



Foodborne Illness and Emergency Response

Fiscal Year 2012

(October 1, 2011 – September 30, 2012)

**A Summary for the House and Senate Appropriations Subcommittees
on Agriculture and the House and Senate Fiscal Agencies**

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Submitted by:

**Michigan Department of Agriculture & Rural Development
Food and Dairy Division**



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Executive Summary

Looking into the future, the Michigan Department of Agriculture and Rural Development (MDARD) Food and Dairy Division (FDD) is working to ensure all food grown, processed and sold in Michigan is safe. Michigan's food safety system is built upon the interaction of our partners at the federal, state and local levels. In 2012, FDD focused on the development and maintenance of those relationships and increasing the confidence in the capabilities of MDARD, local health departments (LHDs) and our federal and state partners through a series of initiatives on training and capability development. The training and development capabilities identified are based on our experience working on foodborne illness disease surveillance and investigation of foodborne illness outbreaks in Michigan and across the nation. As reported by the Centers for Disease Control and Prevention (CDC) roughly one in six U.S. citizens gets sick from a foodborne disease. Michigan's proportion of the nationwide numbers equates to 1.54 million illnesses, 4,900 hospitalizations and 96 deaths (based on the 2010 Census data).

In 2012, looking at the significant budget limitations of Michigan's 45 LHDs and the Michigan Department of Community Health (MDCH), MDARD applied for three competitive Food and Drug Administration (FDA) grants to build capacity within an integrated food safety system as mandated by the Food Safety Modernization Act (FSMA). Each of these grants focused on a differing aspect of an integrated food safety system. MDARD believes the successful implementation of each of these grants will help our LHDs, MDCH, MDARD and our federal partners increase our ability to successfully investigate and determine the causative agents of foodborne illnesses originating in Michigan.

This report contains information on Michigan food-related emergencies and food safety enforcement activities that occurred during fiscal year 2012 (FY12). This includes:

- 109 reported potential foodborne illness outbreaks involving 1,018 persons;
- 166 Class 1 food recalls or recall expansions; and,
- Over 1,200 enforcement actions taken to achieve compliance with food safety standards and applicable state laws.

The number of reported outbreaks increased by 9 percent in FY12 relative to number of outbreaks identified in FY11. MDARD is working with our response partner agencies to assess factors that may have contributed to this increase. Of the incidents reported to MDARD, 16.5 percent identified a causative agent. Identification of a causative agent also increased in FY12 from 14 percent in FY11. MDARD and our partner agencies are developing and implementing additional strategies, training and capabilities in order to continue to increase the identification of causative agents associated with future foodborne outbreaks.

The leading causative agents of foodborne illness outbreaks reported to MDARD in FY 2012 were:

Norovirus	3
Salmonella species	2
E. coli O157	1
E. coli O26	1

Staph aureus	1
Clostridium botulinum (botulism)	1
Clostridium perfringens	1

Accomplishments and Projects

During FY12, FDD's Food Section worked to improve food safety in three major areas: engaging stakeholders; shaping national strategy; and building organizational efficiency.

Engaging Stakeholders

Food Law Update - The updated Food Law was introduced to the legislature and passed into law, effective October 2012. Major focus areas included: adoption of the 2009 FDA Model Food Code; updates to the Cottage Food Law; developing improved small business and local foods regulatory approaches; and updating Michigan's egg safety law.

Michigan's Cottage Food Law - The entrepreneurial spirit and opportunities available in the food industry have been especially apparent in the response to Michigan's Cottage Food Law, P.A. 113 of 2010. Under the Cottage Food Law, non-potentially hazardous foods that do not require time and/or temperature control for safety can be produced in a home kitchen for direct sale to customers at farmers markets, farm markets, roadside stands, or other direct markets. The products can't be sold to retail stores, restaurants, over the Internet, by mail order, or to wholesalers, brokers or other food distributors who resell foods. Selling directly to consumers under the Cottage Food Law provides an opportunity for new, small-scale food processors to "test the waters" and see if operating a food business is the right fit for them, and could lead to full-scale, licensed food processing businesses for many cottage food businesses in the future.

Shaping National Strategy

National Food Safety Integration Efforts - MDARD participated in the FDA 50-state food safety conference aimed at making significant progress in integrating food safety nationally.

FDA Manufactured Food Standards - MDARD has completed a self-assessment of progress made toward meeting FDA's 10 manufactured food standards, which is required annually. Of the 10 manufactured food standards, standards 1, 7 and 10 have been met in 2012 and standard 5 will be met shortly. MDARD is also participating in this evolving effort to improve the manufactured foods regulatory standards assessment and audit program.

RRT Grant - Through our existing rapid response team (RRT) grant, MDARD is working with other RRT states and FDA to develop a variety of materials that can be used to improve national consistency in food safety emergency response.

CIFOR - MDARD participated in the Council to Improve Foodborne Illness Outbreak Response (CIFOR) and has used the national document recently released to develop a state guide for improving multi-jurisdiction foodborne illness response among local health departments and state agencies.

AFDO - MDARD staff attended the Association of Food and Drug Officials (AFDO) meeting, and brought back resources and materials to improve Michigan's food safety efforts. MDARD was also able to invite presenters from the AFDO meeting to speak at industry meetings in Michigan to share their knowledge and expertise.

Building Organizational Efficiency

Quality Processing Improvement Project - A variety of improved inspection forms, guides and industry/regulator reference materials were developed to improve the food safety focus at Michigan's licensed processing establishments. Staff training and implementation is in progress.

Emergency Response - Significant staff training in use of the incident command system was accomplished throughout the year, with the goal of building several trained incident command response teams. Staff participated in an emergency exercise that focused on building capacity among partners at multiple levels.

Environmental Sampling at Processing Plants - Under contract with FDA, MDARD conducted environmental sampling at 10 Michigan processing plants to determine if bacterial contamination was present. Many of the samples collected resulted in enforcement action, with some leading to recalls. Several environmental contamination issues at processing plants were also investigated and resolved. MDARD will continue to build its environmental sampling capacity across the state in conjunction with FDA contract inspections during FY13.

FDA Voluntary Retail Program Standards - MDARD continues to conduct self-assessments. Michigan currently meets three of nine standards.

Food Policy Manual - An updated policy manual was completed and a companion field guide containing various reference documents is in progress, to standardize policy implementation and provide field staff easier access to policy information.

Meat Processing Variance Application - A variance application procedure has been developed to assist meat processors in complying with identifying controls within complex processing operations in retail food establishments. MDARD is working with MSU and other partners to implement and improve the process through training and the development of a technical advisory committee.

