Animal Disease Traceability Assessment Report

April 2017

USDA APHIS

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I. Acronym List

ADT	Animal Disease Traceability
AIN	Animal Identification Number
APHIS	Animal and Plant Health Inspection Service
CFR	Code of Federal Regulations
FSIS	Food Safety Inspection Service
FMD	Foot and Mouth Disease
ICVI	Interstate Certificate of Veterinary Inspection
IES	Investigative and Enforcement Services
NUES	National Uniform Eartagging System
OSS	Owner-Shipper Statement
RFID	Radio Frequency Identification
TB	*Mycobacterium bovis*
TPM	Trace Performance Measure
USDA	United States Department of Agriculture

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II. Executive Summary

The objective of this assessment is to evaluate the Animal Disease Traceability (ADT) program and the effectiveness of the Code of Federal Regulations (CFR) Title 9 Part 86, Animal Disease Traceability, to enhance our tracing capabilities for emergency response, disease control and eradication programs. The assessment is based on an evaluation of traceability parameters since the publication of Part 86 through September 30, 2016.

On January 11, 2013, the United States Department of Agriculture (USDA) published the final rule, "Traceability for Livestock Moving Interstate." Official identification requirements for beef feeder cattle were excluded from the final rule based on comments received from stakeholders. USDA acknowledged that the component of traceability for beef cattle under 18 months of age would be addressed in a separate rulemaking process or implementation phase, and would be considered after assessing whether the requirements were being implemented effectively throughout the production chain for the cattle and bison covered under the initial phase.

The ADT framework was established to improve the ability to trace animals back from slaughter and forward from premises where animals are officially identified in addition to tracing animals' interstate movements. While the Animal and Plant Health Inspection Service (APHIS) focuses on interstate movements of livestock, States and Tribal Nations remain responsible for the traceability of livestock within their jurisdictions. This approach was designed to embrace the strengths and expertise of States, Tribes, and producers, while giving them the flexibility to find and use the most effective traceability approaches to identify animals moving interstate nationally.

APHIS established trace performance measures (TPM) to document progress in ADT, and by these measures the ADT program has been very successful in its administration in the context of the framework of official identification and movement documentation for covered livestock. Specifically the elapsed times to complete TPMs has decreased, and the percent of traces successfully completed for each fiscal year has increased. This improvement can largely be attributed to the timely retrieval of official identification records (records of tags distributed and tags applied) and movement documents through the use of databases for storing the associated information in an easily searchable format. However, while ADT has been successful in the context of the intended framework, significant gaps still exist within our tracing capabilities since the publication of 9 CFR Part 86:

- The most significant impediment resulting from the current framework is the restriction that the official identification requirement is only applicable to livestock that move

interstate. Cattle movements are quite diverse, often with multiple congregation points and opportunities for local spread of disease prior to moving interstate. The requirement that official identification be limited to interstate movements also creates significant confusion in marketing channels and creates enforcement challenges and complications.

- The ADT framework relies on the use of the basic, cost-effective identification methods used in APHIS' disease eradication programs and are widely accepted by producers. However, the challenges and limitations resulting from visual-only low cost identification eartags are evident. Yet the implementation of radio frequency identification (RFID) technology, while preferred by many, also has obstacles. The implementation of a RFID solution for traceability, if undertaken, would be a significant challenge and would require a lengthy implementation period and a well thought out and detailed plan.

- Although there are other fundamental gaps in the traceability framework that need to be addressed foremost, APHIS views the inclusion of feeder cattle in the traceability regulations as an essential component of an effective traceability system in the long-term. The success of animal disease control efforts hinges on including all sectors of the cattle industry. However, it is important to note that the requirement for collecting official identification numbers on movement documents and/or interstate certificate of veterinary inspection (ICVIs) for feeder cattle will be unduly cumbersome with visual only tags and therefore should only be considered when an RFID infrastructure is in place.

- Lastly, while all federally approved slaughter plants are required to collect all identification devices at slaughter and maintain correlation of the devices to the carcass through final inspection, compliance with this regulation is inconsistent. Although successful tracing is not guaranteed by the availability of identification collected at slaughter, it provides a significant advantage for regulatory personnel in disease investigations. In addition, the termination or retirement of official identification numbers at slaughter would greatly increase tracing efficiency as it would document which animals have been removed from the population. While the termination of visual-only tags is not logistically feasible, it would systematically be achieved at the slaughter plants when the RFID technology and infrastructure is established.

APHIS is confident that the basic framework of ADT is being successfully implemented and believes discussions with industry to consider potential next steps are appropriate at this time. It is essential for producers and other industry stakeholders to offer their opinions on relevant issues to help define the level of traceability they want to achieve and how best to reach those goals. Just as APHIS worked through issues and achieved compromises in the initial ADT framework that resulted in improved buy-in and support from many stakeholders, the next phase needs to follow that collaborative approach. APHIS has numerous outreach efforts scheduled in 2017 to obtain feedback from all sectors of the industry and will be providing more information on those activities.

III. Introduction - Objectives, Scope, and Methodology

The objective of this assessment is to evaluate the ADT program and the effectiveness of CFR Title 9 Part 86, Animal Disease Traceability, to enhance our tracing capabilities for emergency response, disease control and eradication programs.

Based on comments in the proposed rule regarding the inclusion of official identification requirements for beef feeder cattle, APHIS revised the final rule so that the component of traceability for beef cattle[1] under 18 months of age would be addressed in a separate rulemaking process or implementation phase. It was acknowledged that this phase would be considered after conducting an assessment of the ADT program to determine if the requirements were being implemented effectively throughout the production chain for the cattle and bison covered under the initial phase. APHIS is undertaking a full review of ADT and in-depth dialogue and collaboration with the cattle and bison industries to examine all aspects of the ADT framework and program activities, to ensure the most logical next steps are taken to advance traceability.

Although 9 CFR Part 86 provides requirements for official identification and movement documentation for cattle, bison, sheep, goats, equine, poultry and swine moving interstate, this assessment focuses on the effectiveness of the ADT program in relation to tracing cattle and bison.

Methods used to conduct this assessment included evaluation of documentation on actual program traces (e.g., brucellosis and tuberculosis) and trace exercises administered to capture TPMs under the ADT cooperative agreements with States; review of monitoring and compliance efforts including Investigative and Enforcement Services (IES) investigations; and informal discussions with State and Federal animal health officials.

