

# Eating Without Reservation

*Ensuring Food Safety in New York City*

APRIL 2019 - EXECUTIVE SUMMARY



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## EXECUTIVE SUMMARY

Each year more than 6,000 New York City residents are hospitalized for food-borne illnesses, according to the New York City Department of Health and Mental Hygiene (DOHMH). In 2017, 3,287 suspected food poisoning cases were reported to 311 and the NYC DOHMH. Between 2010 and 2017, the number of these annual complaints to 311 increased by almost 20 percent.

In the United States, up to 48 million people contract foodborne illnesses every year about a third of which are caused by one of 31 known pathogens. According to the U.S. Centers for Disease Control and Prevention, foodborne illnesses cause on average 55,961 hospitalizations and 1,351 deaths per year. The 9.4 million foodborne illnesses caused by known pathogens cost the United States more than \$15.5 billion annually. These statistics raise several questions about food safety: How well do city, state and federal agencies protect New Yorkers from food-related illnesses? How has the level of food safety in New York City changed in the last decade? What are the emerging threats to food safety in New York City and the nation? What else could New York City do to better prevent food-borne illnesses?

In this report, the CUNY Urban Food Policy Institute summarizes available public evidence on these questions in order to engage health officials, policy makers, food justice advocates and eaters in a conversation on the state of food safety in New York City. Our goal is to provide information that can be used to ensure that New York City’s food safety system protects all New Yorkers against current and emerging threats to safe and healthy food. While other health professionals and scholars have written about specific dimensions of food safety in the city, no recent report has provided a comprehensive overview of the city’s food safety system, summarized the roles of city, state and federal governments, analyzed this complex system’s strengths and weaknesses, or made recommendations for meeting emerging needs, the gaps this report seeks to fill.

New York City has long been a national leader in defining the municipal role for ensuring access to safe and healthy food. Today, New York City has multiple programs and policies to protect food safety. The evidence summarized in this report suggests that city and state agencies take food safety seriously and act when they find a problem.

This report describes and celebrates these past and current accomplishments. It identifies eight emerging challenges as well as ways to address them.

1	Protecting New York City's vulnerable populations
2	Limiting chemical and other contaminants of food supply
3	Addressing globalization of food supply chains
4	Protecting New York City's food distribution system
5	Finding new uses of technology and Big Data to monitor and improve food safety
6	Promoting equity as a food safety system goal
7	Integrating food safety and chronic disease prevention
8	Responding to changing federal food and food safety policies

To meet these challenges, the report proposes recommendations for (1) actions that the City can pursue to develop a more robust system of food safety monitoring and risk assessment and (2) actions that will aid the development of a policy environment conducive to innovation and effective and equitable food safety policies, programs and practices.

### *Recommendations for Improved Assessment of Food Safety*

1. Create an *Annual Report of Food-Borne Illness Outbreaks in New York City*, as proposed in a 2017 report by NYC DOHMH staff.<sup>1</sup> Together, the existing online restaurant inspection database and a summary annual food safety report will enable public officials, public health professionals, civil society groups and others to monitor progress towards reducing food-borne illnesses.
2. Hold City Council hearings to assess key food safety concerns among the public as well as elicit feedback and receive recommendations on current and prospective policies and programs led by New York City government.
3. Create a user-friendly public database of confirmed foodborne disease data in New York City, using publicly reported and other data as needed.
4. Convene a working group of representatives of city, state and federal agencies that monitor food-borne illnesses and food safety in New York City to identify duplication, gaps and opportunities for more effective collaboration on rapid and accurate assessment of food safety problems in New York City and improved methods for communicating findings to key actors.
5. Continue to collect and assess “big data” from social media as early warning of food safety problems and test effective public communications of this data.
6. Identify best and promising practices from other cities that could inform improvements of current systems and mechanisms for food safety planning and management in the city.

### *Recommendations for Policy Change*

7. Provide consumers, public health professionals, policy makers and food stores and food service providers with an accessible and user-friendly one stop source

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<sup>1</sup> Matis B, O'Halloran D, Stavinsky F, Wong M. Using the national environmental assessment reporting system to enhance foodborne illness outbreak investigations in New York city restaurants. *Journal of Environmental Health*. 2017 Apr 1;79(8):46

of relevant and timely information and data that can be used to monitor and improve food safety.

8. Integrate food safety and chronic diet-related disease prevention intervention activities in ways that extend the reach, magnify the impact, and improve the efficiency of current programs.
9. Set measurable targets for improving food safety conditions in New York City (e.g., drop in number of findings of rats) in food businesses and food-serving public Institutions and monitor progress towards goals.
10. Make promoting equity and protecting vulnerable populations a food safety priority.
11. Convene a working group of representatives of city, state and federal agencies that develop and enforce food-borne illnesses and food safety program and policies in New York City to identify duplication, gaps and opportunities for more effective collaboration on enforcement and prevention programs.
12. Support federal implementation of the recommendations of the U.S. Government Accountability Office to establish a government-wide performance plan for food safety and food safety monitoring as well as reinstate a centralized collaborative mechanism for federal agencies to craft common, broad-based food safety goals and objectives.

Finally, city, state and federal agencies, health professional organizations and food advocates need to do more to create mobilized constituencies that will support fair, effective and equitable food safety programs. Public opinion polls show strong public support for safe food,<sup>2</sup> but some public officials and public agencies, in order to minimize conflicts with the food industry, avoid speaking publicly about food safety. Our hope is that this report will contribute to a public discussion about what New York City and other levels of government can do to ensure that New York City remains a national leader in protecting the safety of its food.

Protecting the well-being of New York City's diverse population and its complex food system requires constant vigilance and periodic re-examination of established procedure. Better safe than sorry, that basic principle of public health, shows the value of a comprehensive assessment of the capacity of New York City's current food safety system to meet current and future challenges.

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<sup>2</sup> FoodPrint. National Consumer Survey Results. 2018. Available from: <https://foodprint.org/what-is-foodprint/consumer-survey-results/>

### *Acknowledgements*

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### *About the CUNY Urban Food Policy Institute*

The CUNY Urban Food Policy Institute is an academic research and action center at the CUNY Graduate School of Public Health and Health Policy located in Harlem, NYC. The Institute provides evidence to inform municipal policies that promote equitable access to healthy, affordable food.

## I. INTRODUCTION

Each year more than 6,000 New York City residents are hospitalized for food-borne illnesses, according to the New York City Department of Health and Mental Hygiene (DOHMH).<sup>1</sup> The most common sources of food poisoning include contamination of food as a result of contact with infected raw or undercooked meat, poultry, eggs, shellfish unpasteurized milk, or other products. National data suggest that almost two-thirds of outbreaks of food illnesses that are tied to a single site occur in restaurants.<sup>2</sup> Sit-down dining and fast food outlets together account for more than half of the reported outbreaks. Conversely, outbreaks and outbreak-associated illnesses are far less common at other locations such as private homes, institutions, and grocery stores, which constitute fewer than ten percent of cases reported in 2016.<sup>2</sup> New Yorkers eat out at restaurants or fast food outlets, visiting one of the city's 26,000 eating establishments, nearly one billion times per year.

In the United States, up to 48 million people contract foodborne illnesses every year about a third of which are caused by one of 31 known pathogens. These estimates, based on 2000-2008 data by the Centers for Disease Control and Prevention (CDC), also indicate that foodborne illnesses cause, on average, 55,961 hospitalizations and 1,351 deaths per year. These 9.4 million foodborne illnesses cost the US more than \$15.5 billion annually.<sup>3</sup> In 2016, New York State's rate of reported foodborne disease outbreaks — defined as two or more cases of a similar illness due to the consumption of a common food — is lower than the national average and than rates recorded in Rhode Island, Minnesota, or Oregon, but still much higher than the rates in states like Texas or Pennsylvania.<sup>4</sup>

These statistics raise several questions about food safety: How well do city, state and federal agencies protect New Yorkers from food-related illnesses? How has the level of food safety in New York City changed in the last decade? What are the emerging threats to food safety in New York City and the nation? What else could New York City do to better prevent food-borne illnesses?

In this report, the CUNY Urban Food Policy Institute seeks to summarize available evidence on these questions in order to engage health officials, policy makers, food justice advocates and eaters in a conversation on the state of food safety in New York City. Our goal is to provide information that can be used to ensure that New York City's food safety system protects all New Yorkers against current and emerging threats to safe, healthy food for all New Yorkers. While other health professionals and scholars have written about specific dimensions of food safety in the city,<sup>5,6,7,8,9</sup> no recent report has provided a comprehensive overview of the city's food safety system; summarized the roles of city, state and federal governments; analyzed this complex system's strengths and weaknesses; or made recommendations for meeting emerging needs. This report seeks to fill these gaps.

New York City has long been a national leader in defining a municipal role for ensuring access to safe and healthy food. Table 1 lists some of the highlights of this history from the 19<sup>th</sup> and twentieth centuries. Today, New York City has multiple programs and policies to protect food safety. Evidence suggests that city and state agencies take food safety seriously and act when evidence shows a problem. This report acknowledges and celebrates these past and current accomplishments.

**Table 1. Food Safety highlights of the 19th, 20th and 21st centuries of public health policy in NYC.** <sup>10</sup>

<b>Year</b>	<b>New York City public health actions to improve access to safe and healthy food</b>
1842	City gets fresh water from Croton reservoir
1870	Department of Health created, with four administrative bureaus
1870s	Commissioner Chandler appoints first milk inspector, opens laboratory
1884	Department creates Division of Food Inspection and Offensive Trades
1892	Department opens Bacteriological Laboratory, first municipal laboratory in the world to routinely diagnose disease
1906	Department begins inspection of dairies
1915	Health Districts proposed; begins as pilot project on Lower East Side
1915	Bureau of Public Health Education created; begins printing publications, producing films to disseminate health information
1930	First District Health Center opens in Harlem under new Health District plan
1946	Food Inspection Bureau cracks down on poor restaurant sanitation
1949	Department establishes Bureau of Nutrition
1955	Department establishes Poison Control Center with hotline
2004	Take Care New York is a city-wide health initiative launched in March 2004.
2005	NYC DOHMH starts using a point-scoring system for food service establishment inspections to weight violations to reflect risk factors for foodborne illness
2006	Amendment of Article 81 of the New York City Health Code Adding a New Section 81.50 to Require Calorie Labeling on Menus and Menu Boards, first provision in the United States
2010	NYC DOHMH implements a letter grade program that converts sanitary inspections scores of food service establishments into categorical rankings of A, B, or C, or grade pending, and requires restaurants to post them
2013	The Department launches the Rat Information Portal, an addition to the 2007 Rat Indexing Program which guides proactive intervention in heavily affected areas
2018	New York City requires mobile food vendors such as food carts and trucks to display letter grade scores received from sanitary inspections

But ensuring the well-being of New York City’s diverse population and its complex food system requires constant vigilance and periodic re-examination of established procedures. Several recent incidents, some national, others local, show the potential for old food safety problems to recur or new ones to emerge.

In spring and summer 2018, the CDC and the U.S. Department of Agriculture’s Food Safety and Inspection Service (FSIS) reported they were investigating an ongoing multistate outbreak of Shiga

toxin-producing *E. coli* O157:H7, a foodborne infection.<sup>11</sup> As of June 28, 2018, there were 210 cases reported in 36 states, including 11 in New York State. CDC reported 91 hospitalizations and five deaths, including one in New York State. Eventually the CDC traced the outbreak to romaine lettuce grown the Yuma region of Arizona. Only 20 weeks after the Yuma outbreak was contained, another outbreak of *E. coli* related to romaine lettuce was detected,<sup>12</sup> showing the necessity of ongoing caution.

In New York City, food safety problems have emerged in an unlikely place: school cafeterias. A 2017 report by the CUNY School of Journalism made headlines when it was reported that more than half of New York City public schools experienced critical food violations that year, potentially putting students at risk for serious foodborne illnesses.<sup>13</sup> Based on inspection data obtained from the NYC DOHMH under New York's freedom of information law, the report found that nearly 700 school cafeterias – about half of the approximately 1,400 inspected by health officials in 2017 – received at least one critical violation, the type of violation that could lead to foodborne illnesses. The DOHMH has noted that in general schools have good food safety practices and rarely has it closed school cafeterias because of a food safety hazard.

Additionally, in April 2018, the NYC DOHMH investigated a possible outbreak after more than 50 tourists, most of them teenagers, were hospitalized for possible food poisoning after a trip to New York City. This incident demonstrates the potential for real or perceived food safety problems to jeopardize tourism, a mainstay of the city's economy.<sup>14</sup> Today, as in the past, food borne illnesses have the potential to threaten the health of city residents, burden our health care system and threaten our economy.

Outbreaks of food-borne illnesses can be expensive. A recent national study estimated that the cost to restaurants for a single episode ranged from about \$4,000 to about \$2.2 million, depending on the number affected, the type of restaurant and the pathogen.<sup>15</sup> How much does food poisoning cost New York City? Would further investments in food safety better protect restaurants – and their customers—from cost and suffering? To date, the evidence to answer these questions has not been collected.

