

# Restaurant Inspection Frequency and Food Safety Compliance

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## Abstract

Although food premises are regularly inspected, little information is available on the effect of inspections on compliance records, particularly with respect to the impact of the frequency of inspection on compliance. The following presents the outcome of a study designed to assess the impact of increased inspection frequency on compliance measures in Hamilton, Ontario, in the absence of any other changes to food handler/safety programs or legislation. High-risk food inspection premises were randomly assigned three, four, or five inspections per year. Results indicate that no statistical difference existed in outcome measures based on frequency of inspection. When premises were grouped based on the average time between inspections, premises with greater time between inspections scored better compliance measures relative to premises that were inspected more frequently. The study was also unique for the level of consultation and collaboration sought from the public health inspectors (PHIs) assigned to the Food Safety Program. Their knowledge and experience with respect to the critical variables associated with compliance were a complementary component to the literature review conducted by the research team.

signed either "high," "medium," or "low" risk status based on Hazard Analysis Critical Control Point (HACCP) criteria, an internationally recognized food safety system that involves the identification and control of points in food production where critical problems can occur. High-risk premises are defined as those that serve perishable foods (which therefore support the growth of foodborne pathogens) that involve multiple preparation steps or cater primarily to groups at risk for serious foodborne illness, including full service restaurants and long-term-care facility kitchens. Medium-risk premises are defined as those that also serve perishable foods but with minimal preparation steps and that cater primarily to a general clientele, including fast-food outlets. Low-risk premises include variety stores. PHS strives to meet the Ontario Mandatory Health Program and Service Guidelines that require high-risk premises to be inspected every four months (three times per year), medium-risk premises every six months (two times per year), and low-risk premises annually. Approximately 3,000 food premises in Hamilton are administered by public health inspectors (PHIs) working in geographic districts, including approximately 489 restaurants that are defined as high-risk premises. Inspectors are also responsible for addressing other environmental health issues related to housing, water quality, and communicable disease control in addition to food safety inspections. The typical food premises caseload is 200 premises per inspector district.

## Introduction

Foodborne illness is a major cause of morbidity and mortality. Health Canada and the Public Health Agency of Canada estimate that as many as 13 million Canadians suffer from foodborne illness each year (Health Canada, 2007). Corresponding costs associated with this illness range between 12 and 14 billion (Canadian) dollars (Canadian Partnership for Consumer Food Safety Education, 2007). Strategies to control or reduce foodborne illness in Canada and the U.S. consist of regulatory requirements for the food industry combined with some level of consumer education.

At the municipal level, regulatory activities are aimed largely at retail food premises (restaurants, food stores, etc.). Traditionally, these activities have focused on the routine inspection of premises to monitor and enforce compliance with applicable legislation. Many authorities, however, have begun to question the effectiveness of routine inspections versus other potential strategies such as food handler education and public disclosure of inspection findings.

Hamilton Public Health Services (PHS) began exploring this issue, and particularly the effectiveness of routine inspections, in 2005. In Ontario, food premises are as-

**TABLE 1****Inspection Completion and Compliance Rates, Combined High- and Medium-Risk Categories, Hamilton, Ontario, 2001–2006**

	2001	2002	2003	2004	2005	2006
% Inspection Completion Rate	71	81	85	93	95	91
% Compliance Rate <sup>1</sup>	43	61	77	77	75	76

<sup>1</sup> Compliance Rate = percentage of routine inspections NOT requiring a reinspection.

Although food premises are routinely inspected, little scientific evidence exists to support the impact of routine inspections on compliance rates, particularly with respect to the frequency of inspections on compliance rates. The available studies (Bader, Blonder, Henriksen, & Strong, 1978; Corber, Barton, Nair, & Dulberg, 1984; Kaplan, 1978; Mathias, Sizto, Hazlewood, & Cocksedge, 1995) provide mixed results or changes to inspection frequency mixed with other regulatory changes (Mathias, Sizto, Hazlewood, & Cocksedge, 1995). Some, for example, suggest that once- or twice-yearly inspections resulted in declines in sanitation and compliance, and once-a-year inspections were insufficient to maintain sanitary conditions (Bader, Blonder, Henriksen, & Strong, 1978; Kaplan, 1978). Conversely, increased frequency of inspection (up to four times per year) resulted in improved sanitation (Allwood, Lee, & Borden-Glass, 1999) although sample sizes were relatively small, while a larger randomized study in Ottawa-Carleton, Ontario, found that increasing the frequency of inspections did not lead to improved sanitary conditions (Corber, Barton, Nair, & Dulberg, 1984).

