Traceability: Will it be Regulation or Collaboration?

Presentation to IAFP Food Safety Symposium
April 22, 2015
Topics

- IFT and GFTC
- Recent findings of GFTC research
  - Traceability regulations
  - Interoperability
- GS1 Global Traceability Standard
- Discuss implications for food industry
IFT and GFTC

- Founded 75 years ago to advance the science of food
- Science-based, professional, non-profit society with 18,000 members from over 100 countries
- Launched Global Food Traceability Center in 2013
- GFTC vision is to be the global resource and authoritative voice on the science of food traceability
Comparison of Global Food Traceability Regulations and Requirements
August 2014
Definitions: Traceability

- Traceability is not about data, identifiers, bar codes, RFID, tags, and any information that needs to be linked together to make traceability possible.
  - These are all critical, but not sufficient

- Traceability is the **systematic ability to access any or all information relating to a that which is under consideration, throughout its entire life cycle, by means of recorded identifications**.*
  - For this to happen, a traceability system must access data of when the units (and associated identifiers) are created, used, joined together, split up and finally disposed

* Olsen P, Borit M. 2013. *How to define traceability*. Trends Food Science and Technology
Food Traceability

- Still linked to crisis management
- Food safety and food integrity
- ‘Telling a Story’
- Transparency and Traceability
State of Global Food Traceability Standards and Regulations

- Why benchmarking?
- Why rankings?
  - Share and Compare
  - Global Trade
  - Demand-based expectations
State of Global Food Traceability Standards and Regulations

- 2011 Helsinki Food Safety Summit – Share and Compare
State of Global Food Traceability Standards and Regulations

- **Methodology**
  - State-Pressure-Response model was used as the study framework
  - Review of secondary data, study focuses on indicators that can be influenced by public policy
  - Grades of “progressive,” “moderate” or “regressive” were used
  - Ten (10) distinct assessment metrics.
State of Global Food Traceability Standards and Regulations

- **Methodology** - Indicators met following criteria:
  - Indicator provides valuable information concerning the performance or status of the particular food safety domain;
  - Indicator can be affected by policy;
  - Indicator secondary data are reliable and readily available;
  - Data are sufficiently consistent to allow benchmarking over time and permit a valuable international comparative analysis; and
  - General agreement that a change in the indicator in one direction is better than a movement in the other.
State of Global Food Traceability Standards and Regulations

- Sample Design (21 countries)
  - Australia, Austria, Belgium, Brazil, Canada, China, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Russian Federation, Sweden, Switzerland, United Kingdom, United States.
Assessment Metric #1

- Are there specific regulations/policies on national level for domestic products? When did these policies come into effect?
  - **Progressive**: EU Countries / Near EU
  - **Moderate**: Australia, Brazil, Canada, Japan, United States, New Zealand
  - **Regressive**: China
  - **No Data**: Russian Federation
Assessment Metric #2

- Are there specific regulations/policies for traceability of imported products? What documents required for import products to address traceability?
  - **Progressive**: EU Countries, Japan
  - **Moderate**: Australia, Brazil, Canada, New Zealand, United States
  - **Regressive**: China
  - **No Data**: Russian Federation
Assessment Metric #3

- What is the clarity of level of regulatory bodies responsible for traceability regulations?
  - **Progressive**: Australia, Brazil, EU Countries, Japan, New Zealand
  - **Moderate**: Canada, China, United States
  - **Regressive**: None
  - **No Data**: Russian Federation
Assessment Metric #4

- If no specific regulations, is there voluntary practice by industry?
  - **Progressive**: Australia, Brazil, Canada, Japan, New Zealand, United States
  - **Moderate**: China
  - **Regressive**: None
  - **No Data**: Russian Federation
  - Excluded: EU Countries
Assessment Metric #5

- What commodities are being regulated for traceability?
  - **Progressive**: EU Countries, Japan
  - **Moderate**: Australia, Brazil, Canada, New Zealand
  - **Regressive**: China, United States
  - **No Data**: Russian Federation
Assessment Metric #6

- What kind of identifier is being used for tracking/registering of imports (e.g. ear tags, barcodes, RFID, Clouding)?
  - **Progressive**: Australia, Canada, China, EU Countries, Japan, New Zealand
  - **Moderate**: United States
  - **No Data**: Brazil, Russian Federation
Assessment Metric #7

- "Are GFSI benchmark standards being recognized in that country?"
  - **Progressive**: Australia, Brazil, Canada, EU Countries, New Zealand, United States
  - **Moderate**: China, Japan
  - **Regressive**: None
  - **No Data**: Russian Federation
Assessment Metric #8

- Are GS1 services (i.e. traceability tools and identification standards) available in that country?

