



# HOW SAFE IS OUR FOOD?

## Food recall trends through 2019

**AMERICANS RELY ON A VAST NETWORK** of farms, slaughterhouses and manufacturers to provide safe food every day. In 2019 alone, high-profile recalls and foodborne illness outbreaks linked to flour, chicken strips, and romaine lettuce reveal that more action is necessary to protect public health.<sup>1 2 3</sup>

The Center for Disease Control (CDC) estimates 1 in 6 Americans contract a foodborne illness each year with 128,000 hospitalizations and 3,000 deaths.<sup>4</sup> While most people who are affected by foodborne illness recover without lasting effects, some suffer long-term consequences such as kidney failure, nerve damage, or chronic arthritis.<sup>5</sup> Foodborne illnesses affect vulnerable populations (children, pregnant women, elderly, and sick people) disproportionately.<sup>6</sup>

In 2011, the United States made significant upgrades to the food safety system for produce and processed food by enacting the FDA Food Safety Modernization Act (FSMA).<sup>7</sup> This law required enhanced tracking of foodborne illness outbreaks, improved oversight of the food production system, putting in place preventive controls and updated FDA recall authority. However, Congress failed to update safety standards for meat and poultry monitored by the U.S. Department of Agriculture Food Safety and Inspection Service (FSIS). The bifurcated food safety system has caused inconsistent oversight, ineffective coordination, and inefficient use of resources.<sup>8</sup>

Food recalls can provide insight into the health of our food safety infrastructure. Each recall is an instance when the system failed to prevent contamination, putting people's health at risk.

Comparing trends in recalls since FSMA implementation may help reveal how these diverging policies are impacting the overall safety of the nation’s food.<sup>9</sup> The 2019 analysis of food recalls finds:

- Recalls for produce, processed food and other food overseen by the FDA **decreased 34 percent since new food safety plans for businesses started going into effect in 2016.**<sup>10</sup> The most hazardous recalls have dropped 54 percent.
- **The most hazardous meat and poultry recalls (Class I) have nearly doubled** with an 85% percent increase since 2013. This is a slight increase from 2018. All meat and poultry recalls are up 65% since 2013.
- Companies reported recovering an average of **16 percent of recalled meat and poultry in completed recalls between 2013-2019.**<sup>11</sup>
- While the number of poultry recalls was similar to previous years, the 17 million pounds of poultry and egg products recalled last year more than tripled the average of the previous six years.
- **Fifteen and a half million pounds of meat and poultry were recalled for containing metal, plastic or other extraneous material** in 2019. That’s 75% of the weight of all meat recalls.

This year’s analysis finds that recalls for processed food, produce and other products classified as food have steadily declined

The FDA and FSIS decide the hazard level classification while a recall investigation is occurring based on the below system, but the agencies can also change (upgrade or downgrade) the level of the recall over time.

While FSMA gave the FDA mandatory recall authority, something USDA still lacks, food recalls are almost all voluntary and initiated by manufacturers or distributors.<sup>12 13</sup> The FDA has only used this authority once for food for kratom in April of 2018 because of *Salmonella* contamination.<sup>14</sup>

Class	USDA FSIS Definition <sup>15</sup>	FDA Definition <sup>16</sup>
I	Involves a health hazard situation in which there is a reasonable probability that eating the food will cause health problems or death.	Situation in which there is a reasonable probability that the use of, or exposure to, a violative product will cause serious adverse health consequences or death.
Class II	Involves a potential health hazard situation in which there is a remote probability of adverse health consequences from eating the food.	A situation in which use of, or exposure to, a violative product may cause temporary or medically reversible adverse health consequences or where the probability of serious adverse health consequences is remote.
Class III	Involves a situation in which eating the food will not cause adverse health consequences.	Situation in which use of, or exposure to, a violative product is not likely to cause adverse health consequences.

since major protections mandated by FSMA starting going into effect in 2016.<sup>17</sup> While we can not definitively connect the trend of decreasing recalls to enactment of FSMA, the correlation is suggestive.

However, there are still other dangers that remain unregulated in our food safety system. The delay of health-based standards for water used on all produce, makes it likely contaminated food will continue to reach store shelves.<sup>18</sup> Indeed, one of the most memorable foodborne illness outbreaks of 2019 involved pathogenic *E. coli* contamination linked to Romaine lettuce. A case study later in this year's report explores this further.

