DIRECT FROM CDC ENVIRONMENTAL HEALTH SERVICES BRANCH



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Letter Grading and Transparency Promote Restaurant Food Safety in New York City

Editor's Note: NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature a column from the Environmental Health Services Branch (EHSB) of the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In these columns, EHSB and guest authors share insights and information about environmental health programs, trends, issues, and resources. The conclusions in this article are those of the author(s) and do not necessarily represent the views of CDC.

Wendy McKelvey is principal investigator for two CDC grants that promote environmental public health—one from the Environmental Health Specialists Network (EHS-Net) and the other from the Environmental Public Health Tracking Program. Melissa Wong had been project director for the NYC EHS-Net Program for the past five years. Bailey Matis is the current project director.

Each year in New York City (NYC), more than 6,000 people end up hospitalized for foodborne illness (New York City Department of Health and Mental Hygiene, 2014). Although the proportion of illness caused by food prepared away from the home is uncertain, the food service setting is associated with 68% of nationally reported foodborne illness outbreaks where food was prepared in one place (Gould et al., 2013). New Yorkers eat out nearly one billion times a year (New York City Department of Health and Mental Hygiene, 2011), and two-thirds eat meals from a restaurant, deli, coffee shop, or bar at least once per week, so the potential public health impact of unsafe food handling practices in NYC restaurants is enormous (Wong et al., 2015).

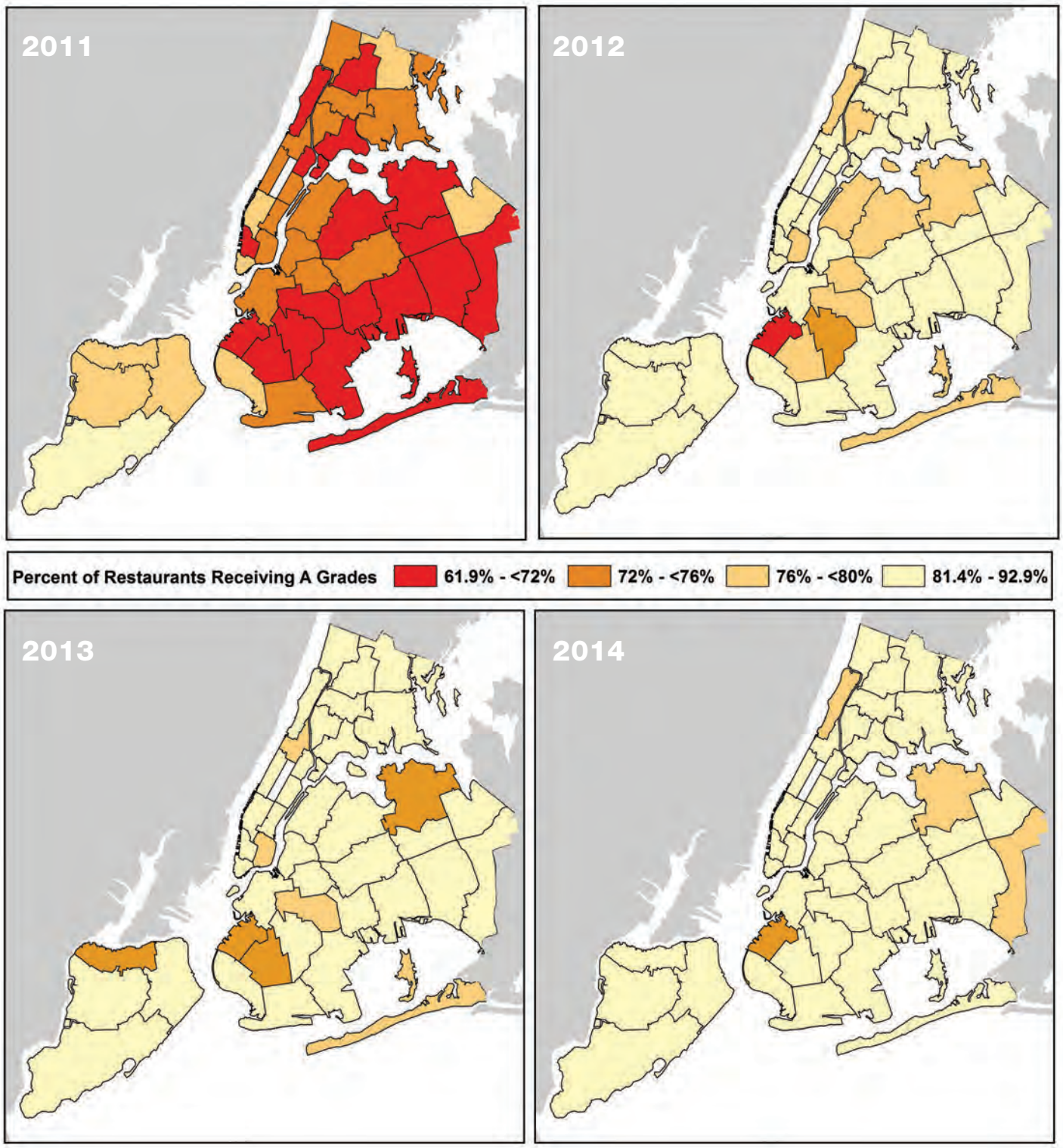
Improving food handling practices across the approximately 24,000 restaurants that operate in NYC on any given day can reduce risks of foodborne illness. Not having a certified kitchen manager on site, employees working while ill, limited food handler knowledge of food safety, and food workers touching food with their bare hands have been identified as factors that increase the risk of restaurant-related foodborne illness (Gould et al., 2013; Hedberg et al., 2006). In an effort to prevent these and other unsafe food handling practices, the New York City Department of Health and Mental Hygiene launched the restaurant letter grading program in July 2010. The program requires restaurants to post a letter grade that reflects their most recent sanitary inspection results in a visible window location. It also targets the poorest performers with more frequent inspections.

The premise of the NYC letter grading program is that consumer access to inspection results will encourage restaurant operators to better comply with food safety rules. In addition to a conspicuously posted letter grade, the NYC Health Department has increased the transparency of restaurant inspection results by making them available in detail on a searchable Web site and a free smartphone app ("ABCEats," available for download on iTunes and Google Play). Both of these data resources provide maps and street views of establishments and allow users to filter restaurants by zip code, cuisine type, and grade.

The NYC letter grading program also supports industry by using a dual inspection approach that allows restaurants to improve before being graded. If a restaurant does not earn an A grade on its initial unannounced inspection, it receives a reinspection approximately 7–30 days later, at which point the grade is issued. Restaurants that earn an A grade at initial or reinspection do not pay fines for sanitary violations cited. Those that do not earn an A grade have the

FIGURE **1**

Percentage of Restaurants Achieving A Grades by New York City Neighborhood, 2011–2014



right to contest their grade and fines at an administrative tribunal.

As a part of the Centers for Disease Control and Prevention's Environmental Health Specialists Network (EHS-Net) cooperative agreement, we evaluated the impact of the NYC restaurant letter grading program on health hazard reduction (Wong et al., 2015). We tracked scores on initial inspection before and after grading began in July 2010 and measured a 35% increase in the probability of a restaurant practicing A-grade hygiene by 2013. Specifically, we observed more food safety certified managers on site, better worker hygiene, more restaurants with proper hand washing stations, and fewer restaurants with mice. We also measured public response to restaurant letter grades in two population-based telephone surveys conducted 12 and 18 months after the program began. In both surveys, more than 90% of respondents said they approved of restaurant letter grading, and 88% said they considered the grades in dining decisions.