Capacity Building Grants – Three grant proposals were developed as part of MDARD's strategy to increase the capacity of LHDs, MDARD, MDCH and federal partners. The first grant focuses on developing the relationships among the epidemiology staff, public health nursing staff and food safety inspection staff with a goal to improve information sharing during food and animal feed emergencies, including

recalls. The second grant focuses on the development of a more fully integrated food safety system by identifying and implementing risk-based regulatory inspection strategies focusing on the relationship between food products, animal feed products and animal health through application of best practices. The third grant is focused on training for FDD and LHD staff. Training of staff, whether delivered to food inspectors, health inspectors or sanitarians, is an ongoing process. In order to meet various national standards, tracking of that training is critical. The grant is focused on the development of a Learning Management System, which will capture the curriculum appropriate to the level of the student and provide the tracking and documentation of the training throughout each staff member's career. By successfully implementing each of these grants FDD will be able to assure our state, federal and local partners that the work completed by sanitarians, food inspectors, health inspectors, etc., is complete, accurate and documents the findings appropriately, thereby providing the public with an integrated food safety system. "Aim Statements" for each grant can be found in the appendix, attachments A, B and C.

Conclusions

Foodborne illnesses and food contamination incidents affected wide portions of the world, the nation, and Michigan in the last year, further underscoring the need for increased resources, training and capacity by all parts of the integrated food safety system. Actions taken by terrorists, food fraudsters/counterfeiters and disgruntled workers continues to affect the safety of our food supply. Whether as a direct act of deliberate contamination in order to cause illness or as a replacement of a constituent part of a food, both result in a loss of confidence in the safety of the food supply. Investigation of those activities and of foodborne illnesses associated with unintentionally introduced disease-causing agents continues to be the focus of MDARD activities. The importance of those investigations and the identification of causative agents will lead to the prevention of foodborne illnesses in the future and increase confidence in the safety of the food system.

In order to assure Michigan's residents are not impacted by the activities listed above, MDARD has identified the following needs:

- Increased compliance with food safety standards by the food industry as outlined in the Michigan Food Law and the standards it adopts.
- Further development of the ongoing relationships among our local, state and federal partners and the regulated community.
- Continued focus on increasing the participation of all food safety agencies in identifying and supporting the training needs of staff with particular relevance to foodborne outbreak investigation.

The complex globalized nature of our interconnected food supply highlights the need in Michigan for highly trained and funded investigators, epidemiologists, laboratorians and a myriad of staff that support them in our food safety system. Michigan can only respond to food safety emergencies in an efficient and effective manner if there are sufficient numbers of well-trained staff. Efficient and effective response will help assure the public that our food is safe, thereby increasing the growth of the food and agriculture industry - one of Michigan's largest economic sectors - in the future.

I. Background

Assuring a safe and wholesome food supply is an integral part of Michigan's \$91.4 billion food and agriculture industry. Michigan production has increased to 300 commodities on a commercial basis, making the state second nationally in agricultural diversity and providing a strong and varied portfolio for our food processing industry. The food processing industry alone has a total economic impact of nearly \$25 billion, employs nearly 134,000 workers and has 1,841 licensed food processors.

Food safety continues to be a concern for our nation and Michigan. The Centers for Disease Control and Prevention (CDC) estimates each year roughly one in six Americans gets sick, 128,000 are hospitalized, and 3,000 die from foodborne diseases. Based on 2010 population estimates, foodborne illness strikes 1.65 million Michigan citizens each year, at a cost of up to \$4.87 billion.

Michigan's grocery and convenience stores, food processors, food service establishments, and food warehouses are regulated by the Food and Dairy Division's (FDD) Food Safety and Inspection Program, in partnership with Michigan's local health departments (LHDs). FDD staff works with a variety of food industry, regulatory, consumer, and academic partners to assure the food produced, distributed, and sold in Michigan is safe. By working closely with these partners, FDD has been able to identify and resolve public health issues relating to food safety in a timely manner.

In addition to assuring a safe and wholesome food supply, Michigan Department of Agriculture and Rural Development (MDARD) and LHD food inspectors play a key role in assuring a robust, growing industry. Although the overall number of food establishments has been stable for the past five years, approximately 2,500 new food establishment licenses are issued each year in Michigan. These range from grocery stores and restaurants to small on-farm and specialty food processors and larger processors who distribute their food products worldwide.

Food inspectors assist the owners of these new businesses before, during, and after the licensing process, by giving advice and guidance on building design and processing plans; reviewing labels and standard operating procedures to assure food safety compliance; explaining state and federal regulatory requirements; and connecting new business owners with the resources they need from LHDs, zoning officials and other state departments. Food inspectors also provide marketing resources to new business owners that are available through MDARD's Office of Agriculture Development and the Michigan State University (MSU) Product Center. This assistance helps new businesses get off to a great start, which directly translates to new jobs and a stronger economy.

MDARD is committed to working closely with our agency partners and the food industry to implement and deliver a comprehensive food safety program. The causes of the majority of foodborne disease are believed to be sporadic events. In order to limit the impact and develop future prevention strategies, MDARD is focused on completing a comprehensive investigation of foodborne illness outbreaks. These investigations are

collaborative efforts involving our local public health, state and federal agency partners. MDARD and our partner agencies have identified the following items for inclusion in a comprehensive food safety program:

- Prevention of foodborne illness through effective regulation;
- Preparedness for contamination incidents that are not prevented;
- Response to detected incidents, including investigation and control activities; and,
- Recovery of critical functions to minimize human illness and adverse economic impact and rapidly restore consumer confidence in the marketplace.

II. Prevention

The FDD inspects and regulates approximately:

- 18,700 licensed food establishments including supermarkets, food processing facilities and convenience stores; and,
- Over 3,900 dairy facilities which includes farms and processing plants.

In partnership with LHDs, MDARD oversees the regulation of over 45,500 restaurants, cafeterias, temporary food vendors and commissaries.

Part of MDARD's prevention strategy is the investigation of foodborne outbreaks. MDARD and our partner agencies work to ensure that the food safety regulations, inspection techniques and investigational practices reflect the best available science. Our local, state and federal partners have identified the five major risk factors associated with foodborne illnesses/outbreaks to be:

- Poor personal hygiene;
- Improper holding temperatures, both hot and cold;
- Inadequate cooking, such as undercooked ground meat;
- Contaminated equipment; and,
- Food from unsafe sources.

FDA's Model Food Code is regularly updated and includes specific strategies to implement controls for these risk factors using the Priority, Priority Foundation and Core principles concept of documenting inspection findings during a regulatory visit. Additionally, MDARD has competed for a series of federal grants to increase the prevention and preparedness portions of our comprehensive food safety program. These grants have been used to develop training for local health inspectors, FDD inspectors and Pesticide and Plant Pest inspection staff. Training will be offered in the spring of 2013 across the state.

III. Preparedness

FDD's continued support and participation in the Michigan Food Protection RRT highlights the collaborative efforts among MDARD, the Michigan Department of Community Health (MDCH) and FDA to continue to develop capacities and further integrate Michigan's food safety system.

One focus area of the RRT is use of the Incident Command System (ICS) process and procedures. The RRT's identification of needs would not have been possible without the implementation of ICS principles, in particular the use of After Action Reports (AARs), during FY12. AARs, when used properly, highlight the strengths and weaknesses of an agency's response to an incident. For FDD, the incidents are food emergencies, including foodborne illness/disease outbreaks; recalls; and traceback investigations of food/animal feeds. Additionally, FDD has incorporated the AAR into our environmental assessments of food processing establishments highlighting additional communication strategies, best practices and training that need improvement.