Unfortunately, Congress' failure to update food safety laws for meat and poultry means potential benefits of updated protections are not extended to food overseen by the USDA. This along with the Department's failure to establish new protections under existing authority, have left meat and poultry recalls at a high level.

### **Recalls overseen by the FDA**

The FDA Food Safety Modernization Act (FSMA) requires the FDA to enhance health standards, inspections, and enforcement for the wide range of foods they oversee.<sup>19</sup> Under the law, requirements were operationalized in separate rules to prevent contamination in the factory, *Preventive Controls for Human Food* and *Produce Safety Rule*, and on farms, *Produce Safety Rule*.

Starting in September of 2016 any large business that manufactures, processes, packs, or stores human food needed to comply with new *Preventive Controls for Human Food*-- by the end of September 2018 these protections covered nearly all businesses. The regulation requires these operations to have a written food safety

plan to identify any "known or reasonably foreseeable biological, chemical or physical hazard" including allergens.<sup>20</sup> Once identified, the company must develop a plan to significantly minimize or remove the threat through changes to the process, sanitation, limiting food allergens, or other preventive controls.

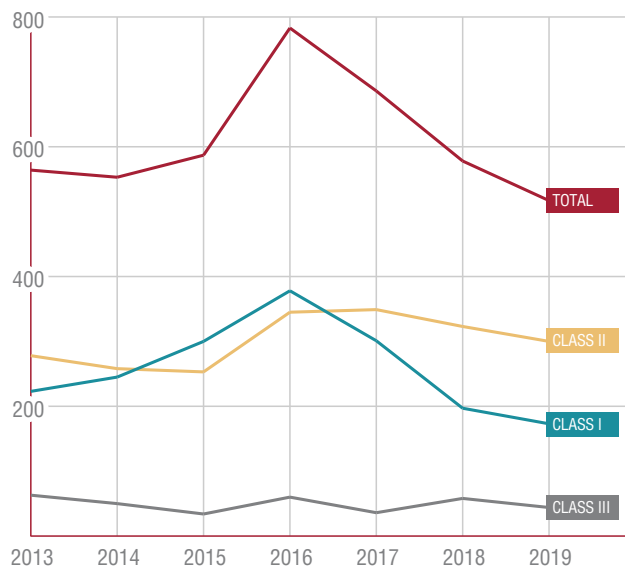
These plans require constant monitoring, verification controls are working and corrective action if failures appear. This will help keep contamination out of the nation's food supply.

Lastly, the regulations require manufacturers to take action if they identify a hazard related to ingredients received from another supplier--as happened in the case of the multiple recalls of flour this past year.<sup>21</sup>

While Preventive Controls addressed processing food, the Produce Safety Rule was designed to establish "science-based standards for the safe growing, harvesting, packing and holding of fruits and vegetables."<sup>22</sup> These standards are intended to address water used on produce, safe treatment of soil with compost and manure to minimize contamination, worker training and hygiene, among other protections. Some of these rules started going into effect in January 2018, making it too early to determine their impact.

More problematic, though, is the delay and potential reconsideration of the agricultural water rule which could limit pathogen contamination of produce. Requirements for this water under the Produce Safety Rule now will not go into effect until 2022--and the rule may in fact change. Voluntary action also seems ineffective in light of continued outbreaks.<sup>23</sup> This is explored in more detail in the below case study on the 2019 *E. coli* outbreak linked to Romaine lettuce.