A food safety system protects eaters against food-borne illnesses transmitted by pathogens in contaminated food but also against other forms of contamination such as pesticides, heavy metals, antibiotics, and other chemicals. While the focus of this report is on food-borne illnesses caused by pathogens, we provide an overview of these other threats in the section on emerging challenges.

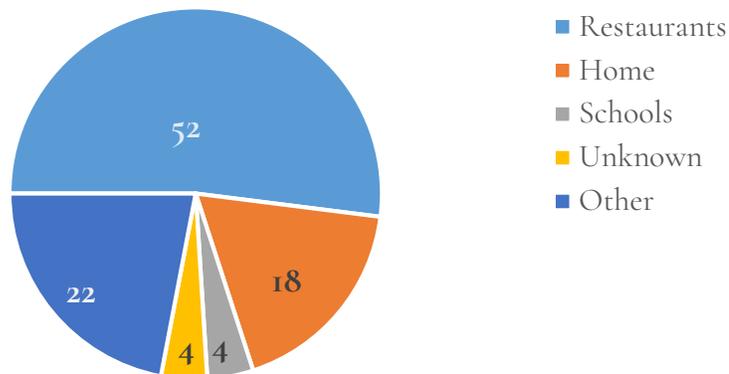
Better safe than sorry, that basic principle of public health, shows the value of a comprehensive assessment of the capacity of New York City's current food safety system to meet current and future challenges.

## II. FOOD SAFETY RISKS

In the United States, food safety risks most commonly occur from restaurants (52 percent), improper food handling and storage preparation from home (18 percent) and schools (4 percent), and unidentified “other” sources (24 percent),<sup>16</sup> as shown in Figure 1, based on a 2006 report. These may lead to the exposure to bacterial, viral or parasitic pathogens that have contaminated food and food products. Risks can occur during “farm to table” (i.e., farming/manufacturing, transportation, storage, handling by retailers and consumers), as shown in Figure 2.<sup>17</sup> Inadequate irrigation and manure management systems at farms, improper storage temperatures or unsealed containers or packaging at processing and distribution facilities, compromised hygienic conditions during the storage or preparation of food at food service establishments or at home can all compromise the safety of our meal from farm to table. To this end, ensuring better food safety behaviors to reduce food borne illness was identified as a goal for Healthy People 2020, the nation’s 10-year goals and objectives for health promotion and disease prevention developed by the U.S. Department of Health and Human Services.

Hazard Analysis and Critical Control Points (HACCP) is a systematic preventive approach to food safety from biological, chemical, and physical hazards in production processes that can cause the finished product to be unsafe. HACCP designs measures to reduce these risks to a safe level. Originally developed in the 1960s to ensure the safety of food for astronauts in space travel, over the next decade the system was adopted by USDA and FDA as well as many food companies and governments to guide farm to fork assessments of food safety threats. Much of what is known about food safety practices today comes from HACCP investigations.<sup>18</sup>

Figure 1. Sources of Foodborne Disease (percent) in United States<sup>19</sup>

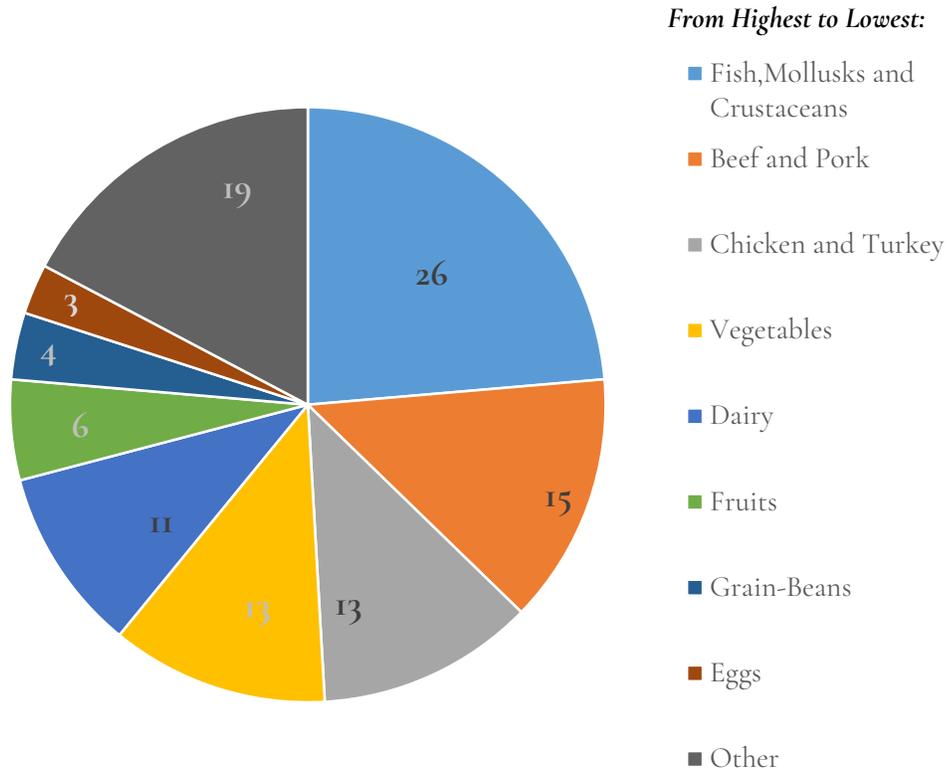


In the opinion of food safety experts, home cooking may be more likely to lead to food safety problems than commercial preparation, but it is the mass exposure and the established reporting systems that occur in national restaurant chains that lead to the higher proportion of restaurant food safety problems and the higher likelihood that these mass exposures will be detected and reported.<sup>20</sup> As the recent romaine lettuce *E Coli* outbreak indicates, supermarket chains also contribute to mass outbreaks due to the wide distribution and high levels of exposure to their products.

Figure 2. Food Safety throughout the Food Production Chain<sup>21</sup>



Figure 3. Foods that Sickened People in Outbreaks with a Single Known Source, Percent, 2009-2016, United States <sup>22</sup>



As shown In Figure 3, the most common types of food related to food borne illness outbreaks in the United States were seafood, meat or poultry, which together accounted for 54 percent of the reported outbreaks. Muscle meat, it should be noted, is sterile so contamination occurs in the slaughter, processing or preparation of meat.

### III. THE NYC FOOD SAFETY LANDSCAPE

To understand the strengths and weaknesses of New York City’s complex food safety system, we begin with an overview of food safety responsibilities at each level of government — city, state and federal — as well as sectors of the food industry. As Table 2 shows, government and private sector entities act concurrently on several food safety tasks including disease surveillance, food safety training, food testing, and public education on food safety.

However, some functions are the sole responsibility of a single level of food safety governance. The federal government, for example, has distinct mandates to ensure the safety of food import and export, the execution of comprehensive food risk and safety assessments, the approval and surveillance of food animal drugs, feed and food additives, and the regulation and enforcement of tolerances for pesticide residues. Similarly, state government agencies have unique responsibilities for the licensing and inspection of food processors, retailers, warehouses, salvagers, and rendering plants, the food safety testing at grocery stores and warehouses, and for the investigation of

consumer complaints. Finally, in addition to their shared responsibilities of disease surveillance, food safety training, and public education with other levels of public government, cities often, though not always (counties and states may too) have the exclusive responsibility for overseeing restaurant inspection and grading.

**Table 2. Food safety responsibilities at each level of government and the food industry**

Task	Level of Government			Industry
	New York City	New York State	U.S.A.	
Restaurant and institutional food inspection and grading	X			
Food retail inspection and grading		X		
Disease surveillance	X	X	X	
Food Safety Training	X	X		X
Food and food manufacturing inspection			X	X
Public education on food safety	X	X	X	X
Food testing		X	X	X
Food labeling and packaging			X	X
Approval and surveillance of food-animal drugs, feed additives, and food additives			X	X
New food ingredients-introduction into food supply and safety assessment				X
Establishment and enforcement of tolerances for pesticide residues			X	
Food import and export safety			X	X
Risk assessment			X	
Licensing and inspection of food establishments/ operators (food processors, food retailers, warehouses, food salvagers, rendering plants, mobile food vendors )	X	X		
Investigating consumer complaints	X	X	X	

In general, governance systems that assign multiple agencies and levels of government shared responsibility for certain tasks are more complex to operate and more likely to lead to duplication or gaps in services. Table 2 suggests that our food safety system is vulnerable to this weakness.

## NEW YORK CITY GOVERNMENT

Several city agencies play a role in food safety in New York City. The most important is the NYC DOHMH but others include the Department of Consumer Protection, the Department of Education, the Human Resources Administration, the Department of Environmental Protection (e.g., responsible for preventing waterborne illnesses), the Department of Correction, the Department for the Aging, and the Department of Sanitation, which is responsible for preventing

unsanitary waste management. On the legislative side, the City Council approves the laws that become part of the City's Administrative Code and holds oversight hearings to assess how city agencies are carrying out their mandates for food safety.

### *Department of Health and Mental Hygiene (NYC DOHMH)*

Of the ten goals the NYC DOHMH identifies in the 2018 Mayors Management Report, one is to reduce the threat of foodborne illness.<sup>23</sup> To achieve this goal, the Department carries out three main food safety activities: 1) inspection and assigning letter grades to the city's 26,000 restaurants, 2) training and certification of food handlers in city restaurants and food businesses and 3) surveillance of unsafe food conditions and foodborne disease including trace back activities, data collection and reporting.

#### **Restaurant inspections**

The Bureau of Food Safety and Community Sanitation under the Deputy Commissioner for Environmental Health performs annual unannounced sanitary inspections on the restaurants and institutional kitchens in the city with additional risk-based inspections as needed. The NYC DOHMH defines food establishments as any environment where food is provided directly to consumers and can include take-outs, food carts/trucks, soup kitchens, pizzerias, employee cafeterias, bakeries, night clubs, cabarets, bars, senior centers, emergency food relief organizations, public and non-public schools, or religious, fraternal and charitable organizations.<sup>24</sup>

DOHMH health inspectors have been inspecting restaurants for decades to monitor compliance with food handling and personal hygiene, maintenance of proper food temperatures, food storage equipment and vermin control.<sup>25</sup> In 2010, these inspectors began to issue food reports cards to each establishment, providing customers with a single grade to rate food safety. In 2018, the city employed about 100 inspectors, about one per 260 food establishments. In that year, they completed 46,106 inspections, about 400 per inspector.<sup>26</sup> Public opinion polls conducted for the NYC DOHMH by the Baruch College Survey Research Center found that 91 percent of New Yorkers approve of restaurant grading and 72 percent are concerned about getting sick from restaurant food.<sup>27</sup>

On average, inspectors visit three or four restaurants a day. To reduce opportunities for personal relationships or bribes, the schedules for inspectors are set daily by a computer which generates a random list of food outlets in any of the five boroughs.<sup>28</sup>

Figure 4. Examples for the Restaurant Grading System.



Sources for images: Left – WNYC<sup>29</sup>; Right – Sam Hodgson for *The New York Times*. Wolfe, Johnathan. *New York Today: What Do Restaurant Grades Mean?* NY Times. 17 May 18. <sup>30</sup>

The agency uses a point system to determine letter grading, i.e., A (0-13 points), B (14-27) or C (28+). The city requires all restaurants to post letter grades where they can be easily viewed. Table 3 shows the post-adjudicated grade distribution for inspections carried out at 25,394 restaurants as of December 31, 2018.