  - **Progressive**: Australia, Brazil, Canada, EU Countries, Japan, New Zealand, United States
  - **Moderate**: China
  - **Regressive**: Russian Federation
Assessment Metric #9

- Is there an electronic database system being used for monitoring imports/export and their traceability? Are these systems accessible by importing countries?
  - **Progressive**: Australia, Brazil, EU Countries, Japan, New Zealand
  - **Regressive**: Canada, China, United States
  - **No Data**: Russian Federation
Assessment Metric #10

- **What information on packaging label is available for consumer to understand traceability?**
  - **Progressive:** Australia, Brazil, EU Countries, Japan, New Zealand, Canada, United States
  - **Moderate:** China
  - **Regressive:** Russian Federation
Overall Ranking of Traceability Regulations for domestic and imported products

- Full report is available online at www.globalfoodtraceability.org

- Superior: EU Countries / Near EU
- Average: Australia, Brazil, Canada, Japan, New Zealand, United States
- Poor: China

- Insufficient Data: Russian Federation
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- Progressive: Green
- Moderate: Yellow
- Regressive: Red
- No Data: Blank
State of Global Food Traceability Standards and Regulations

- EU and rest of World
- Continental approach
- Russia and China lack transparency
- Nature of technology varies
- One-up/One-down no longer sufficient
- Food waste, integrity, public health are drivers
- Attitude and other industries
Conclusions

- Tracing food in global system is increasing complex and prone to errors/gaps
- North America is trailing other trading partners on traceability regulations
- EU takes a helpful ‘regional approach’ for requirements
- Livestock tracking has improved in past 10 years but no holistic strategy yet
- Move forward on development of interoperable global food traceability system
Interoperability & Technology Architecture
Interoperability Global Dialogue: “The Problem”

- Traceability is essential to industry viability, food security, food safety and protection

- Reliable, accessible, timely information is key to successfully managing traceability

- Whole-chain perspective on traceability needed, which means interoperability

- No single global mechanism to address this
Definitions: Traceability System

- System characteristics:
  - Provides access to all properties of a food product, not just those verifiable by analysis
  - Based on systematic recording and exchange of these properties
  - Provides access to properties of a food product or ingredient in all its forms, in all links of the chain
  - Facilitates traceability of food product backwards (where it came from) and forwards (where it went)
  - Unit identification or numbering system is present and links to the properties
Interoperability

- Islands of data
  - Accessibility
  - Syntax
  - Semantics

- Interoperability means
  - Ability to speak the same ‘language’
  - Understand the same words – Vocabulary / terminology
  - Answer the same questions in a predictable manner

- Interoperability does NOT mean
  - One system or a single solution
  - Everyone has to use same KDEs and CTEs for everything
  - Universal access to data – Loss of confidentiality, control, or capability
Definitions for Interoperability

- If two or more systems are capable of communicating and exchanging data, they are exhibiting **syntactic interoperability**
  - Specified data formats, communication protocols and the like are fundamental. XML or SQL standards are among the tools of syntactic interoperability
  - Also true for lower-level data formats, such as ensuring alphabetic characters are stored in same variation of ASCII or a Unicode format (for English or international text) in all the communicating systems

- Syntactic interoperability is a necessary condition for further interoperability
Definitions for Interoperability

- Beyond the ability of two or more computer systems to exchange information, **semantic interoperability** is the ability to automatically interpret the information exchanged meaningfully and accurately in order to produce useful results as defined by the end users of both systems.
  - To achieve semantic interoperability, both sides must refer to a *common information exchange reference model*.
  - The content of the information exchange requests are unambiguously defined: what is sent is the same as what is understood.
Interoperability Models

Distance to bridge between two systems

- No Standards available, Custom Integration needed
- Interface serializations are standardized (syntactic interoperability)
- Interfaces use common semantic model - CIM (semantic interoperability)
- Plug and Automate standard

Scope of Standards-based Integration
What we do NOT want to do…

How standards proliferate:
(See: A/C chargers, character encodings, instant messaging, etc.)

Situation: There are 14 competing standards.

14?! Ridiculous!
We need to develop one universal standard that covers everyone’s use cases.

Yeah!

Soon:

Situation: There are 15 competing standards.