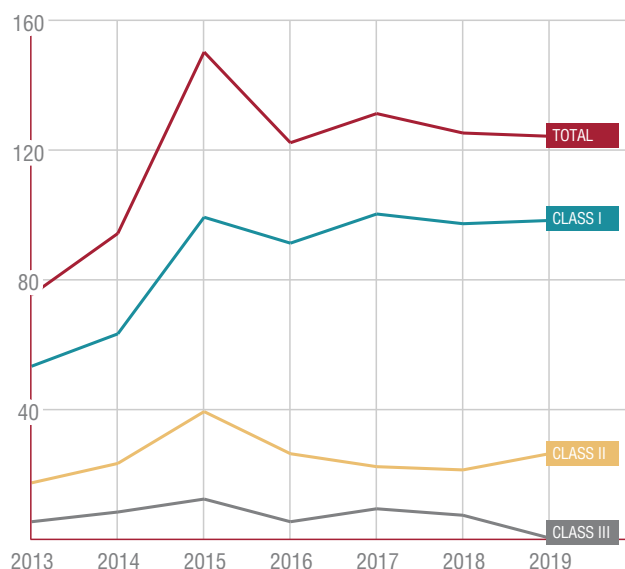
## FDA FOOD RECALLS BY CLASS 2013-2019



U.S. PIRG Education Fund’s analysis of recalls suggest the food safety plans may be working to keep some contaminated food from reaching store shelves, restaurants and people’s plates. Recalls covered by these regulations increased by 38 percent between 2013 and 2016 before the new rules were in place, with Class I recalls jumping 69 percent. Since 2016, when Preventive Controls began for large businesses, the total number of recalls have steadily declined, ending below 2013 levels in 2019.<sup>24</sup>

One major limitation of this analysis is the FDA recall data does not break recalls down into what food product was involved--processed food or fresh produce. That makes it harder to closely examine how these trends relate to specific regulations under FSMA. Additional analysis of the food safety plans required for processing facilities would further bolster this analysis and could help inform future policy. We recommend the Food & Drug Administration analyze the relationship between the quality of these plans and recalls.

## MEAT AND POULTRY RECALLS BY CLASS 2013-2019



### Recalls overseen by USDA remain high

The number of meat, poultry and egg product recalls overseen by U.S. Department of Agriculture remained high in 2019 with 124, only one recall fewer than the previous year. The number of most hazardous Class I recalls were identical to the previous year. While Americans can be slightly comforted that the trend of increasing recalls did not continue in 2019, they remain near a seven-year high.

Although the number of pork recalls decreased in 2019, the total weight of pork recalled increased by 60 percent compared to the average amount of meat recalled between 2013-2018. Despite this concerning trend, it may

## WHAT DO THE FDA AND USDA OVERSEE?

	Food and Drug Administration (FDA)	U.S. Department of Agriculture (USDA)
Bottled Water	✓	
Dietary Supplements	✓	
Eggs in the shell	✓	
Eggs, processing and grading		✓
Processed Food	✓	
Produce	✓	
Meat and poultry		✓
Seafood	✓	
Siluriformes (Catfish)		✓
Wild game ("exotic" meat)	✓	

now get worse. The U.S. Department of Agriculture (USDA) has tested, and now finalized, the Modernization of Swine Slaughter Inspection rule.<sup>25</sup> This allows facilities to remove speed limits for how many pigs can be processed and allows fewer federal safety inspectors at plants. Many consumer, public health and union groups have highlighted the danger posed by this rule--and two whistleblowers filed disclosure forms over the standard.

Metal, plastic, and other extraneous materials have no place in the nation's food. But, the number of recalls in 2019 due to the presence of materials like metal and plastic in meat reached a seven-year high, and more than doubled the average

of the previous six years. Due to a nearly 12 million pound recall of chicken strips for metal pieces, the total weight of these recalls increased nearly fivefold in 2019 over the average of the previous six years.<sup>26</sup> We explore this problem more in a case study below.

The demands of ensuring safe meat and poultry differ from the food overseen by the FDA. But the contrasting trends in food safety between the two agencies make it clear additional action is necessary, especially as Americans continue to eat significant amounts of meat. To reverse these trends, Congress and USDA should investigate potential solutions, including enacting recommendations made in *How Safe is Our Food 2018*.