Restaurant sanitary conditions have been steadily improving in NYC since implementation of letter grading (Figure 1). In 2011, 72% of restaurants were posting A grades, and by 2014, after four years, 85% were posting A grades (New York City Department of Health and Mental Hygiene, 2015). Findings from our evaluation suggest that increasing transparency of restaurant inspection results and providing the public with these results in the form of an easily interpreted letter grade posted at the point of consumer decision making is an effective regulatory approach.

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Did You Know? The U.S. Environmental Protection Agency's third annual SepticSmart Week is September 21–25. Check out www.epa.gov/septicsmart for planned activities and valuable educational materials.

NACCHO
National Association of County & City Health Officials
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[RESEARCH BRIEF]
September 2014

Study of Retail Food Establishment Inspection Scoring and Grading Systems

ENVIRONMENTAL HEALTH

Introduction

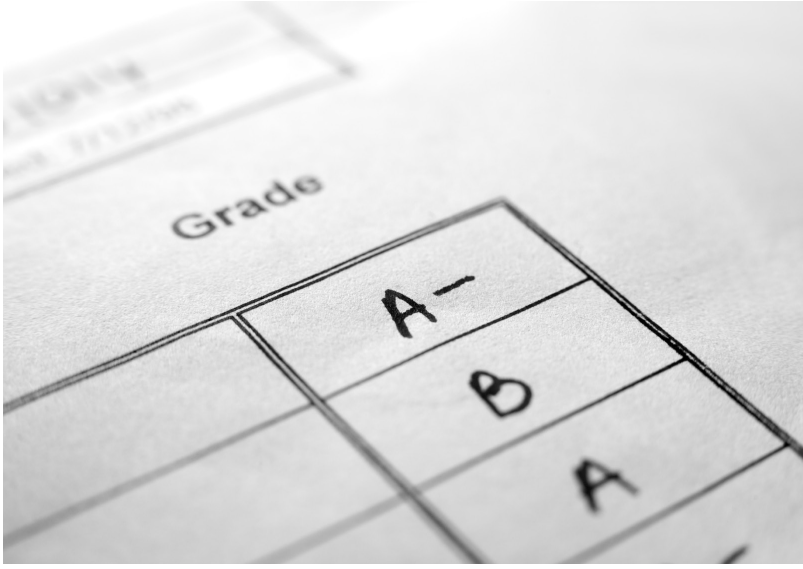
Local health departments (LHDs) play a major role in ensuring the food people eat every day is safe. In the United States, approximately 3,000 entities regulate food safety. The vast majority of these entities are LHDs, with more than 75% of the 2,800 LHDs in the United States educating, inspecting, or licensing retail food establishments.

Through a cooperative agreement with the Food and Drug Administration (FDA), in 2012, the National Association of County and City Health Officials (NACCHO) studied the way that LHDs use scores or grades to convey the results of their retail food establishment[1] inspections.

While food establishment inspection grading and scoring (FISG) systems vary throughout the United States, generally numerical scores, letters, colors, graphics/symbols, or any combination thereof are used to systematically quantify or illustrate the inspection performance of a retail food establishment. Gaining a better understanding of the use, composition, successes, and shortcomings of FISG systems could help additional LHDs implement their own systems. This research brief presents findings from NACCHO's survey to learn more about retail FISG systems implemented by LHDs, including the following:

- National prevalence of LHDs that assign a score or grade to an inspection of licensed food establishments;
- Distribution of different types of scoring and grading systems;
- Relationship between scoring/grading systems and other food safety practices; and
- Potential areas for further research or in-depth case studies.

Local health departments play a major role in ensuring the food people eat every day is safe.



Methodology

Informed by the NACCHO-FDA Food Safety Advisory Group, NACCHO developed, piloted, and executed an electronic quantitative survey instrument in 2012 to a sample of 2,565 LHDs. A stratified random sample of 531 LHDs was selected from this sample. The strata included 48 states and the District of Columbia (excluding Rhode Island and Hawaii). The sample included approximately 20% of LHDs from each state.

The survey included key elements and questions intended to ascertain the following:

- Presence of any scoring or grading system;
- Type of score or grade assigned (e.g., numerical score, letter score, color, or graphic);
- Communication to the public;
- Perceived impact on food safety;
- Implementation year and changes since implementation;
- Regulations, licensing, inspections, and penalties; and
- Geographic barriers and staffing challenges.

Findings and Results

General Information

The survey had a response rate of 39% (208).[2] Non-response includes both survey non-contact[3] and refusal;[4] differentiation between these non-response types is not possible. Among the responses, 183 were from LHDs in states where statewide requirements for how inspections were scored or graded were not present. Twenty-five responses were from states with a statewide requirement for how inspections were scored or graded.

To better understand the prevalence of states with statewide inspection scoring or grading systems, NACCHO contacted the National Conference of State Legislatures (NCSL) to assist with the post-hoc identification. NCSL identified 10 states with a statewide policy regarding how inspection scores or grades were determined and communicated. Fifty LHDs that did not respond to the survey were located in one of those 10 states, so NACCHO concluded that the non-respondents also had a statewide system; however, these LHDs were not imputed into the results.

Prevalence of FISG Systems

NACCHO asked respondents to indicate their use of FISG systems. Nearly 38% (79) of respondents answered "yes" when asked if their LHD jurisdiction, either entirely or within some political subunits, provided licensed food establishments an overall food grade, score, or graphic after an inspection.

Type of FISG System in Use

The following findings were true of the 79 LHDs that responded that they used an FISG system (Figure 1):[5]

- 75% indicated use of a numerical score, 4.5 times greater than the next most frequently used type—letter grade, which 16.5% of respondents reported using;
- 10% indicated use of a color or other graphic to describe an inspection result;
- 11% indicated use of another, unspecified type of FISG system;
- 77% indicated using only one FISG type; and
- 16% indicated using two or more FISG types in combination.

75% of respondents indicated use of a *numerical score*, 4.5 times greater than the next most frequently used type—*letter grade*

Communication

NACCHO asked respondents to provide data on the methods used to communicate grading or scoring of food establishment inspections to the public. The questionnaire allowed respondents to select more than one method of communication. The following findings were true of the 79 respondents who reported using a scoring or grading system:

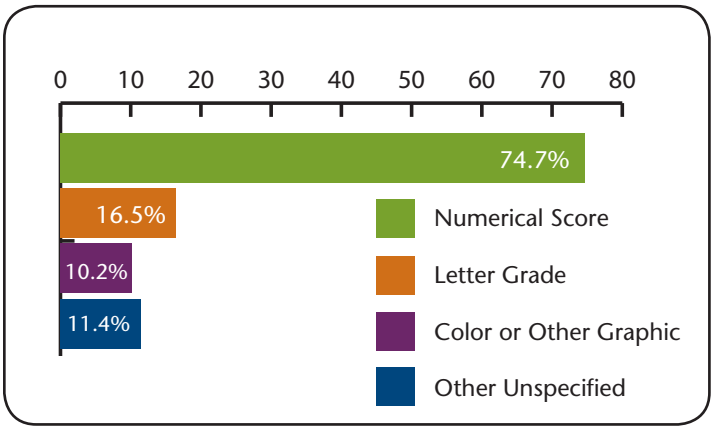
- 62% indicated that the LHD made inspection scores or grades available upon request by the public, making this method the most prevalent among those investigated;
- 41% indicated that inspection scores or grades appeared in local print or broadcast media;
- 37% indicated that inspection scores or grades were made available on the Internet; and
- 35% indicated that inspection scores or grades were posted on the premises of the food establishment.

