December 5, 2019

Division of Dockets Management (HFA–305)
Food and Drug Administration,
5630 Fishers Lane, Rm. 1061
Rockville, MD 20852

Re: **Initial Comments** of AIM North America on:
Docket No. FDA-2019-N-4187 A New Era of Smarter Food Safety
Federal Register, Volume 84, Number 181, pages 49111 - 49114

To Whom It May Concern:

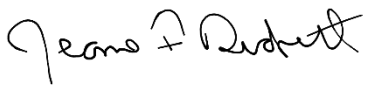
We are pleased to submit the enclosed comments regarding the above referenced docket and regulatory information number which appeared in Federal Register Federal Register, Volume 84, Number 181, pages 49111 – 49114.

These comments were prepared by members of the AIM North America Food Safety Committee, all of whom are subject matter experts of the design and application on automatic identification technology including barcode, RFID, RTLS, IoT, and other technologies. AIM North America is an industry trade association that represents the providers and users of technologies, systems, and services that capture, manage, and integrate accurate data into larger information systems that improve processes enterprise-wide.

AIM North America is a chapter of AIM, Inc. With an uncompromised reputation as a global authority for 50 years, AIM, Inc. takes pride in its proven value as an unbiased resource and industry leader. AIM, Inc. acts as the administrator of the U.S. Technical Advisory Group (TAG) to ISO/IEC JTC 1/SC31 for all standardization in AIDC. See Appendix A. Most barcode and RFID standards in ISO today were vetted and brought through the standardization process by AIM.

AIM North America is an advocate for standards development and advocacy of AIDC technologies appreciates this opportunity to submit comments in response to the Food and Drug Administration's (FDA) Notice in the above-captioned docket, seeking comment on the agency's approach to the modernization of food safety, including development of the anticipated Blueprint for a New Era of Smarter Food Safety.

Sincerely yours,



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INTRODUCTION AND SUMMARY

AIM North America supports FDA's focus on technology-driven food safety modernization and the development of ubiquitous, interoperable traceability from source to consumer.

Some of the most significant challenges to achieving actionable and reliable food supply chain information are listed below. As a global organization dedicated to developing interoperable technical guidance and ISO standards we support the collaborative standards development process. To that end, we feel that the FDA must specify the following minimum elements required for traceability.

- Clearly defined attributes that need to be contained in compliant data carriers which could include 2D barcode, RFID, Bluetooth and others. Since technology evolves faster than regulations AIM North America recommends against specifying the specific data carriers to be used. We encourage the FDA to remain open to emerging data carriers.
- Clearly defined with data type and length, the minimally viable product data set of critical tracking events and key data elements that a 3rd validation suite could verify compliance– what information will be provided by the recalling agency – i.e. Brand, Location, Item Number, Lot, Expiration Date. We encourage the FDA to leverage existing identification standards.
- Clearly defined protocol and data content for product recall and how is this data going to be transmitted to all stakeholders such as consumers, retailers, foodservice, packagers, processors, and producers.
- Food supply chain information has two important attributes: information secrecy (or confidentiality) and information integrity. For example, there is a related applicable international security standard: ISO/IEC-29167 Information technology — Automatic identification and data capture techniques.
- To enable the consumer transparency that food safety culture is built on, consider data carrier convergence, that is, reducing the number of on-pack symbols. The proliferation of barcodes and other methods of identification on products and things causes confusion to consumers and trading partners, who expect a seamless experience of connecting products and things to relevant experiences in the digital world.

AIM North America encourages FDA to adopt policies to facilitate the use of technology to address these challenges by requiring or incentivizing the use of global unique identifiers that can be used to trace each end-consumption item; specifying the minimum content to be tied to global unique identifiers; and requiring the use of technology to electronically and easily capture and share required information. Furthermore, clearly specifying the key data elements, which include the data carrier content, for each critical tracking event will provide a guidepost for supply chain members and solution partners to enable the digital supply chain. AIM North America members play a pivotal role in developing the solutions and the standards behind them that will enable the FDA Smarter Food Supply Chain.

Food Safety

Historically, responses to these outbreaks are reactive, and more time is spent mitigating the incident — and tracing the source — rather than preventing them from happening in the first place. With the help of automation and sensor technology, food suppliers are not only meeting regulatory requirements, but these suppliers are laying the groundwork for diagnostic and root cause analysis. Using a data infrastructure system that collects, analyzes and visualizes data in real time from a network of sensors located on operational equipment, food production companies are finally gaining a complete view of the production process. Not only does this real-time information allow companies to efficiently tackle new Food Safety Modernization Act (FSMA) compliance reporting requirements, this increased visibility into food growing and production equips organizations with the right insights to quickly course-correct before it's too late. The global nature of today's food supply chain has resulted in the need for visibility into food sourcing for customers and regulators to meet the demands of a global community for food safety.

Currently the level of sophistication required to meet the digital supply chain is not reflected in the relevant global standards. When performing a survey of ISO Food Standards as well as other standardization groups one finds the following as an example of the current requirements: ISO 22005:2007 (confirmed 2016) Traceability in the feed and food chain defines, "Traceability systems should be able to document the history of the product and/or locate a product in the feed and food chain. Traceability systems contribute to the search for the cause of nonconformity and the ability to withdraw and/or recall products if necessary. Traceability systems can improve appropriate use and reliability of information, effectiveness and productivity of the organization." While this is good sound advice, it is not a sufficient technical basis on which to build a ubiquitous, interoperable food traceability system. ISO 22000 Food Management Systems, HarmonizedGap, Codex all contain a similar level of detail.