Source: http://imgs.xkcd.com/comics/standards.png
Addressing Industry Interoperability

- Healthcare and pharmaceutical industries
  - “A Case for Interoperability In Healthcare: Reduce Information Management Labor”
  - “Interoperability: The Glass is More than Half Full”
  - “Is Healthcare IT Interoperability (Almost) Here?”
  - “What's Holding Back Innovation in Health Care?”
The Concept:
Common Technology Architecture

- Technology architecture: blueprint for a global food traceability system

- Purpose
  - A unified picture that will enable stakeholders (businesses, industry, regulators) to see how their own unique traceability practices and systems can contribute to more effective global food traceability
  - Designed for multiple uses and constructed on a common set of requirements, much like the telecommunications, financial, and information technology requirements used for other networks today
Project Scope

- Common technology architecture concept and collaborative approach will allow us to build a working system that can serve any product and business.
Project Overview:
Nature of Technology Architecture

- Interoperability must be balanced by principle of managed or controlled access
  - Just because information is stored does not mean that it is ‘accessible to anyone’

- Central concept
  - No matter what kind of information system stakeholders may use in their own organizations
  - Systems can communicate and be understood by other authorized systems through interoperability
  - Presumption of use by trusted parties
Project Assumptions

- Leverage: ‘Stitch together’ dispersed data to provide a more complete view of seafood traceability – Data agnostic

- Leverage: Use existing business systems and transactional data (through standardized protocols and secure access) to deliver relevant, reliable and readily accessible information

- Leverage: Businesses that already have mature electronic data management systems encouraged to participate in early pilots so that implementation reflects current capabilities of industry

- Leverage: Existing software vendors will need to accept the use of uniform requirements
Technology Architecture: Strawmodel

- **Who/ What/ Where? Data**
  - Global Registries
    - Premises Registry
    - Product Registry
    - Participant Registry
    - Movement Registry
    - Terminology Registry

- **Regulatory Agencies such as FDA, EMS, Health, Others**

- **Virtual Lock Box**
  - Virtual Lock Box
  - Virtual Lock Box
  - Virtual Lock Box
  - Virtual Lock Box

- **Commercial third party traceability technology software systems that meet global requirements**
  - Transactional Data
    - Suppliers
    - Producers/Farmers
    - Processors
    - Distributors
    - Retailers / FS

- **Standard Protocols & Security**
Architecture Requirements

- Access to business systems would be voluntary and provided through a ‘Virtual Lock Box’ software layer that enables each owner to exercise control:
  - What data is accessible?
  - Who may access data?
  - When it may be accessed?
  - For what purpose?

- Premises, product, participant, and movement identifiers, and their data systems to create a more complete view of traceability

- Ontology for data structure and communication protocols need to be decided during the design, developmental, and pilot phases of the traceability system

- Agreement on querying capability to serve stakeholder groups
General Timeline

2015
- Kick-off
- Establish Technical Advisory Groups
- Research for Issues Brief
- Design Blueprint
- Initial Blueprint delivered
- Create awareness about interoperability project

Specification/ Knowledge Acquisition/ Conceptualization

2016
- Blueprint feedback / Rollout strategy consultations
- Education sessions on the Blueprint
- Rollout Strategy
- Prepare and deliver recommendations for next steps

Integration/ Consultation/ Evaluation/ Final Documentation
Project Approach – Initial Steps

- Forming technical advisory groups (next slide)

- Conduct assessment of specific topics, each answering
  - What is done now? – We believe can be used as-is
  - What is missing? – Missing or broken pieces
  - What can be leveraged? – Practices by other industries/sectors
  - What can derail this? – Lessons learned by others

- Prepare ‘chapters’ of an Issues Brief that summarize findings and frame the next stage of work

- Use Issues Brief to generate further input & direct the research into the design of an interoperable architecture

- Primary design work will follow during summer and fall 2015
Call to Action:
4 Technical Advisory Groups

- Content Mapping
  - CTEs
  - KDEs

- Context Mapping
  - Common information model and terminology (ontology)
  - Protocols and standards

- Practices and Processes
  - Data validity and security (integrity)
  - Data governance and principles of operation

- Engagement & Communications
  - Multi-industry involvement – Interoperability in other industries
  - Cross-disciplinary outreach – Engagement – Knowledge transfer
Learn More?

- www.globalfoodtraceability.org

- “Profiting from Traceability” short course (1 day)
  - Prior to IFT annual meeting – July 11 – Chicago
  - http://www.am-fe.ift.org/cms/?pid=1001273
Thank You