In Hamilton, however, PHS observed that as routine inspections reached 85% of the mandated provincial frequency (based on 2005 data), compliance with safe food practices levelled off and did not improve with increasing inspection frequency (Table 1). PHS was uncertain whether this trend represented an absolute plateau in effective inspection frequency or whether some increase above the provincial mandate might push compliance higher.

In order to explore this question further, and before committing budget to other potential food safety program enhancements, PHS and the McMaster Institute of Environment and Health (MIEH) conducted a study to analyze the relationship between food inspection frequency and compliance with the expectation that increased inspection frequency would lead to greater compliance rates. Compliance

was measured both as a function of observed critical and noncritical infractions (see below) and the number of inspections required per routine inspection conducted.

### Materials and Methods

The analysis relies upon a mixed methodology, a combination of both quantitative and qualitative tools. The utilization of a mixed-methods approach allowed the research team first, to gauge the effectiveness of increased inspections as measured by a series of compliance measures capturing critical and noncritical infractions, and second, to include the professional opinions of the PHIs about the effectiveness of increased inspection frequency versus other available compliance tools. The research team was committed to the concept of “collective efficacy,” or the belief that a combined effort is necessary to attain a shared goal (Powers, Cumbie, & Weinert, 2006). Thus the research team had access to the expertise and experience (1–30 years) of those who regulate compliance within the industry—an important resource, especially in light of the diversity of the scientific findings. The level of consultation had a secondary benefit in that it also created an atmosphere of cooperation with the PHIs in terms of both the increased workload and the day-to-day observance of the impact of the changes within various premises.

### Quantitative Methodology

High-risk food premises in Hamilton were randomly assigned an inspection frequency of three, four, or five routine inspections in the 2006 calendar year. Randomization was based on geographic districts, so that no inspector was assigned a greater number of premises that needed to be inspected at a greater frequency, and so that premises with increased inspections were distributed across the city. In total, 110 premises were to be inspected four times in 2006, another 110 premises were to be inspected five times, with the balance inspected three times (every

four months) during the year, equal to the provincial standard. Selection of sample sizes was meant to ensure statistical significance at the  $p = .05$  level, while allowing for some attrition of premises in the increased frequency categories and not overburdening inspectors with a large number of increased inspections. Operators were not notified of the potential for increased inspections, although PHS prepared a letter in advance explaining the study and its motivations, if any operator questioned the increased number of routine inspections. The majority of operators did not notice an increase in inspection frequency (when applicable).

All inspections were carried out by certified inspectors employed through the city of Hamilton. Inspections were performed using standardized forms that include time/date of inspection, reason for visit (i.e., routine inspection, reinspection, complaint, consultation), and a listing of critical and noncritical items. Critical infractions include internal temperature of cold and frozen foods, cooking/hot and holding/reheating of hazardous foods, food protection from adulteration and contamination, and food protected from contamination by food handlers. Noncritical infractions include pest control, general food protection, hygiene of food handlers, sanitation, cleaning, and washing.

Compliance indicators based on the number of recorded critical and noncritical infractions for the 2006 calendar year were analyzed and compared. Compliance is measured through three ratios: the number of reinspections per number of routine inspections (RE/R); the number of critical infractions per routine inspections (CI/R); and the number of noncritical infractions per routine inspections (NCI/R). Statistical tests were conducted to evaluate statistical difference from the 2006 city average.

Prior to commencing the study (January 1, 2006), and immediately after its completion (December 31, 2006), PHS inspectors (PHIs) were requested to complete a survey regarding the impact of increasing the annual number of routine food safety inspections from three times a year. Among other questions, inspectors were queried with respect to their impressions of the impact of increased inspections on compliance and the optimal number of yearly inspections. In both cases, PHIs ranked their response on a five-point scale, from *strongly agree* to *strongly disagree*. An open-ended question determined inspector's perceived optimal number of yearly inspections along with why this was the case.