COMMENTS

I. Tech-enabled End-to-end Traceability throughout the Food Safety System

Neither a single data carrier or data repository for holding and sharing traceability information is desirable or feasible to enable a global traceability system. Accordingly, interoperability is necessary to create a traceable food supply chain. AIM North America believes interoperability requires FDA-backed global ISO based standards for both physical and digital identities to facilitate a system that allows supply chain participant's flexibility of approach in capturing and sharing supply chain content that is universally recognized by all stakeholders in the supply chain. Such standards must support and encourage the use of technology [and automated collection], be designed to accommodate various levels of stakeholder technical capabilities/ readiness as well as facilitate the adoption of emerging technologies. Given the diversity that exists in the food supply chain, interoperability is necessary for achieving scalability, lowering adoption costs and preventing the exclusion or elimination of smaller supply chain participants.

In the November 11, 2016 FDA report to congress the following gaps were identified in the Institute of Food Technologist pilots.

1. Lack of coverage of all establishments (e.g., farms and restaurants are excluded)
2. Lack of uniform data and record requirements
3. Inability to link incoming with outgoing product within a firm and from one point in the supply chain to the next
4. Inadequate mechanisms to rapidly capture, receive, and analyze tracing information (electronic and technology applications).

It is the opinion of AIM that technology exists today to address many of the goals of the Smarter Food Supply Chain, and that it will improve over time. However, technology alone will not enable the Smart Food Supply Chain; global regulatory bodies, standards organizations, and the user communities must cooperate to address the objectives, identify and correct deficiencies in existing standards, implement large scale pilots and measure progress and resolve deficiencies.

A. Ubiquitous Global Food Traceability

The federal government should adopt standards to set the baseline content – or data points – needed to facilitate a food supply chain that is both visible and actionable. These standards should require such baseline content to be physically tied to each item entering the food supply chain in a manner that can be digitally captured. By establishing universal baseline requirements, each supply chain participant should be able to collect and share the same information (e.g. unique identifier, lot/batch, etc.) regardless of the technology or platform used.

AIM North America has had a long partnership with GS1 and several of the GS1 specifications have been vetted through the ISO standardization process which ensure global collaboration.

AIM North America recommends that the FDA ensures Food Traceability is backed by ISO specifications that are more likely to be adopted by the global community. See Appendix B.

AIM North America recommends that the FDA addresses the following issues in laying the foundation for ubiquitous traceability: 1) FDA/USDA data elements required to recall a product 2) Globally Unique Identification 3) Common data carrier attributes 4) Core set of events to be tracked with minimum viable data elements 5) Global access to interoperable data repositories 6) Digitally signed data carriers

1) FDA/USDA data elements required for traceability

Regulatory agencies need to decide what data elements are required to identify an item in the supply chain, this requirement will normalize the identification across data carriers. An example could be Global Trade Item Number (GTIN), Lot/Batch Number, Serial Number and Relevant date code. We encourage the FDA to set this requirement as soon as feasible as it will provide a guide post for solution developers.

2) Globally Unique Identification

The ISO/IEC 15459 standard establishes a common framework for the identification of assets in the supply chain including the method whereas entities can apply to be issuing agencies.

Data carriers are encoded in such a way that you can identify the numbering authority used to interpret the data. Per the specification data carriers, either optical or RF, have a code that indicates that the data following should be interpreted by the issuing agency rules. For example, UPC-A, EAN, Databar are always interpreted by GS1 standards. In addition to the GS1, the European Health Industry, Universal Postal Union, and Dun and Bradstreet are examples of other issuing agencies.

AIM North America's recommendation to the FDA that any issuing organization in the global traceability be a registered numbering authority. An example of a non-unique numbering authority would be some of the state cattle associations. They issue a number to farmers to sell their beef under and that number is recorded when the beef is sold at auction. However, since there is no requirement for uniqueness Iowa numbers could be duplicated with Indiana numbers making it difficult to identify original source.

3) Common Data Carriers attributes

Today there are a number of voluntary industry guidelines; i.e. Produce Traceability Initiative, GS1 US Foodservice Traceability Initiative, calling out the use of varying data carriers including GS1-128, U.P.C., GS1 DataMatrix, ITF14, GS1 Databar, and QR code. AIM North America recommends the standardization of minimum set of data attributes to be

contained within the data carrier, ideally this set would be aligned with the data elements required to withdraw a product from market. For instance: GTIN, Lot/Batch, Serial Number and Expiration Date (or another relevant date). Standardization of the data attributes in the

data carrier is critical to successfully locating products in the supply chain for recall or other purposes. If the standardized minimal data elements are not present in the data carrier some means outside the normal process flow will be needed to acquire them adding friction and cost into the supply chain. Below is a table illustrating this point – the left column specifies the business objective and the next 2 columns compare a data rich data carrier with a GTIN.

Table 1: Use Cases Enabled with enhanced item attributes

Feature	GTIN	GTIN+LOT, Serial Number, & Expiry Date
Traceable	Not without other manual intervention	Yes
Additional Data required beyond GTIN		Yes
Product Recall	Not without other manual intervention	Lot/Batch or Serial Number
Anti-Counterfeit Measures	Not without other measures	Yes
FIFO Inventory Management	Not without other measures	Yes

Next you need to examine the data capacity of current data carriers. For instance, if an example GS1-128 case label was generated per the GS1US Foodservice Case Label Guidance a data carrier that could contain the data elements (or to use the GS1US term - application identifiers) - that can meet the requirement are listed in the table below

Data Carrier	Comments
U.P.C.-A/EAN/Databar/ITF14	Contains GTIN only – not recommended for traceability since the item is identified only at the class level
QR Code, GS1 DataMatrix, GS1-128	GS1-128 is limited in size to 48 characters so the combination of elements cannot exceed that size / QR Code, GS1 DataMatrix can contain all needed data elements
RFID	GTIN+ serial number in base memory and Lot/Batch and Expiration Date in user memory as needed

4) Core set of events

AIM North America recognizes the GS1 EPCIS, which has also been published as: ISO/IEC 19987:2015 Information technology — EPC Information services — Specification, as the leading standard for event data capture and recommend its global adoption.