The RRT's activities using the ICS model captured and identified a set of needs that would be required by MDARD, MDCH, LHDs and our federal partners in order to fully implement an integrated food safety system for Michigan. This set of needs was used to develop our three capacity building grants outlined in the Appendix, Attachments A, B and C. Without the RRT's preliminary work, MDARD, and FDD in particular, would continue to struggle with full implementation of some of the strategies, training and best practices in the future. With budgets at both state and county levels restricted, the influx of limited federal funds has allowed for continued training and improvements to our food safety system. This training will be delivered in the next 2-1/2 years. Next efforts will focus on identifying measures that will sustain the strategies, training and best practices that are currently being funded by federal grants once those grant funds have been exhausted.

IV. Response

A. Investigation and Control of Foodborne Illness Outbreaks

The increasingly globalized and complex nature of our food supply requires FDD and our food safety partners to work more closely than ever to rapidly detect, investigate, and control food contamination incidents. In fact, the CDC has documented increased numbers of reported multi-state outbreaks in recent years. (<http://www.cdc.gov/outbreaknet/outbreaks.html>)

MDARD and Michigan's 45 LHDs provide the front line investigators for foodborne illness investigations. Staff often coordinates activities with professionals from local, state and federal government and the private sector.

Foodborne illness outbreaks are identified by investigation of both unconfirmed foodborne illness complaints and reports of laboratory confirmed illnesses. Close coordination of response efforts prevents illnesses and saves lives through early

detection of outbreaks and rapid implementation of control measures. Control measures include but are not limited to seizures, facility license limitations or closures, and food recalls. Division staff participated in intensive traceback investigations throughout the year as part of larger multi-state investigations. Without accurate tracebacks, outbreaks often cannot be tracked to their sources and the root causes of the outbreaks identified.

Lessons learned from these investigations are utilized by MDARD, other agencies and food industry decision-makers to improve risk-based food regulatory and prevention strategies thereby limiting future outbreaks from the same causes.

Tough budget realities have resulted in reduced staffing and increased staff turnover at both the state and LHDs. To meet the increasing need for training and collaboration, MDARD, LHD and MDCH worked collectively to provide multidisciplinary training in foodborne outbreak investigation at the 2012 Michigan Environmental Health Association annual educational conference.

Overview of Foodborne Illness Outbreak Results

Investigations of foodborne illness outbreaks are often multi-disciplinary efforts involving sanitarians, food regulators, communicable disease specialists, epidemiologists, and laboratory staff from multiple agencies.

Under Michigan's Public Health Code, PA 368 of 1978 (MCL 333.2433), LHDs are required to investigate the causes of disease. The Michigan Food Law of 2000, sec. 3129(2), requires LHDs to notify MDARD of foodborne illness outbreaks they are conducting. MDARD uses foodborne illness data to:

- Investigate emerging threats;
- Identify trends;
- Adjust risk-based controls to prevent future illnesses; and,
- Ensure accurate reports are reflected at the state and national level.

A total of 109 events meeting the Michigan definition of a foodborne illness outbreak were reported by LHDs to MDARD in FY12. Michigan Local Public Health Accreditation Program findings show 99 percent of LHDs responded to a foodborne illness complaint within 24 hours of notification, and 97 percent met foodborne illness investigation procedure requirements relating to documentation and reporting of foodborne illness outbreaks, an improvement over FY11 (91 percent).

Note: Accreditation minimum program requirement reviews are based on a summary of random sample evaluations, and are not an evaluation of every foodborne illness complaint received.

Although ill individuals in reported outbreaks shared common food sources, it was often not possible to rule out other routes of illness transmission, particularly in smaller incidents. Of the 109 reported foodborne illness outbreaks, LHDs identified a total of 30 incidents as confirmed or probable foodborne illness

outbreaks after complete investigation, an increase of 9 percent from FY11. This number continues to be low due to indeterminate conclusions or lack of conclusions stated in final reports.

Total # of incidents reported to MDARD	109
(1,018 illnesses)	
Total # of incidents identified as confirmed or probable foodborne illness outbreaks.....	30
(613 illnesses)	
Median number of illnesses reported per confirmed or probable foodborne outbreak	3

The leading causative agents of foodborne illness outbreaks reported to MDARD in 2012 were:

Norovirus	3
Salmonella species	2
E. coli O157	1
E. coli O26	1
Staph aureus	1
Clostridium botulinum (botulism)	1
Clostridium perfringens	1

Of the incidents reported to MDARD, 16.5 percent identified a causative agent.

Foodborne Illness Outbreaks Caused by Norovirus

National data recently released by the CDC identified norovirus as the leading cause of foodborne illness in the U.S. Norovirus continues to be a public health challenge in multiple settings throughout Michigan. MDCH received 176 norovirus outbreak reports from LHDs between January 1 and December 10, 2012. Of the 176 outbreaks, only six outbreaks (3.4 percent) were subsequently categorized as restaurant/food related. Healthcare settings and schools continued to report a greater proportion of the outbreaks.

Noteworthy Incidents from FY12

Haff Disease in Southeast Michigan associated with fish consumption

MDARD was notified by MDCH of a suspected case of Haff Disease in Southeast Michigan, a rare condition characterized by the development of swelling and breakdown of skeletal muscle with a risk of acute kidney failure within 24 hours of ingesting fish. The case had consumed fish purchased at a Michigan grocery store prior to onset of the illness. MDARD and MDCH collaborated on the traceback investigation that was shared with FDA. No other illnesses were reported in Michigan relating to this type of illness.

Listeria monocytogenes in a food processing plant

As part of an FDA contract inspection, MDARD food staff conducted routine environmental sampling at a Michigan food processor. Contamination with

Listeria monocytogenes was found in various areas of the food plant. Production was suspended at the facility during the investigation and decontamination. Human illness surveillance data was reviewed and no illnesses were linked to consumption of foods processed at this location. MDARD worked with FDA, the firm and its consultants to address the contamination issues at the plant and assisted the plant in resuming operations.

Salmonella Infantis multistate human outbreak associated with dry dog food

MDARD lab detected *Salmonella* in an unopened bag of a nationally distributed dry dog food collected during routine retail testing of dry pet food by the Pesticide and Plant Pest Division of MDARD. The pet food originated from a South Carolina plant. The results were shared with public health authorities who used genetic fingerprinting techniques to identify this previously undetected outbreak. By mid-summer, there were 49 known human lab illnesses from 20 states and Canada, including two human cases in Michigan and dozens of pet illnesses connected to the discovery. A number of the cases when later questioned reported exposure to dry dog food. Collaboration between the Division's Rapid Response Team (RRT) and MDARD's Pesticide and Plant Pest Management Division directly contributed to the nationwide recall by the manufacturer of 17 brands of dry dog and cat food (over 30,000 tons of product or 1.5 million 40 lb. bags). A summary of this investigation is featured on the CDC webpage - <http://www.cdc.gov/salmonella/dog-food-05-12/index.html>

Noteworthy Food and Feed Outbreaks from FY12:

Listeria monocytogenes in soft cheeses produced in Southeast Michigan

Genetic fingerprinting techniques revealed that the bacteria isolated from two 2011 Michigan cases of listeriosis were indistinguishable from *Listeria monocytogenes* found in a cheese sample collected at a Michigan cheese plant in 2002. As a result, MDARD sampled ackawi and chives cheeses from the same manufacturer in December 2011 and found them to be contaminated with the same genetically linked organism found in 2002. Production at the plant was limited during the investigation and clean-up. The firm's ackawi and chives cheeses were subsequently recalled. MDARD's sampling at the plant found multiple locations within the environment contaminated with the organism resulting in a summary suspension of their license to manufacture these and other varieties of cheese. MDARD continues to work with the firm to develop measures to address the environmental and manufacturing issues that might contribute to product contamination. The firm is currently manufacturing two cultured dairy products, and is working with MDARD to initiate the manufacture of the ackawi and chives cheeses in the future.