Perceptions

NACCHO asked respondents to provide information about their perception of how FISG systems impacted food safety within the regulated establishment and the manner in which regulatory inspections were conducted. Respondents were equally divided that FISG systems impacted the manner in which inspectors conducted inspections. The following findings were true of the 79 respondents who reported use of a FISG system:

- 67% perceived that an FISG system had no impact on how operators shared information during an inspection;
- 66% either agreed (52%) or strongly agreed (14%) that an assigned score or grade was perceived as correlated with an establishment's control of risk factors;
- 59% perceived that an FISG system had impacted how much attention operators paid to food safety; and
- 58% perceived an improved impact on food safety.

FIGURE 1. TYPE OF FISG SYSTEM IN USE



n=79; percentages do not total 100 because respondents may have selected more than one choice

Next Steps and Future Research Questions

NACCHO plans to conduct six to eight case studies with LHDs to explore key questions and hypotheses determined through the data analysis. LHDs selected for case studies will vary based on perceived impact of FISG system, maturity of FISG system, public access to grades or scores, and degree of urbanization, among other considerations.

NACCHO will develop the case studies through record review, open-ended questions, and telephone interviews with key informants (e.g., food establishment operators, board of health representatives, municipality supervisors, and LHD professionals). Through case studies, NACCHO intends to explore further the following questions:

- Does any particular approach to scoring and grading have a greater impact than others on the control of foodborne illness risk factors in retail food establishments?
- Does any particular approach to scoring and grading have a greater impact than others on consumer attitudes and behavior?
- Does the presence of an FISG system affect the behavior of health inspectors?
- Does the presence of an FISG system affect the behavior of establishment operators?
- Does the method used to communicate inspection results to the public affect the perceived impact or value of FISG systems?
- What motivates LHDs to employ FISG systems?
- Are LHDs in areas with strong local media more likely to use FISG systems or report violation results openly and routinely to the public?

Notes

1. A retail food establishment generally refers to operations that (1) store, prepare, package, serve, vend food directly to the consumer; or (2) provide food for human consumption such as a restaurant; satellite or catered feeding location; catering operation if the operation provides food directly to a consumer or to a conveyance used to transport people; market; vending location; conveyance used to transport people; institution; or food bank.
2. With an assumed population of 2,565 LHDs, a response sample of 335 was needed to reach a confidence level of 95% and confidence interval of +/-5.
3. Inability to contact units selected for the survey.
4. Refusal of selected unit to participate and provide some or all of the information requested.
5. To have a requirement for scoring and grading and imputed as affirmative responses when asked if their LHD jurisdiction, either entirely or within some political subunits, provided licensed food establishments an overall food grade, score, or graphic after an inspection.

Acknowledgments

This project was made possible through the support of the Food and Drug Administration, cooperative agreement #5U50FD004334-04. NACCHO is grateful for this support. The views expressed within do not necessarily represent the official views of the sponsor.

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Study of Retail Food Establishment
Inspection Scoring and Grading Systems

Appendix A—Univariate Data Tables

Uses Food Grading and Scoring System			
	Freq.	**Percent**	**Cum.**
No	129	62.02	62.02
Yes	79	37.98	100.00
Total	208	100.00	

Uses Letter Grade			
	Freq.	**Percent**	**Cum.**
No	66	83.54	83.54
Yes	13	16.46	100.00
Total	79	100.00	

Uses Numerical Score			
	Freq.	**Percent**	**Cum.**
No	20	25.32	25.32
Yes	59	74.68	100.00
Total	79	100.00	

Uses Other Image			
	Freq.	**Percent**	**Cum.**
No	78	98.73	98.73
Yes	1	1.27	100.00
Total	79	100.00	

Uses Other Graphic			
	Freq.	Percent	Cum.
No	72	91.14	91.14
Yes	7	8.86	100.00
Total	79	100.00	

Uses Other			
	Freq.	**Percent**	**Cum.**
No	70	88.61	88.61
Yes	9	11.39	100.00
Total	79	100.00	

Number of Types Used in Combination			
	Freq.	**Percent**	**Cum.**
0	5	6.33	6.33
1	61	77.22	83.54
2	11	13.92	97.47
3	2	2.53	100.00
Total	79	100.00	

Assigned Score or Grade is Correlated with Establishment Control of Risk Factors			
	Freq.	**Percent**	**Cum.**
Strongly Agree	10	13.70	13.70
Agree	38	52.05	65.75
Neither	15	20.55	86.30
Disagree	7	9.59	95.89
Strongly Disagree	3	4.11	100.00
Total	73	100.00	

System has Impacted How Much Operators Pay Attention to Food Safety			
	Freq.	**Percent**	**Cum.**
No	32	40.51	40.51
Yes	47	59.49	100.00
Total	79	100.00	

System has Impacted How Operators Share Information during Inspections			
	Freq.	**Percent**	**Cum.**
No	53	67.09	67.09
Yes	26	32.91	100.00
Total	79	100.00	

System has Impacted Manner in which Inspectors Conduct Inspections			
	Freq.	**Percent**	**Cum.**
No	39	49.37	49.37
Yes	40	50.63	100.00
Total	79	100.00	

Perceived Impact on Food Safety			
	Freq.	**Percent**	**Cum.**
No Impact	4	5.56	5.56
Improved Impact	42	58.33	63.89
Unclear Impact	26	36.11	100.00
Total	79	100.00	

Year Implemented Food Grading and Scoring System			
	Freq.	**Percent**	**Cum.**
Before 2000	49	67.12	67.12
2000	1	1.37	68.49
2001	3	4.11	72.60
2002	1	1.37	73.97
2006	1	1.37	75.34
2007	2	2.74	78.08
2008	4	5.48	83.56
2009	2	2.74	86.30
2010	3	4.11	90.41
2011	3	4.11	94.52
2012	4	5.48	100.00
Total	73	100.00	

Inspection Report Posted on Premises			
	Freq.	**Percent**	**Cum.**
No	50	63.29	63.29
Yes	29	3.71	100.00
Total	79	100.00	

Inspection Report Available upon Request			
	Freq.	**Percent**	**Cum.**
No	11	13.92	13.92
Yes	68	86.08	100.00
Total	79	100.00	

Inspection Report Available on the Internet			
	Freq.	**Percent**	**Cum.**
No	53	67.09	67.09
Yes	26	32.91	100.00
Total	79	100.00	

Grades or Scores Posted on the Premises			
	Freq.	**Percent**	**Cum.**
No	51	64.56	64.56
Yes	28	35.44	100.00
Total	79	100.00	

Grades or Scores Available upon Request			
	Freq.	**Percent**	**Cum.**
No	30	37.97	37.97
Yes	49	62.03	100.00
Total	79	100.00	

Grades or Scores Available on the Internet			
	Freq.	**Percent**	**Cum.**
No	50	63.29	63.29
Yes	29	36.71	100.00
Total	79	100.00	

Grades, Scores, Violations Appear in Local Print or Broadcast Media			
	Freq.	**Percent**	**Cum.**
No	47	59.49	59.49
Yes	32	40.51	100.00
Total	79	100.00	

Food Safety

Impact of a Letter-Grade Program on Restaurant Sanitary Conditions and Diner Behavior in New York City

Melissa R. Wong, MPH, Wendy McKelvey, PhD, Kazuhiko Ito, PhD, Corinne Schiff, JD, J. Bryan Jacobson, MPH, and Daniel Kass, MSPH

Objectives. We evaluated the impact of the New York City restaurant letter-grading program on restaurant hygiene, food safety practices, and public awareness.

