FSRC Food Safety Information Infrastructure Project: Phase 1

Workshop on Public Sector Food Safety Data Collection, Access and Sharing

November 2-3, 2006 | Holiday Inn Conference Center | Decatur, GA

The Flow of Food Safety Data

The food safety information infrastructure (FSII) can be characterized by the institutions that collect and share data, by the types of data that are collected, and by the purposes for which data are collected. The FSII can also be characterized by how these data flow through the system from original collection to analysis, to a food safety decision or action. The purpose of this document is to use two illustrative examples to describe this flow of information in two important food safety contexts. The two examples differ in important ways, and the differences have implications for the key opportunities for improvement that may be found in the system.

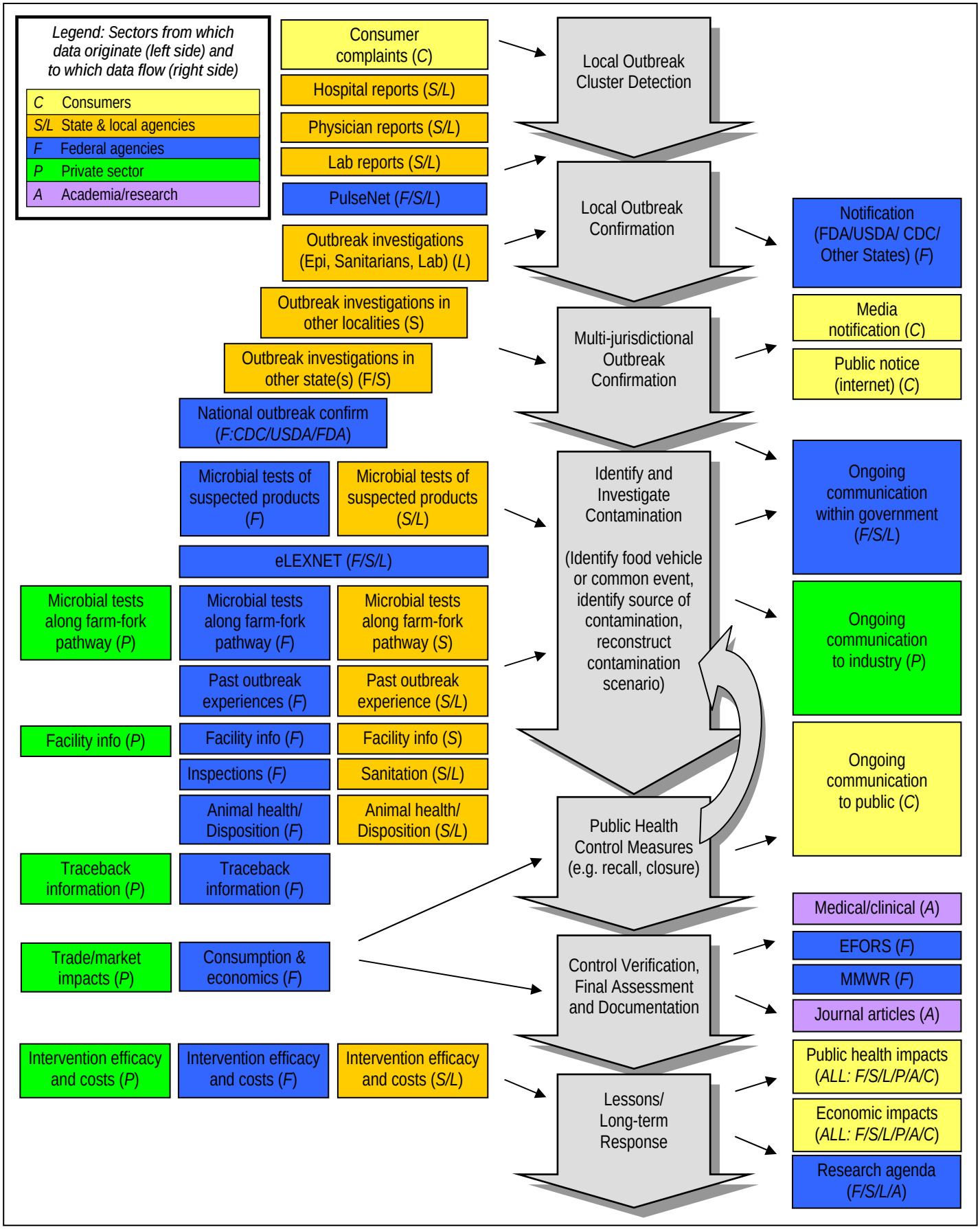
Illustrative Example 1: Foodborne Outbreak Response

Response to foodborne outbreaks is a primary activity in the food safety system, and it is an activity characterized by rapid decision making based upon information that may be changing quickly. An outbreak investigation and possible public health response action, such as a recall, require timely collection and sharing of data between parties. These data sharing activities involve local public health agencies, state agencies, and multiple federal agencies, and may utilize data collected by the private sector as well.