Clostridium perfringens outbreak in a Kent County correctional facility

More than 100 illnesses among prisoners of a county correctional facility were associated with consumption of a contaminated meal. Several inmates were tested and found to be positive for *Clostridium perfringens*. Laboratory analysis of leftover food showed the presence of *C. perfringens* toxin. This toxin is primarily associated with food not being held or cooled at appropriate temperatures, particularly food that is cooked, cooled, and reheated at a later

time. MDARD's RRT epidemiologist worked closely with the LHD and MDCH during the investigation which identified multiple food handling abuses at the facility.

Escherichia coli O26 outbreak (multistate) associated with clover sprouts

A total of 29 laboratory-confirmed cases of *Escherichia coli* O26 infection occurred in 11 states, which included 11 confirmed and one probable case in Michigan. Illnesses were associated with consumption of raw clover sprouts purchased at different locations of a popular sandwich chain restaurant. MDARD food staff worked closely with FDA and multiple LHDs to conduct traceback investigations of the implicated product. The FDA used this and other states' information to trace the seeds back to a common seed lot that was distributed nationwide. Ultimately, the sandwich chain permanently ceased all service of sprouts in its products as a result of this national outbreak investigation.

Listeria monocytogenes multistate outbreak associated with cheese sold interstate

MDARD was notified by MDCH of a confirmed case of listeriosis in a resident of another state who had consumed a specific brand of cheese at a Michigan wedding. The implicated cheese had been manufactured in another state and had been recalled after the wedding because testing had found *Listeria monocytogenes* contamination in the finished cheese product. Additional suspect cases that had also attended the wedding and consumed the implicated cheese were identified in other states, which included eight cases in Michigan. Following a multi-disciplinary investigation, which included a multi-level team of local, state and federal health and regulatory officials, this outbreak was limited in its nature. In this instance, early communication among FDA, industry and state officials allowed for rapid sharing of clinical and food testing results, leading to a recall of the implicated cheese.

B. Food Recalls

During FY12, MDARD shared information with stakeholders via our website, multiple email distribution lists and through our MDARD text alerts (currently over 1,400 subscribers) regarding 166 Class I recalls and recall expansions involving food products distributed in Michigan. MDARD also assisted companies in drafting and distributing press releases during voluntary recalls.

Recalls are the voluntary removal of distributed food products from commerce by the firm when there is a reason to believe that such products are adulterated or misbranded. Working with our federal partners, affected companies, news media and other sources of information FDD evaluates the recall and publishes once a determination has been made that the recall will affect the public. Class I recalls involve a health hazard where there is a reasonable probability that the use of the product will cause serious, adverse health consequences or death.

Recall of multiple nut butter products associated with multi-state outbreak of Salmonella Bredeney

A total of 42 people infected with *Salmonella* Bredeney were reported from 20 states, including one laboratory-confirmed case in Michigan. Illnesses were traced to consumption of a natural peanut butter manufactured by a processor in New Mexico. The processor was found to have shipped products that had previously tested positive for Salmonella, and as a result of the state and federal investigations, the New Mexico firm recalled all raw and roasted nuts and nut products manufactured between March 1, 2010 and September 24, 2012. Dozens of additional manufacturers who used the products as ingredients subsequently conducted their own recalls, resulting in the recall of hundreds of products.

C. Enforcement Actions

Enforcement actions become necessary when food establishments fail to address food safety violations. FDD staff conducted 2,203 enforcement actions during FY12:

Food Section Enforcement Activity

Enforcement Letters	93
Compliance Reviews	6
Consent Agreements and Administrative Fines count/\$ issued	188/\$79,685
Prosecution/Fines	0
Seizures	1,518
Dollar Amount of Seized Product	\$3,186,700
Informal Hearings	0
Reinspections conducted/Fees	76/\$4,560

Dairy Section Enforcement Activity

Enforcement Letters	173
Informal Hearing/Compliance Reviews	9
Administrative Fines/ \$ Collected by MDARD	79/\$16,400
Prosecutions/Fines	0
Seizures	1
Dollar Amount of Seized Product	6,000
Total Permit Suspensions	60
Total Pounds of Contaminated Milk Disposed of (lbs.)/Dollar Value of Milk	11,730,662 lbs./\$2,032,924

V. Recovery

When food-related emergencies occur, MDARD and LHDs determine if food establishments are taking the necessary actions and when it is appropriate for a regulated facility to resume their normal operations. As part of our ongoing review of our policies and procedures FDD has identified the need to develop a set of best practices regarding the return of a regulated facility to normal production following a food related emergency. FDD anticipates in the next fiscal year a completed a set of best practices and policies will be ready for implementation.

VI. Conclusions

Foodborne illnesses and food contamination incidents affected wide portions of the world, nation and Michigan in the last year, highlighting the increased need for resources, training and capacity by all parts of the integrated food safety system. Actions taken by terrorists, food fraudsters/counterfeiters and disgruntled workers continues to affect the safety of our food supply. Whether as a direct act of deliberate contamination in order to cause illness or as a replacement of a constituent part of a food, both result in a loss of confidence in the safety of the food supply. Investigation of those activities and of foodborne illnesses associated with unintentionally introduced disease-causing agents continues to be the focus of MDARD activities. The importance of those investigations and the identification of causative agents will lead to the prevention of foodborne illnesses in the future and increase confidence in the safety of the food system.

In order to assure that Michigan's residents are not impacted by the activities listed above, MDARD has identified the following needs:

- Increased compliance with food safety standards by the food industry as outlined in the Michigan Food Law and the standards it adopts.
- Further development of the ongoing relationships among our local, state and federal partners and the regulated community.
- Continued focus on increasing the participation of all food safety agencies in identifying and supporting the training needs of staff with particular relevance to foodborne outbreak investigation.

The complex globalized nature of our interconnected food supply highlights the need in Michigan for highly trained and funded investigators, epidemiologists, laboratorians and a myriad of staff that support them in our food safety system. Michigan can only respond to food safety emergencies in an efficient and effective manner if there are sufficient numbers of well-trained staff. Efficient and effective response will help assure the public that our food is safe, thereby increasing the growth of the food and agriculture industry - one of Michigan's largest economic sectors - in the future.