## CASE STUDY:

# Romaine Lettuce Outbreak

### SHORTLY BEFORE THANKSGIVING

of 2019, the Center for Disease Control (CDC) announced an outbreak of *E. coli* in Romaine lettuce from the Salinas, California region.<sup>27</sup> The FDA instructed consumers to not eat Romaine lettuce from this region or if the source could not be confirmed. The outbreak of *E. coli* O157:H7 was the same particularly dangerous strain involved with outbreaks linked to Romaine lettuce in 2017 and 2018. As of December 19, 2019, the outbreak was linked to 138 illnesses in 25 states.<sup>28</sup> Traceback investigations have identified a common grower, but not the specific source so no recall has been issued.<sup>29</sup>

This is yet another *E. coli* outbreak linked to leafy greens such as Romaine lettuce.<sup>30 31 32</sup> While the cause has not been determined, some past outbreaks have been tied to contaminated agricultural water that is used on crops. In the 2018 outbreak, FDA investigators could not definitively say a nearby cattle feedlot was the source of contamination, but found “no evidence in support of alternative explanations.”<sup>33</sup> With many of these large farming operations located nearby, it’s not hard to imagine contaminated runoff from nearby Concentrated Animal Feed Operation (CAFO), contaminating irrigation or other water supplies.

Under the Food Safety and Modernization Act (FSMA), the Food and Drug



Alec Meltzer, CC-BY 3.0

Administration (FDA) proposed science-based standards for water used to grow, harvest or clean fruits and vegetables. While some generic *E. coli* could appear during growing of produce, the rule had a zero tolerance for generic *E. coli* in agricultural water used during and after harvest.<sup>34</sup>

The rule was intended to go into effect in 2018, but has now is scheduled for rolling start dates in 2022--and a chance the rule itself will be altered.<sup>35</sup> In the meantime, the California Leafy Green Marketing Agreement adopted new safety standards in April of 2019 to prevent *E. coli* contamination like seen in Yuma, Arizona in 2018.<sup>36</sup> Eight months later the Salinas, California outbreak occurred raising questions about the effectiveness of those corporate standards.

## CASE STUDY:

# Tyson chicken strip products recall

ON MAY 4, 2019, TYSON FOODS ADDED nearly 12 million pounds of chicken strips to an initial recall of 69,000 pounds issued six weeks earlier.<sup>37</sup> The variety of ready-to-eat frozen chicken were recalled after six consumers complained about metal chunks in the chicken. Three had mouth injuries according to the Food Safety and Information services.<sup>38</sup> The products were distributed at a variety of stores across the country, including Publix, Meijer, Food Lion, and Hannaford.<sup>39</sup> The products included in this recall came from four different facilities run by Tyson.<sup>40</sup>

This Tyson Foods recall is illustrative of a broader problem in our food safety system. Extraneous materials shouldn't make it out of the production facility, much less to family tables. In total, contaminations with metal, plastic, and other materials accounted for more than a quarter of the USDA recalls in 2019 and 75% of all pounds of recalled meat or poultry.

Chunks of metal, plastic and other material have no place in our food. The highly industrialized nature of modern food production makes it likely that as machines continue to run pieces break off. When older equipment is run at higher speeds that they



Tyson.com

are not equipped to handle, it is even more likely chunks of material will end up in the food.<sup>41</sup> And without sufficient control to monitor food for this extraneous material, it ends up in the meat sold to consumers.

Lastly federal inspectors are required to be at slaughterhouses at all times. But that is often not the case at processing facilities, where investigators can spend as little as a couple hours at a facility before moving to the next one. This lack of oversight could be contributing to increased recalls.<sup>42</sup>

Modernizing older facilities, closer monitoring for plastic for plastic and metal, and increased transparency could help prevent future contamination.

# | Methodology

We collected information on recalls from two sources for 2019:

- Recalls under the Food and Drug Administration purview were downloaded from Enforcement report website at [https://www.accessdata.fda.gov/scripts/ires/index.cfm#tabNav\\_advancedSearch](https://www.accessdata.fda.gov/scripts/ires/index.cfm#tabNav_advancedSearch). We searched for all recalls with Product Type “Food” between January 1, 2019 and December 31, 2019. This search was run initially on December 30th and then we executed the search again on January 2 to add any recalls for the last few days of 2019.
- Recalls under the U.S. Department of Agriculture Food Safety and Inspection Service was collected from two sources. Completed recalls were copied from the table on the Recall Case Archive 2019 website <https://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive>. Researchers then added information on the amount of food recalled and the cause of the recall by reviewing each press release. Data on active recalls were copied from the table on the Current Recalls and Alerts website for 2019 <https://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/current-recalls-and-alerts>.

Researchers then enhanced the data with information on the amount of food recalled and the cause of the recall by reviewing individual press releases for every recall.

