Food Truck Laws: Legitimate Safety Regulations or Crony Capitalism?

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INTRODUCTION

Food trucks are the hot new trend, and the market is responding. "Roach coaches"—trucks serving cheap gas station food at construction and office worksites—no longer define the market segment.[1] Rather, food trucks are now recognized as "a respectable venue for aspiring chefs to launch careers"[2] and promise to provide "unique gourmet cuisine at lower prices than a sit-down restaurant."[3]

As a result of increasing public demand for high-quality street food, an increasing number of restaurateurs are turning to food trucks as a viable alternative or supplement to brick-and-mortar restaurant business models. From an operator's perspective, the food truck business model presents certain economic advantages over starting a comparable brick-and-mortar establishment: lower operating costs mean food trucks can serve lower-priced gourmet food. Mobility allows food trucks to target different areas based on changing consumer demand—for example, in response to declines in downtown foot traffic during the COVID-19 pandemic, food truck operators were able to refocus operations towards "residential neighborhoods, essential businesses[,] and rest stops."[4] It thus comes as no surprise that the food truck industry is projected to grow at over twice the rate of the broader food service sector. By 2026, food trucks are expected to generate $1.3 billion in revenue.[5]

Food trucks' growing popularity hasn't gone unnoticed by food service industry stakeholders. Some existing restauranteurs argue that food trucks are unfairly competitive and steal businesses away from brick-and-mortar restaurants. Glenn Keefer, a Chicago restaurateur who owns Keefer's and Keefer's Kaffe, characterizes food trucks as "unscrupulous [ ] operators" who "park[ ] in front of the

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[1] *What Is a Roach Coach? Where Did the Term Come from?*, M&R TRAILERS, https://www.mr-trailers.com/roach-coach/.
[2] Bryant Urstadt, *Intentionally Temporary*, N.Y. MAG., Sept. 11, 2009.
[3] THI LE, IBISWORLD, REPORT OD4322, FOOD TRUCKS 9 (2021).
[4] *Id.* at 12.
[5] *Id.* at 9.

highest-priced real estate in the city to siphon off customers headed to businesses paying property taxes, rent and fees for signs, loading zones, and business permits."[6] Trattoria No. 10's owner, Dan Rosenthal, argues that "[e]very dollar I lose in sales to a food truck down the street costs me 50-cents in profit. It doesn't take a lot of decline in sales for restaurants to go out of business, particularly in this economy."[7]

And to some degree, the brick-and-mortar restauranteurs' concerns are rational. From the perspective of a fixed establishment, the limited number of proximate storefronts inherently limits potential competitive volume. Further, similar operational costs between proximate fixed establishments force operators to focus on differentiating their restaurants on quality. Food trucks, absent additional regulation, aren't subject to such limitations—all they require are open parking spaces. Food trucks, given their low startup costs, require fixed establishments to also compete on cost. These two factors, according to brick-and-mortar restaurateurs, mean food trucks are uniquely threatening to fixed establishments. But proponents of food trucks disagree. They argue that food trucks and fixed establishments aren't directly competitive—a customer won't be deterred from patronizing a Ruth's Chris because of a food truck: Ruth's offers "a comfortable and reliable place to eat with table-side service"—factors obviously missing from even the best hypothetical steakhouse food truck.[8] And as matter of actual outcomes, analysis conducted by Mobile Truck suggests that food trucks have yet to cause a single restaurant to shutter its storefront.[9]

Whether brick-and-mortar restauranteurs or food truck proponents are ultimately correct on food trucks' economic effects has yet to be conclusively determined. But the effect of these debates

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[6] Julia Thiel, *Why Chicago's Once-Promising Food Truck Scene Stalled Out*, CHI. READER, Mar. 29, 2017.
[7] Michael Gebert, *Your Guide to the Latest Food Truck Kerfuffle (and Reality)*, N.Y. MAG., May 14, 2012.
[8] *Id.*
[9] *Id.*

has been to spur the creation of local regulations addressing the concerns of brick-and-mortar restauranteurs, some of which severely affect the viability of food truck ventures. Indeed, food trucks are most prevalent in states with "nonrestrictive regulations for street vendors" and easy access to mobile food permits.[10] As of 2017, Los Angeles had 2,600 food truck permits, and Austin, TX had 1,250. Chicago, by contrast, had 70 operational food trucks. Data as recent as July 2021 indicates that no more than 200 food trucks currently roam Chicago's streets.[11]

Two primary justifications underlie local food truck regulations. First are economic justifications which attempt to reduce the operational cost advantages of food trucks relative to fixed establishments. Second are health and safety justifications premised on the belief that products from food trucks—as a category—are more dangerous than those served from fixed establishments. This paper focuses on the second justification by examining the results of food safety inspections between food trucks and their fixed establishment counterparts. Inspections from four localities are evaluated in this paper: (1) Albuquerque, New Mexico; (2) Boston, Massachusetts; (3) Chicago, Illinois; and (4) Louisville, Kentucky. These localities use identical inspection procedures and criteria for both food trucks and fixed establishments, which allows us to draw inferences between food truck and brick-and-mortar establishment types.

Section One of this paper summarizes food truck specific regulations that some localities have attempted to justify as health and safety regulations. Section Two provides an overview of existing literature examining food truck safety. Section Three details this paper's research design—the results of which are discussed in Section Four. Section Five concludes with limitations and explores opportunities for further analyses.

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[10] LE, *supra* note 3, at 21.
[11] Ally Marotti, *How COVID Flattened Food Trucks' Tires*, CRAIN'S CHI. BUS., Jul. 9, 2021.

I. FOOD TRUCK REGULATIONS

A survey of the fifty largest U.S. cities indicates that questionable food truck regulations generally fall into five categories: public property bans, restricted zones, proximity bans, stop-and-wait restrictions, and duration restrictions.[12]

Public property bans limit "vending on public property such as streets or sidewalks."[13] At their most lenient, public property bans limit the sale of certain types of food (e.g., banning food prepared inside the truck while allowing the sale of pre-prepared or pre-packaged food). The most restrictive public property bans like those in Oakland, California forbid food trucks from operating on public property entirely.[14]

Restricted zones render certain parts of the locality off-limits for food trucks. Albuquerque, New Mexico, for example, forbids food trucks from operating in the Historic Old Town Zone. Residential Zoned Districts and Office Districts are off-limits in Louisville, Kentucky. Chicago is an example of the most extreme forms of restricted zone regulation—aldermen ban areas in a patchwork manner in response to local community pressure, resulting in "eight full pages worth of city code detailing where vendors may not sell their wares."[15]

Proximity bans are similar to restricted zones. The main difference is that proximity bans restrict food trucks from operating in areas near brick-and-mortar restaurants. Chicago, for example, prohibits food trucks from operating within 200 feet of any restaurant. Prior to March 22, 2018, Louisville, Kentucky banned food trucks from operating within 150 feet of a brick-and-mortar

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[12] ERIN NORMAN ET AL., INST. JUST., STREETS OF DREAMS 15 (2011).
[13] *Id.* at 15.
[14] *Id.*
[15] *Id.* at 17.

establishment that sold "similar" food.[16] El Paso, Texas used to ban food trucks within 1000 feet of restaurants, grocers, and convenience stores.[17]