VII. APPENDIX

A. “Building the Capacity of Food Safety Entities to Protect Public Health in Response to a Notification under Section 1008 of the Federal Food, Drug and Cosmetic Act or a Recall of Foods (U18).”

AIMS STATEMENT

This proposal is to support the development of a national integrated food safety system by linking local public health agencies with the Michigan Rapid Response Team (RRT) Implementation Project. This collaborative project will facilitate two-way sharing of food and feed emergency best practices and result in better coordinated emergency response actions that protect public health when unsafe foods are identified.

Goals

1. Cause measurable improvement in the capability of local, state, and federal food regulatory agencies in Michigan to protect public health by responding appropriately to identified incidents of adulterated imported foods and food recalls.
2. Develop and share strategies that can be duplicated on a national basis to protect public health in response to a notification under Section 1008 of the Food Drug and Cosmetic Act, or a recall of food.

Objectives

Conduct a pilot project in Michigan to better coordinate local, state, and federal food emergency response actions.

1. Align agency food and feed emergency preparedness activities using the steps outlined in the National Incident Management Preparedness cycle.
(<http://www.fema.gov/emergency/nims/Preparedness.shtm>)
2. Update the Michigan Food Emergency Response Plan (MFEMP) as needed to ensure consistency with the National Association of State Departments of Agriculture (NASDA) Food Emergency Response Template.
3. Update the food emergency response plans of participating local health departments to better coordinate local, state and federal plans.
4. Conduct at least one professionally facilitated review of an existing national-level job task analysis (JTA) or other applicable national training resource, during each year of the grant and recommend refinements as needed to increase applicability for local and state food and feed emergency responders. Initial priorities will be to review JTA sections applicable to section 1008 notifications (Year 1) and recalls (Year 2).
5. Provide role appropriate on-the-job training that addresses the above priorities, to local, state and federal food and feed emergency responders during each year of the grant.
6. Measure progress using process and outcome metrics consistent with national initiatives such as the RRT Best Practices Manual and CIFOR Guidance.

7. Prepare written summaries of the pilot project results and disseminate the lessons learned and best practices in written and web-based formats through agencies, associations, partnerships and initiatives at the local, state, regional and national levels.

B. Building the Capacity of State, Local, Territorial, and Tribal Food Regulatory Agencies to Undertake Examinations, Inspections, and Investigations and other Related Food Safety Activities Under Section 702 of the Federal Food, Drug, and Cosmetic (FD&C) Act (U18)

AIMS STATEMENT

This proposal will support the development of a national integrated food safety system by identifying options to better standardize risk-based regulatory inspection strategies involving food, feed and animal health supply chains. These collaborative projects will facilitate three-way sharing of food, feed and animal health best practices and result in better preventative controls that reduce risk and protect human and animal health.

Goals

1. Cause measurable improvement in the capability and capacity of the state food safety agency to standardize evidence collection, reduce drug residue violations and implement risk based inspection activities under section 702 of the Food, Drug and Cosmetic Act.
2. Develop and share best practices in a food, feed and animal health supply chain that can be duplicated on a national basis to protect public health.

Objectives

1. Identify factors contributing to drug residue violations in milk and animal tissue and pilot a Hazard Analysis and Critical Control Points (HACCP) based drug residue program for producers with violations related to drug tissue residue to better ensure the safety of animal-derived foods for human consumption.
2. Identify options to better standardize risk-based regulatory inspection strategies involving aquaponics, a new and growing food, feed, and animal health supply chain. Identify and share industry best practices to prevent food or feed adulteration in this supply chain.
3. Develop and evaluate key critical sanitation elements at feed mills and elevators and better standardize risk based inspections and ranking of these facilities to help ensure that the production and distribution of animal feed is safe.

4. Provide evidence collection and other investigation training for food, feed and related animal health regulatory programs by offering annual training sessions. Identify and share best practices to promote department-wide uniformity.

C. Advancing the Conformance with the Voluntary National Retail Food Regulatory Program Standards (VNRFRPS) (U18)

AIMS STATEMENT

Michigan's VNRFRPS Cooperative Agreement for a Learning Management System Development and Implementation Project

Project Aims:

Developing and implementing an electronic Learning Management System at both a state and local level to facilitate compliance with the Voluntary National Retail Food Regulatory Program Standards (VNRFRPS).

Further integration of the Michigan's Food Service Sanitation Food Safety Minimum Program Requirements and the VNRFRPS, primarily Standard #2, Training, and other standards related to inspection, auditing, standardization and enforcement.

Strategy:

Implement a robust flexible LMS that supports both MDARD and LHD's needs for documentation, tracking and reporting of training.

- System attributes include the following: reporting on the availability of training, tracking of in process training and training completed, by staff.
- The development process for the requirements gathering and implementation training plan for the LMS would be completed through a consensus process.
 - Identify as a requirement the ability of the LMS to generate reports that support both compliance with the VNRFRPS and agencies training needs.
 - Develop an implementation plan which will be used to train MDARD and LHD staff on how to implement, use and manage the LMS as their training documentation system.
 - Pilot the proposed implementation plan with MDARD staff and select LHD to help assure that all partners understand and can support the process, procedures and implementation plan for an electronic LMS.
 - Review and adapt implementation plan after piloting with LHD and MDARD staff to further refine and improve on the plan prior to rolling out to the remainder of the LHD and MDARD divisions and/or sections.

To further integrate the MPR training requirements so that they are more equivalent to the training requirements outlined in Standard 2 of the VNRFRPS.

- Identify changes to the MPRs using the MPR review and consensus process in order to bring the two standards into alignment.
- Propose changes to the MPR review board for inclusion in cycle 6 of the MPRs.

Summary:

The above approach is designed to result in measurable improvement in the capability of Michigan local, state food regulatory agencies to protect public health, by assuring all of our partners that the work completed by state or local is consistent and satisfactory in approach and action. By actively engaging our LHDs in this project, MDARD believes that this is an important step in building a nationally integrated food safety system. LHDs in Michigan have regulatory authority over the large and diverse food service segment of our food supply. LHDs also employ the majority of non-federal food regulatory officials in this state. Better alignment of plans, procedures and training across local, tribal and state levels will result in the wider application of risk factor interventions, and the incorporation of active managerial controls throughout the retail food industry. Thus assuring uniformity between regulatory agencies and assuring industry and consumers that food protection programs whether delivered by a federal, state, tribal or local food safety agency is focused appropriately on the protection of the nation's food supply.

D. Foodborne and Agricultural Incidents Illustrating Human and Economic Impact

Note: *Underlined events indicate Michigan involvement.*

- **2011 E. coli O157 in Hazelnuts, United States**
 - Outbreak was detected when public health officials identified a small cluster of seven ill persons living in three Midwest states – Minnesota, Wisconsin, and Michigan.
 - Outbreak strain of bacteria had a rare genetic fingerprint.
 - Traceback investigation led to a California nut processor that initiated a national recall

- **2011 Salmonella Muenchen Multistate Outbreak in Clover Sprouts, United States**
 - Six lab-confirmed cases was linked with consumption of sandwiches containing clover sprouts.
 - First outbreak associated with clover sprouts consumption reported in Michigan.
 - Sprouts originated from an out-of-state processor.