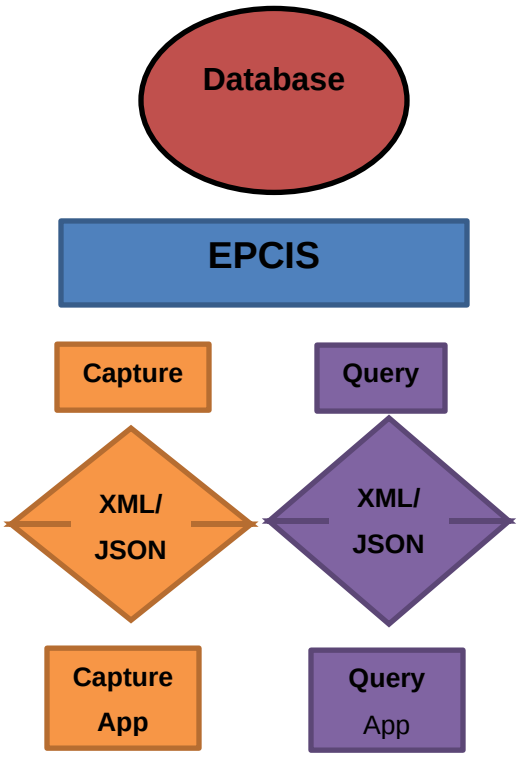
The GS1 EPCIS specifies the syntax that the data can be exchanged. The key data elements (KDE) or critical tracking events (CTE) required to meet the global traceability initiative is beyond the scope of this document. The minimal supply chain events that are captured in the food supply chains can and does vary today among solution partners. This limits supply chain interoperability and could add unnecessary cost / friction into the globally ubiquitous traceability of food.

In order to address this situation, AIM North American recommends that the FDA set the minimal level set of supply chain events and the key data elements that are required to ensure interoperability at the base level.

5) Global access to interoperable data repositories

The FDA needs to consider the time span required for a trace back. Current paper processes time varies dramatically from a few days to a few months. If the FDA establishes that they require the trace back data within 72 hours for instance, that will compel industry to develop electronic path for the data transfer.

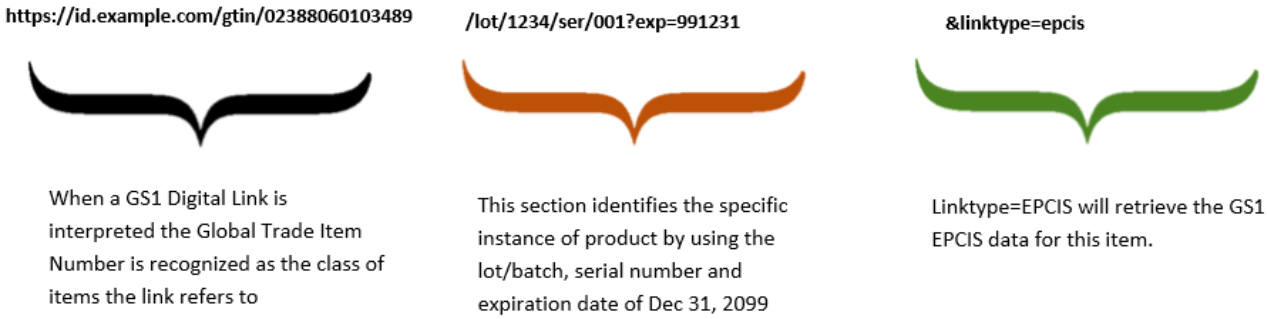
GS1 EPCIS Query Interface is diagramed below to provide an example of a potential method of meeting the trace back data retrieval times by accessing one or more EPCIS repositories. In the typical scenario of a trace back from multiple start points through one or more middle points to the source it is a certainty that more than one data repository will be involved.



Another emerging GS1 standard – GS1 Digital Link may provide another method of walking back the chain. The GS1 Digital Link Standard example could be enabled for authenticated access of EPCIS data for the GTIN, lot/batch, serial number, expiration date.

GS1 Digital Link Example

https://id.example.com/gtin/02388060103489/lot/1234/ser/001?exp=991231&linktype=epcis



In a world where consumers are increasingly connected and demanding more information can be achieved using the above example, the web enable data carrier with the ability to connect with the consumer for: food safety information in terms of expiration or recall; food product handling information; product and ingredient information.

To ensure regulations do not become obsolete before they can even be implemented regulatory bodies need to concentrate on the "what" elements of food traceability enabling the technology community to focus of the "how". The technological progress in computers and mobile devices is well known—but surprisingly, it isn't a special case. A range of other technologies demonstrate similar exponential growth, whether bits of data stored or DNA base pairs recorded. Any regulations specifying the "how" could potentially impact innovation in food transparency.

6) Digitally signed data carriers

As the use of global food traceability increases it will be prudent to enable a method of generating verified symbols that can be authenticated either in an online connected manner or in a stand-alone application.

ISO/IEC 20248 specifies a method whereby data stored within a barcode and/or RFID tag is structured and digitally signed. The purpose of the standard is to provide an open and interoperable method, between services and data carriers, to verify data originality and data integrity in an offline use case. The ISO/IEC 20248 data structure is also called a "DigSig" which refers to a small, in bit count, digital signature.

ISO/IEC 20248 also provides an effective and interoperable method to exchange data messages in the Internet of Things [IoT] and machine to machine [M2M] services allowing intelligent agents in such services to authenticate data messages and detect data tampering

B. Ensuring Extensibility and Scalability

Without interoperability, a vast amount of critical food supply chain data remains siloed, preventing a visible supply chain. The producers and growers at the start of the food supply chain tend to be small businesses, particularly as compared to the large distributors and retailers participating down the line. Supply chain participants can be asked to comply with multiple different/conflicting transparency and traceability demands, which can be burdensome to meet, particularly in the aggregate. Industry collaboration driven by interoperable standards is necessary to lower the technological and financial barriers to adoption and participation, particularly for smaller players. Standardization will also reduce the need for customization allowing for a more seamless and scalable onboarding processes for participants deploying transparency and traceability solutions.