The last two categories are stop-and-wait restrictions, which "prevent vendors from stopping at all unless flagged by a customer, making it difficult to connect with buyers,"[18] and duration restrictions which limit the amount of time a food truck can stay parked in one spot.[19] Duration restrictions, at their most extreme, aren't meaningfully distinguishable from stop-and-wait restrictions: Long Beach, California, for example, limits food trucks to a meager ten minutes per parking spot.[20] As of January 2020, Chicago relaxed its duration limit by allowing food trucks to stay in one spot for four hours—double the prior two-hour limit.[21]

These five regulatory categories directly limit the food truck industry by limiting the time, place, and manner by which they may operate. These restrictions are facially connected with crony capitalism—that is, the state is using its economic regulatory powers to place a thumb on the scale in favor of established brick-and-mortar restaurant stakeholders. However, officials have attempted to justify these same regulations on health and safety grounds. [22] For example, Chicago's public property and proximity ban are justified "for health and sanitary reasons."[23] El Paso's 1000-foot proximity ban

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[16] INST. JUST., *Victory for Louisville Food Trucks*, (Mar. 22, 2018), https://ij.org/press-release/victory-louisville-food-trucks/.
[17] NORMAN, *supra* note 12, at 17.
[18] Crystal T. Williams, *A Hungry Industry on Rolling Regulations: A Look at Food Truck Regulations Across the United States*, 65 ME. L. REV. 705, 708 (2013).
[19] NORMAN, *supra* note 12, at 18.
[20] *Id.*
[21] Fran Spielman, *City Council Committee Agrees to Double the Parking-in-One-Place Limit for Food Trucks*, CHI. SUN TIMES (Jan. 8, 2020), https://chicago.suntimes.com/business/2020/1/8/21057252/food-trucks-longer-parking-limits-four-hours-chicago-city-council.
[22] Cities may be hesitant to concede that food truck specific regulations are solely justified on economic protectionist grounds. Regulations with no plausible justification other than economic protectionism may be invalidated under rational basis review. *See* Elan Shpigel, *Chicago's Over-Burdensome Regulation of Mobile Food Vending*, 10 NW. J. L. & SOC. POL'Y 354, 371 (2015).
[23] LAUREN ETTER, *Moving Violations: In Chicago, Cooking and Driving Don't Mix*, WALL ST. J. (Dec. 13, 2010), https://www.wsj.com/articles/SB10001424052748704008704575638842201629742.

and stop-and-wait restrictions were originally passed by the Health and Environmental District as a health and safety measure.[24] It was only after litigation ensued that the El Paso Department of Public Health admitted that "there was no health reason we could find that would preclude [parking next to a food establishment]."[25] South Padre Island, Texas claims that its decision to grant no more than twelve food truck licenses and require that food trucks receive approval by local restaurants "is reasonable and protects public health."[26]

The incidental relationship these five categories of regulations have with respect to health and safety cast doubt on the legitimacy of the government's proffered justifications. Take Chicago's public proximity ban as an example. Even assuming that Chicago is correct in concluding that food prepared onsite is more dangerous than pre-packaged food, the rule is wildly underinclusive in furthering the city's health and safety interest—food trucks vending on private land aren't distinguishable on health and safety grounds but are allowed to prepare food onsite.

Duration bans are another example of the disconnect between the regulation and asserted government interest. The most plausible health and safety interest supporting such duration bans center around adequate freshwater supplies and wastewater disposal.[27] Doubtful, however, is the efficacy of duration bans in achieving such interests—forcing a food truck to move two blocks over has no effect on the incentive of the operator to obtain additional freshwater or empty wastewater tanks.

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[24] INST. JUST., *El Paso Vending*, https://ij.org/case/el-paso-vending/.
[25] NORMAN, *supra* note 12, at 33.
[26] DAVID YATES, *On Appeal, South Padre Island Argues Limiting Food Trucks Protects Public Health*, SE. TEX. REC. (Feb. 22, 2021), https://setexasrecord.com/stories/574550198-on-appeal-south-padre-island-argues-limiting-food-trucks-protects-public-health; *see also* Petition for Writ of Mandamus at 8, In re SurfVive, Anubis Avalos, and Adonai Ramses Avalos (2021), Case No. 21-0243.
[27] *See infra* Section II.C.

Lastly, the food safety inspection regimes both food trucks and fixed establishments are subjected to make any food safety interest asserted in justifying these five regulatory categories highly suspect. Many localities—including the four studied in this paper—have adopted the FDA Food Code which "includes a variety of regulations that food service operators must abide by, including those related to employee health, hygienic practices, plumbing systems, food labeling, food sourcing[,] and the appropriate disposal of waste."[28] Localities that have adopted the FDA Code into their food establishment inspection regimes implicitly concede that such measures are sufficient to ensure an acceptable level of food health and safety. Government efforts to single out food trucks for additional health and safety regulation therefore appears duplicative (and potentially pretextual).

II. EXISTING LITERATURE

A review of existing literature indicates that there is limited empirical research on food truck health and safety metrics in the United States. Existing literature approaches the topic in three distinct methods. The first approach employs public food safety inspection data collected by local health inspection authorities to conduct between-group comparisons. The second approach conducts direct analyses and observations of food trucks. The last approach surveys consumers and operators regarding their perceptions of food truck safety. The following subsections discuss each approach's methods and conclusions in further detail.

[28] LE, *supra* note 3, at 30.

A. Inspection Data

The Institute for Justice has previously conducted a study comparing food safety inspection scores between food trucks and other food establishment types.[29] This study utilized data from seven localities—Boston, Las Vegas, Los Angeles, Louisville, Miami, Seattle, and Washington, D.C.—collected from 2008 through 2013 and concluded that "[f]ood trucks and carts are every bit as clean and safe as restaurants and other types of brick-and-mortar food establishments."[30] It arrived at this conclusion on the basis of two statistical analyses for each of the seven localities: First was a fixed-effects OLS regression that measured the "average number of violations for each food-service category compared to mobile vendors." The second test was a Poisson generalized linear model that "provide[d] a rate estimating how many times more or fewer violations each food-service category would receive, on average, compared to mobile vendors."[31] The dependent variable for both analyses was "a count of the number of violations during an inspection," with "zero or no demerits being the best score."[32] Both models included dummy variables for day of the week, month, and year to account for the variability of inspection scores over time.[33] However, only the OLS model employed establishment-level fixed effects which "isolates and eliminates individual specific differences" between food establishments such as "the type of food served" and differing inspection frequencies.