### Qualitative Methodology

The qualitative tools consisted of two anonymous and confidential surveys conducted with the PHIs (prestudy and poststudy) and two large focus group sessions, which were composed of all Health Protection Division inspectors, management, and the research team. Focus groups are usually conducted with “relatively homogenous [individuals] who have something in common and can share similar experience about” an issue (Hofmeyer & Scott, 2007). The large group interaction allowed the PHIs to raise issues of concern and offer suggestions into the study process, and it created the opportunity to share any challenges arising from the study. For example, the inspectors raised the issue of appropriate response to operators who may comment on the increased frequency of inspections. The research team was able to proactively prepare a letter for distribution to premise operators, by request only, summarizing the study and its goals. In reality, the inspectors observed that the majority of operators did not notice an increase in inspection frequency (when applicable).

We were also aware that workplace focus groups can lead to issues of “spatial familiarity,” which ultimately can “silence” some of the participants’ “voices” (Hofmeyer & Scott, 2007). Our solution was to utilize a secondary qualitative tool in the form of an anonymous, confidential survey. The survey consisted of a series of closed questions (Y/N and a five-point scale) and open-ended questions. The first survey was distributed in December 2005, prior to the implementation of the study, and the second survey was distributed in January 2007, after the completion of the study. Findings from both were shared with the PHIs by e-mail. The questions covered a range of issues with respect to the impact of increased inspections on compliance and the optimal number of yearly inspections accompanied by space to justify their choice. Questions regarding increased workload and the impact of the increased frequency on operator/inspector relations were also on the survey.

### Results

#### Inspection Frequency Results

Completion rates and final sample sizes for each inspection frequency group were somewhat lower than expected. In total, 374 premises were retained in the final sample, including 56 establishments receiving five routine inspections in 2006, 76 premises inspected four times, and 242 premises inspect-

## TABLE 2

### High Risk Restaurant Inspection Results, 2004-2006

	2004	2005	2006
Routine inspections (R):	1,411	1,371	1,225
Reinspections (RE)	464	430	466
Critical infractions (CI)	506	490	218
Noncritical infractions (NCI)	1,766	1,514	1,436
RE/R	0.33	0.31	0.38
CI/R	0.36	0.36	0.18
NCI/R	1.25	1.10	1.17

## TABLE 3

### High-Risk Restaurant Inspection Results, 2006: Increased Inspection Frequency

	Yearly Frequency of Inspection			
	3x	4x	5x	Total (2006)
Premises	242	76	56	374
Routine inspections (R)	684	275	266	1,225
Reinspections (RE)	259	114	93	466
Critical infractions (CI)	112	51	55	218
Noncritical infractions (NCI)	788	344	304	1,436
Average time (days) between inspections	64	54	43	54
RE/R	0.38	0.41	0.35	0.38
CI/R	0.16	0.19	0.21	0.18
NCI/R	1.15	1.25*	1.14*	1.17

\*Statistically different from 2006 city average (all),  $p < .05$ .

ed three times. The attrition in numbers was due to the closure of premises over the calendar year ( $n = 60$ ), seasonal operation ( $n = 13$ ), new ownership ( $n = 6$ , with these premises dropped from the analysis given the potential for changes in operating methods), or incomplete inspection histories (i.e., less than three routine inspections over the year). Inspections based on nonroutine issues such as complaints or consultation requests were not included in the analysis. Premises that did not meet the targeted increased number of inspections were reassigned to a lower frequency category at the end of the survey year.