**Table 3. NYC Restaurant Inspection Data as of December 31, 2018, (n = 25,394).** Source: Data courtesy of DOHMH.

Number of Restaurants				Post-Adjudicated Grade Distribution (by percent) including Grade Pending				Post-Adjudicated Grade Distribution (by percent) excluding Grade Pending		
A Grade	B Grade	C Grade	Grade Pending	A Grade	B Grade	C Grade	Grade Pending	A Grade	B Grade	C Grade
22,600	1,398	374	1,022	89.0	5.5	1.5	4.0	92.7	5.7	1.5

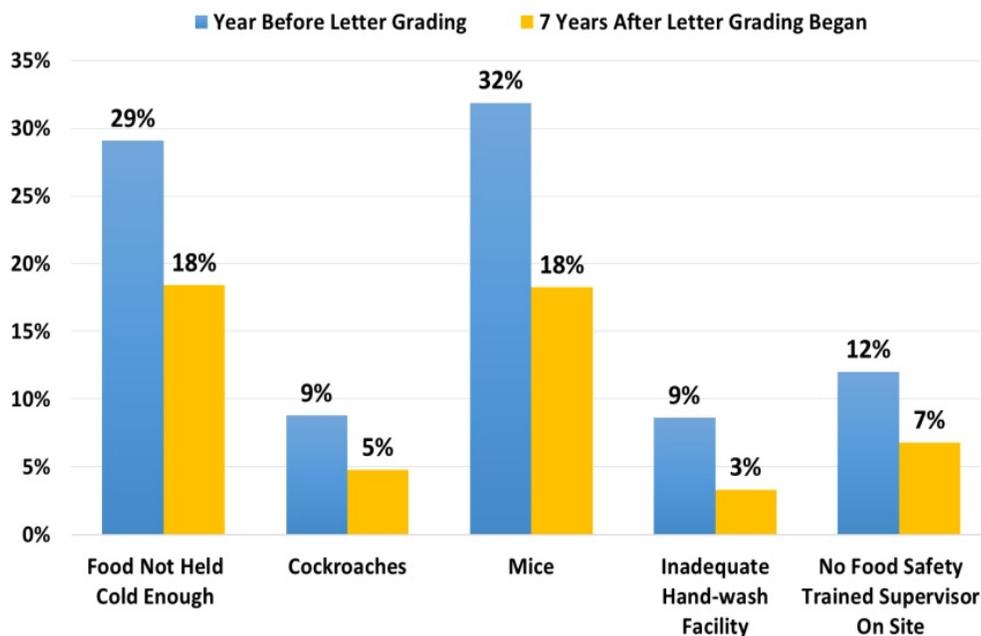
In the 2018 Mayors Management Report (MMR), DOHMH showed that, during the past three years, restaurants which have achieved a grade of A have been near or above 93 percent of all inspected restaurants (Table 4), consistent with data for calendar 2018 year reported in Table 3 above. This is an important increase compared to the 81 percent when the program started. DOHMH also reported decreases in the time it took to act on complaints of food poisoning, with the proportion of cases investigated within 3 days increasing from 84 percent in FY 2015 to 98 percent in FY 2018, a positive trend. Finally, the MMR also showed that the proportion of restaurants inspected in FY 2017 fell from more than 99 percent in FYs 15 and 16 to 87.0 percent in 2017, still a high proportion compared to other cities,<sup>31,32</sup> but a decline of 12 percent. The agency set a target of 100 percent of restaurants inspected for FY 2018 and 2019.

**Table 4. Reduce the threat of foodborne illness.** Source: Table “Goal 3b” taken from “Preliminary Mayor Management Report, 2018.”<sup>33</sup>

PERFORMANCE INDICATORS	ACTUAL			TARGET		4-MONTH ACTUAL	
	FY15	FY16	FY17	FY18	FY19	FY17	FY18
Restaurants inspected (percent)	99.9	99.8	87.5	100.0	100.0	43.1	41.2
★ Restaurants scoring an ‘A’ grade (percent)	93.0	92.7	93.3	↑	↑	92.2	93.4
★ Critical Indicator    ↑ Directional Target							

The agency also distinguishes between three main categories of food safety violations: 1) public health hazard, 2) a critical violation (i.e., serving raw food without proper washing) and 3) a general violation (i.e., not properly sanitizing cooking utensils).<sup>34</sup> A 2017 DOHMH report reported a 41 percent drop in sanitary violations since the peak year in FY 2012. As shown in Figure 5, several indicators of food safety violations fell in the decade after restaurant grading began in 2010.<sup>35</sup>

**Figure 5. Percent of Restaurants with Food Safety Violations before and After Restaurant Letter Grading**<sup>36</sup>



## Food safety training

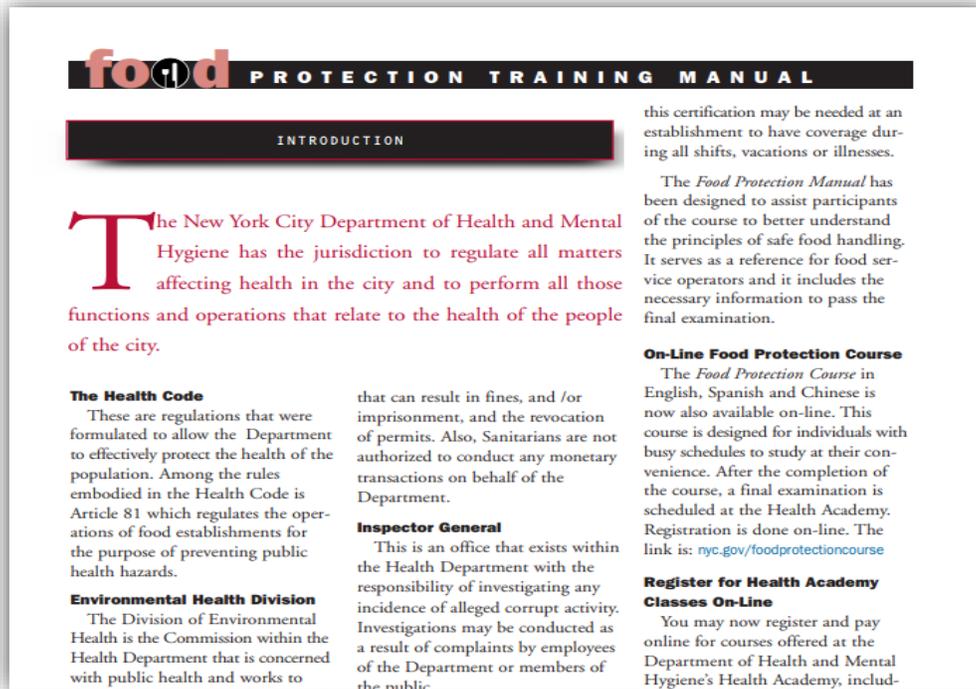
In addition to sanitary restaurant inspections, the Department’s Health Academy, located in the Division of Environmental Health Services, provides training and certification for food handlers and restaurant staff, including for soup kitchen and summer camp staff. The New York City Health Code,<sup>37</sup> requires the certification in food safety of at least one supervisor who must be on site at each food service establishment and non-retail food service organization (e.g., school or shelter). The comprehensive training covers several food safety topics including food storage temperatures, proper hygienic practices, pest management, guidelines to implement a Hazard Analysis Critical Control Point Plan (HACCP), as defined by the USDA,<sup>38</sup> and food defense strategies, including ways to prevent food tampering and potential terrorist activity.<sup>39</sup> Training is offered in person and online and in English, Spanish, Chinese and other languages and study guides are available in almost 30 languages. In 2017, about 28,000 restaurant supervisors completed the course.<sup>40</sup>

Nationwide, restaurant inspection data collected by the FDA between 2013 and 2014 and shown in Table 5 point to five main risk factors for the contraction of foodborne illnesses and connected to specific practices within the food retail industry. The factors are used as the foundation for food safety inspections and training programs and include poor personal hygiene, improper food holding/time and temperature, contaminated equipment/protection from contamination, and inadequate cooking.

**Table 5. Total Number and Percentage of US Restaurants Out-of-compliance for Each Risk Factor (2013-2014)**<sup>41</sup>

Foodborne Illness Risk Factor	Fast Food Restaurants (# Out of Compliance)	Percent Out of Compliance	Full-Service Restaurants (# Out of Compliance)	Percent Out of Compliance
Poor Personal Hygiene	283	66.59	329	83.08
Contaminated Equipment	242	56.94	325	82.07
Improper Holding/Time and Temperature	330	77.56	375	94.70
Inadequate Cooking	42	15.16	105	32.51

Figure 5. Excerpt from the Introduction of the Food Protection Training Manual<sup>42</sup>



In 2017, the Health Academy provided additional free workshops to prepare food establishment supervisors and owners to exercise effective managerial control, learn from the history of prior safety inspections for their establishment and strategies to maintain “A” ratings. According to the Health Academy, there was a “positive response to the workshops” and as a result, they will be offering more such workshops in the future. However, there is no publicly available information beyond this account on the effectiveness or evaluations of trainings.

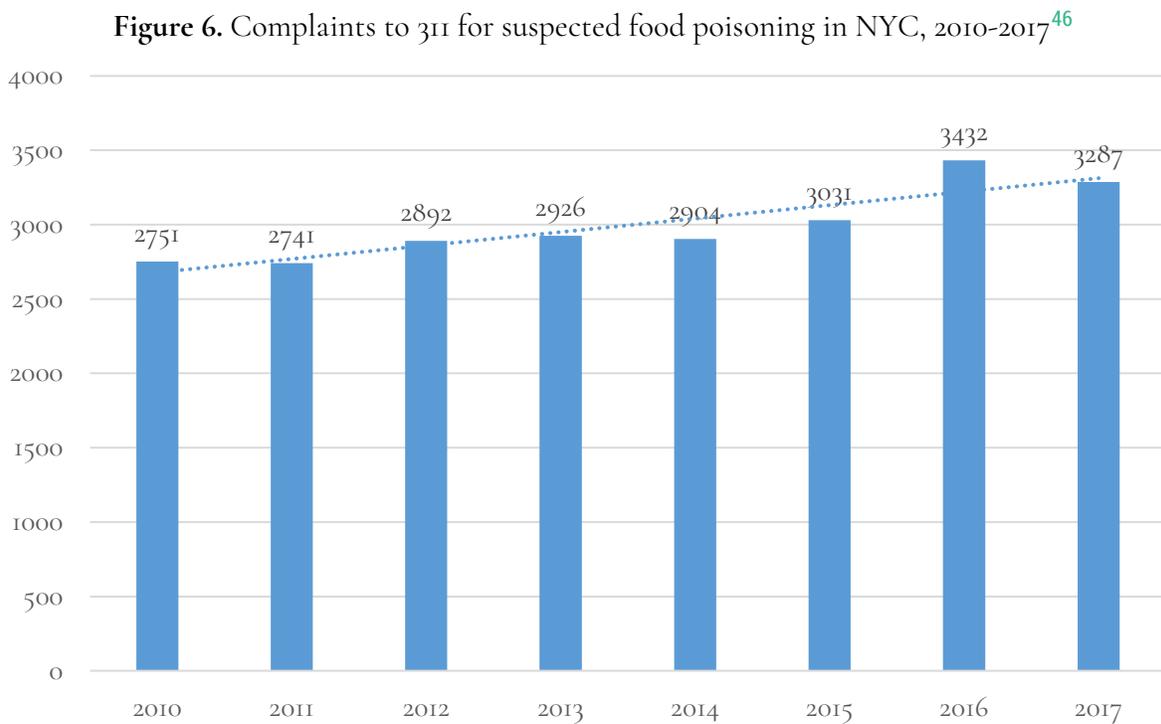
### Surveillance of unsafe food conditions and food-borne diseases

Another key function of the health department is to use citizen complaints to monitor food conditions and food-borne diseases. The foundation of the food reporting system is the city’s 311 system, a telephone and online service that provides access to non-emergency City services and information about City government programs. Visitors to 311 can choose to report unsanitary conditions in a food establishment, concerns about a letter grade, an unsanitary or unlicensed mobile food vendor, food poisoning affecting 1, 2, 3, or more people, or unsanitary conditions at a farmers market, food warehouse, or food processing plant.<sup>43,44</sup>

In addition, New York City's Health Code Article 11 requires health providers to report to the DOHMH some diseases and conditions immediately and others within 24 hours. Reportable food related conditions include Botulism, Campylobacteriosis, Cryptosporidiosis, Cyclosporiasis, *Escherichia coli* O157:H7 infection, Hepatitis A, Listeriosis, Salmonellosis, Shigellosis, *Staphylococcus aureus* (Staph), and some *Vibrio* species.<sup>45</sup>

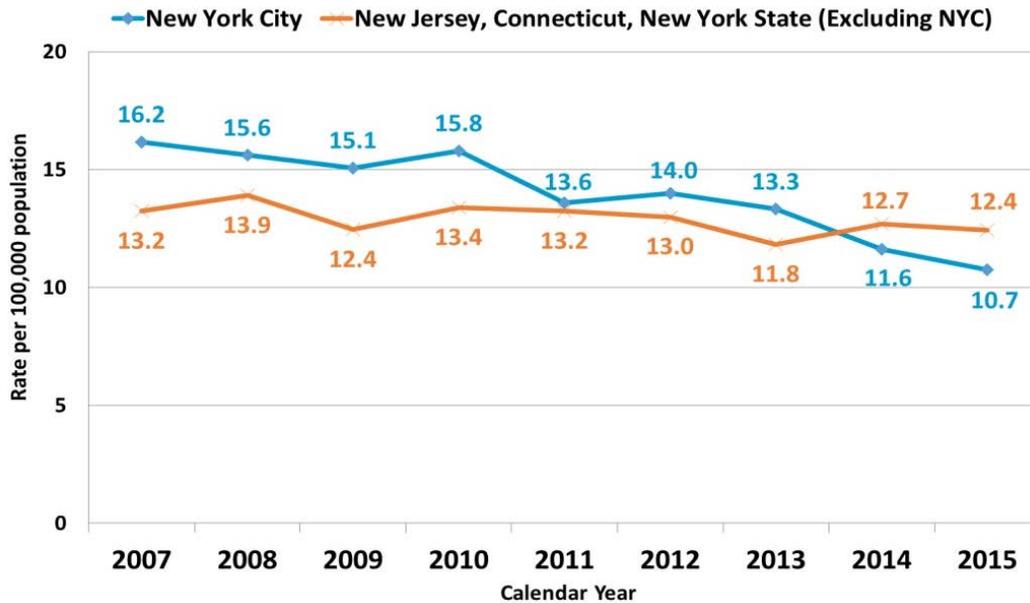
What do these sources of data show about changes in complaints and rates of food-borne illnesses in New York over time? It’s important to note that complaints are self-reported cases of foodborne illness, not cases confirmed by laboratory reporting.