RTC FDA November 2016 document called out that, "Weaknesses in the current system have been identified by the Health and Human Services' Office of the Inspector General (OIG). In a 2009 report, OIG auditors attempted to trace 40 food products from retail sale back to the farm and only five food products were fully traceable. Problems identified in tracing the food by the OIG included failure by firms to maintain lot-specific information and the co-mingling of products from many farms. (OEI-02-06-00210)

AIM North America recommends conducting additional National/International Food recall simulations at the following intervals.

1. Q1, 2020 Benchmark current state of food trace back
2. Q1, 2021 Interim Report on Progress of Smarter Food Supply Chain
3. Q1, 2022 Report out of Smarter Food Supply Chain and recommendations for next steps

II. Smarter Tools & Approaches

FDA should collaborate with industry to develop resources and identify venues for educating retailers, foodservice and other supply chain members on the traceback process and information needed by FDA, State, and local government officials to conduct a traceback of a food which has been linked to foodborne illness outbreak.

Data Analytics and Artificial Intelligence (AI) are current technology trends. Emerging data mining technology can help identify hot spots, analysis trend analysis and help uncover root cause. Good data analytics is driven by data that is captured from supply chain items and requires automatic identification and data capture techniques.

Emerging sensor technology in the new era of smarter food safety includes sensing environmental and other food quality conditions such as temperature, humidity, brix, and CO_2. By storing and transmitting environmental conditions in a cryptographically-secure way to make the data actionable in the supply chain by associating to the food item (GTIN).

More and more food producers are employing blockchain or distributed ledger technology to log product movement through the supply chain. Without wide-scale standardization of the data being collected both from the data carrier along with other transactional details it is unlikely that even with the use of blockchain that food transparency will move from silo'd implementations to widespread adoption.

FDA should focus on making regulations as evergreen as possible allowing for the adoption of emerging technologies.

III. Adapting to New Business Models & Retail Food Safety

Techniques to enhance navigating the last mile will include the AIDC connection making the physical food item "intelligent" and traceable. Also, the availability of low-cost sensors to connect the status of the food as "fit for use" are both areas the AIM association members develop. The GS1 has an emerging standard called GS1 Digital Link Standard that combines barcodes with the power of the web. This initiative may provide valuable in shedding transparency into the last mile. In addition, the standards around low cost sensors will be critical in this area.

With the increase of sensor technology bringing lower cost points, the first mile and last mile food transparency will improve when sensor data is tied to the product as it moves through the supply chain from source to consumption or disposal. Bringing actionable insights that will increase transparency enabling a safer supply chain.

IV. Food Safety Culture

A tenant of the Food Safety Culture is to keep it simple and user friendly. From the farmer in the field who does not want to conduct research on what data elements he needs to be capturing – he just wants to be compliant. To the consumer who does not want to play what region did my romaine salad come from and is it safe to consumer. In order to be ubiquitous, food supply chain transparency needs to be simple, well defined and implementable with clearly defined goals.

In the words of Ralph Waldo Emerson, "The person that can make the hard things easy is the educator". They are also probably successful. Digitization of the global food supply chain will bring transparency as part of the process, not added in.

We recognize that the use of new and evolving digital technologies can play a pivotal role in tracing the origin of a contaminated food to its source in minutes, or even seconds, instead of days or weeks, when contamination does occur.

Access to information during an outbreak about the origin of contaminated food will enable more timely root cause analysis and increase learnings to prevent future food incidents.

A. Inventory Management & Food Waste

By making every product visible in a business's electronic inventory management system, companies are able to have greater efficiency and agility of operations, substantially reducing understocking and overstocking. In the retail context, electronic product tracking can provide detailed data on demand for individual products in specific stores and regions, enabling more efficient ordering, planning, and pricing. In many cases, the savings from reduced labor costs would offset the investment in such technology. FDA should consider the emerging use of returnable packaging and the potential cross contamination of food that the process of container reuse introduces into the food stream. Identification and electronic tracking ensures proper handling and sterilization processes are performed on these returnable packaging which is critical.

B. Brand Power & Consumer Demand

Direct digital interactivity between the consumer and the product is becoming a key means of encouraging brand loyalty and re-purchasing. In 2018, 75% of consumers would be willing to switch brands if another offered them more in-depth product information beyond the label, up from 39% in 2016 as reported by FMI and Label Insights report, "Transparency Imperative". Similarly, consumers are increasingly demanding information about sustainability. More than ever, consumers are willing to engage with businesses that invest in food safety technology. Meeting this demand for ingredients and process transparency requires information to be collected, stored and shared throughout each step of the supply chain. Enhanced data carriers, such as RFID and 2D barcodes, can identify a specific product throughout the supply chain. One data carrier may not be sufficient in meeting the needs throughout the supply chain. For instance, when receiving product or taking inventory, RFID may enable labor required. But when selecting an ingredient for a transformation event in a small foodservice, a direct line of site data carrier may be better suited. If the data carriers on pack contained the same data elements, they could be used interchangeably throughout the supply chain.

Traceability should not require customized solutions. If the same solution can satisfy regulatory requirements and enable businesses to connect with consumers, there is likely to be less resistance to adopting compliance measures. Additionally, investing in technology-driven traceability helps to create a food safety culture of trust and transparency.