Additionally, APHIS is conducting extensive outreach activities with State, Tribal, and Federal animal health officials and industry to obtain grassroots feedback from producers and all other sectors of the livestock industry. These efforts will help determine efficiencies gained, aspects of ADT that are working well, traceability regulations that are problematic and/or creating confusion, and gaps remaining in tracing capabilities since the inception of the rule.

IV. Animal Disease Traceability Framework

A. Program Description & History

In early 2010, the USDA announced a new approach for responding to and controlling animal diseases referred to as the ADT framework. Key principles of the framework include:

- The requirement for official identification of livestock when moved interstate.

[1] While the official identification of beef feeder cattle is often referenced, the regulatory exemption technically applies to sexually intact bison under 18 months of age as well as beef cattle.

- Administration by the States and Tribal Nations to increase flexibility.
- Encouraging the use of low-cost technology.
- Transparent implementation through the full Federal rulemaking process.

Subsequently, the USDA hosted eight public meetings to provide additional details about the new framework and to discuss with States, Tribes, industry representatives and producers how to best develop a workable traceability system. The August 2011 proposed rule included a schedule for the phasing-in of official identification requirements for cattle and bison based on feedback collected from these meetings, input from a State-Tribal-Federal working group, Tribal consultations, and additional discussions with producers and industry. The USDA proposed that beginning on the effective date of the final rule, the requirements would cover all sexually intact cattle and bison aged 18 months and over; dairy cattle of any age; and cattle and bison of any age used for rodeos, recreational events, shows, or exhibitions moved interstate. It was deemed essential to apply the official identification requirements immediately to these categories of cattle because they tend to live longer than feeder cattle, move around more, and have more opportunities for commingling, thus presenting a greater risk of spreading disease via interstate movement.

On January 11, 2013, the USDA published the final rule, "Traceability for Livestock Moving Interstate." The regulations set forth in the rule established APHIS' ADT program and improved the ability to trace animals back from slaughter and forward from premises where animals are officially identified. The regulations also help to trace animals' interstate movements. While APHIS focuses on interstate movements of livestock, States and Tribal Nations remain responsible for the traceability of livestock within their jurisdictions. This approach was designed to embrace the strengths and expertise of States, Tribes, and producers, while providing them the flexibility to find and use the most effective traceability approaches to identify animals moving interstate nationally. Moreover, this approach was also built on the successful use of identification methods in APHIS' disease eradication programs such as the brucellosis eradication program, and requirements for identification of official calfhood vaccinates. These programs have proven that higher levels of official identification enhance tracing capability. The success of our brucellosis eradication program, while certainly a positive development, has resulted in a steep decline in the number of cattle required to be officially identified. As a result of decreasing levels of official identification in cattle, the time required to conduct other disease investigations has been increasing.

The ADT framework reestablished the use of the basic, cost-effective identification methods widely accepted by producers. While ADT does not prevent disease, knowing the date, location, identification, and movement information of animals exposed to disease is indispensable in emergency response and in maintaining disease control and eradication programs.

B. Fundamentals of the Animal Disease Traceability Regulation

The ADT program was structured as a "bookend" system, as it provides the location where the animal was officially identified and the animal's last location, which is often the termination point or slaughter plant. ADT also focuses on interstate animal movements to provide information on the originating and destination premises for animals moved from one State to another. Animal disease programs, brand inspection regulations and, in certain situations, industry programs like breed registries, performance recording systems, or marketing programs also provide traceability data.

The regulations in 9 CFR Part 86 establish minimum national official identification and documentation requirements for the traceability of livestock moving interstate. The species covered in the rule include cattle and bison, sheep and goats, swine, horses and other equids, captive cervids (e.g., deer and elk), and poultry. Livestock moved interstate, unless otherwise exempt, must be officially identified and have an ICVI or other movement documentation. The requirements do not apply to livestock moving either:

- Entirely within Tribal land that straddles a State line and the Tribe has a separate traceability system from the States in which its lands are located.
- To a custom slaughter facility in accordance with Federal and State regulations for preparation of meat for personal consumption.

1. Official Identification

Official identification is fundamental to traceability and animal disease programs. The cattle and bison listed below are subject to the official identification requirements contained in 9 CFR Part 86:

- All sexually intact cattle and bison 18 months of age or over.
- All female dairy cattle of any age and all dairy males born after March 11, 2013.
- Cattle and bison of any age used for rodeo or recreational events.
- Cattle and bison of any age used for shows or exhibitions.

Cattle and bison moving interstate are exempt from the official identification requirement when moved:

- As a commuter herd with a copy of the commuter herd agreement or other documents as agreed to by the shipping and receiving States or Tribes. If any of the cattle or bison are shipped to a State or Tribe not included in the commuter herd agreement or other documentation, these cattle or bison must be officially identified and documented to the original State of origin.

- Directly from a location in one State through another State to a second location in the original State.
- Interstate directly to an approved tagging site and are officially identified before commingling with cattle and bison from other premises or identified by the use of backtags or other methods that will ensure that the identity of the animal is accurately maintained until tagging, so that the official eartag can be correlated to the person responsible for shipping the animal to the approved tagging site.
- Between shipping and receiving States or Tribes with another form of identification, as agreed upon by animal health officials in the shipping and receiving States or Tribes.
- Directly to a recognized slaughtering establishment or directly to no more than one approved livestock facility, and then directly to a recognized slaughtering establishment where they are harvested within 3 days of arrival.
- Interstate with a USDA-approved backtag; or a USDA-approved backtag is applied to the cattle or bison at the recognized slaughtering establishment or federally approved livestock facility.

2. Official Identification Methods

Unique characteristics make it necessary to provide identification methods for each species. For cattle and bison, official eartags are the primary method and an individual official animal number is imprinted on each eartag. All States must recognize official eartags as official identification devices. However, no State may require a specific official eartag for animals moved into their State, e.g., RFID tags. While group/lot identification is recognized as an official method for identifying cattle or bison that move through their entire life as one group, its use is most applicable to the swine and poultry industries.

Individual States have the option to recognize other methods of official identification than those contained in 9 CFR Part 86 for example, brands registered with a recognized brand inspection authority and accompanied by an official brand inspection certificate, tattoos, and other types of identification for registration with a breed association are acceptable when accompanied by a breed registration certificate and when agreed to by the shipping and receiving State or Tribal animal health authorities.