In order to isolate the number of recalls, researchers only counted individual recall events in the analysis. That includes counting two major expansion of recalls by USDA as individual events, as the Department’s own numbering system does. This methodology mirrors U.S. PIRG Education Fund’s *How Safe is Our Food 2018* report.

Recall data was analyzed in a few different ways as indicated in the specific statistics:

- When comparing change in recalls between the 2019 and a previous year, we looked at the total percentage increase. For instance, we divided the number of Class I USDA recalls in 2019 by the number of Class I recalls in 2013.
- Where there was more variation year to year of recalls by cause or weight, we took an average of that information over a certain time period and then compared it to the 2019 recall data. For instance, we took the average of poultry recalls between 2013-2018 and then compared it to the 2019 weight of poultry recalled.



# I Appendix 1: Recall Data

## TOTAL FOOD RECALLS 2013-2019

Year	Class I	Class II	Class III	Total
2013	276	295	68	639
2014	308	281	58	647
2015	399	292	46	737
2016	469	371	65	905
2017	401	371	45	817
2018	294	344	65	703
2019	271	326	44	641
Total	2418	2280	391	5089

## FDA FOOD RECALLS BY CLASS 2013-2019

Year	Class I	Class II	Class III	Total
2013	223	278	63	564
2014	245	258	50	553
2015	300	253	34	587
2016	378	345	60	783
2017	301	349	36	686
2018	197	323	58	578
2019	173	300	44	517
Total	1817	2106	345	4268

## MEAT AND POULTRY RECALLS BY CLASS 2013-2019

Year	Class I	Class II	Class III	Total
2013	53	17	5	75
2014	63	23	8	94
2015	99	39	12	150
2016	91	26	5	122
2017	100	22	9	131
2018	97	21	7	125
2019	98	26	0	124
Total	601	174	46	821

## MEAT AND POULTRY RECALLS BY WEIGHT 2013-2019

Year	Recalled (lbs)	Recovered (lbs)
2013	13,096,784	1,367,693
2014	18,675,102	1,848,451
2015	21,104,848	10,235,544
2016	58,140,787	4,164,575
2017	20,880,574	4,199,488
2018	20,552,911	3,257,539
2019	20,640,144	789,402
Total	173,091,150	25,862,692

## MEAT AND POULTRY RECALLS BY TYPE 2013-2019

Year	Beef	Pork	Poultry	Ovine	Mixed	Siluriformes	Other
2013	20	15	20	0	20	0	
2014	22	26	31	1	14	0	
2015	41	37	33	1	38	0	
2016	26	30	39	0	24	0	
2017	28	20	45	0	35	0	
2018	31	25	34	0	32	3	
2019	24	15	38	1	31	14	1
Total	192	168	240	3	194	17	1

## MEAT AND POULTRY RECALLS BY TYPE AND WEIGHT 2013-2019

Year	Beef	Pork	Poultry	Ovine	Mixed	Siluriformes	Other
2013	396,213	175,622	752,239		11,772,710		
2014	13,232,176	1,032,582	2,230,901	27,948	2,151,495		
2015	1,345,842	1,480,768	8,004,465	35,275	10,238,498		
2016	591,869	696,056	8,321,486	15	48,480,195	51,166	
2017	909,242	502,430	9,620,850		9,761,167	86,885	
2018	13,185,563	670,369	1,214,839		5,267,834	214,306	
2019	645,024	1,215,243	17,305,925	4,365	706,783	750,416	12,388
Total	30,305,929	5,773,070	47,450,705	67603	88,378,682	1102773	12388

## MEAT AND POULTRY RECALLS BY CAUSE 2013-2019

Year	Extraneous Material	Listeria monocytogenes	Other	Processing Defect	Residue	Salmonella	STEC	Undeclared Allergen	Undeclared Substance	Unapproved Substance
2013	10	9	14	2	0	4	9	25	2	0
2014	6	7	23	4	0	4	5	43	2	0
2015	11	6	54	4	0	3	8	58	5	1
2016	21	11	27	5	1	2	14	34	7	0
2017	24	15	17	5	2	1	8	53	6	0
2018	23	21	27	8	1	6	9	26	3	1
2019	33	6	34	4	0	3	7	30	6	0
TOTAL	128	75	196	32	4	23	60	269	31	2