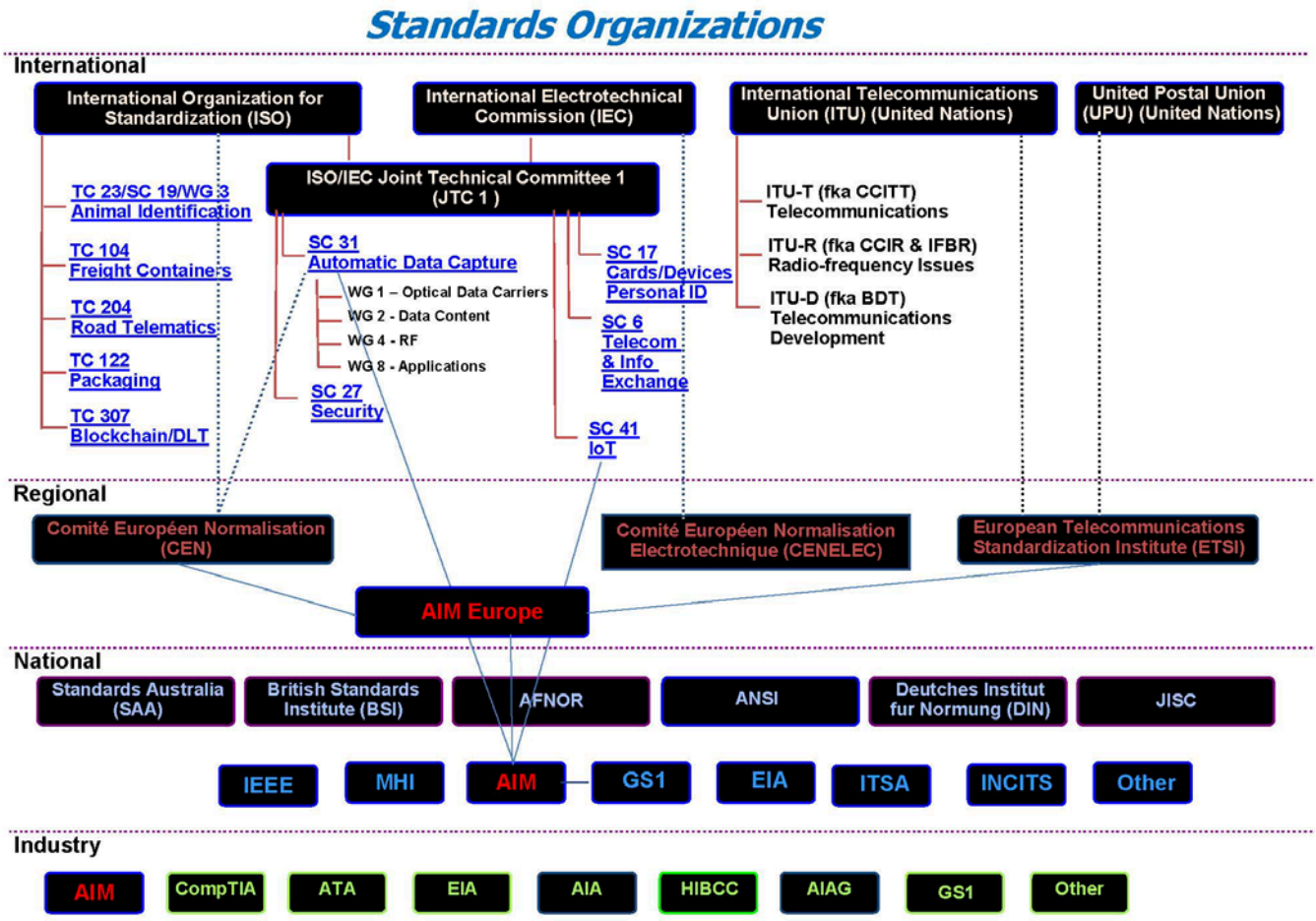
CONCLUSION

A New Era of Smarter Food Safety must focus on the adoption of technology to bring automation, integrity and data management solutions to the food supply chain. The role of government is to establish minimum standards that to facilitate the use of technology allowing them to work seamlessly.

The first step FDA should take is to determine what information they require in case of a product recall or withdrawal and timeframe expectations. Next, a clear definition of the common data elements to be carried on items moving through the supply chain, establish rules for global unique identifiers, methods of securing global identifiers, consumer access to provenance data and product safety information, the electronic capture and sharing of required information. Creation of ubiquitous global traceability can accomplish many of the goals FDA has outlined for the Smarter Food Supply Chain — improved product identification, business and consumer notification in case of a withdrawal or contaminated product. Improved root cause analysis on outbreak identification. Optimization of the supply chain by FIFO data management and reducing waste. Enabling the culture of food safety by creating consumer transparency and education on product handling.

AIM North America thanks the FDA for this very useful effort, and for its consideration of our comments. If we can provide additional information or answer any questions, please do not hesitate to contact the undersigned.