Official eartags are imprinted with official identification numbers, the Official Eartag Shield, and are tamper evident in design. The National Uniform Eartagging System (NUES) and the Animal Identification Number (AIN) are the individual animal numbering systems used for official eartags in cattle and bison.

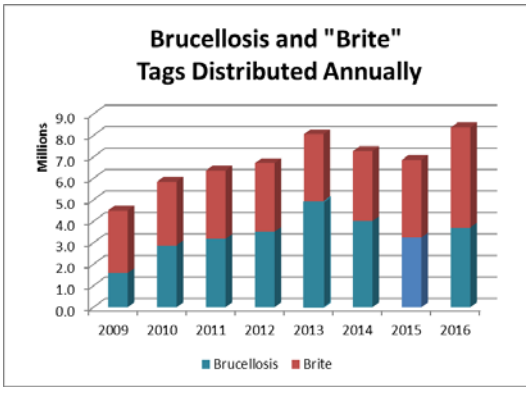
Traditionally, orange brucellosis calfhood vaccination tags and “silver” or “brite” metal clip tags have used the NUES animal number. However, some States have utilized the NUES number for plastic panel eartags. The 15-digit AIN tags prefixed with 840 (country code for United States) are primarily used in RFID eartags, but are also available as plastic visual only eartags (see Figure 1).

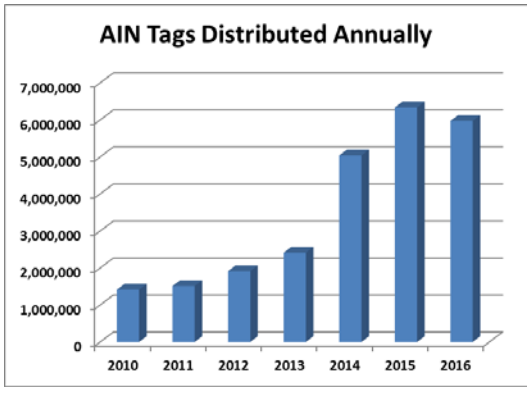
Figure 1. Examples of a brucellosis calfhood vaccination tag (top left), silver/brite tags (top right), and an AIN button tag (bottom)

Proper administration of official identification eartags is essential to ensure records are available to determine the farm or ranch where the animal was officially identified. Determining this location quickly and accurately is key to achieving successful traceability. Records of tags applied by accredited veterinarians, as well as tag distribution records for tags issued to producers provide this information during trace back investigations. Two of the TPMs were established to ensure record keeping and data retrieval capabilities are successfully achieved (see section III. State and Federal Cooperative ADT Efforts).

The number of NUES and AIN tags distributed can be used to estimate trends in the percent of cattle that are officially identified. As seen in Figure 2 below, a demonstrable increase in the number of NUES and AIN tags distributed occurred in 2013 likely corresponding with the publication of 9 CFR Part 86 and the requirements for official identification of covered classes of cattle and bison. It is important to note that the numbers contained in the figures below represent tags distributed during the calendar year as we do not have complete data to determine when the tags were actually applied. As noted earlier, a high majority (95%) of the AIN tags have RFID technology indicating a significant increase in official RFID eartags since 2013.

Figure 2. Annual distribution of NUES (brucellosis vaccination and silver) and AIN tags





3. Movement Documentation

The ADT program relies on interstate movement documents to provide information on the originating and destination premises for cattle and bison shipped interstate. While ICVIs are not actual reports of animal movements (the shipment may not occur or some of the animals listed may not be included in the final shipment), the information contained on the certificates highly correlates to the resulting movements for the listed animals and is used to indicate likely interstate movements. Shipping and receiving States and Tribes may agree on other movement documents. The persons responsible for animals leaving a premises for interstate movement must ensure that the animals are accompanied by an ICVI or other approved document for the interstate movement of animals.

Cattle and bison moved interstate must be accompanied by an ICVI unless they are moved:

- Directly to a recognized slaughtering establishment or directly to an approved livestock facility (livestock market), and then directly to a recognized slaughtering establishment. For the movement to the approved market, an owner-shipper statement (OSS) is required.
- Directly to an approved livestock facility with an OSS and do not move interstate from the facility unless accompanied by an ICVI.
- From the farm of origin for veterinary medical examination or treatment and returned to the farm of origin without change in ownership.
- Directly from one State through another State and back to the original State.
- As a commuter herd with a copy of the commuter herd agreement or other document as agreed to by the States or Tribes involved in the movement.

The official identification number of cattle or bison must be recorded on the ICVI or alternate documentation unless the cattle and bison are either:

- Moved from an approved livestock facility directly to a recognized slaughtering establishment.
- Under 18 months of age and sexually intact, or are steers or spayed heifers. This exception does not apply to sexually intact dairy cattle of any age or to cattle or bison used for rodeo, exhibition, or recreational purposes.

Since 2013 APHIS has attempted to acquire data on the administration of official identification devices and interstate movement activity, including the number of:

- ICVIs or other official movement documentation issued (for cattle to be exported from the State) and received (for cattle to be imported into the State).
- The number of cattle accounted for on ICVIs or other official movement documents issued and received.

- USDA official tags or devices distributed by the State.
- Cattle officially identified on ICVIs or other movement documents issued and received.

However, the acquisition of these data proved challenging as many States still rely on paper records, and resources are not available to provide the requested information in a standardized format for analysis. It is important to note that data on the number of cattle officially identified on ICVIs or other movement documents does not necessarily correlate to the number of cattle that actually moved interstate or were required to be officially identified under 9 CFR Part 86. For example, if an animal was required to be officially identified and listed on a movement document but the consignor failed to do so, the State would not be aware of the lack of compliance unless each shipment was monitored for accuracy, which is impractical. In addition, the exemptions related to certain types of movements and the requirements for listing of official identification on the movement documents contained within 9 CFR Part 86 make it difficult for State officials to determine which animals need official identification and movement documents without reviewing each movement. Due to the above constraints APHIS is no longer requesting that States report information on the administration of official identification and interstate movement activity.