The 311 Open Source data on the number of suspected food poisonings indicated that a total of 25,536 complaints were filed between 2010 and June 30, 2018. In 2017, 3,287 suspected food poisoning cases were reported to 311 and the NYC DOHMH, along with time, date and location of restaurant or food establishments. Between 2010 and 2017, the number of these annual complaints to 311 increased by almost 20 percent, as shown in Figure 6. Whether these increases reflect improved reporting or higher levels of food poisoning cannot be ascertained from these data.



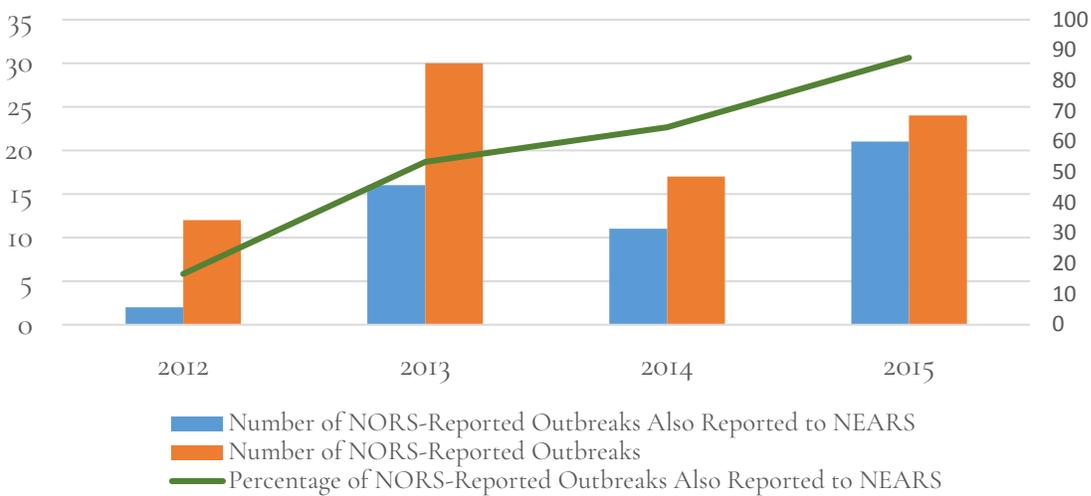
A 2017 report from DOHMH, shown in Figure 7, indicated that salmonella cases fell 32 percent in New York City between 2010 and 2015—from 15.8 cases per 100,000 in 2010 to 10.7 cases in 2015. This drop was four times greater than the drop in the surrounding region of New Jersey, Connecticut and other parts of New York State.<sup>47</sup>

Figure 7. Reported Salmonella Cases per 100,000 Population in New York City Compared to Surrounding Areas.<sup>36</sup>



In a report published in 2017, investigators from the NYC DOMH described their progress in improving investigations of the source of reported food-borne illnesses. As shown in Figure 8, the proportion of food borne illness outbreaks that also received an environmental assessment increased from less than 15 percent in 2012 to more than 90 percent in 2015, an impressive accomplishment.<sup>48</sup>

Figure 8. Surveillance for Environmental Antecedents of Foodborne Illness Outbreaks in New York City Restaurants, 2012-2015<sup>49</sup>



NORS = National Outbreak Reporting System; NEARS = National Environmental Assessment Reporting System

### *Department of Education (NYC DOE)*

Each day, the New York City schools serve about 950,000 breakfasts and lunches to the city's children and youth. The program, operated by the city DOE's Office of Food & Nutrition Services, serves as a foundation for healthy diets for children, a safety net for food security, and an important support for learning and academic success. The size and scope of the program require careful attention to food safety. In 1999, School Food implemented the Food Safety Program using the Hazard Analysis and Critical Control Points (HACCP) required by USDA which identifies areas where school food staff and procedures have a direct impact. All School Food employees receive initial and ongoing training in HACCP and food safety principles, and at least one employee from the kitchen staff at each school is required to attend a 15-hour course in basic sanitation and food handling procedures. As part of DOE's Food Safety Program, all schools undergo periodic reviews to monitor their food safety practices, procedures, and kitchen conditions.<sup>50</sup>

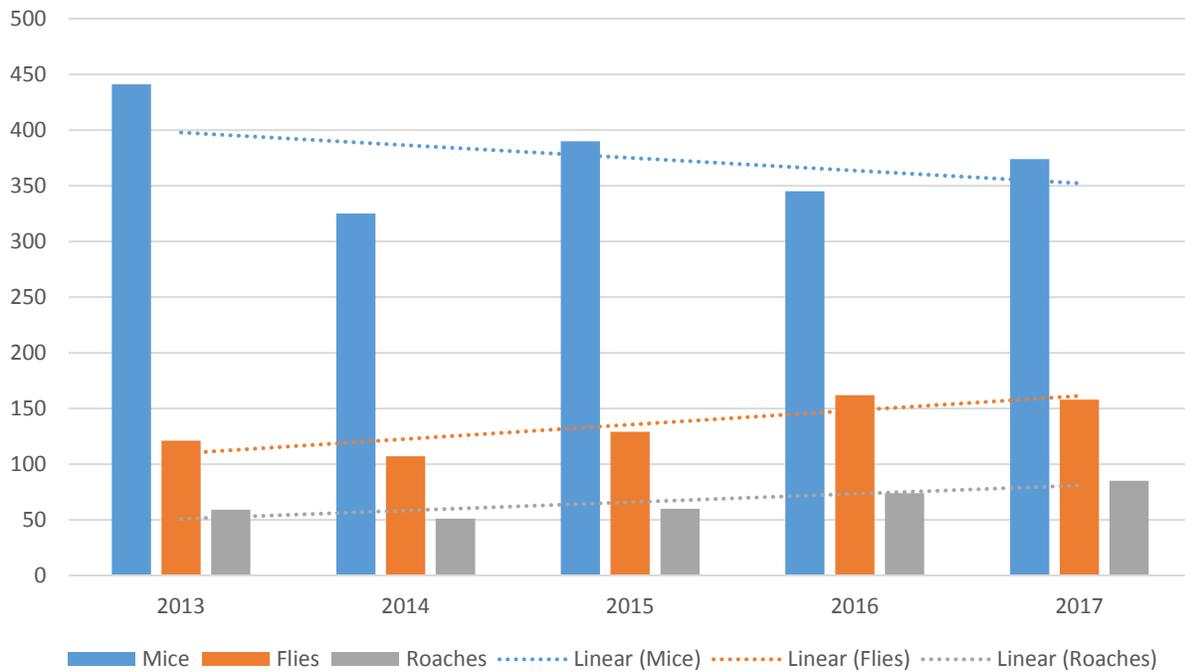
A 2011 audit of this safety program by the City Comptroller found that DOE's monitoring of the food safety practices at schools was adequate. The Comptroller's unannounced inspections of the sampled schools revealed that 1) at least one employee having a DOHMH Food Protection Certificate was on-site and, in general, 2) the schools' kitchen facilities, cafeteria, and food storage areas were, with some minor exceptions, clean and well maintained, and 3) the kitchen personnel appeared to have been adhering to DOE's policies and procedures pertaining to proper food handling techniques and uniforms. The audit identified some weaknesses: the DOE did not ensure that all its School Food kitchen employees receive the required training in a timely manner; sanitation-related deficiencies (e.g., leak and drain problems) were found at five of the 15 schools visited. The comptroller recommended improved mandatory training of kitchen personnel, immediate reporting of facility conditions in need of repair, and ensuring that all "schools received the required DOE annual oversight inspections."<sup>51</sup>

A 2017 report by the CUNY School of Journalism made headlines when it was reported that more than half of New York City public schools experienced critical food violations that year, potentially putting students at risk for foodborne illnesses.<sup>52</sup> Based on inspection data obtained from the New York City Health Department under New York's freedom of information law, the report found:

- Nearly 700 school cafeterias – about half of the approximately 1,400 inspected by health officials in 2017 – received at least one critical violation, which indicates the kinds of problems that could lead to foodborne illnesses.
- City health inspectors discovered an average of two violations per school cafeteria visit. While some schools had no violations, as Health Department officials pointed out, others racked up more, driving up the average.
- One of every five of the citations is a critical violation – something that could lead to foodborne illnesses. More than half of the 1,150 critical violations reported in 2017 show evidence of mice, rats, roaches and other insects in food preparation and consumption areas, along with flies.

- The four dozen schools with the worst inspections records in 2017 largely serve some of the city’s poorest students. The students who go to these schools tend to be disproportionately people of color, city records show.

**Figure 9.** Violations with Pests in NYC Public School Cafeterias 2013-2017<sup>53</sup>



In a response to this report, a spokesman for DOE said, “all schools must provide students with safe, clean cafeterias and we ensure that they meet all federal and state requirements.” He also said that the city’s Department of Education works closely with health officials to “immediately investigate and address any violation,” adding that in 2016, 97 percent of schools passed their inspections. In 2018, New York City provided access to all public school cafeteria inspection results in the city since 2016. DOHMH notes that its online inspection results have rarely shown violations that warranted closure of a school cafeteria.

### *Department of Homeless Services (NYC DHS)*

In partnership with other public agencies and nonprofit organizations, the New York City DHS works to prevent homelessness before it occurs, reduce street homelessness, and assist New Yorkers in transitioning from shelter into permanent housing. DHS is legally mandated to provide temporary emergency shelter to those experiencing homelessness in a safe and respectful environment.

In 2017, according to the U.S. Department of Housing and Urban Development (HUD) Annual Homeless Assessment Report, 76,501 people in New York City experienced homelessness, the largest number of homeless individuals in the U.S.<sup>54</sup> About 94 percent of homeless people, or 63,000

individuals, pass through the DHS shelter system.<sup>55</sup> Given that many homeless people experience conditions that put them at higher risk of food-borne illness, e.g., undernutrition, compromised immune systems, and inability to cook at home or living in circumstances with inadequate or no cooking facilities, DHS has an obligation to prevent its residents from unsafe or contaminated food. Those public and nonprofit city shelters that provide food services are mandated to comply with the New York City health code food safety rules.

While we were unable to find systematic investigations of food safety in city shelters, other reports provide cause for concern. In 2015, the Mayor's Office and the Department of Investigations (DOI) published findings from a yearlong investigation into select DHS shelters and found hundreds of safety violations.<sup>56</sup> Although violations in food handling or food safety were not noted, violations of "extensive vermin infestation" were cited as critical public health concerns. Tier II shelters, which house 7,400 families, are expected to provide residents with three nutritional meals a day, assessment and referral services.<sup>57</sup> In response to the report, Mayor De Blasio initiated a "shelter repair squad" and shelter scorecard to monitor the progress of shelter repair and safety compliance.<sup>58</sup> DOHMH was mandated to help shelters remediate and control vermin and pest infestations, but again food safety was not identified as a specific concern. DOHMH does inspect shelter-based food services.

### *Administration for Children's Services (NYC ACS)*

The Administration for Children's Services (ACS) protects and promotes safety and well-being of New York City's children and families by providing child welfare, juvenile justice, and early care and education services. In early care and education, ACS coordinates and funds programs and vouchers for close to 100,000 children eligible for subsidized care. This responsibility provides ACS an opportunity to address food safety issues for another vulnerable population, young children.

Most New York City children enrolled in child care are in group centers while a smaller number attend home-based day care programs. Both group and home childcare centers are regulated by the DOHMH under Article 47 of the New York City Health Code. Under this mandate, all supervisors of group centers kitchen areas must hold a food service certificate and must oversee proper storage, proper temperature maintenance, and hygienic practices.<sup>59</sup> Eligible child care programs in the city and state provide food under the New York State Child and Adult Food Program (CACFP), a federal program that provides reimbursement for meals and snacks to children in low income households or census block groups. In addition to nutritional guidelines, CACFP sponsors nonprofit organizations that ensure program implementation and support for childcare centers and provide food safety monitoring and compliance at participating sites. Data on these monitoring visits are not publicly available. According to the 2018 New York City Food Metrics Report, New York City's *EarlyLearn* programs served 15,313,158 meals in that year.<sup>60</sup>

## NEW YORK STATE GOVERNMENT

New York State, like New York City, assigns multiple agencies some responsibility for food safety. While the New York State Department of Health (NYSDOH) again plays a primary role, other agencies, such as the Department of Agriculture and Markets, are also important.