Methods. We analyzed data from 43 448 restaurants inspected between 2007 and 2013 to measure changes in inspection score and violation citations since program launch in July 2010. We used binomial regression to assess probability of scoring 0 to 13 points (A-range score). Two population-based random-digit-dial telephone surveys assessed public perceptions of the program.

Results. After we controlled for repeated restaurant observations, season of inspection, and chain restaurant status, the probability of scoring 0 to 13 points on an unannounced inspection increased 35% (95% confidence interval [CI] = 31%, 40%) 3 years after compared with 3 years before grading. There were notable improvements in compliance with some specific requirements, including having a certified kitchen manager on site and being pest-free. More than 91% (95% CI = 88%, 94%) of New Yorkers approved of the program and 88% (95% CI = 85%, 92%) considered grades in dining decisions in 2012.

Conclusions. Restaurant letter grading in New York City has resulted in improved sanitary conditions on unannounced inspection, suggesting that the program is an effective regulatory tool. (*Am J Public Health.* 2015;105:e81–e87. doi:10.2105/AJPH.2014.302404)

Restaurant food safety is increasingly important, with almost half of the US food dollar spent on restaurant food[1] and about one third of caloric intake from foods prepared outside the home.[2] In New York City (NYC), residents eat out nearly 1 billion times each year.[3] Although most diners do not get sick, foodborne pathogens cause millions of preventable illnesses in the United States annually.[4] The exact proportion of restaurant-attributable foodborne illness is unknown, but national surveillance in the United States found that two thirds of reported foodborne outbreaks from 1998 through 2008 occurred in the restaurant or deli setting,[5] and consumption of food prepared outside the home has been linked to an increased risk of sporadic foodborne diseases.[6]

Regular inspection of restaurants for food safety is a core function of local health authorities, guided by the US Food and Drug Administration (FDA) Food Code.[7] Although all states have sanitation codes modeled after the FDA Food Code,[8] implementation methods vary by jurisdiction. The NYC Department of Health and Mental Hygiene (hereafter, Health Department) is charged with inspecting restaurants, coffee shops, bars, nightclubs, employee or university cafeterias, bakeries, and fixed-site food stands (hereafter, restaurants). Its inspection program uses a scoring system to measure compliance with the NYC Health Code, which is updated regularly to maintain consistency with the FDA Food Code and the New York State Sanitary Code. Restaurants are entitled to an impartial review of inspection results by an administrative tribunal, which can improve an assigned score and reduce associated monetary fines.

Before letter grading, the Health Department aimed to inspect restaurants at least once per year and imposed monetary fines for violations cited at inspections. Inspection results were available on the Health Department Web site. However, financial disincentives and the Web site posting were insufficient to drive improvements across the industry, with most restaurants cited for multiple public health hazards. Mean inspection scores and restaurant sanitary conditions were stagnant (D. Kass, email communication, February 2009).

In an effort to improve restaurant food safety and increase transparency of inspection information, the Health Department launched its letter-grade program on July 27, 2010. The program uses public disclosure of inspection scores in the form of letter grades at point of decision-making; a more finely tuned, risk-based inspection schedule; and financial incentives to encourage high food-safety standards. It began after an 18-month planning process that included a public announcement of the intent to begin letter grading; meetings with restaurant industry representatives, food safety experts, and regulators from a jurisdiction with a restaurant sanitary grade program; promulgation of 2 regulations subject to notice and comment; and training and education for restaurateurs. The process was covered by the media, and by July 2010, restaurateurs were aware of the program and anticipating the launch.[9,10]

We evaluated the impact of the restaurant letter-grade program by assessing (1) hygiene and food-safety practices as characterized by inspection outcomes before and after program implementation and (2) public response to the program measured by 2 population-based telephone surveys.

METHODS

The NYC restaurant inspection program has been using a point system to score inspections since 2005.[11] Presence and severity of violations contribute to an inspection score. Under the grading program, an inspection score of 0 to 13 points is in the A-range; 14 to 27 points is in the B-range; and 28 or more points is in the C-range. Restaurants scoring 0 to 13 points on the first inspection of their inspection cycle (initial inspection) are issued an A grade. Restaurants not earning an A grade on initial

inspection receive a full reinspection no less than 7 days later. The grade card is issued based on the reinspection score. The initial inspection and any reinspection together are an "inspection cycle." Upon completion of an inspection cycle, there is an interval before the next cycle. Restaurants earning an A grade on initial inspection of a cycle are inspected in 11 to 13 months. Restaurants scoring 28 or more points on either initial or reinspection of a cycle have a 3- to 5-month interval. The remaining restaurants scoring 14 to 27 points on either initial inspection or reinspection of a cycle have a 5- to 7-month interval.

Before the grading program was launched, the Health Department aimed to conduct at least 1 inspection in all restaurants annually. Restaurants scoring 28 or more points received a follow-up compliance inspection about 1 month later. A score of 28 points or higher could result in a restaurant being placed on a twice-yearly inspection schedule. Administrative violations (e.g., expired permit) were included in the scoring system before implementation of letter grading, but they are not included under the grading program.

Health Department inspectors cite violations with standardized forms on handheld computers. They also collect data on restaurant descriptors such as cuisine, service method to customer (e.g., wait service, counter service), venue description (e.g., restaurant, bar), and chain status (15 or more national outlets). Inspectors are trained in the classroom and under an experienced inspector in the field before they are allowed to work independently.

Data Analysis

We analyzed preadjudicated inspection scores and points for violations cited on initial or reinspections conducted between July 27, 2007, and July 26, 2013. We subtracted administrative violation points from pregrading inspection scores to make pregrading scores more comparable with postgrading.

We calculated measures that used "most recent initial inspection" among restaurants in business as of July 27 in each year. "Most recent initial inspection" is used in crude analyses to depict a restaurant's usual sanitary conditions closest to the specified period end date. We consider initial inspections of a cycle the best indicator of usual sanitary conditions because they occur at the longest interval after the previous inspection and they are unannounced to operators. Crude metrics were percentage of restaurants scoring in the A-, B-, or C-range; percentage scoring 40 points or higher (85th percentile score on initial inspection in the program's first year); median inspection score; and average points for specific violations or violation groups. Average violation points characterize both presence and severity of violations over time.

We assessed performance on reinspection of a cycle by calculating percentage of restaurants scoring in the A-range on reinspection among those with B-range or C-range initial inspection scores. We tracked the percentage of restaurants with A, B, or C grades on a cycle that went on to earn an A grade on their next cycle.