Successful ADT systems depend on timely retrieval of accurate records of official identification distribution and application, and movement documentation. Electronic record systems are becoming widely utilized and have proven more valuable than paper-based methods since the information is legible when printed or viewed, retrieved quickly, easily searched for specific information, and in many situations available to the shipping and receiving States in real time. This process saves time for the accredited veterinarian and client by eliminating the need for handwritten records and mailing of documentation to the shipping and receiving State offices, while ensuring that regulatory requirements are met. Accredited veterinarians must keep accurate records of tag distribution to producers, tags applied, and ICVI or other interstate movement documentation pertaining to cattle and bison for 5 years.

4. Collection of Identification at Slaughter

Traceability also depends on maintaining the animal's identity at slaughter plants through final carcass inspection. All identification devices affixed to covered livestock unloaded at slaughter plants after moving interstate are removed at the slaughter facility by slaughter facility personnel. The devices must then be correlated with the animal and its carcass through final inspection or condemnation by means approved by the USDA Food Safety and Inspection Service (FSIS). If diagnostic samples are taken, the identification devices must be packaged with the samples and be correlated with the carcasses through final inspection or condemnation by means approved by FSIS. Devices collected at slaughter are made available to APHIS and FSIS by the slaughter plant. In addition to 9 CFR Part 86, FSIS also has regulations requiring the collection of identification devices from all cattle and bison at slaughter and maintaining correlation of the devices with the carcass through final inspection (9 CFR 310.2). Proper administration of

identification at slaughter plants significantly enhances disease programs and surveillance efforts.

V. State and Federal Cooperative ADT Efforts

States, Territories, and Tribal Nations are cooperators with the USDA for the implementation of the ADT program. As part of their cooperative agreements with the USDA, cooperators provide ADT road maps to reflect their long-term plan for implementing the ADT program. Road maps are required to be updated every three years as advancements in ADT are made within the State. The cooperator's annual work plan must focus on activities the cooperator plans to implement during the funding period that supports their ADT road map, including:

- Trace performance measures: As a performance-based program, ADT is designed to measure outcomes that will document successful advancement of animal disease traceability. Traceability performance activities have been established to measure and document progress. Cooperators, collaboratively with APHIS, will annually administer test exercises that reflect tracing capabilities based on the defined tracing activities. Goals provided for the administration and completion of trace exercises must be achieved to maintain eligibility for quarterly reimbursements.

- Administration of official identification devices: The proper administration of official identification devices and documents used to help determine interstate movements, in particular ICVIs, are key to having information to achieve successful animal disease traceability. Activities to support official identification and interstate movement documentation must be given high priority and accounted for in the cooperator's work plan. Cooperators should include records pertaining to the distribution of official eartags and data obtained from ICVIs and other movement documents in their accomplishment reports.

- Information sharing: Sharing information quickly and effectively will help APHIS and its cooperators respond to animal disease events and make ADT successful. Information systems must be compatible. Therefore, all cooperators must administer defined data elements in accordance with data standards. Options to share data seamlessly, including the integration of systems, should be given high priority.

- Outreach: Cooperators should implement an outreach plan to support ADT.

- Electronic records: Activities to increase the volume of electronic records that optimize the search ability of potential ADT data should be described. Priority areas to consider include: distribution/tag applied records of official identification devices, ICVIs, and other sources deemed applicable for the cooperator (e.g., data from bovine brucellosis vaccination and testing, bovine tuberculosis testing, brand inspection certificates, etc.).

- Compliance and enforcement of traceability regulations: High compliance with traceability regulations is also critical to achieve optimum tracing capabilities. While APHIS is the lead on the regulations defined in 9 CFR Part 86, cooperators are encouraged to work collaboratively to the degree possible on activities that will support compliance with the regulations. Cooperative efforts of State and Federal resources are highly preferred, in particular when the State has regulations that align with the federal regulations.

The APHIS Program Manager reviews the cooperator's ADT road map and works with the cooperator to ensure the cooperative agreement work plan aligns with the objectives of the ADT road map. The Program Manager also meets with the cooperator as often as necessary to ensure progress in accomplishing the goals of the work plan, identifying obstacles, and resolving concerns.

APHIS provides information regarding ADT on its website and supports the outreach efforts of States, Tribes, and territories to the extent possible. In addition, APHIS developed outreach and training programs for USDA accredited veterinarians, including processes for responsibilities associated with using official identification eartags, devices, and automated data capture technologies.

The ADT program was established to improve the ability of Federal, State, and Tribal animal health officials to trace livestock in the event of an animal disease outbreak. Ongoing implementation of this performance-based program is measured through a specific set of four TPMs, also referred to as traceability performance activities. These TPMs, established by a State-Federal working group in 2010, are based on activities that are typically associated with the administration of trace (trace-back or trace-forward) investigations. The working group chose these four activities because they can be uniformly measured regardless of the complexity of the trace. These activities measure a State's ability to properly administer, record, and retrieve documents pertaining to official livestock identification and interstate movement. Information retrieved that answers the following questions reflects a successfully completed TPM:

1. In what State was an imported animal officially identified? (Time it takes to determine the State/Tribe where an imported animal was officially identified).
2. Where in your State was the animal officially identified? (Time it takes the State/Tribe where the reference animal was officially identified to determine the physical location in the State where the animal was officially identified). This activity evaluates the accessibility and accuracy of records of tags applied to animals and tags distributed to producers and accredited veterinarians.
3. From what State was an animal shipped? (Time it takes to determine the State an imported animal was moved from when it moved interstate into the State).

4. From what location in your State was an exported animal shipped? (Time it takes to determine the physical location an exported animal was shipped from when it moved interstate).

Two values are measured for each TPM. The "percent successful" value represents the percentage of time the information was successfully retrieved for each activity, while the "time" value reflects the average elapsed time it took the State to complete each activity. When recording the elapsed time, the start time is when the State is notified of the official identification number and the end time is when the State finds the information to answer the question posed by the TPM. During the cooperative agreement period, each State is assigned five to ten exercises or may utilize actual traces to complete exercises for TPMs 2, 3, and 4. This assigned number or "quota" is based on the size of the State's cattle population. For example, based on cattle cow/calf statistics, the following distribution of test exercises would be appropriate:

- Large: 9 to 10 exercises for each of Activities 2, 3, and 4.
- Medium: 6 to 8 exercises for each of Activities 2, 3, and 4.
- Small: 4 to 5 exercises for each of Activities 2, 3, and 4.