### *New York State Department of Health (NYSDOH)*

The NYSDOH's Bureau of Community Environmental Health and Food Protection works to protect the public health by ensuring that food service establishments are operated in a manner that eliminates hazards through design and management, resulting in a decreased incidence of foodborne illness in our communities. The Bureau's Food Protection Program also coordinates foodborne outbreak investigations, analyzes the findings and uses this information to develop regulations and guidance designed to prevent similar outbreaks in the future.<sup>61</sup>

New York State is home to more than 90,000 food service establishments. The Food Protection Program provides guidance and assistance to county and city health departments, if needed, and State District Offices, which in turn permit and inspect food service establishments, some institutional food services, temporary and mobile food service establishments and food and beverage vending machines.

The NYSDOH provides technical assistance on food borne outbreaks, search support and coordination, and makes recommendations for action. Under the purview of NYSDOH central office, the regional offices and local health bureaus report cases to the state and carry out epidemiological investigations and reporting. Additionally, the state's Public Health Laboratory is responsible for processing specimens, including confirmatory testing, species identification, and genomic testing.

### **Epidemiological Surveillance**

Like the NYC DOHMH, NYS DOH also conducts surveillance of foodborne outbreaks, defined as two or more cases of a similar illness due to the consumption of a common food. The National Outbreak Reporting System (NORS), launched by the Centers for Disease Control and Prevention in 2007, is a national disease reporting and surveillance online database, described more fully in the section on federal food safety initiatives, below. NORS collects confirmed and suspected foodborne illness cases from local and state-level DOHs, verifies outbreaks and publishes reports.

Figure 10. Foodborne Illnesses in New York State, 1998-2017<sup>62</sup>

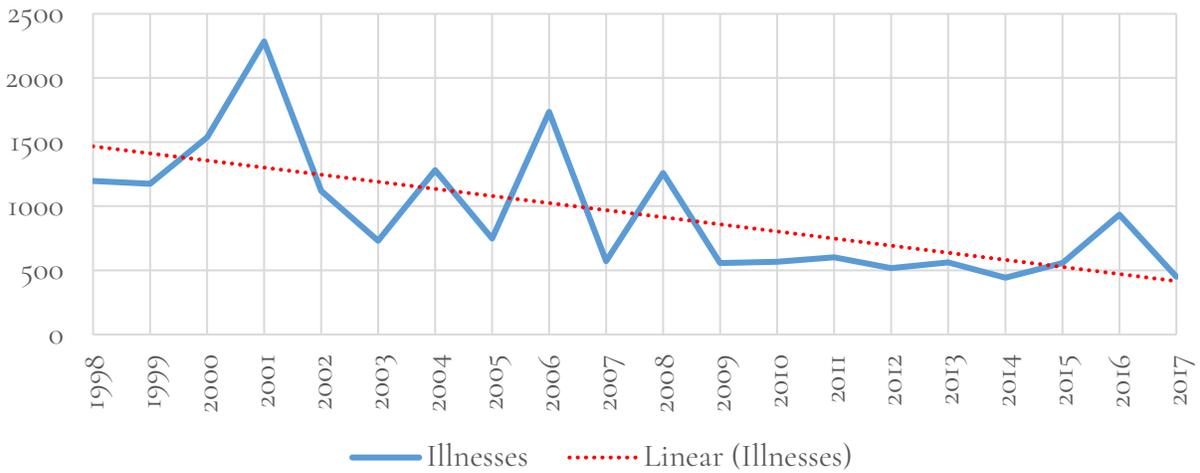


Figure 11. Foodborne Outbreaks and Hospitalizations in NYS, 1998-2017<sup>63</sup>

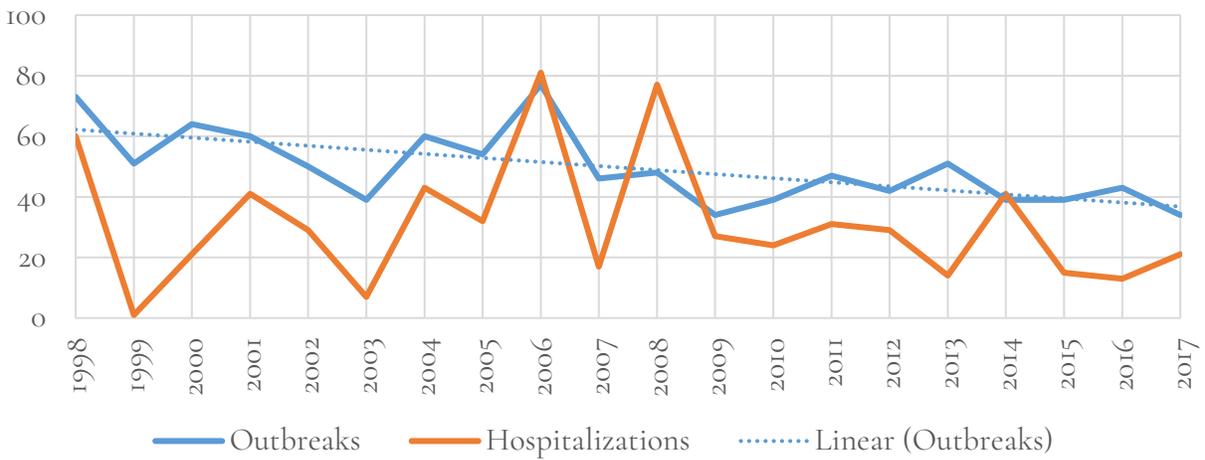
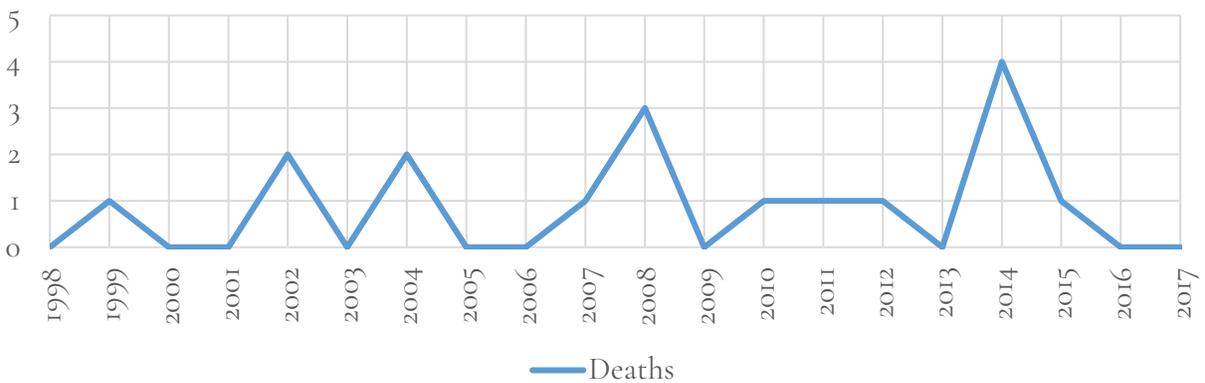


Figure 12. Foodborne Deaths in NYS, 1998-2017<sup>64</sup>



Between 1998 and 2017, New York State reported 990 foodborne outbreaks (Figure 11), which caused 18,833 illnesses, 631 hospitalizations and 15 deaths (Figure 12). In this period, New York State accounted for 4.7 percent of the nation's reported foodborne outbreaks, 4.7 percent of the illnesses, 3.8 percent of the hospitalizations and 3.8 percent of the deaths. Considering the 2000 and 2010 censuses, New York State accounted respectively for about 6.7 percent and 6.3 percent of the U.S. population, therefore the rate of foodborne outbreaks, illnesses, hospitalizations, and deaths was lower than the national average.

Figure 10 shows data on foodborne illnesses in New York State from 1998 to 2017. Food borne illnesses decrease in the first decade and then stabilize at about 500 cases per year. Figures 11 and 12 show data for outbreaks and hospitalizations respectively recorded between 1998 and 2017. The charts show that the number of outbreaks decreases, while hospitalizations fluctuate year by year and deaths are generally too few to discern possible trends.

In April 2019, New York State Comptroller released an audit of the NYS Department of Health's food safety program, which focused on the department's support and oversight of food safety in New York State's 36 counties with full-service health departments, 21 counties without such full-service departments, and New York City's DOHMH food safety program.<sup>65</sup> The audit found that while the health departments reviewed have effective systems for investigating and following up on foodborne illness outbreaks, NYS DOH could do a better job providing guidance on what constitutes an accurate, complete and timely investigation. Such guidance could ensure more consistent complaint investigation and enforcement across the state, the Comptroller found.

### *New York State Department of Agriculture and Markets*

The New York State Department of Agriculture and Markets, the division of state government responsible for the regulation, oversight and promotion of agriculture in the state, houses the Division of Food Safety and Inspection (FSI). The largest division under the Agriculture and Markets, FSI issues licenses to food businesses in the state, ranging from large scale food processing operations to food retail establishments. FSI "provides a vital service that is critical to maintaining the safety of the food supply in New York State from the producer to the consumer".<sup>66</sup> FSI also contributes to the orderly marketing of food and farm products in New York State. In addition to licensing, FSI conducts announced and unannounced food safety inspections, seizures of adulterated food products and verification of food labelling.

Each year, the division's 75 inspectors conduct about 29,000 inspections at retail stores, 3,000 at food manufacturing facilities and 1,200 at New York State produce operations. FSI also investigates about 2,500 consumer complaints. In 2018, the FSI seized adulterated and misbranded food from more than 2,500 locations.<sup>67</sup> The main reasons for seizures were foods that were rodent-defiled, insect infested, prepared or stored at improper temperatures or adulterated. Truck accidents and floods and fires also contributed to seizures. Finally, FSI participates in about 200 to 225 national and local recalls of unsafe food each year, about 50 percent of which is imported food products.

## Food Laboratory

Under FSI, food samples collected during food safety inspections are processed by the Division of Food Laboratory that tests products for purity, accurate food labelling, and specific food hazards, such as in the case of suspected the foodborne illness.<sup>66,68</sup> The Food Laboratory collaborates with the FDA, US Department of Agriculture, New York Liquor Authority, Environmental Protection Agency and the NYSDOH, and deploys a rapid response team in the case of foodborne disease outbreaks in food establishments.

The laboratory processes approximately 1,800 food and dairy samples a month, both routinely and in response to suspected outbreaks. In 2016, FSI conducted 35, 901 food safety inspections in the state, of which 77 percent passed.<sup>69</sup> In that same year, the NYS Food Laboratory processed 23, 377 samples and recalled 303 food products (See Table 6).<sup>70</sup>

**Table 6. Number of Samples Tested at the NYS Food Laboratory (2014-2016).**<sup>71</sup>

	YEAR		
	2014	2015	2016
<b>Numbers of Samples Received</b>	<b>22,015</b>	<b>19,963</b>	<b>23,377</b>
• <b>From Food, Safety &amp; Insp</b>	3,805	2,443	3,363
• <b>From Milk Control</b>	15,853	15,426	17,745
• <b>From Plant Industry</b>	115	129	184
• <b>From Pesticide Data Prog</b>	1,998	1,667	1,800
• <b>From State Liquor Authority</b>	105	46	37
• <b>Other (PTs and other NYS agencies)</b>	139	252	248
<b>Number of tests performed</b>	<b>55,784</b>	<b>61,187</b>	<b>67,256</b>
<b>Percentage of violative samples found</b>	<b>6.5</b>	<b>7.3</b>	<b>7.5</b>
<b>Total number of recalls triggered by laboratory results</b>	<b>239</b>	<b>345</b>	<b>303</b>

## Food Retail Store Inspections

In January 2018, following the example of New York City's restaurant letter grades, the Department of Markets and Agriculture's FSI started assigning A, B and C letter grades to retail food stores to let customers know if the place is clean and safe.<sup>72</sup> Stores that fail to display the letter grades at each entrance face a \$600 fine. In FY 2018, 75 percent of the 30,410 stores inspected received a grade of A, 6 percent received Bs, and 19 percent received Cs.<sup>73</sup> A B grade means critical deficiencies were found and corrected during the inspection while a C means the issues were not corrected. The Department's Division of Food Safety and Inspection staff visits the state's 29,000 retail food stores, convenience stores, bodegas, grocery stores and supermarkets. If critical deficiencies are found or a customer files a complaint, inspectors come back for another visit. Prior to the launch of the new grading system, the state had been inspecting food retailers for at least 40 years.

## UNITED STATES GOVERNMENT

Several federal agencies play a role in food safety in the nation including the United States Department of Agriculture's Food Safety and Inspection Service, the United States Food and Drug Administration, and the Centers for Disease Control and Prevention. Since there is no overarching national strategy for food safety, understanding the responsibilities of each of these agencies is an essential step toward better appreciating the complex web of policies and regulations that guide food safety decisions in the US.