Table 2 illustrates the aggregate compliance outcome measures for 2006 relative to 2004 and 2005. Overall, compliance ratios for 2006 were similar to those observed in previous years and statistically equivalent to 2004,

with the exception of CI/R, which was significantly lower in 2006 compared to the two preceding years. Table 3 disaggregates the 2006 inspections by inspection frequency. Contrary to expectations, little difference occurred in the outcome measures relative to inspection frequency. While a modest upward trend in the number of critical infractions to routine inspections (CI/R) was noted, rising from 0.16 for three annual inspections to 0.21 for five annual inspections, this difference was not statistically different. The results are, therefore, broadly consistent with the literature, which suggests that increased inspections are not associated with reduced violations (Mathias, Sizto, Hazlewood, & Cocksedge, 1995). The ratio of noncritical inspections to routine inspections, however, peaked for four annual inspections, and was statistically different than the city average

**TABLE 4****High-Risk Restaurant Inspection Results, 2006: Duration (Days) Between Inspections**

	Average Days Between Routine Inspections			
	<70	70-89	90+	All
Premises	104	92	94	290
Routine Inspections (R)	441	360	282	1,103
Reinspections (RE)	146	116	97	359
Critical infractions (CI)	86	46	50	182
Noncritical infractions (NCI)	505	409	323	1,237
RE/R	0.33	0.33	0.34	0.33
CI/R	0.20	0.13	0.18	0.16
NCI/R	1.15	1.14	1.15	1.15

for both four annual inspections and five annual inspections. Although this difference was statistically different, it is likely a statistical artefact, given that the sample size for premises targeted for increased inspections had fallen below optimal sizes.

Given the difficulty with sample size, the inspection data was recombined and separated based on the average time (business days) between routine inspections, with 90 to 100 premises assigned to each category (Table 4) (Jones, Pavlin, LaFleur, Ingram, & Schaffner, 2004). Categories included (i) an average time of less than 70 days between inspections, (ii) 70-89 days between inspections, and (iii) 90 or more days between inspections. Average time between routine inspections was based on the average number of business days between the first and subsequent inspections in 2006. Because of this additional restriction, premises with only two routine inspections were dropped from the analysis, reducing the total number of premises to 290. Once again, no significant trend was noted, with compliance measures statistically equivalent to the city average ( $p < .05$ ).

The analysis of the PHS inspectors' ( $n = 21$  responses) prestudy questionnaires indicated that the majority of PHIs (76%) felt that increasing the number of routine inspections would result in fewer reinspections. Disagreement occurred, however, with regards to the number of "optimum" inspections; just 38% felt that the standard, provincially mandated frequency (three times annually) was optimum. When asked to choose the optimum number of routine inspections, the majority of respondents (82%) believed three to four times annually would be ideal. Inspectors were also asked a series of

open-ended questions. Thematic analysis of these comments revealed that the majority of PHIs wished to increase routine inspections if the establishment was high-risk or had a history of infractions, allowing inspectors to educate the staff on proper and safe food handling, ultimately leading to a decrease in infractions.

Postsurvey, the majority of inspectors (68%,  $n = 19$ ) remained committed to three annual inspections, with only a small proportion suggesting that four inspections per year was optimal. Moreover, only 42% felt that an increase in routine inspections would lead to a decrease in reinspections based on violations, reflecting a reversal from presurvey attitudes. Although inspectors felt that a handful of premises would always be noncompliant, they broadly agreed that premises with a history of poor compliance should be inspected more frequently, enabling greater educational opportunities for workers and operators regardless of the attention paid by inspectors. This theme was noted in both the presurvey and postsurvey questionnaires. Inspectors also noted support for both a public disclosure system and food safety/handler training.

**Inspector (PHIs) Survey Results***Compliance*

In the prestudy survey (2005), which had a response rate of 66%, a clear majority (76%) of the PHIs believed an increase in routine inspections (R) would lead to a decrease in reinspections (RE). The ratio R/RE is considered an acceptable indicator of compliance. In the poststudy survey (2007), however, which had a similar response rate (63%), the percentage of PHIs who agreed with the as-

sumption had decreased to 37%. Thus the percentage of PHIs who disagreed with the premise had not only increased (from 14% to 42%) but those who were indifferent had more than doubled (from 10% to 21%). As one inspector reported, the increase in frequency was banal in its impact:

"None of my operators noticed the difference in the increase in inspections, e.g., four or five times a year!"

*Optimum Frequency Rate*

The survey findings also revealed an increase in the percentage of PHIs (from 38% to 68%) who agreed (versus disagreed) that the provincially mandated three times per year was the optimum frequency with respect to compliance rates. These findings were consistent with the results from an open-ended question which allowed the PHIs to choose the best inspection frequency. In 2007 the favorite choice (42%) was three times, whereas in 2005 the majority (82%) had chosen three to four times:

"Frequent enough to observe but if problems exist can reinspect as needed."