Following the launch of the ADT program, national baseline values were established for each TPM using data that was reflective of the States' record keeping systems that existed prior to implementation of the program. Each successive year a comparison to those baseline values and the preceding year(s) is made to measure and document progress.

Table 1 provides the comparison of the 2nd year results to the national baseline values established in 2014 and the 1st year comparison. The quota assigned to each State was used to account for the distribution of the cattle population to arrive at weighted values for TPMs 2, 3, and 4. This approach helps minimize potential bias that could result if the non-weighted average of all States was used to arrive at the TPM values. TPM 1 evaluates the completeness of 840 tag distribution data recorded in the Animal Identification Management System maintained by APHIS and is therefore based equally on the average of all records.

The elapsed time decreased for all four TPMs in both the 1st and 2nd year comparisons. For example, for TPM 2, the time decreased from 88 hours for the national baseline to 35 hours and 29 hours respectively in the 1st and 2nd year comparison. In addition, the total number of trace records assigned or initiated, and the number of traces completed are used to reflect the frequency with which information was successfully retrieved to answer the question posed by each TPM. Improvement for successfully completed TPMs has been achieved from the national baselines values for all four TPMs. However, there is minimal change from the 1st comparison to the 2nd for TPMs 2, 3 and 4, while there was significant increase in the frequency of successfully completed exercises for TPM 1. For example, the national baseline values indicate that information was successfully retrieved 69% of the time for TPM 2 in the national baseline data with 88% and 87% for the 1st and 2nd comparison respectively. For TPM 1 those values improved from 88% for the 1st comparison to 97% for the 2nd comparison.

Table 1. Comparison of 1st and 2nd year TPM values to national baseline values

#	Performance Measure Description	National Baselines		1st Year Comparison		2nd Year Comparison	
		% Successful	Time	% Successful	Time	% Successful	Time
1	In what State was an imported animal officially identified?	NA	NA	88%	39 hr.	97%	20 hr.
2	Where in the State was the animal officially identified?	69%	88 hr.	88%	35 hr.	87%	29 hr.
3	From what State was an animal shipped?	58%	138 hr.	85%	42 hr.	86%	32 hr.
4	From what location was an exported animal shipped?	76%	264 hr.	88%	46 hr.	91%	41 hr.

The emphasis placed on recordkeeping systems, particularly electronic systems to retrieve data associated with the TPMs has resulted in a favorable trend demonstrating improved traceability completion time and, for the most part, a greater number of TPMs successfully completed. As noted earlier, it is important to acknowledge that the data used for the national baseline values reflects time to retrieve information prior to the implementation of the ADT program. For the first year comparison, event records from 2012, 2013, and 2014 were primarily selected, and for the 2nd year comparison, event records were selected from 2013, 2014, and 2015. While the first two comparisons are based on records that are more current and alone would likely make those records more readily available, the overall trends shown by the TPM values indicate progress has been achieved.

As the States and APHIS continue to improve record keeping processes both internally and with accredited veterinarians, tagging sites and tag manufactures, etc., TPMs will likely be maintained or slightly improved. A few States have greater potential for making improvements than others, and their progress will positively affect the national TPM values. The expansion of electronic recordkeeping systems has contributed to a decrease in the time required for searching records to trace livestock. However, some States report that continued advancement of electronic records will only be achieved in future years with additional information technology investments.

The ongoing administration of the TPMs through the current cooperative agreement period will help document continued progress as well as identify possible limitations to the current ADT infrastructure. In February 2017, a joint State/Federal working group completed a review of the current TPMs with consideration of additional performance measures to help ensure they continue to remain of merit to the ADT implementation process. The working group concluded that no additional TPMs are needed at this time, but did revise the guidance for completion of the TPMs to ensure accurate reporting and consistency of information provided by States.

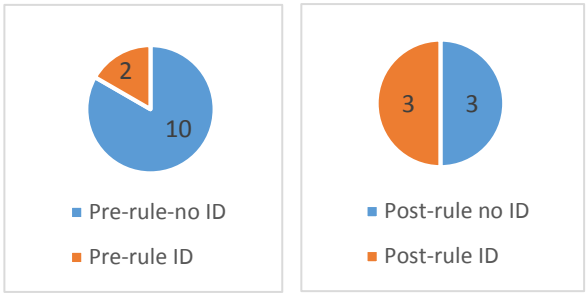
IV. Data Related to Program Disease Traces

Data from actual traces related to Cattle Health Center program diseases were analyzed to assess improvement in tracing capability since the publication of 9 CFR Part 86. In particular, data from confirmed cases bovine tuberculosis (TB) caused by infection with *Mycobacterium bovis* were reviewed with specific focus on the presence and type of identification found at slaughter. The data in Figure 3 are from 18 adult cattle slaughtered from January 2010 through April 2016, and confirmed with TB. These cases were detected at federally inspected slaughter plants, which slaughter approximately 98% of adult cattle slaughtered in the United States.

The data were divided categorically into pre-rule and post-rule groups (see Figure 3 below) where the pre-rule group was composed of TB cases in adult cattle with slaughter dates from January 1, 2010 through March 1, 2013, and the post-rule group was composed of cases after March 1, 2013 through September 30, 2016 (after publication of 9 CFR Part 86).

The number of confirmed TB cases found at slaughter in the United States is a very small sampling of the U.S. cattle population. However, prior to the rule, only 2 of 12 confirmed TB cases in adult cattle had official identification tags, and after the rule, three of six had official identification. Although the numbers are suggestive of progress in the proportion of U.S. cattle with official identification, the sample does not show a statistically significant difference in the proportion of tagged animals at the 95% confidence level (Chi squared p = 0.12), likely due to the small number of animals in the sample.

Figure 3. The number of confirmed TB cases in adult cattle with official identification (ID) slaughtered prior to and after publication of 9 CFR Part 86

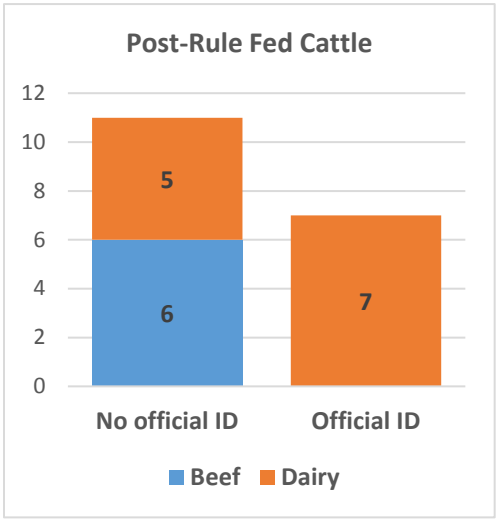


In addition to official identification tags, the 18 TB cases in adult cattle were presented at slaughter with varied other types of identification including slaughter back tags, production bangle tags, and no identification. Of the 12 pre-rule TB cases, five of 12 (42%) had no identification of any kind, while all of the post-rule animals had some type of identification tag.

