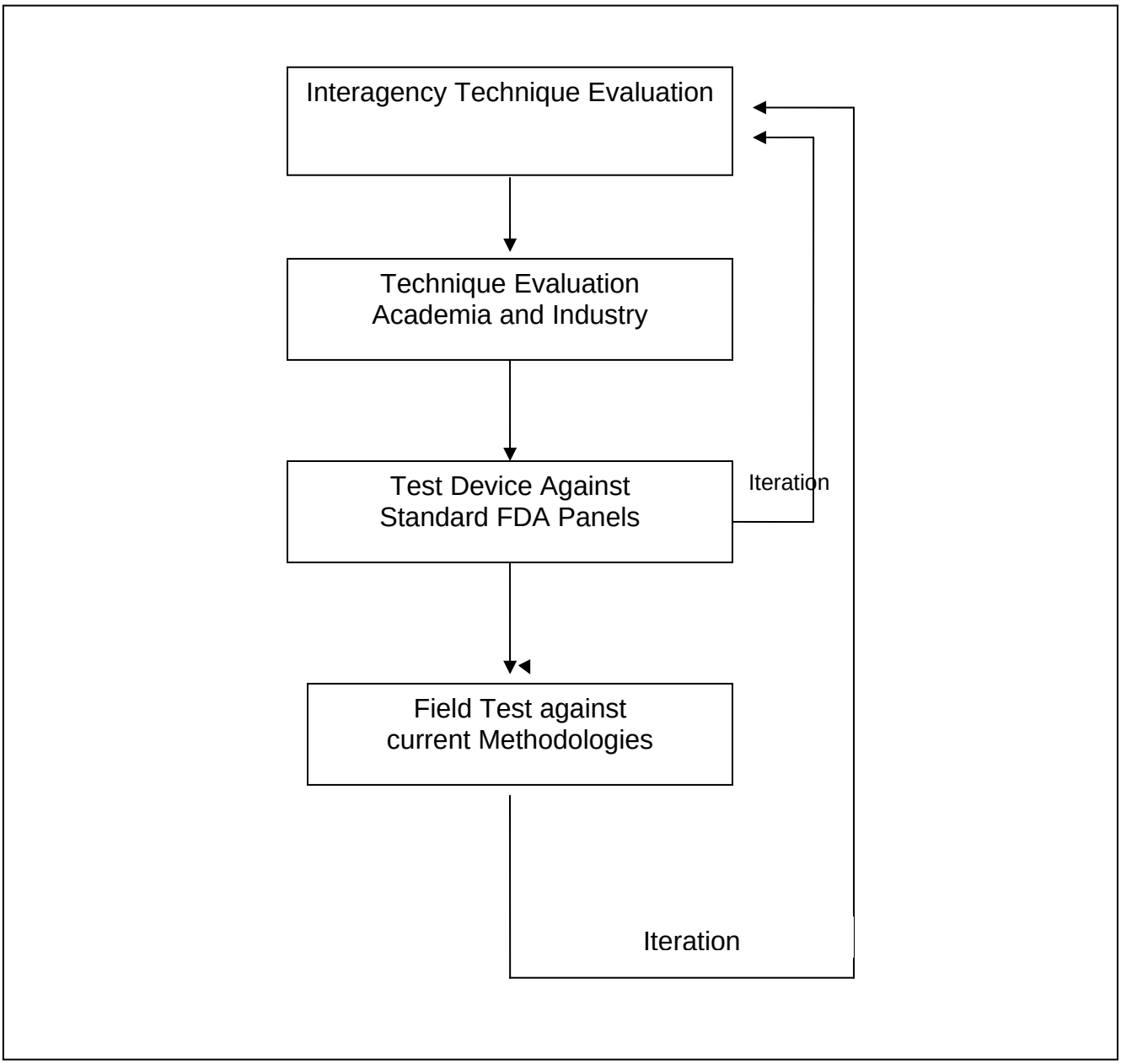
New Technologies

Immediately prior to this meeting, there was a two-day FDA/CDC joint symposium entitled “New Frontiers in Molecular Epidemiology.” The participants specifically discussed new technologies and had roundtable discussions on the suitability and potential of various technologies for foodborne outbreak investigations. An action plan was created and several interagency working groups were formed to advance joint subtyping studies and technology evaluations. Methodologies discussed at the New Frontiers meeting include pyrosequencing, optical mapping, MLVA, HT PCR, SNP analysis, HT sequencing, microarrays, and mass spectrometry. There is significant work being done in the SNP analysis area and DNA microarrays. Currently there are approximately 20 *Salmonella* whole-genome sequences available and 60 more are underway.

Related to new technologies, a representative from DHS described its Food Biological Agent Detection Sensor (FBADS) program and representatives from DARPA outlined several ongoing projects at DARPA that relate to rapid methods development, including a project looking at unusual SNP patterns and a project looking at traditional and non-traditional metrics in humans for rapid indication of impending disease. The representative from NIST indicated that its relevant programs include a project that evaluates test methods for their robustness and the development of several food commodity-specific reference panels.

Next Steps

There will be two workshops with academia and industry in the Spring to solicit input on rapid methods and evaluate technologies. More information on these workshops will be forwarded to meeting participants soon.

Appendix 1

The figure below depicts the four component strategy for approaching the challenge of evaluating rapid *Salmonella* identification techniques.