Other than the Institute for Justice study, the only remaining literature using inspection scores to compare food trucks and brick-and-mortar restaurants is a 2016 Los Angeles Times article. Entitled "The Dark Side of Trendy Food Trucks: A Poor Health Safety Record," the article concluded that

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[29] ANGELA C. ERICKSON, INST. JUST., STREET EATS, SAFE EATS: HOW FOOD TRUCKS AND CARTS STACK UP TO RESTAURANTS ON SANITATION, (2014).
[30] *Id.* at 8.
[31] *Id.* at 7.
[32] *Id.* at 28.
[33] *Id.*

food trucks "have been lagging behind restaurants and even sidewalk food carts in . . . health safety."[34] The article noted that between 2014 and 2016, "[a]bout 27% of food trucks earned lower than A grades" as compared to "less than 5% of brick-and-mortar restaurants and about 18% of food carts."[35] Data also showed that "[m]ore than 4% of food trucks received C grades, compared with fewer than 1% of restaurants."[36]

B. Direct Analysis and Observation

A 2019 study conducted by the University of Central Florida examined the safety of "30 raw and cooked ready-to-eat foods . . . collected from 24 food trucks" in the Orlando, Florida area by conducting lab analyses for coliform bacteria and observing food handling practices.[37] Sampled food trucks were chosen to reflect "two types of locations: one that has high tourist traffic . . . and one with both commercial and residential areas where locals who live and work in the area purchase food."[38] PCR tests were conducted on samples purchased from sampled food trucks to test for the presence of *E.Coli* and *Salmonella* DNA.[39] Field observational data regarding food truck vendors' personal hygiene, food handling and sanitation practices, and availability of sanitation infrastructure was also collected.[40]

Results from the University of Central Florida study paint a mixed picture. Field observations of sanitary food handling practices showed that none of the 30 sampled food trucks "reached 100% adequacy for hygiene or sanitary conditions." Main issues identified were uncovered utensils, open

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[34] Ben Poston et al., *The Dark Side of Trendy Food Trucks: A Poor Health Safety Record*, L.A. TIMES (May 18, 2016), https://www.latimes.com/local/california/la-me-food-trucks-20160518-snap-story.html.
[35] *Id.*
[36] *Id.*
[37] Bendegul Okumus et al., *Exploring Safety of Food Truck Products in a Developed Country*, 81 INT'L J. HOSP. MGMT. 150 (2019).
[38] *Id.* at 152.
[39] *Id.* at 153.
[40] *Id.* at 152.

trash cans, presence of insects and birds, and misuse of gloves.[41] Further, PCR results indicated that pathogens were detectable in fourteen of thirty food samples. However, the "virulence genes associated with diseases . . . were mostly absent" and the "pathogen . . . levels of food analyzed were considered to be acceptable."[42] As such, the increased risks from improper food handling procedures were functionally mitigated by alternate factors such as adequate cooking and short food holding times.[43]

A report on food handling practices from Environmental Health Services Branch (EHSB) of the Centers for Disease Control (CDC) finds similar results to the University of Central Florida study.[44] Ninety-five food trucks were evaluated for compliance with "food worker handling practices most closely associated with critical risk factors that contribute to foodborne illness such as improper temperature control and poor personal hygiene.[45] Ninety of the ninety-five observed food trucks "exhibited at least one critical risk factor," with the most common risk being improper hand washing (eighty-four of the ninety-five observed trucks).[46]

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[41] *Id.* at 155.
[42] *Id.* at 153, 156.
[43] *Id.* at 156.
[44] Brenda Vanschaik Faw & Joyce L. Tuttle, *Mobile Food Trucks: California EHS-Net Study on Risk Factors and Inspection Challenges*, 76 J. ENV'T HEALTH 36, (2014).
[45] *Id.* at 36.
[46] *Id.* at 37.

C. Survey Responses

Survey responses provide insight into unique challenges faced by food trucks that may affect food safety. Ghezzi, Ayoun, and Lee interviewed and focus-grouped food truck owners and managers from Atlanta, Georgia; Birmingham, Alabama; Miami, Florida; and San Francisco, California.[47] Primary concerns raised by food truck operators regarding food safety include the necessity of thorough cleaning to keep pests away, limited food storage areas, heated water for proper handwashing, and reliance on generators for power.[48] Food Safety News's interview of Bob Kramer, a registered sanitarian and food safety consultant, provides further context for the concerns identified by Ghezzi, Ayoun, and Lee. Infrastructure concerns such as "filling up [a] water tank, emptying wastewater, finding power sources, and working within the limited time and space there is to sell" are indeed challenges unique to food trucks.[49] However, Kramer notes that "the layout of the equipment inside a food truck is similar to brick-and-mortar restaurants," which allows both establishment types "to follow the safe flow of food through the facility."[50] In other words, food safety protocols between food trucks and brick-and-mortar restaurants are not completely distinct.

Survey responses also provide insight into consumers' expectations regarding food truck products. These expectations, if reflected in consumer purchasing decisions, may influence the food safety procedures prioritized by food truck operators. A Brazilian food truck consumer survey further indicates that consumers rank food safety as an important consideration in choosing to eat from food trucks. Specifically, a vast majority of respondents were highly concerned with "the usage of gloves,

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[47] Sara Ghezzi et al., *Exploring Food Truck Food Safety Training and Practices in the United States: A Qualitative Study*, 40 FOOD PROT. TRENDS 413, 414–15 (2020).
[48] *Id.* at 420–21.
[49] LYDIA ZURAW, *Food Safety on Food Trucks Called 'A Little More of a Challenge'*, FOOD SAFETY NEWS (May 27, 2015), https://www.foodsafetynews.com/2015/05/food-safety-on-food-trucks-a-little-more-of-a-challenge/.
[50] *Id.*

masks, caps, and the existence of a hand sink for handwashing."[51] Other visible food safety items such as the availability of trash receptacles and the absence of pests and bugs were also considered highly important by respondents.[52] However, respondents assigned little to no importance to non-visible factors such as proper food handling temperatures, thus suggesting a "limited awareness of food safety by consumers."[53] Further, the study notes that respondents' answers may not be associated with actual behavioral changes since "only a few consumers who usually express concern on food safety appear to be changing their food buying and consumption behaviors."[54] In other words, respondents are likely engaging in cheap talk when assigning high priority to food safety—other factors such as hedonistic value, convenience, and cost are more important drivers of purchasing decisions than food safety concerns.[55]

D. Takeaways

In summary, existing literature indicates that food trucks face unique challenges relating to safe food handling. Adequate food storage space, pest control, and availability of water and power supplies are particularly relevant concerns for food truck operators—brick-and-mortar restaurants need not worry about freshwater tanks running dry or gas-powered generators breaking down. However, these unique risk factors may be inconsequential for actual food safety if they're already accounted for in food safety inspection regimes. A passing food safety inspection should mean that an establishment—be it a fixed restaurant or mobile food truck—has the capability to adequately manage these risks (despite the additional concerns food truck operators have to address to meet the

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[51] Lígia Isonia Auad et al., *Brazilian Food Truck Consumers' Profile, Choices, Preferences, and Food Safety Importance Perception*, 11 NUTRIENTS, no. 5, 2019, at 9.
[52] *Id.*
[53] *Id.* at 10.
[54] *Id.*
[55] *See id.*

passing baseline).[56] As such, existing literature lends credence to both the Institute for Justice and Los Angeles Times studies—perhaps a food truck is more likely to receive a lower score for a first inspection because its facilities are insufficient to ensure adequate food safety, thus supporting Los Angeles Times' findings. However, in the long run, once such facilities are established, food trucks may be just as capable of maintaining food safety standards equal to those of brick-and-mortar restaurants—supporting the Institute for Justice's conclusion.

III. RESEARCH DESIGN

A. Localities Studied

Four localities were chosen for this current project: Albuquerque, New Mexico; Boston, Massachusetts; Chicago, Illinois; and Louisville, Kentucky. Localities were primarily chosen because of convenience: potential localities were first identified using the US City Open Data Census which maintains a list of open access restaurant inspection datasets.[57] Localities eliminated from consideration were those that (1) failed to include variables that allowed food trucks to be distinguished from other food establishment types,[58] (2) did not present data in a machine-readable format,[59] or (3) had not been updated for multiple years.

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[56] Additionally, the existing literature supports a conclusion that differences between food safety inspection scores just aren't particularly meaningful for consumers. Factors such as quick food turnaround times and adequate cooking may nullify any actual food contamination risks. That is, any increase in risk is inconsequential because it doesn't affect the probability a consumer gets sick from eating the food.