## MEAT AND POULTRY RECALLS BY CAUSE AND WEIGHT 2013-2019

Year	Extraneous Material	Listeria monocytogenes	Other	Processing Defect	Residue	Salmonella	STEC	Undeclared Allergen	Undeclared Substance	Unapproved Substance
2013	331,732	784,350	486,648	849	0	45,505	10,771,539	595,952	80,209	0
2014	265,607	270,926	9,639,047	59,203	0	372,414	1,840,533	6,147,288	80,084	0
2015	1,104,790	82,547	3,420,406	5,259	0	4,828,874	215,593	10,268,457	1,176,731	2,191
2016	6,372,416	47,398,141	532,313	1,999,078	21,521	19,287	291,900	843,536	662,595	0
2017	9,043,982	546,276	971,547	387,357	3,190	1,076	144,997	8,761,495	1,020,654	0
2018	1,587,250	4,127,696	963,687	88,285	69,016	12,963,341	287,758	446,138	4,377	15,363
2019	15,502,301	165,221	1,692,644	71,820	0	118,830	394,697	2,572,463	122,032	0
TOTAL	34,208,078	53,375,157	17,706,292	2,611,851	93,727	18,349,327	13,947,017	29,635,329	3,146,682	17,554

# Endnotes

- 1 Outbreak of E. coli Infections Linked to Flour (Final Update). (2019, July 11). Retrieved from <https://web.archive.org/web/20191226004857/https://www.cdc.gov/ecoli/2019/flour-05-19/index.html>.
- 2 Dan Nosowitz, “Tyson issues fourth recall of the year for having non-food material in its chicken”, *Modern Farmer*, 22 August 2019, Retrieved from <https://web.archive.org/web/20200102164448/https://modernfarmer.com/2019/08/tyson-issues-fourth-recall-of-the-year-for-having-non-food-material-in-its-chicken/>.
- 3 Center For Disease Control, “Outbreak of E. coli Infections Linked to Romaine Lettuce.”, 19 December 2019,. Retrieved from <https://web.archive.org/web/20200102164729/https://www.cdc.gov/ecoli/2019/o157h7-11-19/index.html>.
- 4 Burden of Foodborne Illness: Findings. (2018, November 5). Retrieved from <https://web.archive.org/web/20200102164947/https://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html>.
- 5 Culture-Independent Diagnostic Tests | Food Safety | CDC. (2016, July 30). Retrieved from <https://www.cdc.gov/foodsafety/challenges/cidt.html>
- 6 10 Facts on Food Safety. (2016 October). Retrieved from [https://web.archive.org/web/20200102165255/https://www.who.int/features/factfiles/food\\_safety/en/](https://web.archive.org/web/20200102165255/https://www.who.int/features/factfiles/food_safety/en/).
- 7 Food Safety Modernization Act (FSMA) - Full Text of the Food Safety Modernization Act (FSMA). (2017, December 13). Retrieved from <https://web.archive.org/web/20200102165746/https://www.fda.gov/food/food-safety-modernization-act-fsma/full-text-food-safety-modernization-act-fsma>
- 8 HIGH-RISK SERIES Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others. (2017 February) Retrieved from <https://web.archive.org/web/20200102165904/https://www.gao.gov/assets/690/682765.pdf>
- 9 Easily publicly accessible data from the FDA is less granular than the data provided by the USDA limiting comparison. For example, USDA data classifies recalls by type of product and cause. FDA recall data includes this data but does not provide classifications, limiting evaluation.
- 10 Key Facts about Preventive Controls for Human Food. (n.d.). Retrieved from <https://web.archive.org/web/20200103153437/https://www.fda.gov/media/108775/download>.
- 11 This excludes any recalls that are still active because recovered quantities are not yet available for those recalls.
- 12 Zuraw, L. (2018, July 31). Gillibrand Proposes Mandatory Recall Authority for USDA. Retrieved from <https://web.archive.org/web/20200103210002/https://www.foodsafetynews.com/2015/05/gillibrand-introduces-bill-giving-usda-mandatory-recall-authority/>.
- 13 FDA Finalizes Guidance on Mandatory Recall Authority. (n.d.). Retrieved from <https://web.archive.org/web/20200103210351/https://www.fda.gov/food/cfsan-constituent-updates/fda-finalizes-guidance-mandatory-recall-authority>.
- 14 FDA orders mandatory recall for kratom products due to risk of salmonella. (n.d.). Retrieved from <https://www.fda.gov/news-events/press-announcements/fda-orders-mandatory-recall-kratom-products-due-risk-salmonella>.
- 15 FSIS Food Recalls. Retrieved from <https://web.archive.org/web/20200103153257/https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/production-and-inspection/fsis-food-recalls/>.
- 16 CHAPTER 7 - RECALL ACTIVITIES. (2018) Retrieved from <https://web.archive.org/web/20200103153145/https://www.fda.gov/regulatory-information/search-fda-guidance-documents/chapter-7-recall-activities>.