In comparison to adult cattle TB cases, APHIS records show 20 feeder cattle were confirmed TB positive in the same time period (January 1, 2010 through September 30, 2016). There were two cases prior to the ADT rule and 18 after the rule. Neither of the pre-rule cases were required to have nor had official identification.

Of the 18 post-rule cases, seven animals (39%) had official identification and 11 did not. Of the 11 without official identification, seven (64%) did not have identification of any type. Stratifying cases by breed shows that six cases were beef breeds and 12 were Holstein. No official identification is required for the beef feeder cattle under the current rule, and none of the six TB cases had official identification. Identification is only required for dairy animals moving interstate. A review of individual case records revealed that official identification was a requirement for two (40%) of the five dairy animals with no identification (i.e., non-compliant), and three of the five were exempt due to intrastate movement. Of the seven cattle with official identification, only one was required under the rule. The remaining six were intrastate movements to slaughter and official identification was not required (Figure 4).

Figure 4. Confirmed TB cases in fed cattle slaughtered after publication of 9 CFR Part 86



Of the 38 confirmed TB cases in cattle, 26 were successfully traced (see table 2 below) including 21 having any form of identification (official or unofficial) and five with no identification. Of 14 animals with no identification, five cases were traced due to available slaughter records, five were traced indirectly because of information derived from a successfully traced case detected at slaughter originating from the same premises, and four were untraceable. It is unknown whether the indirect traces, particularly those with no identification, would have been successfully traced without the official identification present on their cohorts. There is a statistically significant difference at the 95% confidence level (p=0.02) in the ability to successfully trace animals with official identification compared to those with no identification present at slaughter.

Table 2. Trace outcome for TB confirmed cases detected at slaughter by identification type

	Total Cases by Identification Type	Successful Trace	Traced Indirectly	Unable to Trace
Unofficial Identification	12	9	1	2
No Identification	14	5	5	4
Official Identification	12	12	0	0
Total	38	26	6	6

While APHIS acknowledges that the lack of identification on individual animals is not the only issue related to TB trace- back investigations, it is an ongoing and significant issue. As evidenced by the data, many of the cattle confirmed with TB were not required to have official identification under the current ADT framework because they moved intrastate only or moved interstate directly to slaughter. The ability to trace animals effectively can be accomplished without official identification if other documentation (e.g., livestock market and slaughter records) is accurate, maintained, and made available to animal health officials. However, in many cases records are incomplete and tracing efforts lead back to multiple herds to be tested in an attempt to determine where the infection may have come from. For example, tracing feeder cattle from slaughter records will lead quickly back to the feedlot the cattle originated from. Although the feedlot may maintain records on the sources of origin making up a particular lot of animals, the exact source of an individual animal often cannot be identified. In fact many feedlots remove any management identification applied to the animal by the previous owner.

For adult cattle that move intrastate many times before being shipped to slaughter intrastate or interstate, records available to assist with tracing efforts may not exist. These scenarios render tracing and disease control impractical and cost prohibitive. Conversely, if the infection goes undetected, diseases spread and higher costs result in the long term. Official identification that is properly collected and correlated to the carcass at slaughter is a significant tool utilized to ensure tracing to the correct herd of origin.

Brucellosis slaughter surveillance is conducted at 13 of the top 40 adult cattle slaughter establishments and two bison establishments located in 13 States, representing all regions of the United States. There have not been any brucellosis-infected herds identified from slaughter surveillance since the publication of 9 CFR Part 86. Since records of brucellosis slaughter traces are mainly still paper based, data was incomplete for the purpose of analyzing the effectiveness of the ADT framework related to tracing for this program. APHIS is currently modernizing how trace information is captured for program diseases to ensure this information will be available for future analysis.

The TB and brucellosis programs have been very successful at reducing the prevalence of the diseases to extremely low levels. However, niduses of infection exist in a few States while the rest of the country remains free of both diseases.

Both the test exercises used to complete the TPMs and actual traces provide feedback to APHIS and State animal health officials on: traceability capabilities, where improvement is needed, and areas of noncompliance with 9 CFR Part 86. The following trace initiated through TB slaughter surveillance highlights areas where improvement in the ADT framework is necessary.

A dairy steer slaughtered in State A was identified by inspectors as having lesions suggestive of TB. FSIS personnel collected samples, which were submitted to the National Veterinary Services Laboratories for testing. Upon confirmation of TB infection, a trace was initiated and the identification that was collected and correlated to the steer's carcass at slaughter was retrieved by plant personnel for DNA tissue matching to confirm that the identification collected originated

from the lesioned carcass. State A began the trace by contacting State B to inform them that the dairy steer was shipped to slaughter from a feedlot located in State B. State B began an epidemiological investigation of the originating feedlot and determined that the steer was imported to the feedlot from a premises in State A. In the interim, the DNA tissue matching results were returned and found that the identification collected and submitted did not match the lesioned tissue from the carcass. By the time the discrepancy was discovered, identification for the lots had been discarded and follow-up DNA matching was not possible. Based on slaughter plant records, State A was able to determine the steer traced back to the same feedlot in State B; however, the lot the steer originated from traced back to four calf ranches in State B, of which seven steers from the lot were unable to be traced further, and the remaining animals traced back to 29 dairies located in State A, State B, and two additional states.

This trace is a prime example of the complexity of epidemiological investigations encountered on a regular basis by regulatory personnel. Based on the cost and time involved to quarantine and test 29 dairies, State officials closed this epidemiological investigation with the steer designated untraceable. From the data available, it is impossible to determine if the dairy steer moved interstate to State B without official identification and movement documentation in violation of 9 CFR Part 86. Conversely, the steer might have originated in State B and therefore was exempt from the requirement to be officially identified under 9 CFR Part 86 when moved interstate direct to slaughter from the feedlot. Either situation represents gaps present in the ADT framework. Without traceability, the herd of origin is undetermined and the potential for further disease spread is likely.