APPENDIX A


Standards Organizations
International
International Organization for Standardization (ISO)
International Electrotechnical Commission (IEC)
International Telecommunications Union (ITU) (United Nations)
United Postal Union (UPU) (United Nations)
TC 23/SC 19/WG 3 Animal Identification
TC 104 Freight Containers
TC 204 Road Telematics
TC 122 Packaging
TC 307 Blockchain/DLT
ISO/IEC Joint Technical Committee 1 (JTC 1)
SC 31 Automatic Data Capture
WG 1 – Optical Data Carriers
WG 2 - Data Content
WG 4 - RF
WG 8 - Applications
SC 27 Security
SC 17 Cards/Devices Personal ID
SC 6 Telecom & Info Exchange
SC 41 IoT
ITU-T (fka CCITT) Telecommunications
ITU-R (fka CCIR & IFBR) Radio-frequency Issues
ITU-D (fka BDT) Telecommunications Development
Regional
Comité Européen Normalisation (CEN)
Comité Européen Normalisation Electrotechnique (CENELEC)
European Telecommunications Standardization Institute (ETSI)
AIM Europe
National
Standards Australia (SAA)
British Standards Institute (BSI)
AFNOR
ANSI
Deutches Institut fur Normung (DIN)
JISC
IEEE
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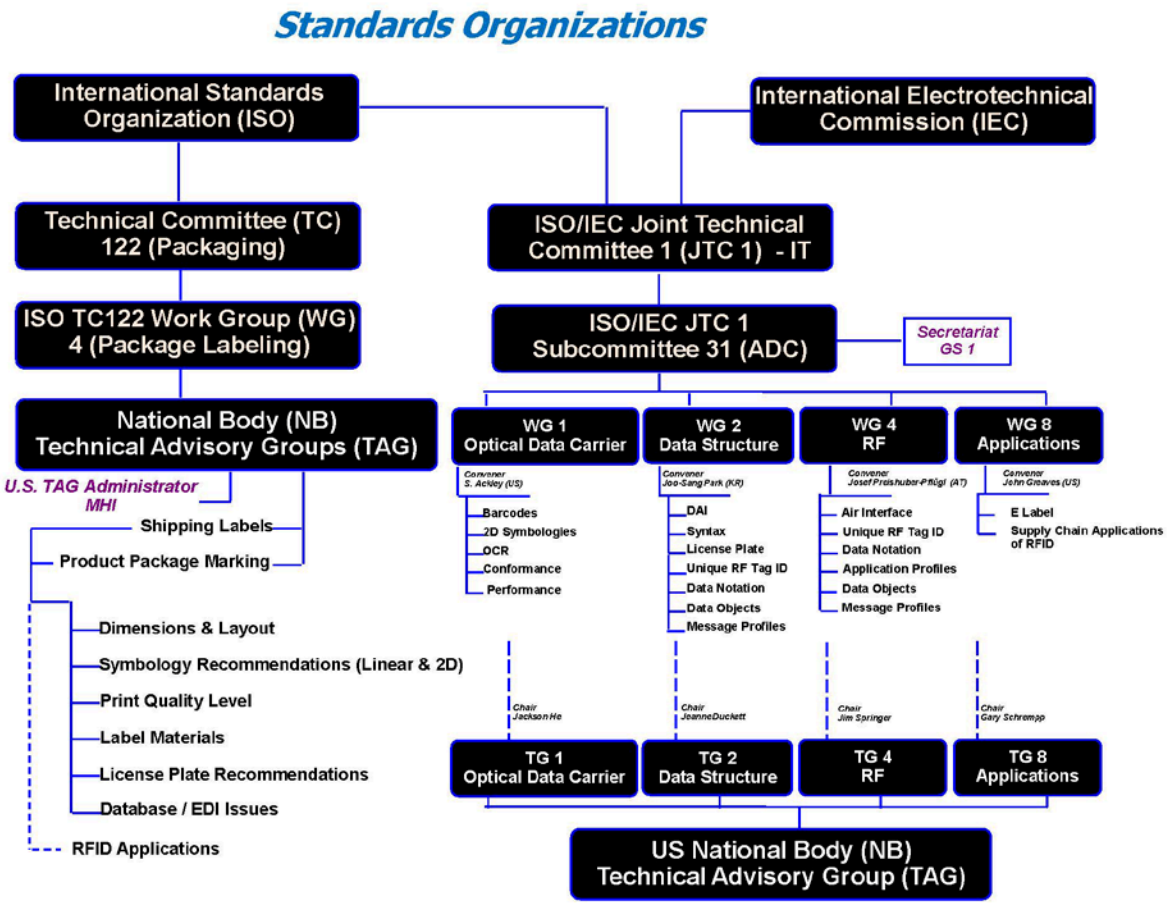
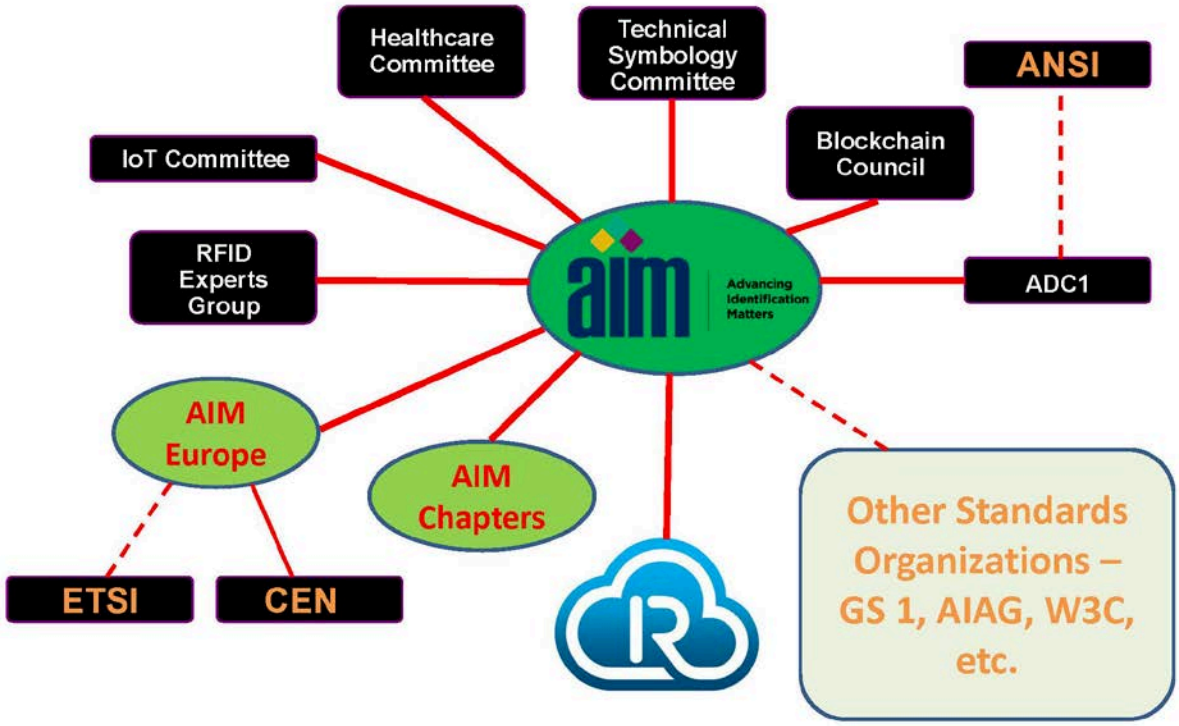
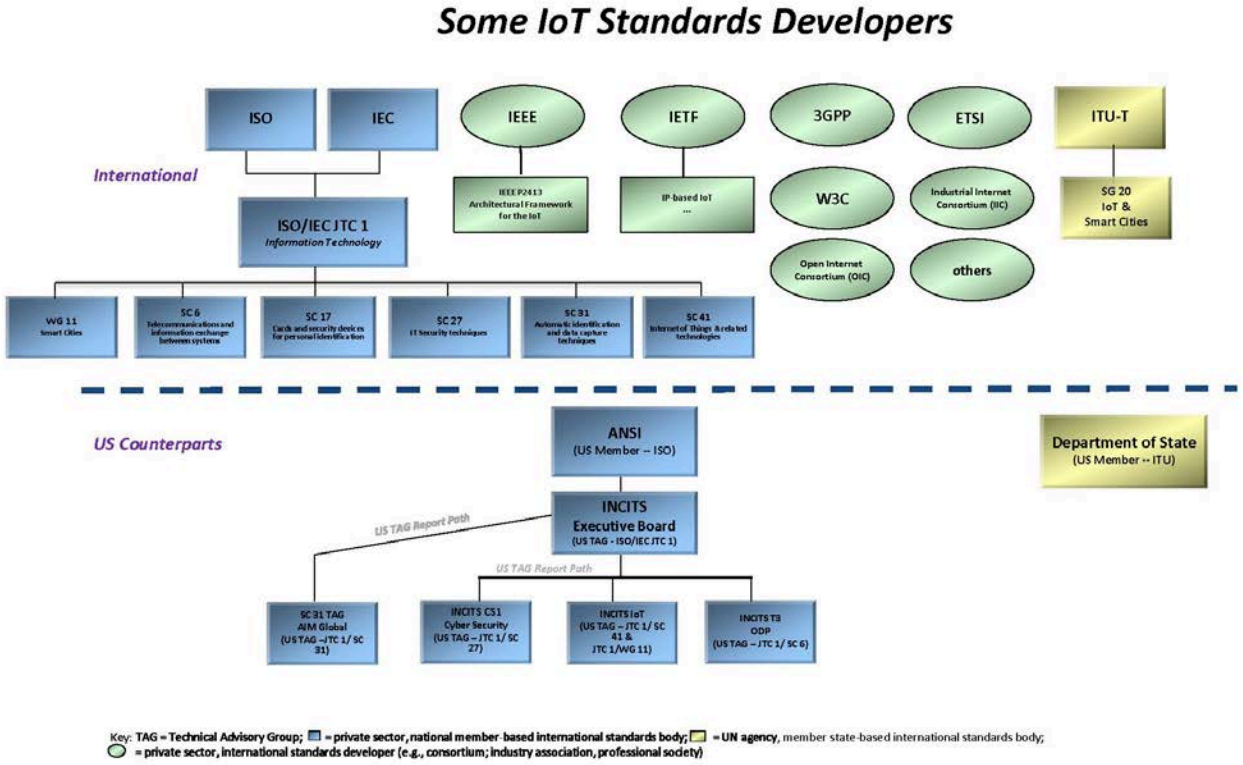
GS1
Other