### *United States Department of Agriculture (USDA)*

At the USDA, the Food Safety and Inspection Service (FSIS) is responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged.<sup>74</sup> Additionally, FSIS develops educational campaigns regarding food safety.

The USDA has several agencies working to support food safety and regulation. The Animal and Plant Health Inspection Service's (APHIS) conducts animal health monitoring and surveillance in order to protect the public from plant and animal pests and diseases. Through its National Animal Health Surveillance System (NAHSS), APHIS seeks to rapidly detect diseases and global risks for foreign and emerging diseases which in turn can have an impact on the food safety and environmental health systems.

The Food and Nutrition Service (FNS) is responsible for administering USDA nutrition assistance programs including food safety components. FNS develops food safety education resources and resources on instruction and technical assistance for FNS program operators. Within the National Agricultural Library of the USDA, the Food Safety Research Information Office (FSRIO) provides information on food safety research initiatives to the research community and the general public. The FSRIO assists in the assessment of food safety research needs and priorities.

The USDA's Egg Products Inspection Act (EPIA), Federal Meat Inspection Act of 1906 (FMIA), Poultry Products Inspection Act of 1957 (PPIA) are laws that promote the food safety of the nation's commercial food supply of meats, poultry, and eggs. The EPIA, passed by Congress in 1970, grants FSIS the authority to inspect egg products (liquid, frozen, and dried) and reinspect imported products to ensure U.S. food safety standards are met. The FMIA requires the inspection of all cattle, sheep, swine, goats, and horses when slaughtered and processed for human consumption, as well as the reinspection of imported products to ensure that U.S. food safety standards are met. The PPIA requires the inspection of all poultry or "domesticated birds" and reinspection of imported poultry products to ensure U.S. food safety standards are met. Under the FMIA, PPIA, and EPIA, the FSIS is responsible for the regulation of food labeling for meat, poultry, and egg products, respectively.

At present, USDA's role in food safety governance may substantially evolve due to proposed changes in federal policy. In June 2018, the White House proposed that USDA's FSIS and the U.S. Food and Drug Administration (FDA), which operates under the auspices of the US Department of

Health and Human Services (see also section below), be merged into a single agency, a recommendation that had been proposed several times over the past decade. However, until details are presented on such a reorganization, it is unclear whether USDA's new responsibilities will amplify or hamper the progress already made so far. The two agencies took steps to formalize their commitment to coordinate food safety oversight efforts through an agreement concerning biotechnology products, among others, signed in January 2018.<sup>75</sup>

### *Food and Drug Administration (FDA)*

The U.S. Food and Drug Administration (FDA) is charged with protecting consumers against impure, unsafe, and fraudulently labeled products. Through its Center for Food Safety and Applied Nutrition (CFSAN), the FDA regulates foods other than the meat, poultry, and egg products regulated by FSIS.

The FDA Food Safety Modernization Act (FSMA), signed into law by President Obama on January 4, 2011, enabled FDA to better protect public health by strengthening the food safety system.<sup>76</sup> It mandates FDA to focus more on preventing food safety problems rather than relying primarily on reacting to problems after they occur. The law also provides FDA with new enforcement authorities designed to achieve higher rates of compliance with prevention- and risk-based food safety standards and to better respond to and contain problems when they do occur. Additionally, the law gives FDA important new tools to hold imported foods to the same standards as domestic foods and directs FDA to build an integrated national food safety system in partnership with state and local authorities. The FSMA requires the FDA to prepare special reports to Congress and studies on FDA's activities and impact of the law on food safety.

On February 25, 2019, the FDA released a new strategy for improving food safety of imported foods in the US. In view of the rising volume and variety of imported foods, as well as diversity countries of origin – shown in Figures 13 and 14 – the agency called attention to the inadequacy of the existing regulatory oversight model and the need to enhance the FMSA.<sup>77</sup> The new strategy proposes a four-pronged approach that aims to ensure that:

- 1) Food offered for import meets US food safety requirements;
- 2) Entry of unsafe food is prevented by FDA Border Surveillance;
- 3) If unsafe food is imported, there is a rapid and effective response by FDA; and
- 4) An effective and efficient Food Import Program is established.

The final and notable recommendation would require the agency to develop a comprehensive global inventory of food facilities and farms that intend to import food in the US. To date, the FDA has already made agreements to recognize and accept findings from food safety systems in several other countries – Canada, New Zealand and Australia – and is currently discussing such an agreement with the European Union.

Figure 13. Number of imported food shipments in the U.S. by exporting country or region.<sup>78</sup>

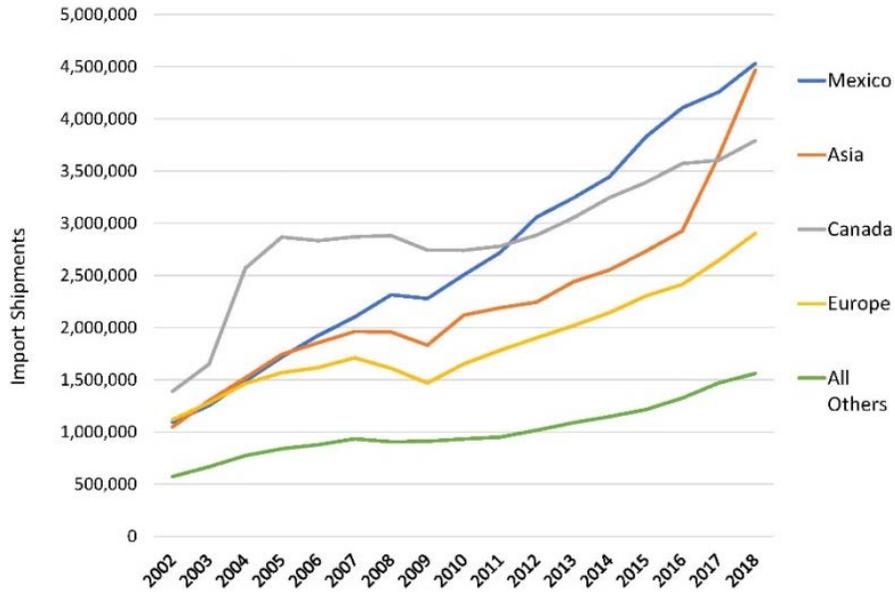
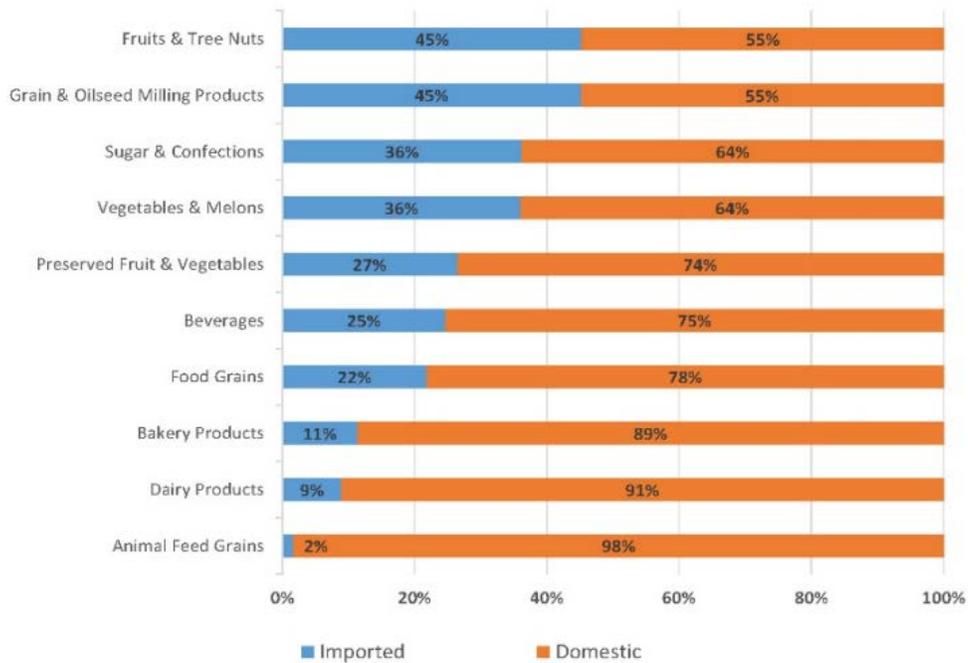


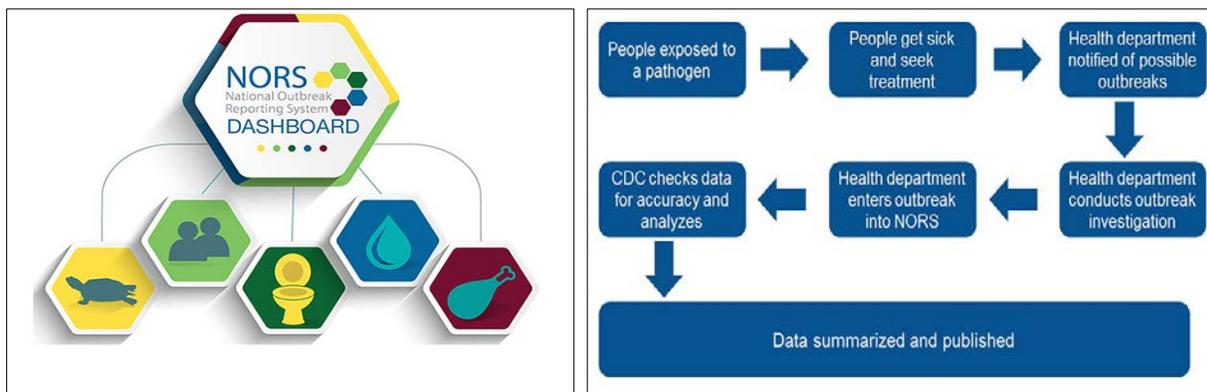
Figure 14. Imports compared to domestic share of U.S. consumption (by value) for selected food groups, 2016.<sup>79</sup>



## Centers for Disease Control and Prevention

The Centers for Disease Control and Prevention (CDC) leads federal efforts to gather data on foodborne illnesses, investigate foodborne illnesses and outbreaks, and monitor the effectiveness of prevention and control efforts in reducing foodborne illnesses. CDC also plays a key role in building state and local health department epidemiological, laboratory, and environmental health capacity to support foodborne disease surveillance and outbreak response. The Food Safety and Modernization Act (FSMA) requires special reports to Congress and studies on FDA's activities and impact of FSMA.

**Figure 15.** National Outbreak Reporting System (NORS) Dashboard and Reporting Schematic<sup>80</sup>



In the last few years, the U.S. Government Accountability Office (GAO), has conducted several studies of federal food safety issues. The GAO found that:

The fragmented federal oversight of food safety has been a longstanding concern because it results in inconsistent oversight, ineffective coordination, and inefficient use of resources. In 2007, federal oversight of food safety was added<sup>81</sup> to GAO's high-risk list. GAO's 2019 update<sup>82</sup> of the high-risk list noted that the Department of Health and Human Services, the U.S. Department of Agriculture (USDA), and the Office of Management and Budget (OMB) had taken some positive steps to address fragmentation in the federal food oversight system but that additional steps were needed. The safety and quality of the U.S. food supply is governed by a complex system stemming from at least 30 laws administered by 15 federal agencies. The two primary agencies are USDA, which is responsible for the safety of meat, poultry, processed egg products, and catfish and the Food and Drug Administration (FDA), which is responsible for virtually all other food. FDA and USDA's Food Safety and Inspection Service do not always coordinate—for example, on drug residue testing methods,<sup>83</sup> as called for in a 1984 memorandum of understanding between the agencies. As a result, the agencies are not leveraging each other's knowledge and resources to develop drug residue testing methods. In January 2018, FDA and USDA signed an agreement to improve their coordination in certain areas, including produce safety and biotechnology products, which is a positive development.<sup>84</sup>

Consumer advocacy groups have also found the fault with current federal food safety programs. A 2019 report by the Public Interest Research Group found that between 2013 and 2018:<sup>85</sup>

- The most hazardous meat and poultry recalls (Class 1) nearly doubled with an 83 percent increase, while overall all recalls of meat and poultry by the FSIS increased by 67 percent.
- Recalls of produce and processed foods from the FDA largely held steady, with a 2 percent increase over 2013 levels.
- All food recalls increased 10 percent, with the most hazardous of these edging up slightly at 6 percent.

Based on these findings, PIRG suggested that:

Our food safety defenses need an across the board upgrade. Gaps in public health protections, enforcement and inspection make it too likely that dangers will reach Americans plates with potentially disastrous consequences. And, when these dangers are identified through analysis of disease vectors and health impacts, our recall system often allows hazards to continue to impact people's health. To solve these problems, we recommend a serious boost to our food safety system.