[57] US CITY OPEN DATA CENSUS, *Restaurant Inspections—Datasets*, http://us-city.census.okfn.org/dataset/food-safety.

[58] An example is Dallas, TX. While the restaurant inspection dataset includes the variable "Inspection Type" with potential values of "Routine, Follow-up, Complaint, Temporary, and Mobile," the actual dataset includes zero "Inspection Type == Mobile" observations. *See* CITY DALL., *Restaurant and Food Establishment Inspections (October 2016 to Present)*, https://www.dallasopendata.com/Services/Restaurant-and-Food-Establishment-Inspections-Octo/dri5-wcct.

[59] Los Angeles, California is an example. The city recently transitioned to an interactive website that requires users to click on individual inspection reports for detailed violation information. *See* CNTY. L.A. PUB. HEALTH, *Los Angeles County Environmental Health Access Page*, http://publichealth.lacounty.gov/rating/. Efforts to request

The final four localities were chosen based on (1) adoption of the FDA Food Code, which provides non-binding guidance on food safety and sanitation for the retail food industry and (2) overlap with the Institute for Justice's seven localities. These considerations provide two advantages. First, localities that have adopted the FDA Food Code likely incorporate its food safety and sanitation requirements in its restaurant inspection procedures. This does not mean that results between localities can be directly compared; locale-specific differences still exist. For example, Louisville uses a two-tier category for violation severity while the other three localities use a three-tier categorization. However, FDA Food Code adoption does ensure that all studied locales are generally targeting the same food safety and sanitation goals. Second, choosing localities used by the Institute for Justice allows us to draw comparisons between the two projects. As explained below in Section III.C, this project attempts to replicate the general research design employed by the Institute for Justice study, albeit with a few methodological tweaks. The results of this study may therefore be useful in testing the validity of the Institute for Justice study's findings.

Raw datasets from these four localities were trimmed to remove failed inspection attempts (e.g., where a business was temporarily or permanently closed when an inspection attempt was made), ungraded inspections, and re-inspections. Re-inspections are excluded from the dataset because they are typically "groomed" inspections requested by restaurant owners following an unsatisfactory inspection report.[60] The purpose of this project is to examine whether a relationship exists between food truck establishment types and inspection violation counts—including re-inspections likely injects noise and may potentially mask causal relationships. In total, this study evaluates 195,128 observations

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a raw CSV file from the County of Los Angeles Department of Public Health were unsuccessful. Attempts to scrape the website were also unsuccessful. This issue affects a multitude of projects examining targeted transparency projects. *See* Daniel E. Ho, *Fudging the Nudge: Information Disclosure and Restaurant Grading*, 122 YALE L.J. 574, 587 (2012).

[60] Ho, *supra* note 59, at 633 ("Reinspections, which typically happen within a month, are disproportionately responsible for the shift toward borderline 'A's and 'B's.").

across four localities. Inspection dates range from January 4, 2010 to February 11, 2022. Breakdown by localities of observation counts and date ranges is found in Table 1.

TABLE 1: Localities Studied

Locality	*Obs.*	*Oldest Inspection*	*Newest Inspection*
Albuquerque, NM	759	2021-07-02	2022-01-14
Boston, MA	78444	2006-08-28	2022-02-11
Chicago, IL	98338	2010-01-04	2022-02-04
Louisville, KY	17587	2017-01-31	2022-01-22

B. Descriptive Statistics

Table 2 reports the descriptive statistics for non-minor and total violation counts per locale. Figures 1A–1D show the frequency of non-minor (critical or serious violations) per inspection. Figures 2A–2D show the frequency of all violations (critical, serious, and minor violations). All figures exhibit a positive skew, which is consistent with the Institute for Justice's conclusion that "violations per establishment were few, regardless of the category of food service."[61]

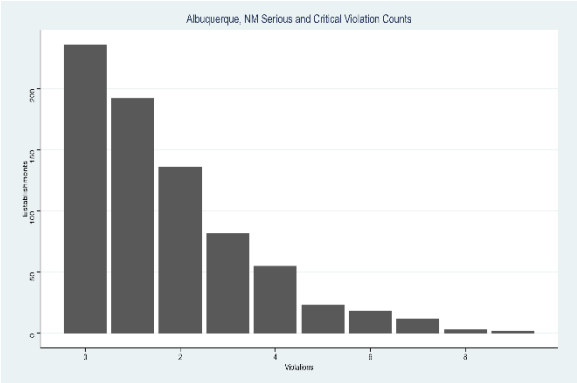
TABLE 2: Mean Measures of Violation Counts

Locality	*M*	*SD*	*Min*	*Max*
Albuquerque, NM				
Total	2.394	2.362	0	14
Non-Minor	1.685	1.765	0	9
Boston, MA				
Total	5.741	4.602	0	59
Non-Minor	1.538	1.776	0	23
Chicago, IL				
Total	3.741	2.763	0	35
Non-Minor	0.942	1.502	0	30
Louisville, KY				
Total	2.570	1.646	1	15
Non-Minor	0.027	0.256	0	6

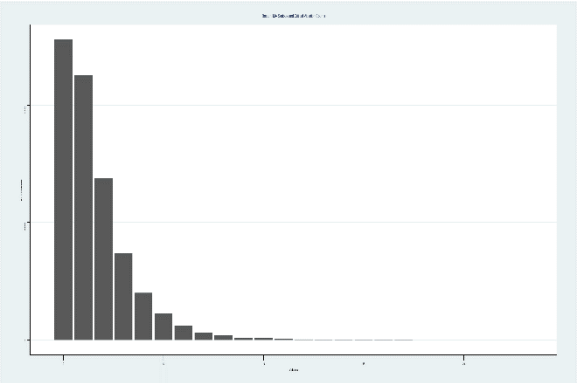
[61] ERICKSON, *supra* note 29, at 8.