Standards Organizations
International Standards Organization (ISO)
International Electrotechnical Commission (IEC)
Technical Committee (TC) 122 (Packaging)
ISO/IEC Joint Technical Committee 1 (JTC 1) - IT
ISO TC122 Work Group (WG) 4 (Package Labeling)
ISO/IEC JTC 1 Subcommittee 31 (ADC)
Secretariat GS 1
National Body (NB) Technical Advisory Groups (TAG)
WG 1 Optical Data Carrier
WG 2 Data Structure
WG 4 RF
WG 8 Applications
U.S. TAG Administrator MHI
Convener S. Ackley (US)
Barcodes
2D Symbologies
OCR
Conformance
Performance
Convener Joo-Sang Park (KR)
DAI
Syntax
License Plate
Unique RF Tag ID
Data Notation
Data Objects
Message Profiles
Convener Josef Preishuber-Pflügl (AT)
Air Interface
Unique RF Tag ID
Data Notation
Application Profiles
Data Objects
Message Profiles
Convener John Greaves (US)
E Label
Supply Chain Applications of RFID
Shipping Labels
Product Package Marking
Dimensions & Layout
Symbology Recommendations (Linear & 2D)
Print Quality Level
Label Materials
License Plate Recommendations
Database / EDI Issues
RFID Applications
Chair Jackson He
Chair JeanneDuckett
Chair Jim Springer
Chair Gary Schrempp
TG 1 Optical Data Carrier
TG 2 Data Structure
TG 4 RF
TG 8 Applications
US National Body (NB) Technical Advisory Group (TAG)

AIM Relationships



Some Key IoT Standards Developers



Key: **TAG = Technical Advisory Group;** **= private sector, national member-based international standards body;** **= UN agency**, member state-based international standards body; **= private sector, international standards developer (e.g., consortium; industry association, professional society)**

APPENDIX B

AIM Ultracode International Symbology Standard

AIM 7351731 Medical Electrical Equipment & Sys Electro Immunity Test for RFID Readers

AIM ISS DotCode Symbology Specification

Global Numeric Code Issuing Agencies in accordance with ISO 15459
https://www.aimglobal.org/uploads/1/2/4/5/124501539/register-iac-def_2019.pdf

ISO/IEC 15459-1:2014 Information Technology - Automatic Identification And Data Capture Techniques - Unique Identification - Part 1: Individual Transport Units

ISO/IEC 15459-2:2015 INFORMATION TECHNOLOGY — AUTOMATIC IDENTIFICATION AND DATA CAPTURE TECHNIQUES — UNIQUE IDENTIFICATION — PART 2: REGISTRATION PROCEDURES

ISO/IEC 15459-3:2014 Information technology — Automatic identification and data capture techniques — Unique identification — Part 3: Common rules