## BUSINESS ROLES IN FOOD SAFETY

While city, state and federal governments have the mandate and legal authority to regulate food safety, local, regional, national and global businesses also play an important role. As the Grocery Manufacturers of America asserts, "in free-market societies the ultimate responsibility for investing the physical and managerial resources that are necessary for implementing appropriate controls lies with the food industry - the industry that continuously oversees the manufacture and processing of foods, from raw ingredients to finished product."<sup>86</sup>

Although a comprehensive review of the food safety practices of each sector and level of the food businesses that operate or send food to New York City is beyond the scope of this report, a few observations illustrate industry perspectives on their role.

Supermarket and restaurant chains usually have a food safety unit within their corporate structure, a group responsible for ensuring safety and preventing outbreaks. McDonald's decision to remove salads from 3,000 restaurants in 14 states after the products were linked to gastrointestinal illnesses in Iowa and Illinois in 2018<sup>87</sup> and Chipotle's 2015 and 2018 food poisoning outbreaks demonstrate that these systems sometimes fail, putting public health as well as corporate credibility and profits at risk.

Food safety is also a concern for grocery store and restaurant owners and managers. On the one hand, they want to protect their customers and their reputation, making food safety a priority. On

the other hand, some perceive federal, state and city food safety regulations as unreasonable, burdensome and a threat to their often-narrow profit margins.

A chef with experience in several New York City restaurants explained this dilemma.<sup>88</sup> Food safety standards for cooling, holding, and reheating, for example, affect the quality and taste of food and may require equipment that kitchens in small restaurants lack or cannot afford. In addition, many restaurants prepare food that may not pass food inspections because their customers demand certain products and quality that conflict with safety standards, e.g., cooking meat sous vide, a cooking method in which food is heated for longer times at lower temperatures. NYC DOHMH provides extensive guidance and instruction on meeting standards, but some business owners believe that full compliance jeopardizes profits.

One study examined the economic impact of NYC DOHMH's letter grading of restaurants. The investigators concluded that restaurants that post "A"s are less likely to close, owe fewer fines and bring in more revenues compared to B restaurants.<sup>89</sup> While improving food safety thus becomes an incentive for increasing revenues, restaurants with fewer resources may be less equipped to pursue this goal.

In New York City, business groups of restaurants, grocery store chains, food truck operators, and other food outlets have often complained of the burden that food safety rules impose on the city. While food safety regulations should not unnecessarily burden businesses and city and state agencies should consult those affected by regulations both before and after these rules are introduced, the primary goal of public health regulation is to protect the public, not private businesses. Health advocates can contribute to safer food by supporting fair and equitable enforcement of food safety protections that prevent food-borne illnesses and deaths.

## IV. EMERGING CHALLENGES

The food safety system in New York City, State and the nation was first established in the late nineteenth and early twentieth centuries to address the food safety issues of that time. As New York City readies itself for the third decade of the 21<sup>st</sup> century, it will need to re-assess its portfolio of food safety programs as will the state and federal governments. This section describes eight emerging challenges facing New York City's food safety system, listed in Table 7. Its goal is to encourage public agencies with responsibilities for food safety and those in other public sectors whose policies might influence food safety directly or indirectly to assess emerging challenges and take action to counter these threats.

**Table 7 Emerging Challenges to Food Safety System in New York City**

1	Protecting New York City's vulnerable populations
2	Limiting chemical and other contaminants of food supply
3	Addressing globalization of food supply chains
4	Protecting New York City's food distribution system
5	Finding new uses of technology and Big Data to monitor and improve food safety
6	Promoting equity as a food safety system goal
7	Integrating food safety and chronic disease prevention
8	Responding to changing federal food and food safety policies

## PROTECTING NYC'S VULNERABLE POPULATIONS

New York City is home to large populations of people vulnerable to food safety problems:

- People with compromised immune systems, including those with HIV infection or some cancers
- Young children living in poverty
- Older people
- Recent immigrants who may be reluctant to report food poisoning to public agencies
- Homeless people, those with housing instability, and those who lack sanitary cooking facilities

How well does the city's food safety system protect these more vulnerable groups, who together constitute a considerable portion of the city's population? What data monitoring systems are used or could be used to assess the adequacy of current efforts and monitor progress towards improved protection? Currently, city and state agencies do not collect data that enable them to assess whether the current food safety system provides equitable protection to these or other vulnerable populations, a gap that warrants attention.

## LIMITING CHEMICAL AND OTHER CONTAMINANTS OF FOOD SUPPLY

The food safety system in place in New York City focuses on contamination of the food supply with biological agents but other threats jeopardize the healthfulness of our food including pesticides, antibiotics, plastics, heavy metals and other harmful substances. Responsibility for protecting against these treats is also dispersed among a plethora of federal, state and city agencies. About 9,000 environmental chemicals on the market end up in our foods, including food additives, colorings, flavorings, pesticides, and food-packaging chemicals. Even though they are ever-present in our environment and our bodies, many are never adequately tested for safety—and some are never tested at all.<sup>90</sup> At the federal level, the FDA and the US EPA have primary responsibility for chemical food safety.

While the magnitude of the threat from these agents has not been well quantified, the World Health Organization estimates that chemical contamination of food globally results in 217,632

illnesses and 19,712 deaths per year, a lower burden than biological contamination.<sup>91</sup> As evidence grows that chemical contaminants of our food supply influence many dimensions of health, public officials and advocates will need to monitor more closely whether federal and other agencies are adequately fulfilling their mandates to protect New Yorkers' food supply from these contaminants. As global concerns about antibiotic resistant strains of fungal and other infections grow, reducing the antibiotics in our food supply is a priority prevention strategy.

Eighty percent of the antibiotics in use today are fed to healthy animals and plants to prevent disease, ensuring their presence in humans where they can accelerate the development of antibiotic resistance. To meet the growing global demand for animal protein, new approaches are needed to maintain the health and welfare of food animals while reducing the risk of antimicrobial resistance to build up in people and the environment.

Both the New York City and State Departments of Health have antibiotic resistance prevention programs, but additional action is needed at the federal level and from industry. The New York City Department of Education is part of the Urban School Food Alliance, a national consortium of ten city school systems that buys antibiotic-free chicken in bulk for school meals, an illustration of how city government can use its market power to make food safer.<sup>92,93</sup>

## ADDRESSING GLOBALIZATION OF FOOD SUPPLY CHAINS

The world's food system is rapidly globalizing. The US imports about 15 percent of its total food supply; about 32 percent of fresh vegetables, 55 percent of fresh fruit, and 94 percent of seafood.<sup>94</sup> As the FDA and USDA turn over some responsibilities for food inspections to food producers in other countries, is food safety compromised?

Globalization also increases the movement of people across national boundaries. New York City has long prided itself on welcoming the poor, the rich and everyone in between from around the world. New York City has also been the entry point for a variety of national and ethnic cuisines. The waves of Italian, Chinese, Thai, Vietnamese, Dominican and Mexican restaurants that have opened in New York City over recent decades have contributed to a diverse food culture but may also present additional food safety challenges. Some research suggests that food safety outbreaks are higher at restaurants specializing in non-US cuisines, perhaps because of more limited resources or less familiarity with U.S. food safety practices.<sup>95</sup> An interactive map based on NYC DOHMH inspection reports shows restaurant ratings in New York City by neighborhood, type of cuisine, and report card grade, allowing informed consumers to assess these factors, an illustration of how new data technologies can help digitally savvy consumers and policy makers to make informed choices.<sup>96</sup>

## PROTECTING NYC'S FOOD DISTRIBUTION SYSTEM

New York City's food distribution system is changing rapidly. More people order food online and get home deliveries of food; more people visit farmers markets; supermarket chains are consolidating, and the number of community and commercial urban farms is growing. With

increased complexity of both short and long food supply chains, the City is faced with multilayered landscape of new food safety challenges. To what extent do the food safety procedures that have evolved over the last century address this new food distribution system? What additional monitoring strategies could identify potential problems before people become ill?

### *Complexity and Dynamism of NYC's Food System and Importance of Real-Time Monitoring*

Contemporary food systems – and the task of monitoring associated health risks – are exceedingly complex and include multiple interwoven processes and infrastructures that enable the production, processing, distribution, marketing, and consumption of food by billions of people every day. Moreover, the sustainability of today's food system – and global cities like New York exemplify this -- depends on the successful coordination of food flows at multiple scales – global, national, regional, city, and household – as well as the wider context of biophysical, socioeconomic, and political systems that shape them. Urban food system complexity is the result of both heterogeneity and scale. This is observed in the dynamic, nonlinear (small changes can produce system-wide effects) behavior across the system and the degree of uncertainty this entails. To cope with this challenge, some scholars have suggested that food systems are best understood as intimately linked to urban systems and together conceived as self-organizing systems.<sup>97</sup>

Ensuring that New Yorkers food is safe is a gargantuan task. It entails monitoring the flow of 19 billion pounds of food and how these products are stored and handled at 42,000 different points of sale throughout the City every year.<sup>98</sup> This is a critical emerging challenge for 21st century food safety planning given the demand for food in the City is growing at a pace (1.6 percent) double the national rate.<sup>98</sup> To accomplish this task, city, state and federal officials, with the food industry, will need to invest more in improving the traceability of food throughout the supply chain.

Assessments of the city's distribution system have revealed that most food retailers in the city are unable to trace the place of origin of the products they sell beyond their immediate distributor. This hampers the ability of both private and public operators of the system to promptly locate the source of disease and prevent or limit the expansion of outbreaks. While not a panacea, comprehensive data at multiple levels will allow better real-time monitoring, risk assessment, and efficient allocation of investments. Currently, legislators in Colorado,<sup>99</sup> Walmart, the nation's largest supermarket chain,<sup>100</sup> and others are exploring the feasibility of using block chain technology to create food traceability systems that can pinpoint the source of contamination.

### *Emergencies*

Emergencies like hurricanes, blackouts, droughts, tornados and floods as well as attacks or infrastructure collapses can endanger the safety of our food. Long term changes in climate can also lead to problems. Global warming may increase the burden of foodborne diarrheal illness as food is produced in altered climactic conditions, creating new opportunities for pathogen transmission.<sup>101</sup> A study in New York City found that hot weather leads to increases in food-safety violations and breakdowns in restaurant operations.<sup>102</sup>

Can New York City act to mitigate threats to food safety related to climate change? To what extent is food safety at the Hunts Point Food Distribution Center protected?

Climate change has clear large-scale adverse effects on almost all facets of the global food system which have reverberation for the city as well. Temperature changes in overall climate and oceans; changes in weather patterns; and extreme weather events and natural disasters may contribute to disruptions in the global food system and to global increases in diseases caused by viral, bacterial, vector-borne, and fungal sources.<sup>103,104</sup> Increased temperatures and diseases may mean an increase in the use of pesticides and fertilizers, which have the potential to leach harmful substances into the land, water, and atmosphere. Increases in agricultural runoff and rising temperatures may also contribute to harmful algae blooms that contain toxins which can affect the metabolic, respiratory, and brain function of birds, fish, and mammals (including humans). These have the potential to result in severe health problems or even death.<sup>105</sup>

These consequences will deeply affect the 98 percent of the world's population which lives in coastal regions. Large cities like New York appear to be unprepared for the potential challenges to the food system caused by climate change. Hurricane Sandy highlighted faults in local food distribution mechanisms, as most food suppliers do not have food inventories to meet the demand in an emergency.<sup>106</sup> Additionally, one study found that restaurants experience more failures in their cooling systems during warmer summer months.<sup>107</sup> As global temperatures rise, natural disaster rates increase, and weather patterns change, the global incidence of food-borne diseases is expected to increase.

### *The Alternative Food System*

In the 20th century, food safety regulations in the United States were established to protect the mass production food system. While current food safety regulations affect smaller food producers, the 21st century emergence of an alternative food system that includes farmers markets, community supported agriculture, on-farm sales, urban farming, artisanal food producers poses new issues in each of the five areas of food production that affect safety: processing, facility, storage, labeling, and distribution.<sup>108</sup> Urban farms, for example, pose a particular set of challenges related to organic and inorganic soil contaminants, vandalism, vermin, and staff who lack training in food safety.<sup>109</sup>

Community supported agriculture (CSA) and farmers markets share several food safety concerns. Farmers must ensure proper hand washing practices during all steps of the production process, including selling at farmers markets; containers and trucks which store, and transport food must be kept clean; all food producers must comply with Good Agricultural Practices (GAP) set by USDA. As the farm-direct sales market grows, food safety regulations will have to be adapted to reflect this new segment of the regional food system. Interstate regulations for this type of production are difficult to navigate and discourage farmers from engaging in this market, and in many states, the regulations for small farm food safety can be unclear and difficult to locate.

School systems have also begun to engage with farm-direct sales to feed their students. Currently, the National Farm to School Network estimates that more than 40 percent of schools in the US are engaged in farm-to-school programs with about \$789 million spent on local food every year.<sup>110</sup> This presents a specific set of challenges for farmers and school systems as they need to comply with both standard food safety regulations and school system regulations. Additionally, school lunch programs and school facilities are typically not equipped for large amounts of fresh food or seasonally changing supplies.<sup>111</sup> Industry food safety standards will have to adapt to include alternative food systems in order to avoid the spread of foodborne illness and large-scale public health epidemics.