FIGURE 1: Distribution of Non-Minor Violations

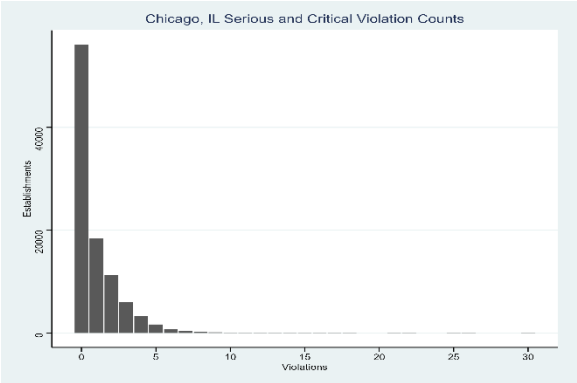
A: Albuquerque, NM



B: Boston, MA



C: Chicago, IL



D: Louisville, KY

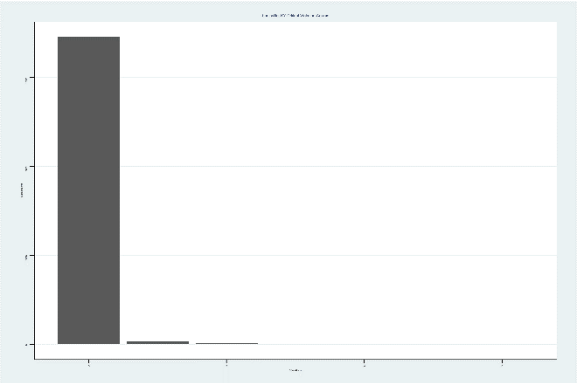
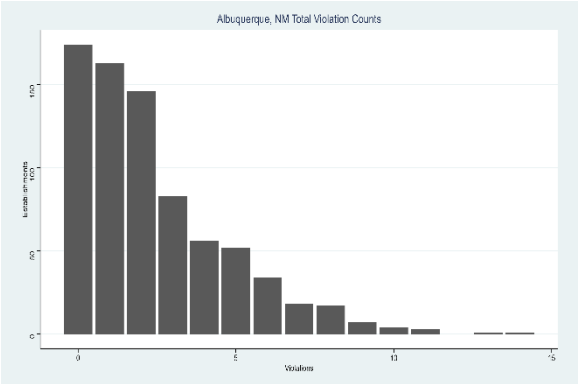
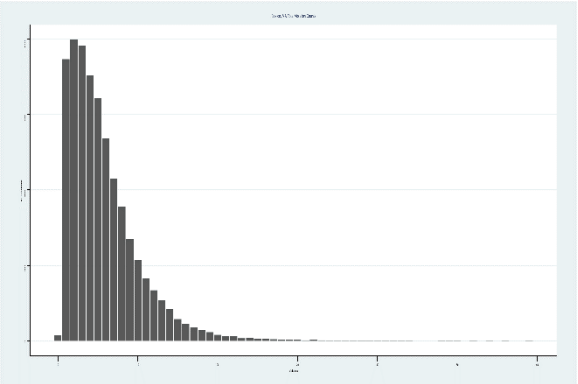


FIGURE 2: Distribution of Total Violations

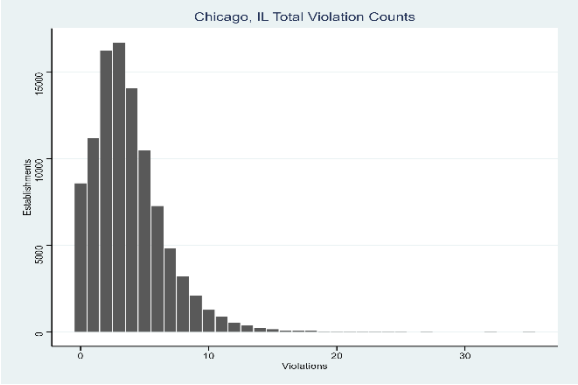
A: Albuquerque, NM



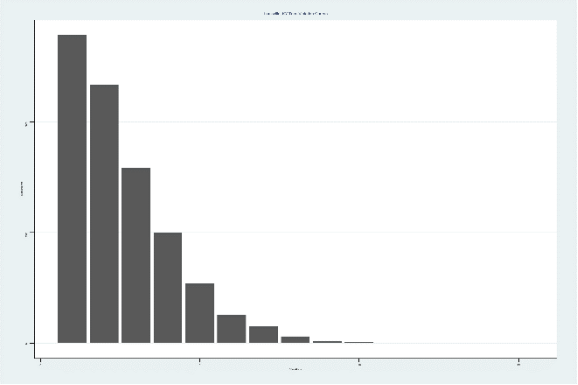
B: Boston, MA



C: Chicago, IL



D: Louisville, KY



C. Model Design

As noted in Section III.A, this project borrows heavily from the Institute for Justice study's model design. The Institute for Justice Ordinary Least Squares (OLS) model is

$$Y = \beta_0 + \beta_1(\text{restaurants}) + \beta_2(\text{other}) + \theta + X + \Omega + \Phi + \varepsilon \quad (1)$$

where phi represents the establishment-level fixed effect. The Institute for Justice Poisson model is:

$$\ln(Y) = \beta_0 + \beta_1(\text{restaurants}) + \beta_2(\text{other}) + \theta + X + \Omega \quad (2)$$

Theta, chi, and omega signify day of the week, month, and year dummy variables for both models.[62] Dependent variable Y represents violation counts, with "zero or no demerits being the best score."[63] Interestingly, clustered standard errors were used in place of establishment-level fixed effects for the Poisson model.[64]

Using the Institute for Justice models as a starting point is advantageous for two reasons: First, this project's dataset suffers from the same omitted variable issues identified in the Institute for Justice study. Inspection datasets, even when combined with business license datasets, do not provide a comprehensive picture of establishment-specific factors that may influence inspection scores. That is, clustering at the establishment-level is necessary because each observed inspection is not an independent event. As such, establishment-level fixed effects allow us to differentiate the effect of establishment type (whether the restaurant is a food truck) from other time-invariant establishment-level factors. Second, employing a similar model design for this project allows us to compare this

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[62] *Id.* at 28.
[63] *Id.*
[64] The Institute for Justice notes that running the Poisson model with fixed effects did not result in appreciably different results. Fixed-effect Poisson model outputs were not available for inspection. *See id.* at 28 n.20.

project's results with those in the Institute of Justice study. Specifically, conclusions from two shared localities, Boston and Louisville, are directly comparable. The Institute for Justice study covers Boston inspections from 2011 to July 2013—this project extends the observed timeframe from 2006 to 2022. Similarly, in Louisville, the Institute for Justice evaluated inspections from 2010 to July 2013—this project's dataset extends the analysis to data from 2017 to 2022.

However, this project's models deviate from the Institute for Justice models in a few key respects. First, this project omits OLS regression results since all dependent variables are discrete counts. At best, OLS results that mirror GLM results are duplicative.[65] Second, negative binomial models are specified in lieu of Poisson models for two localities. Specifically, this project's Boston and Chicago samples exhibit overdispersion and thus violate the Poisson assumption that the mean and variance of the distribution are equal.[66] Third, establishment-level fixed effects are retained for all models. Fourth, dummy variables for time are omitted. The Institute for Justice is correct that establishment-level fixed effects do not control for variability of individual inspection scores over time.[67] However, model performance indices suggest that including day of the week, month, and year dummy variables do not result in better fit.[68] All other considerations being equal, simpler models are preferable. Lastly, this project simplifies the dataset by comparing only two groups of establishments:

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[65] At worst, reporting divergent OLS and GLM results risk misleading readers. OLS models theoretically require a continuous dependent variable, and no such dependent variable exists here. As such, this author has chosen to only report GLM results.

[66] Poisson models were also fit for Boston and Chicago. The negative binomial models exhibited significantly better fit than the Poisson models. Negative binomial models are not the only option though: a quasi-Poisson model is another potential alternative. For further discussion, *see* ANDREW GELMAN & JENNIFER HILL, DATA ANALYSIS USING REGRESSION AND MULTILEVEL/HIERARCHICAL MODELS, 114–16 (2006).

[67] Fixed effects models only account for time-invariant omitted variables. Time-varying values must be separately accounted for in the model. Comparing gender (time-invariant) and education (time-varying) illustrates the difference: a 9th grade male student will (hopefully) be a male high school graduate when observed five years later. The Institute for Justice, by including dummy variables for day of the week, month, and year, separates the effect of time-varying inspection effects from the establishment-type effect.