We modeled the probability of scoring 0 to 13 points (A-range score) across all initial inspections in all 43 448 restaurants by fitting a binomial regression model that included 5 indicators of time: 13 to 36 months before grading (reference), 0 to 12 months before grading, 0 to 12 months after grading, 13 to 24 months after grading, and 25 to 36 months after grading. We fit restaurant random intercepts to account for repeated observations and variation across individual restaurants. We used indicator variables to adjust for potential confounding by season of inspection (January–March, April–June, July–September, October–December), because pest and holding temperature–related violations increase during the warmest season and the distribution of inspection date varied over time.[12] We did not think chain restaurant status was a potential confounder because the distribution before and after grading remained constant, but we included it to estimate the probability that a chain restaurant scored 0 to 13 points relative to a nonchain. We also ran the fully adjusted model for the subset of restaurants with inspections in the first and last year of the study ($n = 7059$) to evaluate whether improvement differed among the most stable restaurants.

To assess whether an excess or deficit in the frequency of inspection scores around grade cut-offs could have biased our results, we estimated the underlying (unbiased) smooth frequency distribution of scores by fitting a generalized additive model with penalized splines[13] and used the smoothed distribution to estimate the "bias-corrected" percentage of A-range scores in the postgrading period. The percentage of A-range scores across initial inspections in the postgrading period dropped only slightly from 30.7% to 27.4% upon correction. We therefore deemed it unnecessary to correct for potential bias resulting from an excess or deficit of scores around grade cut-offs.

We conducted analyses in SQL Management Studio 2008 R2 (Microsoft, Redmond, WA), SAS version 9.2 (SAS Institute, Cary, NC), and R version 3.0.1 (R Project, Vienna, Austria).

Public Perception Surveys

The Health Department worked with Baruch College Survey Research (BCSR) to conduct 2 English/Spanish bilingual telephone surveys in July 2011 and February 2012 to assess public perceptions of the grading program. Landline samples on a random-digit-dial design and respondents were selected randomly within the household; cell phones were randomly selected from a mobile number database for NYC county telephone numbers. Respondents were screened for NYC residency and age of 18 years or older.

In July 2011 and January 2012, 502 and 511 adults completed surveys, respectively. Based on the American Association for Public Opinion Research (AAPOR) standard definitions,[14] response rates were 26% and 22%, and cooperation rates were 60% and 51%, respectively. AAPOR response rates incorporate estimates of the proportion of respondents of unknown eligibility that might have been eligible. Data were weighted to the US Census 2009 American Community Survey to ensure the samples represented the age, gender, race, Hispanic origin, and borough distribution of NYC adults. Confidence intervals (CIs) for proportions were calculated with SAS version 9.3 (SAS Institute, Cary, NC).

RESULTS

Approximately 24 000 restaurants operate in NYC on any given day. A total of 43 892 restaurants were in business at some point between July 2007 and July 2013, and 46% (20 005) of those were in operation at some point both before and after grading. During the 3 years before grading, 31 226 restaurants

operated. Of those, 41% were newly opened for business and 36% went out of business. In the 3 years since grading began, 32 700 restaurants operated. Of those, 39% were newly opened for business and 27% went out of business (Table 1). The distribution of restaurant types was nearly identical before and since grading was instituted.

Inspections

The percentages of A-range scores on recent unannounced initial inspection were similar during the 3 years before grading and have improved since grading. The proportion of restaurants with A-range scores went from 28% in July 2008 to 31% in July 2010, with an additional increase to 46% by July 2013 (Figure 1). With more restaurants achieving A-range scores after grading, the median initial inspection score went from 21 points as of July 2008 and 20 points as of July 2010 to 17 points as of July 2013.

After we controlled for chain status, season of inspection, and correlation within restaurants, the probability of attaining an A-range score on an unannounced initial inspection among all restaurants increased 26% (success ratio [SR] = 1.26; 95% CI = 1.22, 1.31) by the 2-year mark (Table 2). The SR increased at the 3-year mark to 1.35 (95% CI = 1.31, 1.40). Compared with the warmest season (July–September), the other seasons exhibited higher SRs, with the highest (SR = 1.30; 95% CI = 1.26, 1.35) in the coldest season (January–March). The SRs for the subset of restaurants in business during the whole period (data not shown in Table 2) were slightly higher—1.32 (95% CI = 1.25, 1.40) and 1.41 (95% CI = 1.33, 1.49) for the 2- and 3-year mark, respectively. Chain restaurants showed a high SR for both all restaurants (SR = 3.46; 95% CI = 3.31, 3.61) and the subset of restaurants operating during the whole period (SR = 3.79; 95% CI = 3.54, 4.07).

TABLE 1—Restaurant Characteristics Before and After Grading: New York City, NY, 2007–2013

Characteristic	Operating Between July 27, 2007, and July 26, 2010 (n = 31 226), No. (%)	Operating Between July 27, 2010, and July 26, 2013 (n = 32 700), No. (%)
Borough		
Bronx	3 267 (10)	3 222 (10)
Brooklyn	7 538 (24)	8 047 (25)
Manhattan	11 828 (38)	12 584 (38)
Queens	7 307 (23)	7 552 (23)
Staten Island	1 286 (4)	1 295 (4)
Chain restaurants		
Yes	3 393 (11)	3 627 (11)
No	27 833 (89)	29 073 (89)
Restaurant type[a]		
Wait service restaurant or diner	8 589 (31)	10 564 (33)
Quick-service establishment with take-out or limited seating	12 706 (46)	14 443 (45)
Baked goods, ice cream, or cafe only	3 539 (13)	4 050 (13)
Bar or wine bar	1 206 (4)	1 289 (4)
Cafeteria and banquet-style service or deli buffet	992 (4)	1 236 (4)
Food service at attraction	534 (2)	662 (2)
Missing	3 660	456

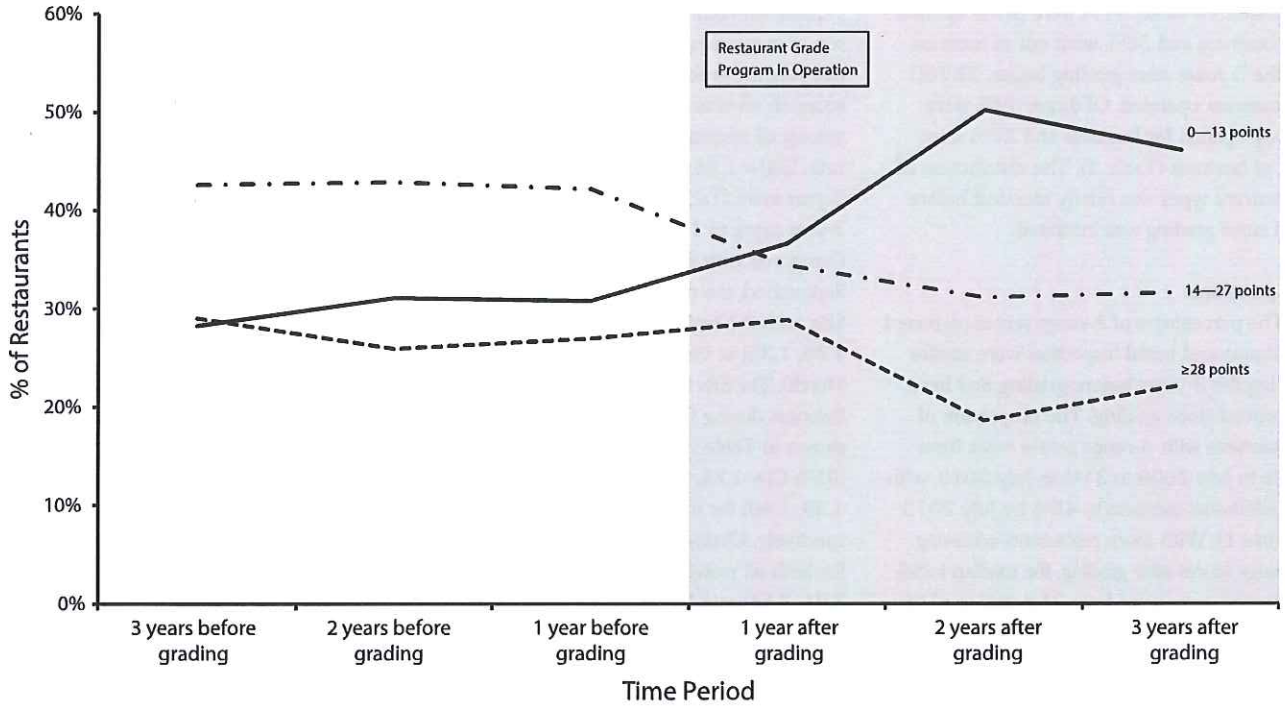
Note. The city restaurant letter-grading program began on July 27, 2010. All gradable restaurants (or pregrading equivalent) in operation between July 27, 2007, and July 26, 2013, included.
[a]Percentage excludes missing values.