### *The Informal Food Economy*

Informal food economies have existed in the form of street vendors for centuries, recently in-home 'food-sharing' has become popular across the United States and Europe, both practices pose different challenges to food safety. At-home meal services, meal clubs, and other cottage food businesses are largely considered illegal in the United States, and many operate through loopholes in current laws and therefore fall outside the current enforcement of existing regulations. Given that informal food establishments provide economic opportunities for immigrant workers, finding the right balance between protecting food safety and encouraging entrepreneurial ventures can be challenging.

While the likelihood of foodborne illness increases with the quantity of food produced, few regulations address these types of businesses.<sup>112,113</sup> The United States Department of Agriculture has a guidebook for food safety for cooking for large groups, but notes that these rules were developed for community events and not for profit purposes.<sup>114</sup> The European Union is embracing the positive aspects of the informal food economy. While food safety is a central issue, the regulations on this sector seem to be moving more rapidly than in the United States.<sup>115</sup>

In developing nations, street vending has been an important aspect of local economies for centuries. Street-vending has grown in popularity in the United States, particularly in areas where there are large immigrant populations.<sup>116</sup> In developing nations, the sanitary practices of street-vendors can generate conflict and concerns appear to vary based on region.<sup>117</sup> Inadequate sanitation practices are often due to a lack of knowledge and infrastructure.<sup>118,119</sup>

In the United States, particularly in large cities like New York, street vendors must subscribe to strict regulations, and even aid in bringing healthier food options to neighborhoods that might otherwise not have access.<sup>120</sup> In New York City, licensed street vendors are highly regulated but those who operate outside this system risk high fines – but also consumer food safety.

## FINDING NEW USES OF DATA AND TECHNOLOGY TO MONITOR AND IMPROVE FOOD SAFETY

Breakthroughs in computer science, information technology, "big data," and citizen science over the past two decades are ushering a new era in food safety monitoring and management for public and

private operators in the agri-food chain. Within federal government, the FDA is piloting a number of innovative tools for modeling of food safety risks.<sup>121</sup> These include efforts to predict likely sources of contamination (QPRAM); assess the impact of different food safety interventions at different points in the system of infrastructures and practices from farm to fork (FDA-iRISK); and use of computer simulations to identify the highest-risk stages for *Listeria monocytogenes* outbreaks during different phases of meat preparation in retail settings.<sup>121</sup>

Real-time recall information accessible to customers is another emerging channel of food safety monitoring. New smartphone apps that can instantly scan and compare grocery stores products with the lists of recalls published by FDA are becoming available for public use. However, these services are often restricted to one retail location and charge customers a fee per scan, which reduces broader accessibility. Mobile apps are only a small fraction of an entire new niche of research on portable sensors seeking to make food safety monitoring as ubiquitous and accessible to the public as other small-scale monitoring devices like glucose monitors or pregnancy tests.

Researchers are also developing strip tests for on-site neonicotinoids testing (with the potential to reduce use of neonicotinoid pesticides), consumer spectroscopy able to control for fipronil – a common insecticide – in eggs, smartphone software able to use the integrated cameras for biochemical recognition of elements or perform electrochemical detection via an externally plugged device.<sup>122</sup> Overall, mobile devices can be used to monitor a variety of components in a city's food system such as antibiotics, allergens, spoilage microorganisms, pesticides, mycotoxins, and marine biotoxins. Since almost 80 percent of city residents own a smartphone,<sup>123</sup> New York has an unprecedented opportunity to tap into this vast decentralized sensor infrastructure.

Food safety data from social media platforms like Twitter and Yelp offer another emerging opportunity to gauge and manage foodborne illnesses and outbreaks in cities. In March 2013, the Chicago Department of Public Health (CDPH) launched a web platform called Food-borne Chicago<sup>124</sup> with the aim to address alerts about possible foodborne illnesses signaled through Twitter.<sup>125</sup> Using this technology, CDPH compiled 270 unique responses and carried out 133 restaurant inspections over ten months, 41 percent of which either failed the inspection or passed with critical or serious violations. In January 2018, researchers at NYC DOHMH and Columbia University Department of Computer Science published a report identifying foodborne outbreaks in the city through complaints posted to Yelp restaurant reviews.<sup>126</sup> Monitoring Yelp reviews has helped NYC DOHMH to identify ten outbreaks since 2012 and approximately 1,500 complaints a year.

Crowdsourced data, however, is not without limitations and can result in low-quality food tests, unrepresentative samples, as well as large volumes of non-validated claims which can increase misinformation and uncertainty. More research and demonstration projects of citizen science are needed to ensure that the benefits of these approaches outweigh their drawbacks.

Lastly, promising innovations come also from early adopters of smart sensors and "big data" in supermarket design. Some of the largest retailers in the US are now investing in real-time

monitoring through smart shelves and infrared cameras able to detect changes in temperature as well as inform logistics and just-in-time supply models. Innovations in nanotechnologies are also pointing to opportunities for rapid pathogen and contaminant detection and removal of chemical and microbiological contaminants from soils, water, and foods.<sup>127</sup>

Overall, researchers are in agreement, "big data" from sources like large online databases (e.g., Global Environmental Monitoring System/Food), automatic surveillance systems based on real-time analysis of internet data (e.g., MedISys), online archives of toxicogenomic data to predict health risks (see <http://aopkb.org/>), mobile phones, social media, and the Internet of Things (IoT) in food retail are here to stay and can add value to food safety efforts at different scales of monitoring and intervention.<sup>128</sup>

## PROMOTING EQUITY AS A FOOD SAFETY SYSTEM GOAL

New York City is a diverse city with high levels of income equality and inequitable access to resources. Through a variety of policy initiatives, Mayor Bill de Blasio has made reducing these inequities a priority. To date, however, there has been no systematic assessment of impact of the city's food safety system on health or dietary equity. To what extent does New York City's current food safety system offer equal protection to different income groups and different races and ethnicities? Do current practices reduce or exacerbate prevalent inequalities in health? What data and monitoring systems could answer this question? The inequitable food retail environment in low-income compared to higher income neighborhoods (i.e., higher number of bodegas or corner stores, larger retailers with lower quality produce or meats, small poorly resourced restaurants),<sup>129,130</sup> may pose threats to residents living in these communities.

A focus on equity also requires a consideration of the deeper social determinants of food safety. Food workers who lack paid sick leave are more likely to come to work when they are ill, increasing the risk that they can transmit foodborne illnesses to their customers.<sup>131</sup> Enforcing the city and state's new paid sick leave laws could help prevent such outbreaks. New York City restaurants and stores faced with rising rents<sup>132</sup> may cut into essential services including cleanliness, vermin control and food safety to break even; commercial rent control could help free small business owners to find the resources needed to maintain a safe food supply.<sup>133</sup>

## INTEGRATING FOOD SAFETY AND CHRONIC DISEASE PREVENTION

More than ten years ago, senior officials in the NYC DOHMH called for improved coordination between the food safety functions of the department and its growing involvement in preventing diet-related chronic diseases.<sup>134</sup> After all, it is the city's 26,000 restaurants, more than 1,000 supermarkets<sup>135</sup> and 10,000 bodegas that influence both food safety and diet-related diseases outcomes. Moreover, the health department's 100 food inspectors constitute a substantial asset and they already visit and inspect the city's restaurants and fast food outlets. Already food inspectors have taken on some chronic disease prevention activities, including enforcing the city's smoking laws in restaurants, re-enforcing its rules on displaying the warning signs of alcohol consumption

during pregnancy, and banning the use of commercial trans-fat. What additional ways could these two functions be integrated? What resources would be needed to achieve optimum impact?

## RESPONDING TO CHANGING FEDERAL POLICIES ON FOOD & FOOD SAFETY

In June 2018, President Trump released a plan that would bring all federal responsibility for food safety under a single agency.<sup>136</sup> In previous years, the Government Accountability Office (GAO), the National Academies of Sciences, Engineering and Medicine, and the Center for Science in the Public Interest have all released reports advocating for one, unified food safety agency,<sup>137</sup> a proposal also put forward by President Obama, suggesting the rationale for such a re-organization cuts across ideological lines.

Since the 2018 report, USDA has taken steps to consolidate the food safety process into their agency, including signing an agreement with the FDA to formalize this consolidation. USDA currently has the capacity to take on more food safety responsibilities, according to the March 2019 High Risk Series report published by GAO. However, for more consolidation to take place, Office of Management and Budget, Center for Disease Control, Department of Commerce's National Marine Fisheries Service, Department of Homeland Security's Customs and Border Protection, and Congress would need to take coordinated action.<sup>138</sup>

Currently, the United States government spends almost \$2.3 billion a year on food-safety programs. At the USDA, 9,200 people to handle meat inspections with an annual budget of \$1 billion. Trump's proposed re-organization plan does not indicate whether budgeting or staffing would be cut or expanded.<sup>137</sup>

What are the potential problems in Trump's reorganization plan? Currently, the USDA and HHS share regulation of food safety. Obama proposed shifting all food safety responsibilities to HHS while Trump proposes locating all responsibility within USDA. However, USDA is mandated by law both to promote agriculture and regulate it. In the past, according to a recent analysis in Quartz, this has created "an awkward relationship in which powerful meat interest groups have held political sway within the department." The proposed change would mean that potential for conflict of interest (i.e., between protecting food growers and protecting consumers) would be applied to "the entire US food system, not just meat."<sup>137</sup> As Congress considers these changes, policy makers and advocates in New York City will need to assess their position on such modifications and also to ensure that whatever the changes, food safety in New York City will continue to be protected.

## V. CONCLUSION

New York City has long been a national leader in ensuring its residents access to safe and healthy food. To safeguard and modernize this tradition, New York City would benefit from a concerted effort to review and upgrade its food safety policies and programs, many established more than a century ago.

Based on our review of the city’s food safety system, we propose several steps to deepen policy makers’ and advocates’ understanding of the strengths and weakness of the current system. We then suggest possible policy changes to strengthen this system and better confront the emerging challenges.

## RECOMMENDATIONS FOR ASSESSMENT

1. Create an *Annual Report of Food-Borne Illness Outbreaks in New York City*, as proposed in a 2017 report by NYC DOHMH staff.<sup>139</sup> Together, the existing online restaurant inspection database and a summary annual food safety report will enable public officials, public health professionals, civil society groups and others to monitor progress towards reducing food-borne illnesses.
2. Hold City Council hearings to assess key food safety concerns among the public as well as elicit feedback and receive recommendations on current and prospective policies and programs led by New York City government.
3. Create a user-friendly public database of confirmed foodborne disease data in New York City, using publicly reported and other data as needed.
4. Convene a working group of representatives of city, state and federal agencies that monitor food-borne illnesses and food safety in New York City to identify duplication, gaps and opportunities for more effective collaboration on rapid and accurate assessment of food safety problems in New York City and improved methods for communicating findings to key actors.
5. Continue to collect and assess “big data” from social media as early warning of food safety problems and test effective public communications of this data.
6. Identify best and promising practices from other cities that could inform improvements of current systems and mechanisms for food safety planning and management in the city.

## RECOMMENDATIONS FOR POLICY CHANGE

7. Provide consumers, public health professionals, policy makers and food stores and food service providers with an accessible and user-friendly one stop source of relevant and timely information and data that can be used to monitor and improve food safety.
8. Integrate food safety and chronic diet-related disease prevention intervention activities in ways that extend the reach, magnify the impact, and improve the efficiency of current programs.
9. Set measurable targets for improving food safety conditions in New York City (e.g., drop in number of findings of rats) in food businesses and food-serving public institutions and monitor progress towards goals.
10. Make promoting equity and protecting vulnerable populations a food safety priority.
11. Convene a working group of representatives of city, state and federal agencies that develop and enforce food-borne illnesses and food safety program and policies in New York City to identify duplication, gaps and opportunities for more effective collaboration on enforcement and prevention programs.

12. Support federal implementation of the recommendations of the U.S. Government Accountability Office to establish a government-wide performance plan for food safety and food safety monitoring as well as reinstate a centralized collaborative mechanism for federal agencies to craft common, broad-based food safety goals and objectives.

Finally, city, state and federal agencies, health professional organizations and food advocates need to do more to create mobilized constituencies that will support fair, effective and equitable food safety programs. Public opinion polls show strong public support for safe food,<sup>140</sup> but some public officials and public agencies, in order to minimize conflicts with the food industry, avoid speaking publicly about food safety. Our hope is that this report will contribute to a public discussion about what New York City and other levels of government can do to ensure that New York City remains a national leader in protecting the safety of its food.

Protecting the well-being of New York City's diverse population and its complex food system requires constant vigilance and periodic re-examination of established procedure. Better safe than sorry, that basic principle of public health, shows the value of a comprehensive assessment of the capacity of New York City's current food safety system to meet current and future challenges.

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