- **2010 Medicated Feed Intended for Swine Delivered to Dairy Farm, Michigan**
 - Medicated feed product intended for swine containing the drug, Tilmicosin, delivered and fed to 460 head of dairy cattle.
 - MDARD Animal Industry Division quarantined farm.
 - MDARD Food and Dairy Division seized milk.
 - MDARD Pesticide and Plant Pest Management Division investigated feed mill in conjunction with FDA, and issued a seizure at feed mill based on violations of sanitation practices and “good manufacturing” procedures.
 - MDARD Environmental Stewardship Division worked with investigators to ensure contaminated feed and milk was land applied at agronomic rates.

- MDARD Laboratory Division coordinated the testing of milk products from contaminated dairy farm with FDA laboratory.
- **2010 *Campylobacter* Outbreak from Raw Milk from a Cow Share Program, Michigan**
 - A cluster of 25 illnesses was identified in two Southeast Michigan counties in March.
 - Twelve of the 25 cases were laboratory-confirmed as *Campylobacter jejuni*.
 - Eight of the twelve cases were children under the age of 10.
 - The raw milk was obtained through a cow share cooperative program in Southwest Michigan, who obtained it from an Amish farm in Indiana.
 - Testing of leftover milk did not yield *Campylobacter*, likely due to spoilage of the milk and the difficulty with culturing the organism from food.
- **2010 – *Campylobacter* Cluster from Raw Milk. Michigan**
 - During April, another cluster of illnesses was linked to consumption of raw milk purchased at a grocery store in western Michigan.
 - The store was reportedly selling the product in unmarked jars as ‘pet food’.
- **May 2010 - *Campylobacter* Outbreak from Raw Milk from a Cow Share Program, Michigan**
 - A cluster of 11 illnesses was identified in a county in Southwest Michigan, associated with consumption of raw milk from a Michigan cow share cooperative.
 - The cow share cooperative was not associated with the cooperative involved in the March outbreak.
 - Approximately half of the cases were children.
- **2010 *E. coli* O145 in Romaine Lettuce, United States**
 - Multistate outbreak in five states.
 - 26 confirmed and seven probable cases of illness associated with consumption of romaine lettuces sold in institutional-size packages.
 - 11 confirmed and two probable cases in Michigan; most were associated with food from a single restaurant chain.
 - MDARD worked with LHDs and FDA to trace product back to a single processor in Ohio.
 - Traceback of product by FDA found product grown in Arizona.
 - Nationwide recall of 72 different products.
- **2010 *Salmonella* Enteritidis in Shell Eggs, United States**
 - Approximately 1,939 illnesses reported as likely to be associated with this outbreak.
 - Over 550 million whole shell eggs were recalled by two Iowa egg producers.
 - MI had no clusters of illnesses associated with this outbreak, but recalled products were distributed in the state.

- MDARD field inspectors conducted recall audit checks of a number of distributors.
- **2010 Contaminated Infant Formula, United States**
 - Multiple consumer complaints of infant digestive upset led to the identification of infant formula potentially contaminated with insect parts.
 - On-site assessment by MDARD and FDA helped identify possible routes of contamination of product ingredients at the manufacturing plant.
 - MDARD seized product and coordinated with FDA on nationwide recall.
- **2010 Vitamin D Hypervitaminosis to Dogs Due to Dog Food, United States**
 - Four known cases effecting dogs in Michigan; 16 nationwide.
 - PPPM investigated cases in Michigan, working with Kansas Department of Agriculture and Michigan State University's Diagnostic Center for Population and Animal Health to determine cause.
 - Reported findings to FDA, Center for Veterinary Medicine (FDA CVM). FDA CVM investigating approved maximum levels of Vitamin D for dogs.
 - Investigation led to nationwide recall of affected brand of dog food.
- **2010 Salmonella Saintpaul in Alfalfa Sprouts, Michigan**
 - Sample collected from a Michigan sprout grower previously associated with numerous outbreaks.
 - The MDARD Rapid Response Team, FDA and MDARD field staff conducted joint on-site environmental and product sampling, record collection and environmental assessments.
 - No illnesses reported.
 - MDARD field staff identified problem areas and equipment that might contribute to contamination and growth of Salmonella.
 - Company conducted a voluntary market withdrawal of remaining product.
- **2009/2010 Salmonella Montevideo Associated with Deli Meats with Black and Red Pepper, United States**
 - 272 laboratory-confirmed cases reported in 44 states and the District of Columbia; four Michigan cases.
 - Most cases linked to consumption of Italian-style deli meats from an East Coast processor.
 - Testing at processor found Salmonella contamination in black and red pepper from two importers.
 - Over 1.2 million pounds of deli meats and multiple non-meat and spice products recalled.
- **2009 Listeria Monocytogenes in Hispanic Cheese, United States**
 - MDARD sample collected at Michigan manufacturer found to be contaminated.
 - Same genetic strain found in routine sample collected by MDARD matched several cases of illness in other states with history of Hispanic cheese consumption; unknown if they consumed Michigan product.
 - MDARD worked closely with affected states and FDA to trace products to and from manufacturer, and to assist the manufacturer with initiating several product recalls.

- *Listeria* contamination found on poorly maintained equipment seal.
- **2009 *Salmonella* Saintpaul Outbreak Associated with Alfalfa Sprouts, United States**
 - 235 confirmed cases of illness identified in 14 states.
 - 19 cases in Michigan.
 - A common distributor of a single implicated lot of seed was identified.
- **2009 *Salmonella* (multiple strains) in Dry Milk Products, United States**
 - Samples collected by USDA found to be contaminated with *Salmonella*.
 - No known illnesses identified.
 - Not directly sold to consumers, but used as ingredient in many instant drink mixes, breakfast foods, candy, sauce mixes, etc.
 - Over 270 products recalled, from 2007 through 2009 production dates.
- **2009 *E. coli* O157 Outbreak Associated with Undercooked Beef Products, United States**
 - 24 cases nationwide associated with beef consumption in nine states; six Michigan cases.
 - Initiated nationwide beef recall of approximately 380,000 pounds of product from a Colorado processor.
 - MDARD worked closely with USDA Food Safety Inspection Service in investigations at a local market where several Michigan cases had purchased meat.
 - The Michigan market itself subsequently recalled products at the recommendation of MDARD.
- **2009 *Salmonella* Typhimurium Outbreak Associated with Alfalfa Sprouts, Michigan**
 - Product from Michigan sprouter associated with cases of illness from consuming sprouts from a sandwich restaurant chain.
 - 12 Michigan laboratory-confirmed cases, with one in each of three other states.
 - MDARD conducted extensive sampling and investigation at the facility; all samples negative for the pathogen.
 - The Michigan company issued a market withdrawal of product.
- **2009 *E. coli* O157:H7 Outbreak Associated with Steaks and Beef Products, United States**
 - Over 248,000 pounds of beef was recalled after FSIS determined there was an association between non-intact steaks (blade tenderized prior to further processing) and *E. coli* O157 illnesses in Colorado, Iowa, Kansas, Michigan, South Dakota and Washington.
 - 21 laboratory-confirmed cases nationwide; one case in Michigan.
 - MDARD collaborated with the USDA Food Safety and Inspection Service and MDCH in the investigation.