V. Monitoring and Compliance

In order for the ADT program to be successful, there must be a high-level of compliance to achieve a solid infrastructure for tracing livestock. For the first year after 9 CFR Part 86 was published, the USDA prioritized informing stakeholders and educating the public of the regulatory requirements of the new rule. While education and consultation with stakeholders remains a priority, the USDA began issuing penalties in 2014 for individuals that repeatedly violate the regulation. The USDA, in conjunction with States and Tribes, focuses monitoring and compliance activities in areas that have the greatest impact on traceability. These areas include official identification, proper completion of ICVIs when use is required, and the collection of identification at slaughter plants.

Table 3 contains the number of enforcement actions per sector (producer, market, etc.) for the 2014 and 2015 ADT cooperative agreement periods. The totals for educational actions, such as consultations and letters of information compared to the number of enforcement cases initiated with IES demonstrates APHIS' continued commitment to education and collaboration with stakeholders on the ADT requirements. In 2014, enforcement actions for livestock markets and dealers were reported as one sector category, but were reported separately for 2015. Also in 2015, enforcement actions taken based on other trace regulations contained in the CFR were reported.

Table 3. ADT Enforcement Actions taken for the 2014-2015 Cooperative Agreement Periods

9 CFR Part 86 Enforcement Actions	Consultation		Letters of Info. (or Equiv.)		Cases Initiated with IES	
	2014	2015	2014	2015	2014	2015
Producer	657	590	438	727	16	20
Dealer	1299	56	143	124	20	17
Market		310		2		5
Accredited Vet	476	493	1534	1113	12	27
Slaughter Plant	192	148	41	0	0	4
Other Sectors	254	179	143	50	2	1
Trace Regs Outside Part 86	**N/A**	9	N/A	193	N/A	4
Total Part 86	2878	1776	2299	2016	50	74

In the period from the publication of the rule in 2013 through October 2016, there have been 23 cases initiated with IES involving cattle that resulted in confirmed violations of 9 CFR Part 86. Penalties assessed for the violations included 38 separate official warnings (APHIS Form 7060) and six monetary fines/stipulations ranging from $313 to $6250 per fine. In general the violations involved moving cattle without official identification or an ICVI, removal of official identification without approval, and failure to list official identification on the ICVI.

One of the more common complaints received by ADT staff is noncompliance regarding the exemption of official identification of cattle presented “for slaughter only” by consignors at auction markets. Buyers acquire these cattle for a brief feeding period where they are often commingled before being shipped to slaughter. In other situations, the cattle may be held at assembly points for several days. These cattle are often only identified with backtags applied at the livestock market which are often lost before the cattle are eventually shipped to the slaughter plant. Without official identification and the record of its application the movements of such animals are often untraceable.

VI. ADT Successes and Challenges

The ADT framework was established to improve the ability to trace animals back from slaughter and forward from premises where animals are officially identified in addition to tracing animals’ interstate movements. As mentioned previously, APHIS focuses on interstate movements of livestock, while States and Tribal Nations remain responsible for the traceability of livestock within their jurisdictions. This approach was designed to embrace the strengths and expertise of States, Tribes, and producers, while providing them the flexibility to find and use the most effective traceability approaches to identify animals moving interstate nationally.

The ADT program has been very successful in its administration in the context of the intended framework of official identification and movement documentation for covered livestock. Progress is evidenced by the decrease in elapsed times and increase in percent of traces

successfully completed for each fiscal year TPM values compared to the national baseline values for these parameters. This improvement can largely be attributed to the timely retrieval of official identification records (records of tags distributed and tags applied) and movement documents through the use of databases for storing the associated information in an easily searchable format.

While ADT has been successful in the context of the intended framework it has become apparent since the publication of 9 CFR Part 86 that significant gaps still exist within our tracing capabilities. APHIS has hosted numerous calls with State and Federal animal health officials including national and smaller district calls to offer animal health officials an opportunity to share their opinions on the current framework of ADT. These outreach efforts have identified areas where there is national agreement for advancement of ADT as well as some areas where regional differences in traceability needs exist.

The following gaps in the current traceability framework summarize the feedback APHIS has received from the outreach efforts to date.

A. Official Identification Requirement Limited to Interstate Movements

The most significant impediment resulting from the traceability regulation in Part 86 is the restriction that the official identification requirement is only applicable to livestock that move interstate.

Cattle movements are quite diverse, often with multiple congregation points and opportunities for local spread of disease prior to moving interstate. An individual animal infected with a highly contagious disease may never leave the State where it was born, and thus remain excluded from the current Federal traceability regulation but still spread disease to many other animals that subsequently move interstate to several new states.

The requirement that official identification be limited to interstate movements creates significant confusion in marketing channels where cattle of differing requirements may be mixed, which creates enforcement challenges and complications. The interstate identification requirement often places the onus on livestock markets where the sorting and tagging of animals is often cumbersome and may fall short of full compliance. Additionally, the ability to determine compliance with the official identification requirement at slaughter plants is nearly impossible due to limited resources.

B. Reliance on Low-cost Technology (visual only tags)

The ADT framework relies on the use of the basic, cost-effective, visual identification methods used in APHIS' disease eradication programs and widely accepted by producers. However, the challenges and limitations resulting from visual-only low-cost identification eartags are evident, including inability to read official identification at the speed of commerce, handling of animals multiple times for the application and reading of the identification, and issues with legibility and transcription errors when official identification has to be recorded on movement documentation.

The implementation of RFID technology, while preferred by many, also has its challenges. In addition to cost concerns, the technologies all have limitations, and no one technology is perfect or even preferred across different livestock groups and management systems. The successful integration of RFID must be driven by the industry with government oversight and support.

Many producers will not be able to enhance their management systems with RFID and will continue to utilize the lowest cost official eartags to meet the official identification requirements. The continued use of visual-only official identification eartags by producers, even if in the minority of the population, will require that manual identification recording systems be maintained. In addition to requiring extra cattle sorting resources, the increased stress on cattle due to multiple and cumbersome management practices will continue to be problematic and an ongoing burden to the industry.