[68] An example is total violations for Albuquerque. Compared to the baseline model, adding date dummy variables doesn't lower AIC, BIC, or RMSE values. This author believes the loss in model power outweighs the benefit of including time-variant controls.

brick-and-mortar restaurants and food trucks. The decision to exclude other establishment types such as grocery stores or caterers was based on project scope considerations and practicality.[69] Existing public debate focuses on comparisons between food trucks and brick-and-mortar restaurants—not self-serve food lines at grocery stores or private caterers. And as a practical matter, this author simply lacks the compute resources necessary to fit models that include other establishment types.[70] As such, the model used for this project is

$$\ln(Y) = \beta_0 + \beta_1(\text{mobile}) + \Phi \quad (3)$$

Phi represents establishment-level fixed effects. Poisson models are used for Albuquerque and Louisville, and negative binomial models are used for Boston and Chicago because of overdispersion. The same formula applies for all localities since Poisson and negative binomial equations are identical.

IV. Model Analysis

Tables 3 and 4 present this project's results. All regression outputs substitute coefficients for Incidence Rate Ratios (IRR) with 95% Confidence Intervals (CI) to better illustrate the effect of the food truck establishment type on violation counts. Interclass Correlation Coefficients (ICC) are provided to contextualize the proportion of variance attributable to inspection-level differences. Lastly, two R^2 values are included as a rough fit heuristic: marginal R^2 considers fixed effect variance only, while conditional R^2 considers the entire model.

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[69] *See* ERICKSON, *supra* note 29, at 18.

[70] Two computers were used for this project: (1) a 6-core ThinkPad with 16GB of RAM and (2) a 4-core desktop with 32GB of RAM. The ThinkPad runs out of RAM when fitting the largest models despite regular garbage collection. Model convergence is painfully slow on both computers even when OpenMP is used.

A. Non-Minor Violation Rate

Table 3 presents the results of non-minor violations for the four localities. Results for Albuquerque, Boston, and Chicago are consistent with the Institute for Justice's conclusion that food trucks receive similar or fewer violations than brick-and-mortar restaurants. The Albuquerque results provides a headline-grabbing example: when holding all other variables constant, Albuquerque food trucks are expected to have a 48% lower non-minor violation rate than brick-and-mortar restaurants. However, the Albuquerque model ICC value (0.43) indicates a slight majority of the variance in violation counts is attributable to inspection-level differences within a business. Further comparing marginal and conditional R^2 values suggests that inspection-level differences explain most of the violation count variance. The Albuquerque model thus supports the inference that the food truck establishment type has—at most—a weak negative causal effect on violation rates.

The Boston and Chicago models support a conclusion similar to that of Albuquerque's. Both models lack significant explanatory power, suggesting that the food truck establishment type has little or no effect on violation rates. Additionally, low ICC values for both models indicate that the vast majority of violation rate variance is attributable to differences between inspections within the same business.[71] As such, even Boston's statistically significant IRR does not create the inference that food truck establishment types affect non-minor violation rates.

Louisville's results are peculiar. Of note is the high ICC (0.82) indicating a significant establishment-level variance. Further, the massive difference between marginal and conditional R^2 values suggests that the food truck establishment type is meaningless in explaining the Louisville

[71] Low ICC also indicates that a fixed-effect model may be unnecessary since the individual inspection observations are practically independent. One-level models were also created for Boston and Chicago but weren't appreciably different. *See* Appendix A for these model outputs.

observations. These factors cast doubt on the accuracy of the reported IRR which projects a 463% increase in violation rates for food trucks. However, the Louisville results aren't totally unexpected—Figure 1D shows that observations with zero non-minor violations dominate the dataset.[72] Implications of both Louisville models are discussed in further detail in Section IV.B.

B. Total Violation Rate

Table 4 presents the results of the total violation models. Unlike the models detailed in Section IV.A, the dependent variable for the models in Table 4 include critical, serious, and minor violations.

Like the results from Table 3, the Albuquerque, Boston, and Chicago models in Table 4 yield similar inferences for models reporting total violation rates. A food truck establishment is expected to have a 48%, 94%, and 68% lower total violation rate than brick-and-mortar restaurants in Albuquerque, Boston, and Chicago respectively. However, these causal relationships are severely tempered by indicators that inspection-level factors account for most of the variance in total violation counts—this is especially true for Boston where the ICC value (0.06) suggests that almost all of the action is happening between individual inspections. Thus, just like the non-minor violation models for these three cities, the most plausible inference is that the food truck establishment type has little to no effect on total violation rates.

Given the anomalous results in Table 3, Louisville is addressed separately. For total violations, Louisville observations are more similar to the other three localities. A food truck establishment has

[72] A zero-truncated hurdle model exhibits significantly better fit. *See* Appendix B for the hurdle model output. However, it's not included in this project's main discussion because this author cannot think of a reason why observations with zero non-minor violations are logically distinct from observations with non-zero non-minor violations. Model specification cannot contradict research design. As such, no justifiable inferences can be drawn from the hurdle model, regardless of fit.

a 13% lower total violation rate when compared to brick-and-mortar restaurants. Differences in individual inspections still control the vast majority of the total violation variance.

Figures 1D and 2D provide some insight into the divergent results between the two Louisville models. Figure 1D shows that the number of Louisville inspections with zero non-minor violations is surprisingly high. Figure 2D, which counts total violations, exhibits a distribution more similar to those of the other three jurisdictions.[73] As such, this project's model likely failed to accurately fit the zero-inflated non-minor violation count.

Explaining why Louisville's non-minor and total violation counts are so differently distributed is more difficult. Standard data cleaning procedures did not reveal any obvious errors in the Louisville dataset. Further investigation, however, might reveal that non-minor violations have been systematically miscoded—not much unlike the significant data integrity issues previously documented in the New York restaurant dataset.[74] Another possibility is that Louisville's non-minor violation counts are grossly inflated. Indeed, a prior study found that Louisville's inspections exhibited uncannily consistent grades, with "94% of restaurants receiv[ing] 'A's."[75] Such grade inflation, if still prevalent in Louisville, would explain the high proportion of inspections receiving zero non-minor violations.

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[73] The total violation distribution strongly suggests that zero-count observations are not logically distinct from non-zero observations. This further justifies excluding the hurdle model discussed in footnote 72 and Appendix B.
[74] Ho, *supra* note 59, at 658–59.
[75] *Id.* at 671.

TABLE 3: Non-Minor Violations Model Outputs

	Albuquerque, NM			**Boston, MA**		
Predictors	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*
(Intercept)	1.46	1.34–1.46	<0.001	1.51	1.45–1.57	<0.001
Mobile = TRUE	0.52	0.38–0.71	<0.001	0.89	0.83–0.96	0.002
Random Effects						
σ^2	0.54			0.81		
τ_{00}	$0.41_{FacilityID}$			$0.01_{FacilityID}$		
ICC	0.43			0.01		
Obs.	759			70827		
Marginal R^2	0.040			0.001		
Conditional R^2	0.455			0.014		

	Chicago, IL			**Louisville, KY**		
Predictors	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*
(Intercept)	0.88	0.87–0.89	<0.001	0.00	0.00–0.00	<0.001
Mobile = TRUE	1.12	0.86–1.47	0.399	4.63	1.21–17.76	0.025
Random Effects						
σ^2	1.23			9.08		
τ_{00}	$0.20_{FacilityID}$			$40.45_{FacilityID}$		
ICC	0.14			0.82		
Obs.	98338			17587		
Marginal R^2	0.000			0.001		
Conditional R^2	0.141			0.817		