- 17 Key Facts about Preventive Controls for Human Food. (n.d.). Retrieved from <https://web.archive.org/web/20200103153437/https://www.fda.gov/media/108775/download>.
- 18 FDA Finalizes New Compliance Dates for Agricultural Water Requirements. (n.d.). Retrieved from <https://web.archive.org/web/20200103153955/https://www.fda.gov/food/cfsan-constituent-updates/fda-finalizes-new-compliance-dates-agricultural-water-requirements>.
- 19 Food Safety Modernization Act (FSMA). (n.d.). Retrieved from <https://web.archive.org/web/20200103154722/https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/food-safety-modernization-act-fsma>.
- 20 Final Rule for Preventive Controls for Human Food. (n.d.). Retrieved from <https://web.archive.org/web/20200103155124/https://www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-preventive-controls-human-food>.
- 21 <https://www.cdc.gov/ecoli/2019/flour-05-19/index.html>
- 22 Statement from FDA Commissioner Scott Gottlieb, M.D., and Deputy Commissioner Frank Yiannas on advancing new tools and science for implementing agricultural water requirements for produce safety (2019, March 15). Retrieved from <https://web.archive.org/web/20200108140522/https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-and-deputy-commissioner-frank-yiannas-advancing-new>
- 23 FDA Finalizes New Compliance Dates for Agricultural Water Requirements. (n.d.). Retrieved from <https://web.archive.org/web/20200103153955/https://www.fda.gov/food/cfsan-constituent-updates/fda-finalizes-new-compliance-dates-agricultural-water-requirements>.
- 24 Ibid.
- 25 Radford, M., & Franco, A. (2019, December 16). Inspectors warn unsafe pork could make its way to consumers under Trump rule change. *NBC News*. Retrieved from [https://web.archive.org/web/20200103191722/https://www.nbcnews.com/politics/2020-election/inspectors-warn-unsafe-pork-could-make-its-way-consumers-under-n1097676?cid=eml\\_nbn\\_20191216](https://web.archive.org/web/20200103191722/https://www.nbcnews.com/politics/2020-election/inspectors-warn-unsafe-pork-could-make-its-way-consumers-under-n1097676?cid=eml_nbn_20191216)
- 26 Tyson Foods, Inc. Recalls Chicken Strip Products Due to Possible Foreign Matter Contamination. (2019, May 4). Retrieved from <https://web.archive.org/web/20200103192249/https://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive/archive/2019/recall-034-2019-exp-release>.
- 27 Vera, A. (2019, November 23). E. coli outbreak reported in romaine lettuce harvested from Salinas, California, CDC and FDA say. Retrieved from <https://www.cnn.com/2019/11/22/health/e-coli-outbreak-romaine-lettuce/index.html>.
- 28 Asmelash, L. (2019, December 19). CDC confirms 138 cases of E. coli in 25 states linked to romaine lettuce. CNN. Retrieved from <https://web.archive.org/web/20200108144334/https://www.cnn.com/2019/12/19/health/romaine-lettuce-recall-cdc-trnd/index.html>
- 29 Statement on new findings and current status of the romaine lettuce E. coli O157:H7 outbreak investigation (2019, December 12). Retrieved from [https://www.fda.gov/news-events/press-announcements/statement-new-findings-and-current-status-romaine-lettuce-e-coli-o157h7-outbreak-investigation?utm\\_campaign=121219\\_Statement\\_New\\_findings\\_and\\_status\\_of\\_the\\_romaine\\_lettuce\\_E\\_coli\\_O157:H7&utm\\_medium=email&utm\\_source=El-oqua](https://www.fda.gov/news-events/press-announcements/statement-new-findings-and-current-status-romaine-lettuce-e-coli-o157h7-outbreak-investigation?utm_campaign=121219_Statement_New_findings_and_status_of_the_romaine_lettuce_E_coli_O157:H7&utm_medium=email&utm_source=El-oqua)
- 30 Outbreak of E. coli Infections Linked to Romaine Lettuce. (2019, December 19). Retrieved from <https://web.archive.org/web/20200102164729/https://www.cdc.gov/ecoli/2019/o157h7-11-19/index.html>
- 31 Outbreak of E. coli Infections Linked to Romaine Lettuce. (n.d.). Retrieved from <https://web.archive.org/web/20200103223215/https://www.cdc.gov/ecoli/2018/o157h7-11-18/index.html>.
- 32 Multistate Outbreak of E. coli O157:H7 Infections Linked to Romaine Lettuce (Final Update). (n.d.). Retrieved from <https://web.archive.org/web/20200103223232/https://www.cdc.gov/ecoli/2018/o157h7-04-18/index.html>.
- 33 Environmental Assessment of Factors Potentially Contributing to the Contamination of Romaine Lettuce Implicated in a Multi-State Outbreak of E. coli O157:H7 (2018 November). Retrieved from <https://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm624546.htm>