ISO/IEC 15459-4:2014 Information Technology - Automatic Identification And Data Capture Techniques - Unique Identification - Part 4: Individual Products And Product Packages

ISO/IEC 15459-5:2014 Information technology — Automatic identification and data capture techniques — Unique identification — Part 5: Individual returnable transport items (RTIs)

ISO/IEC 15459-6:2014 Information technology — Automatic identification and data capture techniques — Unique identification — Part 6: Groupings

ISO/IEC 15459-8:2009 Information technology — unique identifiers — Part 8: Grouping of transport units

GS1/ ISO Standards list

ISO Standard	GS1 Component
ISO/IEC 15459-6	GTIN (Global Trade Item Number
ISO/IEC 15459-4	SGTIN (Serialized Global Trade Item Number
ISO/IEC 6523	GLN (Global Location Number
ISO/IEC 15459-1	SSCC (Serial Shipping Container Code
ISO/IEC 15459-4 & 5	GIAI (Global Individual Asset Identifier
ISO/IEC 15459-5	GRAI (Global Returnable Asset Identifier
ISO/IEC 15418	GSRN (Global Service Relationship Number

ISO/IEC 15418	GDTI (Global Document Type Identifier
ISO/IEC 15418	GINC (Global Identification Number for Consignments
ISO/IEC 15459-6	GSIN (Global Shipment Identification Number
ISO/IEC 15418	GCN (Global Coupon Number
ISO/IEC 15418	CPID (Component / Part Identifier
ISO/IEC 15418	Application Identifiers
ISO 22274	Global Product Classification (GPC
IETF RFC 3986	EPC URI Syntax
ISO 9735	EANCOM syntax
UN/CEFACT UNSMs	EANCOM content
W3C XML	GS1 XML syntax
W3C XML	GS1 XML content
ISO/IEC 15424	Symbology identifiers
ISO/IEC 15420	EAN/UPC
ISO/IEC 16390	ITF-14
ISO/IEC 15417	GS1-128
ISO/IEC 24724	GS1 DataBar
ISO/IEC 16022	GS1 DataMatrix
ISO/IEC 24723	GS1 Composite
ISO/IEC 18004	GS1 QR Code
ISO/IEC 18000-63	UHF Class 1 Gen 2 /IEC 18000-63
ISO/IEC 18000-3	HF Class 1 Gen 2
ISO/IEC 15962	EPC Tag Data Standard
ISO/ICE 24791-5	Low-level Reader Protocol (LLRP)
ISO/IEC 24791-2	Application Level Events (ALE)
ISO/IEC 24791-3	Reader Management (RM)
ISO/IEC 24791-3	Discovery, Confguration, and Initialization (DCI)
ISO/IEC 19987	EPC Information Services
ISO/IEC 19988	GS1 Core Business Vocabulary (CBV)

Food Supply Chain Management

REPORT TO CONGRESS ON ENHANCING TRACKING AND TRACING OF FOOD AND RECORDKEEPING SUBMITTED PURSUANT TO SECTION 204 OF THE FDA FOOD SAFETY MODERNIZATION ACT, PUBLIC LAW 111-353 SUBMITTED BY US DEPARTMNET OF HEALTH AND HUMAN SERVICES FOOD AND DRUG ADMINSTRATION NOV 11, 2016
FOOD SAFETY CULTURE CREATING A BEHAVIOR BASED FOOD SAFETY MANAGEMENT SYSTEM
FOOD TRACEABILITY FROM BINDERS TO BLOCKCHAIN EDITED BY DR JENNIFER MCENTIRE AND ANDREW KENNEDY
COMPARING GLOBAL FOOD SAFETY INITIATIVES (GFSI) RECOGNIZED STANDARDS
ROMAINE TASK FORCE FINAL REPORT AND RECOMMENDATIONS, SEPTEMBER 2019
PRODUCE TRACEABILITY INITIATIVE GUIDANCE FOR SHARING TRACE-BACK DATA STANDARDS
PROCEEDINGS GLOBAL SEAFOOD DIALOG WORKGROUP 1 ALIGNMENT OF KEY DATA ELEMENTS, AND WORGROUP 2 DATA SHARING: TECHNOLOGY ARCHITURE + PROTOCOL (AVERY DENNISON SITS ON THE BOARD FOR GLOBAL SEAFOOD DIALOGUE)
THE TRANSPARENCY IMPERATIVE- PRODUCT LABELING FROM THE CONSUMER PRESPECTIVE
NATIONAL ACADEMIES OF SCIENCE, ENGINEERING, MEDICINE: STANDARDS, CONFORMITY ASSESSMENT, AND TRADE
STANDARDS I HAVE REVIEWED (I HAVE COPIES OF ALL OF THESE DOCUMENTS)
ISO 22000:2018 FOOD SAFETY MANAGEMENT SYSTEMS — REQUIREMENTS FOR ANY ORGANIZATION IN THE FOOD CHAIN
ISO 22005”2007 TRACEABILITY IN THE FEED AND FOOD CHAIN — GENERAL PRINCIPLES AND BASIC REQUIREMENTS FOR SYSTEM DESIGN AND IMPLEMENTATION
ISO 9001 QUALITY MANAGEMENT SYSTEMS — REQUIREMENTS
CODEX CAC/GL 60-2006 - PRINCIPLES FOR TRACEABILITY/PRODUCT TRACING AS A TOOL WITHIN A FOOD INSPECTION AND CERTIFICATION SYSTEM
USDA HARMONIZED GOOD AGRICULTURAL PRACTICES (GAP) REQUIREMENTS FOR TRACEABILITY
GLOBAL FOOD SAFETY INIAITIVE (GFSI) APPROVED SCHEMES INCLUDING BRC, CANDAGAP, PRIMUSGFS, SQF
FOUNDATION FOOD SAFETY SYSTEM CERTIFICATION 22000 (FSSC 22000)