TABLE 4: Total Violations Model Outputs

	Albuquerque, NM			**Boston, MA**		
Predictors	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*
(Intercept)	2.08	1.92–2.25	<0.001	5.64	5.33–5.96	<0.001
Mobile = TRUE	0.42	0.31–0.57	<0.001	0.61	0.58–0.64	<0.001
Random Effects						
σ^2	0.42			0.42		
τ_{00}	$0.44_{FacilityID}$			$0.03_{FacilityID}$		
ICC	0.52			0.06		
Obs.	759			78444		
Marginal R^2	0.066			0.008		
Conditional R^2	0.548			0.065		

	Chicago, IL			**Louisville, KY**		
Predictors	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*
(Intercept)	3.51	3.48–3.54	<0.001	2.34	2.30–2.38	<0.001
Mobile = TRUE	0.61	0.53–0.72	<0.001	0.87	0.78–0.97	0.010
Random Effects						
σ^2	0.34			0.36		
τ_{00}	$0.16_{FacilityID}$			$0.12_{FacilityID}$		
ICC	0.32			0.25		
Obs.	98338			17587		
Marginal R^2	0.001			0.001		
Conditional R^2	0.323			0.251		

V. DISCUSSION AND CONCLUSION

The purpose of this project has been to analyze publicly accessible food safety inspection data to examine whether local regulations justified on the belief that food trucks are categorically less safe are defensible. In closing, this Section summarizes our findings, discusses potential limitations, and briefly explores the impact of our findings on food safety regulation.

A. Findings and Limitations

This project's findings support the Institute for Justice's finding that "[f]ood trucks and carts are every bit as clean and safe as restaurants and other types of brick-and-mortar food establishments."[76] Data from all four localities suggest that an establishment, by being a food truck, is expected to receive fewer total violations per inspection.

Conclusions are harder to draw for non-minor violations. Chicago and Louisville models suggest that food trucks will receive more inspection violations than brick-and-mortar restaurants. The other two localities—Albuquerque and Boston—suggest the opposite result: food trucks in these localities are expected to receive *fewer* non-minor violations. As these four models demonstrate, meaningful insights require more than just a statistically significant IRR. Given the low ICC values for Boston and Chicago, the most plausible inference is that inspection-level differences are the primary determinants of non-minor violation rates.

Differing non-minor violation model outputs also support a broader conclusion—the relationship between food truck establishment types and inspection violation rates is weak at best. Inspection-level factors which reflect the steps an establishment's management and employees have taken to ensure compliance with food safety standards should be the primary determinant of violation

[76] ERICKSON, *supra* note 29, at 8.

rates. This conclusion makes intuitive sense: a sparkling restaurant won't stay safe for long in the hands of a slob (perhaps this project shares something in common with Kitchen Nightmares). Other establishment-level factors may also relate more strongly to violation counts. For example, one study suggests that establishment-level factors such as onsite "alcohol consumption and tobacco retail licenses" can be used to forecast restaurants with critical safety violations.[77]

Substantively, this paper has only begun to scratch the surface of hypothesis testing about the role of establishment-level factors on food health and safety outcomes. This project's narrow scope constrains our ability to draw specific inferences on factors that may meaningfully affect inspection violation rates. Further establishment-level analysis will likely require additional measurements not currently available in publicly accessible datasets. This paper, by showing the exploring the relationship between the food truck establishment type and violation counts, therefore serves as a starting point for future researchers seeking to positively identify the role various covariates play in inspection violation counts.

This project's findings are also constrained by the inability to fully exclude latent systemic bias from publicly available datasets. In other words, inspections might favor certain establishment types as a category. More than mere speculation, some anecdotal evidence suggests that food trucks and brick-and-mortar restaurants are treated differently, notwithstanding uniform inspection procedures and guidelines. Indeed, some reports suggest that food trucks must endure *more* rigorous inspections than brick-and-mortar restaurants. One Washington, D.C. food truck owner noted that "his business [was] inspected eight times in seven months,"—a stark difference from the brick-and-mortar restaurant he previously worked at, which was only inspected "once in the same length of time."[78]

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[77] CITY CHI., *Food Inspections Evaluation*, GITHUB, https://github.com/Chicago/food-inspections-evaluation.
[78] NORMAN, *supra* note 12, at 32.

Further, Food Safety News reports that "[f]ood truck owners in Los Angeles County continue to complain that inspectors are out to find food truck violations, making it harder for them to make an 'A' grade."[79]

On the other hand, some reports suggest that inspections are biased in favor of food trucks. For example, the CDC EHS-Net study argues that difficulties in locating mobile food facilities mean that "annual health inspection[s are] usually scheduled and do[ ] not occur when the food truck is in operation."[80] Because "the food trucks are empty of food and water, and since no food preparation nis occurring[,] the evaluation of food and water safety risk factors is not possible."[81] A 2016 ABC7 Chicago investigation also found that the Chicago health "department isn't doing many surprise inspections on food trucks," with "only a mere 10 percent ever get[ting] surprise or otherwise known as 'canvass' inspections."[82] Observations in the dataset may therefore overrepresent inspections that are easier for food trucks to score well in.

For Chicago, these concerns are misplaced—the trimmed dataset used for both Chicago models focus exclusively on canvas inspections. However, the datasets for the remaining three localities did not allow for similar trimming: only follow-up inspections were removed for Albuquerque, Boston, and Louisville. Yet, the severity of such biases on the reported IRRs is likely not meaningful. If lower non-minor violation rates are attributable a lack of inspections conducted

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[79] FOOD SAFETY NEWS, *Food Trucks with Good Food Safety Records Hard to Find in LA County*, (May 19, 2016), https://www.foodsafetynews.com/2016/05/food-trucks-with-good-food-safety-records-hard-to-find-in-la-county/.

[80] Faw & Tuttle, *supra* note 44, at 36.

[81] *Id.*

[82] JASON KNOWLES & ANN PISTONE, *Food Truck Health Reports: Lack of Surprise Inspections*, ABC 7 EYEWITNESS NEWS CHI. (Dec. 15, 2016), https://abc7chicago.com/1659003/. Also included in the ABC7 Chicago story is a quote from Dr. Julie Morita, Chicago's Public Health Commissioner: "These are lower risk food establishments, food trucks are lower risk, so they are not as frequent as we would do for the higher risk categories." Dr. Morita's statement seems to cast further doubt on Chicago's health and safety justifications for public property and proximity bans. *See supra* Section I.

while a food truck is operating, then the IRRs for these three localities should be very different between the non-minor and total violation models. This is because minor violations should be captured for food trucks even under the inspection conditions described by EHS-Net, thus diminishing the proportion of non-minor violations in the total violation count. Systemic bias would likely result in IRR values rising closer to 1. But Albuquerque and Boston's IRR values are *lower* for total violations than non-minor violations. This indicates that non-operational inspections described by EHS-Net do not explain this project's findings.

B. Implications for Food Safety Regulation

Our conclusion—that the food truck establishment type does not meaningfully affect inspection violation rates—naturally leads to the next question: So what?