A thematic analysis of the open-ended questions found some PHIs believed optimum frequency should be left to the discretion of the individual inspector:

"The number of inspections per year should be based on the premises. It should be strictly up to the operators, [a] bad premises...if premises is always dirty then the owner will be subject to more inspections the following year. Incorporate a reward-like system where if you are in compliance you see less public health inspections."

Leaving the frequency to the inspectors' discretion would mean "bad" operators would be visited more often, allowing for increased education of management and staff with regards to safe food handling practices.

Initially, inspectors had believed an increased frequency would improve relations between inspectors and industry operators (57%) and ultimately increase compliance. In the poststudy survey (2007) the PHIs reported this had not been the case (32%).

*Public Disclosure and Other Compliance Tools*

Overall, findings revealed support for the current provincially mandated inspection rate with some flexibility for "bad" operators. PHIs did not believe inspection frequency should be applied in isolation but should be combined with other compliance tools including mandatory food handler certification, increased enforce-

ment, and public disclosure systems. In both the presurvey and postsurvey, PHIs were consistent in their support (48%) of a public disclosure system. This result is interesting in light of a subsequent extensive public consultation (industry and general public) undertaken by Hamilton PHS in collaboration with MIEH in spring 2007. Like the PHIs, both the general public and industry operatives believe a public disclosure system can be an effective compliance tool (City of Hamilton, 2007). Below are some of the findings from the postsurvey study (2007):

"Frequency is not the issue with repeated offender. Food handler education is more effective."

"We need mandatory food handler education instead of inspections."

"Initially I thought an increased presence in high-risk establishments would encourage operators to aim for higher levels of compliance. It became clear that the operators who were cited with critical infractions on more than one occasion were not overly concerned about achieving greater compliance. In my area in particular, I noted an ambivalence about my presence and operators had a laissez-faire attitude. I think greater compliance will be achieved by more aggressive enforcement. A public disclosure system would also act as a great motivator for operators. There would be more of an effort to reduce critical infractions cited. This should be coupled with mandatory food handler training so operators gain a better understanding of critical food safety issues."

## Discussion and Conclusion

As in all jurisdictions, restaurant inspections serve to protect the safety of both workers and patrons. This study was meant to fill a void in the literature in regards to the relationship between frequency of inspection and compliance outcome measures (as opposed to foodborne

illness outcomes). The analysis was completed independent to other changes in Hamilton's restaurant inspection system. As such, all inspections were carried out over 2006 under the same laws and regulations, and completed by trained inspectors using standardized forms. Premises were randomized to each of the three inspections groups (three, four, and five times per year) based on geography (so that no one inspector would have an excess case load of premises with greater inspection frequencies), and group sizes were meant to ensure statistical significance.

Based on the random assignment of increased yearly inspection frequency, these data suggest mixed results, although the results of the initial randomized study are in broad agreement with the literature: that an increased number of inspections does not lead to an improvement in compliance. When stratified by the targeted number of yearly inspections, no statistical difference existed in compliance criteria between three, four, and five inspections across the city. Likewise, when stratified by the average time between routine inspections, no significant difference existed. While additional compliance may not be achieved by increasing the frequency of inspections, food premise inspections should continue to play an important role in protecting the public from foodborne illnesses by educating workers. Moreover, a series of regular inspections throughout the year enables ongoing education of food workers and the capture of seasonal aspects and issues, such as more frequent summer cold chain violations that could be missed if inspections were not routinely conducted during this period.

Embedded in the compliance measures used in this analysis are variations across operators, with some premises consistently noted as "clean" or "good" operators with high standards by inspectors, while others are regarded as less compliant and needing more regular inspections. Consequently, such premises may need to be dealt with based on risk assessment

and inspected more frequently (Buchholz, Run, Kool, Fielding, & Mascola, 2002), a suggestion also raised by inspectors in the presurvey and poststudy interviews. In large part, this is already occurring, albeit informally, and is consistent with the Ontario Ministry of Health HACCP protocol for assigning risk designations to food premises.