- **2008/2009 Salmonella Typhimurium Outbreak Associated with Peanut-Containing Products, United States**
 - 714 confirmed illnesses; nine deaths nationwide.
 - 38 confirmed cases of illness in Michigan; no deaths.
 - Over 3,000 food and feed products recalled.
 - Estimated \$1 billion impact on industry.
 - MDARD spent approximately \$748,000 in staff resources for investigations and recall audit checks.

- **2008 Salmonella Agona Outbreak Associated with Breakfast Cereal, United States**
 - 28 confirmed cases in 15 states; one confirmed case in Michigan.
 - Suspect food: unsweetened puffed rice and puffed wheat cereals.
 - Nationwide recall.

- **2008 E. coli O157:H7 Outbreak Associated with Ground Beef, United States**
 - 49 confirmed cases in seven states; 23 confirmed cases in Michigan.
 - Most cases occurred in Michigan and Ohio.
 - Suspect food: ground beef.
 - Recall of ground beef products.
 - Implicated product traced back to Midwest processor.

- **2008 Salmonella Saintpaul Outbreak Associated with Tomatoes and Peppers, United States/Canada**
 - **1,442 confirmed cases in 43 states, Canada and District of Columbia.**
 - **28 confirmed cases in Michigan.**
 - **Suspect foods: tomatoes, peppers, originating in Mexico.**
 - **Resulted in several health alerts.**

- **2008 E. coli O157:H7 Outbreak Associated with Iceberg Lettuce, United States**
 - **38 confirmed cases of illness in Michigan.**
 - **Two large clusters of illness in Michigan at a university and a county jail.**
 - **Common source: lettuce from a Michigan processor.**
 - **No product was laboratory-confirmed.**

- **2008 Melamine in Infant Formula, United States**
 - FDA issued a Health Information Advisory in response to reports from China of infant formula contaminated with melamine.
 - Numerous other products potentially contaminated with melamine also resulted, including candy, cookies, beverages, etc.
 - MDARD field staff conducted checks of stores where these products may potentially have been sold.

- **2007 Melamine Contamination in Pet Food, United States**
 - FDA determined that pet illness and deaths were associated with Chinese wheat gluten and other ingredients contaminated with melamine.
 - Nationwide recall of multiple brands.
 - Contaminated pet food entered animal feed, which raised questions on human health effects from consumption of these livestock.

- MDARD staff performed recall effectiveness checks of pet food sold at retail.
 - FDA initiated a protein surveillance project with states to sample human food ingredients and products prepared with Chinese gluten and proteins.
 - Two sites sampled in Michigan by MDARD and FDA staff.
 - No contamination found in human foods.
- **2007 E. coli in Beef Trim, United States**
 - E. coli illness outbreak associated with beef trim products from Minnesota processor.
 - Beef trim sent to Michigan for processing into ground beef, exported back to Minnesota.
 - Finished ground beef from processors out of state found in Michigan.
 - MDARD worked with USDA to identify distribution.
- **2007 E. coli in Beef Products from a Michigan Processor, United States**
 - 16 confirmed cases nationwide; two in Michigan.
 - 140+ MDARD and LHDs recall audit checks conducted.
 - Michigan cases of E. coli O157 linked to multi-state outbreak.
 - Michigan cases associated with consumption of ground steak-burger from national food service distribution and retail operation.
 - Product manufactured at Michigan processor.
 - National recall of beef product.
 - MDARD worked with LHD and USDA staff to conduct recall effectiveness checks.
- **2007 Botulism Linked to Canned Foods, United States**
 - Multi-state C. botulinum (botulism) outbreak.
 - Eight confirmed cases in Indiana, Texas and Ohio; no Michigan cases identified.
 - Suspect food: canned chili, hot dog sauce, etc.
 - Nationwide recall of 90+ products under dozens of brand names.
 - MDARD staff conducted 1,000+ recall audit checks.
- **2007 E.coli O157:H7 Outbreak Linked to Ground Beef Patties; United States**
 - 40 confirmed cases; no Michigan cases identified.
 - Nationwide recall of 21.7 million pounds of product.
 - Company went out of business.
- **2007 Salmonella Outbreak Linked to Frozen Pot Pies; United States**
 - 272 confirmed cases in 35 states; three cases in Michigan.
 - Suspect food: undercooked frozen pot pies.
 - Nationwide recall of products.
- **2006-2010 Detection and Eradication of Hemlock Woolly Adelgid, Michigan**
 - Approximately 40 HWA positive hemlock detected in three counties from 2006 to 2010.
 - All trees removed and destroyed; surrounding trees treated with insecticide for multiple years.
 - 30,000+ hemlock trees examined in vicinity.

- Over \$175,000 in state, federal, and other funds spent in response.
- Surveys and treatments will continue in 2011.
- **2006-2007 Peanut Butter Outbreak and Recall, United States**
 - 425 confirmed cases of *Salmonella* Tennessee across 44 states.
 - Outbreak associated with consumption of major national brand of peanut butter manufactured in Georgia.
 - No deaths associated with outbreak strain of pathogen.
 - Nine confirmed cases in Michigan.
 - MDARD staff worked with federal investigators on recall effectiveness checks at retail and food service facilities.
- **2006-2007 Detection and Eradication of Plum Pox Virus, Michigan**
 - One PPV-positive plum tree found in Southwest Michigan during routine survey.
 - Approximately 14,000 trees destroyed during eradication effort.
 - Quarantine restricting movement of *Prunus* promulgated.
 - Five years of intensive survey.
 - Over \$900,000 in federal funds spent for survey and response.
 - Survey activities will continue in 2011.
- **2006 Norovirus Outbreak at Restaurant in Eaton County, Michigan**
 - 495 cases associated with dining at a full-service restaurant, including 17 employees.
 - No deaths were associated with this outbreak.
 - Believed to have been caused by ill food worker vomiting in the kitchen during business hours.
- **2006 Norovirus Outbreak at Restaurant in Eaton County, Michigan**
 - 105 probable cases from seven Michigan counties associated with consumption of food from fast food restaurant, with no deaths.
 - Believed to have been caused by ill food workers.
- **2006 Norovirus Outbreak at Restaurant in Ingham County, Michigan**
 - Over 460 cases identified with this outbreak from a restaurant in Lansing.
 - Believed to have been caused by an ill food worker.
- **2006 E. coli O157 in Fresh Spinach, United States**
 - 204 laboratory-confirmed cases of E. coli O157 in 26 states associated with consumption of fresh spinach, including five Michigan cases.
 - 104 cases were hospitalized; three deaths.
 - Product sold by numerous distributors under a variety of names.
 - MDARD staff completed over 500 recall effectiveness checks of food facilities.
- **2006 E. coli O157 Outbreak Associated with Lettuce Served in National Fast Food Franchise, Northeastern United States**