Figure 1 shows a *simplified and abstracted* diagram of the response of public health agencies to a foodborne outbreak. With apologies to those involved with outbreak investigation, this diagram is not intended to accurately represent all of the stages (e.g. validity checking, hypothesis generation, case definition, case identification, descriptive epidemiologic investigation, analytic epidemiologic investigation, etc.), nor all of the interaction between parties that occur. Rather, it is to focus on the role of data. In the center of the diagram, the grey arrows show stages of outbreak response, from detection of a local cluster to recall action and long-term response. The feedback arrow simply indicates that multiple controls may be undertaken as the investigation continues. The colored boxes on the left show the data sources that are utilized in various stages to inform the process, while the colored boxes on the right show the data that come out of the process. The colors of the boxes indicate the sectors from which and to which data flows, as do the letters in parentheses, including consumers (C), state and local agencies (S/L), federal agencies (F), the private sector (P), and academia (P). For example, the local public agency may receive complaints from consumers or reports of foodborne illness from physicians, and when an outbreak is confirmed, federal agencies such as CDC may be notified and data available at that time may be shared. Note that data sources are only placed in the chart at the location of their first use, though most are used throughout downstream stages as well.

A few aspects of the diagram are worth noting. First, a large number of data sources are used throughout the process, from original reporting of illness to microbial testing to estimates of the costs of the outbreak. Second, data come from many sources, though most are collected by the public sector. Third, certain kinds of information may come from multiple sources or sectors in different datasets. Fourth, data exits the process at multiple points and is shared with stakeholders on an ongoing basis. Fifth, interactions with the academic/research sector are minimal.

Figure 1: Flow of Data in an *Illustrative* Foodborne Outbreak Investigation: Potential Input and Output of Information, by Data Type and Sectors



Illustrative Example 2: Quantitative Microbial Risk Assessment

While outbreak response is useful to describe the flow of data in an emergency response situation, it is useful to also look at how data flows during a more analytical risk management scenario such as during a quantitative microbial risk assessment. A risk assessment is a much slower process than an outbreak situation, in which it is the breadth, depth, and utility of data, rather than the timeliness of information, that is most critical.

Figure 2 uses the same approach as Figure 1 to show a *simplified and abstracted* diagram of a risk assessment. As with Figure 1, Figure 2 is not intended to accurately represent all of the stages of any individual risk assessment, but to serve as an illustrative example. In the center of the diagram, the grey arrows show the main stages in a risk assessment, from hazard identification through risk characterization and the risk management decision. A risk assessment may go through multiple iterations, in which preliminary results are made available for comment by the public. During this period, the private sector and other peer-reviewers may provide additional data or information to utilize in the risk assessment. The colored boxes on the left show the data sources that are utilized in various stages to inform the process, while the colored boxes on the right show the data that come out of the process. The colors of the boxes indicate the sectors from which and to which data flows, as do the letters in parentheses, including consumers (C), state and local agencies (S/L), federal agencies (F), the private sector (P), and academia (P). For example, microbial testing data from the private sector, the scientific literature, and federal datasets may be utilized, either in the form of contamination prevalence or quantified levels of contamination. Likewise, preliminary results may be shared with multiple constituencies through public meetings or draft reports. As with Figure 1, data utilized in one stage may be utilized in later downstream stages, but data sources appear on the graphic only once.

There are a few aspects of the diagram worth noting. First, there are a large number of data sources utilized throughout the process, with different kinds of data used in different stages. Second, in contrast to outbreak response, a lot of the data used in a risk assessment may come from the academic and scientific research communities. Third, there may be many kinds of data for which there are multiple sources, possibly from different parties and sectors. Risk assessors must be able to compare these different sources of information, either to choose the "best" data or to combine studies into an aggregate dataset. Fourth, unlike in an outbreak situation, in which communication with the public is ongoing throughout the process, communication of information is primarily focused at the end stages of a risk assessment, when draft or final results are shared with the public. The iterative nature of a risk assessment allows for peer-review and validation of approach and data.

Figure 2: Flow of Data in an *Illustrative* Quantitative Microbial Risk Assessment: Potential Input and Output of Information, by Data Type and Sectors