Conventional wisdom would suggest that food inspection results are related to public health and safety outcomes. A higher scoring restaurant is safer than a lower scoring one—so the argument goes. Indeed, the FDA Food Code proclaims that "inspections on the control of foodborne illness risk factors . . . mak[e] a great impact on reducing foodborne illness."[83] Theoretically, food inspections have the ability to increase food safety by "motivat[ing] improvement of food handling practices," "educat[ing] and inform[ing] food business operators," and "promote greater compliance via disclosure of results to consumers."[84] Notably, even the Institute for Justice study, by concluding that food trucks are "every bit as clean and safe as restaurants," implicitly assumes there is a link between inspection scores and health outcomes.[85]

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[83] *See* U.S. DEP'T OF HEALTH & HUMAN SERVS., PUB. HEALTH SERV., FOOD & DRUG ADMIN., FOOD CODE, ANNEX 5, at 590 (2017).
[84] Jason Barnes et al., *Defining Food Safety Inspection*, 19 INT'L J. ENV'T RSCH. & PUB. HEALTH, no. 19, 2022, at 10.
[85] ERICKSON, *supra* note 29, at 8.

However, the link between inspection results and food safety is weaker in practice. Deficiencies in accuracy and reliability severely limit the practical benefit of inspection results on food safety. The first accuracy problem involves differing localities' food safety inspection regimes. State and local governments have wide discretion to dictate inspection criteria and procedure—no federal uniform sanitation standard exists.[86] Since the FDA Food Code "is neither federal law nor federal regulation," even localities that have adopted the Code are free to deviate from its guidance. Inspection criteria and procedure thus vary wildly across different localities. For example, "[n]ine of twenty top metropolitan areas do not use any formal numerical score" for their inspections.[87] Localities that use numerical scoring assign "drastically different weights" to the same violation.[88] These differing weights and methods of evaluation suggest the lack of consensus on methods to accurately measure food safety.[89] As such, higher inspection scores don't necessarily translate to increased food safety.

A second issue impacting accuracy is grade inflation. As briefly mentioned above in Section III, some localities provide the vast majority of inspected restaurants with uncannily high grades. For example, "99%, 97%, and 94% of restaurants receive 'A's in North Carolina, South Carolina, and Louisville, respectively."[90] San Diego is the worst offender, with "99.9% of restaurants receiv[ing] an 'A' [grade]."[91] Since inspection grades are necessarily inversely related with violation counts, even a theoretically accurate inspection rubric may become inaccurate with grade inflation. In other words, high grades may be the result of inspectors downplaying, overlooking, or miscoding

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[86] Ho, *supra* note 59, at 590.
[87] *Id.* at 594.
[88] *Id.*
[89] *Id.* at 591.
[90] *Id.* at 671.
[91] *Id.* at 611.

violations. Problematically, such uniform grade inflation means that inspection results become meaningless with respect to determining actual food safety outcomes.

Further weaking inspection results' link to food safety is inconsistent inspection implementation. Inspections, even when conducted with objective scoring rubrics, are heavily susceptible to inspectors' subjective discretion. Indeed, "[a]ssessing the existence and severity of violations, such as an 'improperly constructed' surface, . . . necessarily requires inspector discretion and is subject to variability in implementation across inspectors."[92] Problematically, such discretion can be abused by inspectors acting in bad faith. Inspectors have been caught red-handed "instructing a restaurant operator that an A grade was going to cost $200."[93] Chicago restaurant owners claim that standing up to the health department results in inspectors "find[ing] anything to put you in your place."[94] Discretion extends beyond bad-faith inspectors—even well-intentioned inspectors are subject to subconscious biases that influence inspection scores. For example, "an inspector's experience at one establishment affect[s] their scrutiny at the next one. . . . [I]nspectors who encountered many violations or worsening trends at a first location tended to intensify their next inspection, leading them to cite more violations."[95] As such, even a theoretically accurate inspection regime may generate unreliable inspection results in practice.

These three deficiencies in accuracy and reliability mean that inspection results might not be a useful proxy in determining whether a particular restaurant is actually safe. As such, this project's

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[92] *Id.* at 592.
[93] Matthew Philip Makofske, *Mandatory Disclosure: Letter-Grade Systems, and Corruption: The Case of Los Angeles County Restaurant Inspections*, 172 J. ECON. BEHAV. & ORG. 292, 295 (2020).
[94] MONICA ENG ET AL., *City Health Inspections Tough Even for Toniest of Restaurants*, CHI. TRIB. (Dec. 30, 2011), https://www.chicagotribune.com/lifestyles/health/ct-met-restaurants-health-inspection-failures-20111230-story.html.
[95] MARIA R. IBANEZ & MICHAEL W. TOFFEL, *To Improve Food Inspections, Change the Way They're Scheduled*, HARV. BUS. REV. (May 16, 2019), https://hbr.org/2019/05/to-improve-food-inspections-change-the-way-theyre-scheduled.

finding—that food trucks have equal or slightly lower inspection violation rates—likely tells little about food safety risks consumers face when eating out.

However, this is not to say that this project's findings are meaningless from a public policy perspective. Food inspections, regardless of their actual accuracy and reliability, are trumpeted by policymakers as an effective means to increase restaurant safety.[96] Indeed, the lack of pushback against food inspection regimes suggests widespread acceptance of food inspections' purported benefits: Consumers value inspections because they are seen as useful informational tools and a means to hold businesses accountable. Operators value the competitive advantages favorable inspection results provide. Inspectors may value inspections due to regulatory buy-in. As such, food inspection results likely remain infallible in the eyes of policymakers.

Perceived infallibility makes this project's findings highly relevant in evaluating the defensibility of policies passed in the name of food safety. Such policies include the five regulations outlined in Section I. These regulations, despite being facially related to economic protectionism, are justified on health and safety assertions by numerous localities. Policymakers swear that food inspection regimes are accurate indicators of food safety. But under these same inspection regimes, food trucks receive equal or fewer violations than brick-or-mortar restaurants—thus casting significant doubt on the asserted health and safety justifications underlying these five regulations. In closing, we hope that this project's conclusions inspire researchers to further scrutinize justifications advanced by state and local governments in support of regulation.

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[96] Ho, *supra* note 59, at 583. *See also* NAT'L ASS'N CNTY. & CITY HEALTH OFFS., RETAIL FOOD INSPECTION AND GRADING CASE STUDY: SOUTHERN NEVADA HEALTH DISTRICT 5, (2016) (Although "SNHD has not conducted an analysis on the impact of the [food inspection] system on food safety . . . the system has had a positive impact on food safety.").

APPENDIX A

	Boston Total Violations			**Boston Non-Minor Violations**			**Chicago Total Violations**			**Chicago Non-Minor Violations**		
Predictors	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*	*IRR*	*CI*	*p*
(Intercept)	5.77	5.74 – 5.80	<0.001	1.54	1.53 – 1.55	<0.001	3.74	3.73 – 3.76	<0.001	0.94	0.93 – 0.95	<0.001
Mobile = TRUE	0.67	0.64 – 0.70	<0.001	0.95	0.89 – 1.01	0.100	0.59	0.52 – 0.68	<0.001	1.08	0.84 – 1.40	0.544
Obs.	78444			78444			98338			98338		
R^2	0.003			0.000			0.001			0.000		

APPENDIX B

	Louisville Non-Minor Violations Hurdle Model		
Predictors	*IRR*	*CI*	*p*
Count Model			
(Intercept)	1.80	1.75 – 1.85	<0.001
Mobile = TRUE	0.81	0.69 – 0.94	0.007
Zero-Inflated Model			
(Intercept)	0.00	0.00 – Inf	0.972
Mobile = TRUE	1.34	0.00 – Inf	1.000
Random Effects			
σ^2	0.19		
$\tau_{00FacilityID}$	0.32		
ICC	0.63		
Obs.	17531		
Marginal R^2 / Conditional R^2	0.002 / 0.628		