Certain critical food safety violations contributed fewer average points in July 2013 compared with the 2 years before grading (Table 3). In July 2012, the average points given to all restaurants declined substantially for evidence of any type of vermin (rats, mice, flies, or roaches), inadequate hand-washing facilities, and no food safety–certified supervisor on-site. Points given for improper storage or use of equipment or utensil and inadequate food worker hygiene also declined to a lesser extent. These overall point reductions were maintained in July 2013. Meanwhile, average points increased for improperly maintained food contact surfaces, and the points given for inadequate protection of food from contamination, cross contamination, and holding food at improper temperatures increased slightly (Table 3). Although average points for temperature and cross-contamination violations increased slightly, average severity of cited violations decreased (data not shown).

We observed inverse trends for C-range scores on recent initial inspection over time. The proportion of C-range scores decreased from 29% as of July 2008 and 27% as of July 2010 to 22% as of July 2013 (Figure 1). The percentage of extreme C-range (≥ 40 points)–scoring restaurants dropped from 14% in the year before grading to 13% in July 2011, dropping to 7% in July 2012, and increasing to 9% in July 2013, while the 80th percentile decreased from 36 points in July 2008 to 30 points in July 2013.

Three years after grading, more restaurants corrected unsanitary conditions observed on initial inspection of most recent inspection cycle. In July 2013, 45% of restaurants requiring reinspection earned A grades upon reinspection, up from 34% in July 2011. Likewise, there was a decrease in the proportion of poorly performing restaurants that did not improve on reinspection (28+ point scores on both initial and reinspection). The proportion of restaurants that scored poorly on both initial and reinspection dropped from 28% as of July 2009 to 22% as of July 2013.

When we tracked performance from inspection cycle to inspection cycle, we found that 80% and 79% of A-grade restaurants maintained their A grade on their next cycle at 2 and 3 years after grading, respectively. Among B-grade restaurants, 53% and 54%



Note. The city restaurant letter-grading program began on July 27, 2010. Pre-adjudicated score from initial inspection closest to end of each period for unique restaurants was included in the analysis. For the time before the letter grading program began, inspection scores before grading were adjusted to remove points given for nonsanitary administrative violations.

FIGURE 1—Inspection score category on recent initial restaurant inspection: New York City, NY, 2007–2013.

improved to an A grade on the next cycle as of the 2- and 3-year mark, respectively.

Public Perception Surveys

Results from 2 independent telephone surveys suggested that New Yorkers dine out frequently and support and use letter grades to help them decide where to eat. Among NYC adults, 67% (95% CI = 63%, 71%) and 68% (95% CI = 63%, 72%) reported eating meals from a restaurant, deli, coffee shop, or bar at least once per week at the 1-year and 18-month mark, respectively. At the 1-year mark, 90% (95% CI = 87%, 93%) approved of the program and 71% (95% CI = 66%, 74%) had seen a grade card in restaurant windows. At 18 months, support remained at 91% (95% CI = 88%, 94%) and 81% (95% CI = 77%, 84%) had seen grade cards. Among those who had seen grade cards, 88% (95% CI = 85%, 92%) considered them in their dining decisions at the 1-year and 18-month mark.

Results suggested that grades reassure diners about food safety; 76% (95% CI = 71%, 80%) felt more confident in a restaurant's food safety when an A grade was posted. An estimated 70% (95% CI = 66%, 74%) expressed concern about getting sick from eating from restaurants, delis, and coffee shops, with 38% (95% CI = 34%, 43%) being very concerned. A majority of 88% (95% CI = 85%, 91%) supported more frequent inspections for restaurants that do not earn an A grade.

DISCUSSION

The NYC Health Department launched the restaurant letter-grading program to motivate restaurants to improve food safety, inform the public about inspection results, and reduce illness associated with dining out. The program introduced multiple changes to the enforcement landscape, including the mandatory posting of letter grades summarizing sanitary inspection scores, a fine-tuned risk-based inspection schedule, and a revised policy on financial penalties. Survey results suggest that New Yorkers approve of the program and use it when making dining decisions. Our restaurant hygiene analysis suggests that the program provided an effective incentive for operators to comply with regulations and improve practices. We also found that there is an incentive to maintain hygiene practices, with the majority of A-grade restaurants earning A grades on their next inspection cycle.

Our ultimate goal is to reduce foodborne illness, but evaluating the impact of 1 program on such a multifactorial outcome is challenging. Past foodborne illness studies have noted that case finding suffers from underreporting and potential misclassification.[4,15] Among cases that are identified, it can be difficult to know if exposures occurred in a restaurant. Certain hygiene and food-safety conditions monitored in restaurants are known risk factors or environmental antecedents for foodborne illness outbreaks,[7,16,17] so we think measurement of sanitary conditions alone serves as a good proxy for public health risks.

TABLE 2—Estimated Success in Scoring in the A-Range on Initial Inspection in Restaurants: New York City, NY, July 2007-July 2013

Indicator	Inspections, No.	Model I,[a] SR (95% CI)	Model II,[b] SR (95% CI)
Time period			
13-36 mo before grading (Ref)	42 016	1.00	1.00
0-12 mo before grading	26 200	1.05 (1.01, 1.09)	1.05 (1.01, 1.09)
0-12 mo after grading	32 594	0.86 (0.83, 0.89)	0.87 (0.84, 0.90)
13-24 mo after grading	38 339	1.24 (1.20, 1.29)	1.26 (1.22, 1.31)
25-36 mo after grading	32 918	1.33 (1.29, 1.38)	1.35 (1.31, 1.40)
Season			
July-September (Ref)	36 598	...	1.00
October-December	41 697	...	1.20 (1.16, 1.24)
January-March	45 825	...	1.30 (1.26, 1.35)
April-June	47 947	...	1.20 (1.16, 1.24)
Chain restaurant			
No (Ref)	151 374	...	1.00
Yes	20 693	...	3.46 (3.31, 3.61)

Notes. CI = confidence interval; SR = success ratio. The city restaurant letter-grading program began on July 27, 2010. Preadjudicated initial inspection scores for all restaurants in operation between July 27, 2007, and July 26, 2013, included. A-range is equivalent to ≤ 13 points.
[a]Model includes random intercepts for unique restaurants.
[b]Model includes random intercepts for unique restaurants and adjusts for chain restaurant status and season of inspection.