34 Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption. (2015, November 27). Retrieved from <https://web.archive.org/web/20200103192537/https://www.federalregister.gov/documents/2015/11/27/2015-28159/standards-for-the-growing-harvesting-packing-and-holding-of-produce-for-human-consumption>.

35 Puckett, J. (2018 November 28) VERIFY: Trump Didn't Overturn Obama Era Rules on Water Testing, but They Were Postponed. Retrieved from [www.ktvb.com/article/news/local/verify/verify-trump-didnt-overturn-obama-era-rules-on-watertesting-but-they-were-postponed/277-618540803](http://www.ktvb.com/article/news/local/verify/verify-trump-didnt-overturn-obama-era-rules-on-watertesting-but-they-were-postponed/277-618540803).

36 Leafy Greens Marketing Agreement Announces New, More Stringent Food Safety Practices to Prevent Outbreaks. (2019, April 22). Retrieved from <https://www.businesswire.com/news/home/20190422005453/en/Leafy-Greens-Marketing-Agreement-Announces-New-Stringent>.

37 Tyson Foods, Inc. Recalls Chicken Strip Products Due to Possible Foreign Matter Contamination. (2019, May 4). Retrieved from <https://web.archive.org/web/20200103192249/https://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive/archive/2019/recall-034-2019-exp-release>.

38 Reilly, K. (2019, May 6). Tyson Recalls Nearly 12 Million Pounds of Chicken Strips. Retrieved from <https://time.com/5583751/tyson-chicken-strip-recall/>.

39 Reilly, K. (2019, May 6). Tyson Recalls Nearly 12 Million Pounds of Chicken Strips. Retrieved from <https://time.com/5583751/tyson-chicken-strip-recall/>.

40 Nosowitz, D. (2019, August 22). Tyson Issues Fourth Recall of the Year For Having Non-Food Material in Its Chicken. Retrieved from <https://web.archive.org/web/20200102164448/https://modernfarmer.com/2019/08/tyson-issues-fourth-recall-of-the-year-for-having-non-food-material-in-its-chicken/>.

41 Kindy, K. (2019, December 23). Processed meat recalls rise dramatically as consumers bite down on metal, plastic and glass. *Washington Post*. Retrieved from [https://www.washingtonpost.com/national/processed-meat-recalls-rise-dramatically-as-consumers-bite-down-on-metal-plastic-and-glass/2019/12/20/c6b670c6-15d6-11ea-8406-df-3c54b3253e\\_story.html?arc404=true](https://www.washingtonpost.com/national/processed-meat-recalls-rise-dramatically-as-consumers-bite-down-on-metal-plastic-and-glass/2019/12/20/c6b670c6-15d6-11ea-8406-df-3c54b3253e_story.html?arc404=true)

42 Ibid.