- 71 laboratory-confirmed cases of E. coli O157 in five states, associated with lettuce consumption at a national fast food franchise in November and December of 2006.
- 53 hospitalized; eight with kidney failure.
- No cases found in Michigan.
- **2006 Norovirus Outbreak at Catered Event in Washtenaw Co., Michigan**
 - 188 ill from office party buffet from consumption of potato salad.
 - No hospitalizations.
 - Ill worker implicated.
- **2005 Wendy's Finger Hoax, United States**
 - After a woman announced she found a finger in a bowl of chili at a California Wendy's location, sales dropped nationwide, by as much as 70 percent in the surrounding area. Wendy's claimed losses of \$2.5 million in its felony complaint.
- **2005 Orange Juice Outbreak and Recall Due to Salmonella – United States**
 - Over 152 confirmed cases of *Salmonella* Typhimurium in 23 states, associated with “fresh-squeezed” unpasteurized orange juice from Florida processor.
 - Product sold under variety of labels.
 - Michigan had over 20 confirmed cases.
 - MDARD staff among the first in the nation to identify manufacturer.
- **2004 Salmonella Outbreak and Recall of Almonds, United States/International**
 - Over 30 confirmed cases in a multi-state outbreak of *Salmonella* Enteritidis associated with consumption of contaminated raw California almonds, including several cases in Michigan.
 - Over 13 million pounds of almonds were distributed in the U.S. and a number of other countries under a variety of names and in many different products.
 - MDARD staff audited approximately 110 Michigan food establishments that received the almonds to verify that recalls were effective.
- **2003 Hepatitis A Outbreak, Pennsylvania**
 - 660 confirmed cases identified - some requiring liver transplants; four deaths.
 - 9,000 persons given immune globulin to prevent disease.
 - Contaminated green onions implicated as the source.
 - Restaurant chain (Chi-Chi's) had filed for Chapter 11 bankruptcy protection shortly before the outbreak and was sold to a competitor (Outback Steakhouse).
- **2002 - Present Detection and Response to Emerald Ash Borer (EAB), U.S. and Canada**
 - EAB identified as cause of ash tree mortality in Southeast Michigan.

- An interior quarantine was in place and kept updated based on known locations of EAB infestations.
 - Eradication efforts (host tree removal) in several locations proved to be unsuccessful.
 - Containment efforts focus on regulatory enforcement, education and outreach.
 - Currently seven counties in the Upper Peninsula (UP) and all but two counties in the Lower Peninsula are known to be infested with EAB. Additionally, EAB is known to be infesting sites in 14 other states and Ontario, Quebec.
 - Systematic survey using baited panel traps continues in non-quarantined counties in the Upper Peninsula.
 - The Slow Ash Mortality Pilot Project, (a multi-agency/multi-year effort) is testing an integrated approach to managing EAB at several UP locations.
- **2002 -2003 Intentional Contamination of Hamburger with Nicotine, Michigan**
 - Disgruntled meat market worker contaminated product while grinding meat unsupervised.
 - Potentially lethal doses of nicotine-containing pesticide identified.
 - 124 persons sickened.
 - Need for better coordination of industry, public health, agriculture, and law enforcement investigations was clearly identified.
- **1999 E. coli 0157:H7 Outbreak at a County Fair, New York**
 - Poorly constructed well on Washington County Fairground likely contaminated by manure run-off.
 - Estimated 2,800 to 5,000 fair attendees ill; 71 hospitalized, 14 developed Hemolytic Uremic Syndrome (HUS), two deaths.
 - Similar outbreaks have occurred in Ohio, Wisconsin, Oregon, and Ontario.
 - A petting zoo was linked to a 2004 E. coli outbreak at the North Carolina State Fair that sickened 108 people, including 15 children who developed life-threatening kidney ailments.
- **1998 Listeria monocytogenes Processed Meat Outbreak, United States**
 - Improved laboratory capabilities linked isolated cases occurring in 14 states - sometimes several months after illnesses occurred.
 - Michigan and national news media sharply criticized state and federal agencies for not detecting the outbreak quicker.
 - Over 100 illnesses and 21 deaths (largely elderly persons and unborn/newborn children) linked with consumption of contaminated hot dogs and processed meats.
 - Michigan production facility implicated (Sara Lee owned Bil Mar Foods in Zeeland).
 - 35 million pounds recalled by Sara Lee, with an estimated cost of \$76 million.
 - 241 employees (19 percent of facility workforce) laid off following the outbreak.

- **1997 Hepatitis A Outbreak, Michigan**
 - Outbreak began in school children and spread to the community.
 - Frozen strawberries later found to have come from Mexican source.
 - Approximately 329 cases occurred over a year.
 - \$389,000 in unbudgeted response costs plunged local government into extreme financial difficulties.

- **1997 E. coli 0157:H7 Ground Meat Outbreak, Colorado**
 - Laboratory genetic fingerprinting techniques allowed detection of a widespread outbreak in the early stages, confirming link between 15 ill persons and consumption of contaminated ground meat.
 - 25 million pounds of ground meat from a single plant recalled.
 - The production facility was closed during the outbreak and sold by the parent company to a competitor at deeply discounted prices.
 - The parent company was itself taken over by another competitor within a year.

- **1996 E. coli 0157:H7 Fresh Juice Outbreak, United States**
 - One of three outbreaks linked to fresh juice or cider that year.
 - 66 illnesses identified; one, a 16-month-old child, died.
 - Company paid a \$1.5 million fine.
 - Michigan researchers, regulators, and agricultural leaders developed more stringent cider production guidelines to protect consumers.

- **1996 Mis-identification of Source in Cyclospora Outbreak, Texas**
 - Local health department incorrectly names California strawberries as culprit in foodborne outbreak (source later shown to be Guatemalan raspberries).
 - \$40 million in lost sales for California strawberry growers as consumer perception became reality.

- **1994 Salmonella Enteritidis Ice Cream Outbreak, United States**
 - Estimated 224,000 illnesses in 41 states.
 - Cross-contamination of a key ingredient occurred during transportation.

Note: Another example of a massive outbreak linked to a dairy product occurred in 1985 when *Salmonella typhimurium* contaminated pasteurized milk, sickening 170,000 people.

- **1990s Bovine Spongiform Encephalopathy (BSE), Great Britain**
 - Prions evaded traditional control measures and contaminated feed.
 - Human deaths linked with beef consumption shook consumer confidence in government.
 - Estimated \$9 -14 billion in compensation paid to cattle farmers and unemployed laborers.
 - \$2.4 billion in loss of export markets.

- **1985 Intentional Salad Bar Contamination with Salmonella, Oregon**
 - Religious sect followers contaminated salad bars in 10 facilities hoping to disrupt local elections.
 - 750 people sickened; 45 hospitalized.
 - Criminal intent in this case not recognized for months.

- **1973-74 Accidental Contamination of Animal Feed with PBB, Michigan**
 - 30,000 cattle, 4,500 hogs, and 1.5 million chickens slaughtered at cost of \$215 million (\$708 million in 2001 dollars).
 - Environmental and human health effects and costs largely unknown.
 - Citizen confidence in government shaken.