Improvement in hygiene conditions appeared to be driven by certain categories of violations. Having a certified kitchen manager on site is important because it has been associated with fewer critical violations on inspection[18,19] and identified as an important factor for preventing foodborne outbreaks.[20] Decreases in violations for inadequate handwashing facilities and worker hygiene and improper storage or use of equipment or utensils are also likely to decrease risk for foodborne illness.[21] Decreases in presence and severity of vermin violations contributed in large part to improvements in inspection scores, but vermin violations remain the largest average contributors to inspection score on initial inspection, suggesting a need for more restaurant operator education on this topic. The increase in average violation points related to food contact surface maintenance was likely an artifact related to a tendency for inspectors to cite this violation under a "miscellaneous" section before grading.

Although overall inspection performance improved in the second and third year of grading, A-range scores (0–13 points) decreased slightly in the first year of grading compared with the year before. We believe this decrease reflects the method in which the program was rolled out. The first restaurants inspected under the grading program were those that scored poorly under pregrading program rules. These poorer-performing restaurants were overrepresented during year 1.

We call attention to the strong association between chain restaurant status and A-range score on initial inspection. This finding is consistent with other studies that reported better sanitary conditions (i.e., fewer critical violations) in chain restaurants compared with nonchains.[18,22,23] It is instructive to consider the mechanisms used by chains to ensure food safety, such as use of standardized procedures, specialized equipment, and additional worker training and internal mock inspections, when conducting educational outreach among nonchains.

New York City is not alone in requiring public disclosure of restaurant inspection results at the point of decision-making. This type of disclosure program is becoming more common in North America at the state, county, and local level and several jurisdictions have published program evaluation findings. Similar to our results, the Toronto and Los Angeles evaluations found their disclosure programs were used by consumers and led to improved restaurant sanitary practices.[24–26] Jin and Leslie[24] found that mandatory posting of grade cards in Los Angeles County improved inspection scores after they controlled for restaurant characteristics. Similar to our findings, Toronto Public Health found overwhelming program approval by diners and that diners felt safer making purchases with their program.[25] Both of these evaluations were also able to detect decreases in foodborne illness after program implementation.[15,27]

A previous study of the NYC restaurant grading program analyzed a public-use restaurant inspection data set and concluded that the program was not associated with an improvement in scores.[28] However, the analysis included only 17 complete months of inspection data after grading. We identified improvements in sanitary conditions only after the 2-year mark, which may partially explain the inconsistency in results. The previous analysis also did not account for overrepresentation of poorer-performing restaurants resulting from more frequent inspection for poorer performers after grading. By contrast, our regression analysis addressed oversampling by including random intercepts for individual restaurants.

Limitations

This study has certain limitations. We compared inspection performance across time among inspected restaurants. In our earliest period (July 2007–July 2008), about 25% of restaurants were uninspected because of reduced staffing and other inspectional priorities. Because initial inspection assignment before grading was random, we believe inspections during this period were not biased toward poorer-performing restaurants. Use of inspection scores over time may have also been problematic. Subtracting administrative violation points from pregrading inspection scores to make them comparable with grading scores may have underestimated inspection scores pregrading, because the scoring system did not always include points from every violation to calculate inspection score. The impact would be an underestimate of the success of the program. We were unable to find an adequate comparison group (e.g., nongraded jurisdiction) because of jurisdictional differences in food-safety regulations and inspection scoring systems, but we used time and within-restaurant analysis as controls to isolate the impact of the program over time.

TABLE 3—Average Points per Inspection for Specific Violations Cited on Recent Initial Inspections in Restaurants: New York City, NY, 2008–2013

Violations	From 24 Mo to 13 Mo Before Grading (n = 21 208)	From 12 Mo Before to Start of Grading (n = 22 313)	From 13 Mo to 24 Mo After Grading (n = 24 942)	From 25 Mo to 36 Mo After Grading (n = 24 681)
Facility and worker violations				
Critical violations				
Improperly maintained food contact surfaces[a]	0.69	0.98	1.31	1.53
Inadequate worker hygiene	0.51	0.47	0.36	0.35
Public health hazards[b]				
No food safety-certified supervisor on site	1.29	1.37	0.84	0.79
Inadequate hand-washing facilities	1.81	1.45	0.65	0.58
Food handling and holding violations				
Critical violations[c]				
Improper storage of in-use utensil	0.83	0.76	0.62	0.58
Inadequate protection of food from contamination during storage, preparation, display, service	1.03	1.01	1.20	1.16
Public health hazards				
Food not held cold enough	2.40	2.59	2.52	2.75
Food not held hot enough	1.28	1.39	1.28	1.36
Cross-contamination of foods	0.69	1.05	0.80	0.82
Pest violations: all vermin violations[d]	3.47	3.33	2.97	2.95

Notes. The city restaurant letter-grading program began on July 27, 2010. Each time period covers 12 months. Preadjudicated results from initial inspection closest to the end of each period for unique restaurants. Average points per violation cited on all recent initial inspections used to quantify the severity of violation conditions.
[a]Violation citation practices changed when grading started. Before grading, violation was cited in a miscellaneous violation category.
[b]Public health hazards point range is 7 to 28 points, except for "inadequate hand-washing facilities," which is 10 or 28 points, and "no food safety certified supervisor on-site," which is 10 points.
[c]Critical violation range is 5 to 8 points.
[d]Vermin includes rats, mice, cockroaches, or flies; all vermin violations range from 5 to 28 points. Points were bundled together for multiple vermin types.

Finally, the NYC restaurant grading program involved multiple changes to the enforcement landscape—more nuanced risk-based inspection frequency, greater exposure of restaurants to the risk of fines, grade posting, improvements to online resources, and additional training opportunities.[29] We cannot tease out which factors contributed most to improving hygiene or grades.

Conclusions

The results from our analysis indicate that the NYC restaurant letter-grading program exhibited a positive impact on restaurant hygiene, food-safety practices, and public awareness, suggesting that the program is an effective tool for improving food safety. Our analysis also identified violation areas that can be targeted for improvement in future program operations. ■

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This article was accepted October 17, 2014.

Contributors

M. R. Wong contributed to program evaluation design, performed analysis, and drafted the article. W. McKelvey contributed to program evaluation design and assisted with drafting the article. K. Ito and J. B. Jacobson conducted the analysis and assisted with drafting the article. C. Schiff and D. Kass conceptualized the program and assisted with drafting the article. All authors helped to interpret findings and review drafts of the article.

Acknowledgments

This work was supported by federal funds from the Centers for Disease Control and Prevention (grants 5U01EH000692 and 1U38EH000939).

Note. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Human Participant Protection

The New York City Department of Health and Mental Hygiene institutional review board determined that the program evaluation protocol was not human participant research in accordance with 45 CFR Part 46.