Further changes to municipal regulatory activities in regards to food safety are likely to include some combination of food handler education, restaurant grading (e.g., Simon et al., 2005), or broader public disclosure of inspection findings. Food service education, particularly when directed toward managers and supervisors, is typically associated with fewer violations and greater compliance (Mathias, Sizto, Hazlewood, & Cocksedge, 1995). Timing between training and inspection has been noted to alter results, however, and high employee turnover in the food service industry means that training must be ongoing. With regard to disclosure of inspection results, the issues are where to post inspection results (e.g., Web or on-premise), the timeliness of posting relative to inspections, variation in inspection depth across individual inspectors, and the ability of the public to interpret scores or ratings (Dundes & Rajapaksa, 2001). Many of these issues were identified by the Hamilton PHIs who participated in our frequency study and were also in agreement with the public consultation findings undertaken by PHS in collaboration with MIEH (City of Hamilton, 2007). ■

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## REFERENCES

- Allwood, P.B., Lee, P., & Borden-Glass, P. (1999). The vital role of restaurant health inspections. *Journal of Environmental Health*, 61(9), 25–29.
- Bader, M., Blonder, E., Henriksen, J., & Strong, W. (1978). A study of food service establishment sanitation inspection frequency. *American Journal of Public Health*, 68, 408–410.
- Buchholz, U., Run, G., Kool, J.L., Fielding, J., & Mascola, L. (2002). A risk-based restaurant inspection system in Los Angeles County. *Journal of Food Protection*, 65(2), 367–372.
- Canadian Partnership for Consumer Food Safety Education. (2007). *Food safety tips/fact sheets*. Retrieved July 6, 2007, from [http://www.canfightbac.org/cpcfse/en/safety/safety\\_factsheets/foodborne\\_illness/](http://www.canfightbac.org/cpcfse/en/safety/safety_factsheets/foodborne_illness/)
- City of Hamilton. (2007, April 23). Board of Health Report B0H07006: Food Safety Program Improvements. Retrieved July 6, 2007, from <http://www.myhamilton.ca/myhamilton/cityandgovernment/citydepartments/corporateservices/clerks/agendaminutes/boardofhealth/2007/april23boardofhealthcommitteeagenda.htm>
- Corber, S., Barton, P., Nair, R.C., & Dulberg, C. (1984). Evaluation of the effect of frequency of inspections on the sanitary conditions of eating establishments. *Canadian Journal of Public Health*, 75, 434–438.
- Dundes, L., & Rajapaksa, S. (2001). Scores and grades: A sampling of how college students and food safety professionals interpret restaurant inspection results. *Journal of Environmental Health*, 64(5), 14–19.
- Health Canada. (2007). *Food-related illnesses*. Retrieved July 6, 2007, from [http://www.hc-sc.gc.ca/fn-an/secure/ill-intox/index\\_e.html](http://www.hc-sc.gc.ca/fn-an/secure/ill-intox/index_e.html)
- Hofmeyer, A.T., & Scott, C.M. (2007). Moral geography of focus groups with participants who have preexisting relationships in the workplace. *International Journal of Qualitative Methods*, 6(2), 29–33.
- Jones, T.F., Pavlin, B.I., LaFleur, B.J., Ingram, L.A., & Schaffner, W. (2004). Restaurant inspection scores and foodborne disease. *Emerging Infectious Diseases*, 10(4), 688–692.
- Kaplan, O.B. (1978). On the effectiveness of restaurant inspection frequencies. *American Journal of Public Health*, 68, 670–671.
- Mathias, R.G., Sizto, R., Hazlewood, A., & Cocksedge, W. (1995). The effects of inspection frequency and food handler education on restaurant inspection violations. *Canadian Journal of Public Health*, 86, 46–50.
- Powers, J., Cumbie, S.A., & Weinert, C. (2006). Lessons learned through the creative and iterative process of community-based participatory research. *International Journal of Qualitative Methods*, 5(2), 203–209.
- Simon, P.A., Leslie, P., Run, G., Jin, G., Reporter, R., Aguirre, A., & Fielding, J.E. (2005). Impact of restaurant hygiene grade cards on foodborne-disease hospitalizations in Los Angeles county. *Journal of Environmental Health*, 67(7), 32–36.

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