The implementation of a RFID solution for traceability, if undertaken, would be a significant challenge and would require a lengthy implementation period and a well thought out and detailed plan. A comprehensive infrastructure to support RFID technology must be in place in order to achieve the benefits associated with the technology. Applying RFID eartags is the starting point in the process. While this is significant in itself, it must be recognized that the entire infrastructure including readers and data communications systems must be defined to successfully integrate RFID solutions to advance traceability. RFID readers, software, and databases must be in place along the entire production chain to capture the official identification numbers and movement of the animals in real time to be of value for the industry.

Technology companies will become better established, offer more devices, and will provide greater technical support as they see a clear signal that industry and government are committed to an RFID solution. APHIS has provided funding for the assessment of RFID devices (https://www.aphis.usda.gov/traceability/downloads/uhrf-id-demo-pro-summary-st-rpt.pdf), and will continue to support projects to evaluate new technologies as they are developed and as resources are available.

C. Exclusion of Beef Feeder Cattle in the Official Identification Requirement

The success of animal disease control efforts hinges on including all sectors of the cattle industry. If the United States is unable to eradicate high-impact diseases quickly, industry groups and regulatory officials will battle lost markets, vaccination programs, highly regulated movement controls, and enhanced biosecurity requirements that exact a high cost over time.

Although there are other fundamental gaps in the traceability framework that need to be addressed foremost, APHIS views the inclusion of feeder cattle in the traceability regulations as an essential component of an effective traceability system in the long term. Typical cattle management systems do not isolate feeder cattle from exposure to diverse animal groups that can propagate infectious diseases. In fact, the management, marketing, and long-distance movement of feeder/stocker cattle expose these animals to diseases with a long incubation period and slow development such as bovine TB, as well as highly contagious diseases that spread quickly and easily between animals, such as foot-and-mouth disease (FMD). As mentioned earlier, there

were 20 confirmed TB cases in fed cattle from 2010 through 2016 and 18 confirmed TB cases in adult cattle.

Since a fully integrated RFID system will not be established for some time, the basic "book-end" system is likely to be the starting point for official identification of beef feeder cattle. Consideration should be given to defining the first book-end point as the birth premises versus the location prior to interstate movement established in the current regulation. If the requirement for official identification of feeders is limited to the subpopulation that move interstate, international trade opportunities could continue to be negatively impacted.

It is important to note that the requirement for collecting official identification numbers on movement documents and/or ICVIs for feeder cattle will be unduly cumbersome with visual only tags, and therefore should only be considered when an RFID infrastructure is in place.

D. Inconsistent Collection and Correlation of Identification at Slaughter Facilities

While all federally approved slaughter plants are visited quarterly (at a minimum) by APHIS personnel to confirm compliance with 9 CFR Part 86, the collection of identification at slaughter and maintaining correlation of the devices with the carcass through final inspection are inconsistent. Although successful tracing is not guaranteed by the availability of identification collected at slaughter, in many cases it provides a significant advantage for regulatory personnel in their investigations. APHIS and FSIS in cooperation with State Animal Health Officials are committed to and actively working with plant personnel to improve the rates of collection of identification and correlation to the carcass at slaughter plants.

In addition to collection and correlation of official identification, the termination or retirement of official identification numbers at slaughter would greatly increase tracing efficiency as it would document which animals have been removed from the population. While the termination of visual-only tags is not currently feasible, it could be systematically achieved at slaughter plants when RFID technology and infrastructure are established. At this point in time many slaughter facilities have not invested in RFID readers because there are limited numbers of cattle arriving with electronic identification. RFID technology may significantly improve the process of correlating the identification number to the carcass through final disposition and would provide valuable carcass data back to the producer.

VII. Conclusions and Future Direction of ADT

The ADT program has been very successful in its administration in the context of the framework of official identification and movement documentation for covered livestock. As mentioned previously, the key to the success of the program has been the timely retrieval of accurate records of official identification distribution and application, movement documentation, and more specifically the increase in electronic records due to the use of databases for storing the associated information in an easily searchable format.

However, even with the successes achieved with the initial framework, it is clear that significant gaps exist and enhancements are needed to move the United States closer to a full traceability system. While views on traceability may still differ among industry and animal health officials, it is important to recognize that overall support for traceability has evolved over the last few years.

Two traceability issues affecting the economic viability of the livestock industry may explain this trend and highlight the need for consideration of a fully implemented and technologically efficient ADT system. First is the growing demand for beef and pork in emerging economies; currently, the United States exports 12-14% of beef production and more than 20% of pork production. Many countries that export a high percentage of their beef production have advanced traceability systems to meet the demands of their trading partners. International trade opportunities will continue to be challenging and limited with some countries until the United States has a foundation traceability system that documents birth premises of livestock, particularly for beef feeder cattle. ADT, with its current regulatory structure does not systematically provide documentation of birth premises. Thus specialized programs through the Agricultural Marketing Service are necessary to document eligibility for trade to those countries demanding source verification.

While voluntary programs have provided options for producers who are interested in exporting to countries requiring source verification, some trading partners may also require the exporting country have a full traceability system in place domestically, where official identification is applied at the birth premises, movement documents are required, and official identification is retired at slaughter.

The second traceability issue affecting the economic viability of the livestock industry involves the recent occurrence nationwide of disease epidemics impacting the swine and poultry industries. These recent outbreaks have resulted in unprecedented cost to both government and industry, yet these costs are only a fraction of the estimated cost of an FMD outbreak. While it is difficult to determine the resulting cost reduction from a fully implemented ADT system, few epidemiologists would disagree that rapid and accurate animal tracing is critical to the control and containment of a rapidly-moving industry-crippling epidemic such as FMD. Additionally, a fully implemented ADT system would benefit industry by facilitating safe movement of livestock from disease control areas by permit, supporting continuity of business for producers in affected areas.

The basic framework of ADT is being successfully implemented, and discussions with industry to consider potential next steps are appropriate at this time. APHIS needs producers and other stakeholders to help define the level of traceability of greatest benefit to the industry and how best to progress towards those goals. As in the initial ADT framework, APHIS is committed to work collaboratively with industry partners and State officials to address issues and find middle ground that best supports all stakeholders in the livestock industry. APHIS has numerous outreach efforts scheduled in 2017 to hear viewpoints from all industry sectors and will be providing more information summarizing the feedback.