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Feasibility of Restaurant Letter Grading in Utah

By: Breanna Peltekian, Heather Stuart, Ry Mount, and Lauren Martinez
Public Health Program, Westminster College - Spring 2015

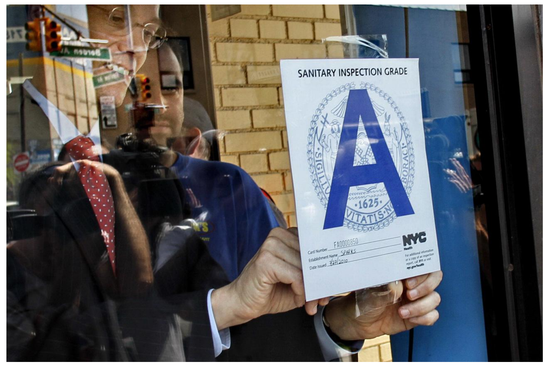
Introduction

Utahns are in need of a transparent identification system to determine which restaurants are sanitary, based on the grade assigned by the health department, which would be conveyed to the public in a simplified format. This will create market pressure to improve safety and sanitation and to reduce the incidence of foodborne illness through informed consumer choice.

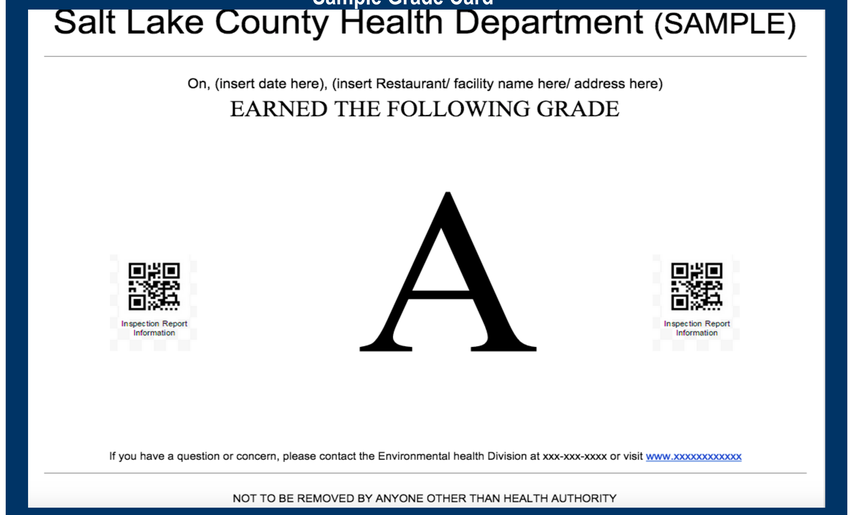
Overall, this proposal's main objective is to determine the feasibility of implementing a restaurant letter grading system in Utah. To achieve this objective, there are several sub-objectives:

- Survey the general public on their opinions and acceptance of the letter grading system
- Assess cost-effectiveness and success of other states' restaurant letter grading programs
- Discuss with health professionals the feasibility and limitations of our proposal
- Receive feedback from the Utah Restaurant Association and/or restaurant owners to determine the limitations of our proposal

Up to 70% of FBI is linked to food prepared at foodservice establishments (WHO, 2007). Determining the feasibility of this proposal is important to Public Health because implementing the letter grading system will potentially decrease the amount of foodborne illnesses and provide the public with information to help determine the health and safety of what they will be eating.



Sample Grade Card


Salt Lake County Health Department (SAMPLE)

On, (insert date here), (insert Restaurant/ facility name here/ address here)

EARNED THE FOLLOWING GRADE

A

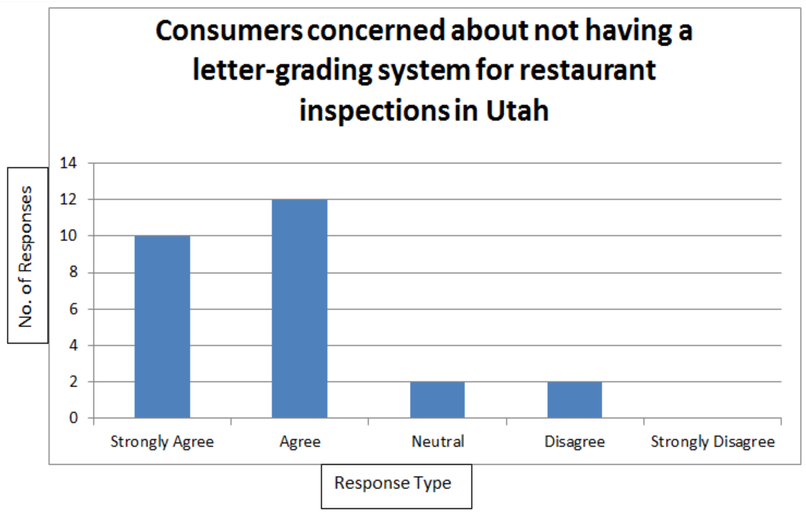
Inspection Report Information

Inspection Report Information

If you have a question or concern, please contact the Environmental health Division at xxx-xxx-xxxx or visit www.xxxxxxxxxxxx

NOT TO BE REMOVED BY ANYONE OTHER THAN HEALTH AUTHORITY

Results



Materials and Methods

Environmental health professionals, restaurant owners, and the general public were interview/surveyed. First, environmental health scientists discussed the process used in their specific Utah counties for food inspections and how the current food inspection scores are determined. They also gave their opinion on our letter-grading proposal and they answered, with their experience, if they believe restaurant letter grading would be effective in Utah.

Next, twenty five restaurant-goers from the general public were surveyed to determine if they would benefit from the restaurant letter grades being easily displayed. A Likert Scale was used to assess the opinions and desires from the public. Finally, restaurant owners were interviewed to see what their main concerns are in regards to letter grading and to answer any questions that they had. In the end, political feasibility will be determined by speaking with a Utah State Legislator, LaVar Christensen, who is interested in sponsoring and passing a bill regarding restaurant letter grading in Utah.

The letter grading systems that other states utilize were closely examined. It was researched whether the other states' systems are beneficial to reducing the incidence of foodborne disease, as well as improve business for the restaurants.The letter grading system in other states allowed us to compare Utah's system to theirs, to see the limitations that they faced, if any, and how they overcame those limitations.

Conclusion

By surveying the public and researching foodborne illness in Utah, it was determined that the existing programs that are implemented in Utah are insufficient in protecting the public. The programs in place now provide limited access to the public for them to see the results of inspections and to understand the risks they are taking when dining out. This research supports that a letter grading system would aid in lowering the rates of restaurant contracted food borne illnesses. It would not just come from simply changing the format of the grade card, but with the accountability that comes with this awareness. The letter grade would make consumers more aware of inspection reports and more selective in their choices.

This selectivity would make restaurant cleanliness a part of a business plan. It would mean that restaurants are no longer only being held accountable by the health department, but also by consumers. If a restaurant knows that their potential customers would be put off by a poor grade, it would be crucial to the business's survival to make sure that they were up to code. This would by default lower food borne illness rates and is why Utah should be in support of a restaurant letter grading system.

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Acknowledgments

We would like to express our sincere thanks to everyone who has been a contribution to developing our proposal: Environmental Health Professionals Brian Cowan, Royal Delegge, and Phil Bondurant for their opinions and expertise on health inspections and how to overcome the limitations to a letter grading system; Rose Henderson from the Southern Nevada Health Department for her knowledge and experience with a live letter grading system and grade cards; Ryan Glenn and Michelle Serrano for providing us with restaurant owners' perspectives; Representative LaVar Christensen for his guidance and interest in our plan for implementation; the participants from our survey for taking time out of their day; and last but definitely not least, Han Kim for his expertise and knowledge of public health research and policy projects and his continued support of our success.