

Michala Krakowski,^{1,2} Janet Buffer,^{2,5,7} Gina Nicholson Kramer,²
 Laura Morrison,³ Nicole L. Arnold,^{4,5*} and Barbara Kowalczyk^{2,5,6,7}

¹College of Public Health, Division of Epidemiology, The Ohio State University, 250 Cunz Hall, 1841 Neil Ave., Columbus, OH 43210, USA

²Center for Foodborne Illness Research and Prevention, The Ohio State University, 213 Parker Food Science Building, 2015 Fyffe Road, Columbus, OH 43210, USA

³Ohio Restaurant & Hospitality Alliance, 100 E Campus View Blvd. STE 150, Columbus, OH 43235, USA

⁴Ohio State University Extension, The Ohio State University, Agricultural Administration Building, 2120 Fyffe Road, Columbus, OH 43210, USA

⁵Dept. of Food Science and Technology, The Ohio State University, Parker Food Science and Technology, 2015 Fyffe Road, Columbus, OH 43210, USA

⁶Translational Data Analytics Institute, The Ohio State University, 175 Pomerene Hall, 1760 Neil Ave., Columbus, OH 43210, USA

⁷Exercise and Nutrition Science, Milken Institute School of Public Health, The George Washington University, 950 New Hampshire Ave., NW, Washington, D.C. 20052, USA



An Exploratory Survey of Food Safety Practices for Food Delivery Affiliated with Ohio Foodservice Businesses

ABSTRACT

Food safety should be an essential part of food delivery systems, but little is known about the implementation of safe food handling practices. To better understand safe food handling practices employed for food delivery orders within Ohio foodservice businesses, an exploratory study was conducted. Foodservice business managers and/or owners registered with the Ohio Restaurant & Hospitality Alliance (ORHA) voluntarily completed an anonymous online survey about food delivery models, food delivery packaging, and hot and cold holding delivery practices. The survey was distributed to approximately 16,000 ORHA registered email addresses; 163 responses were received and 76 were analyzed. Over half (55%) of businesses only offered third-party delivery whereas over a third (36%) only offered direct-to-consumer services; remaining businesses (9%) used both systems of food delivery. Most respondents indicated practices were implemented to protect the safety of food during delivery. However, type of practice varied depending on delivery model, foodservice type, and business model. Survey results indicate foodservice

businesses implement practices that protect food during delivery, but how that food is handled during delivery is not fully understood. Food safety practices should be monitored within different food delivery systems, and across establishment types, to reduce risk to consumers.

INTRODUCTION

Food delivery has become increasingly popular throughout the last decade, given the integration of food delivery mobile platforms within the foodservice industry and the impacts of the Coronavirus disease (COVID-19) pandemic (4, 7). Prior to the COVID-19 pandemic, third-party delivery spending was around \$0.4 billion, but this number increased to \$1.4 billion during the pandemic (5, 9). The implementation of social distancing and stay-at-home mandates to mitigate virus spread left retail food establishments unable to fulfill their in-person seating capacity, resulting in loss of revenue (10). Food delivery quickly filled the gap, allowing retail foodservice businesses to continue providing service to customers (6, 23, 26). According to a small-business financial resource group, nearly 112 million people living in the United

*Author for correspondence: Email: arnold.1363@osu.edu; Phone: +1 614.247.6109

States (U.S.) reported using online food delivery services at least once in 2020 (24). Furthermore, in 2022, food delivery from retail food establishments contributed nearly \$76.2 billion to the U.S. market for online food delivery (25).

As the food delivery market grows, the importance of upholding proper food handling for food deliveries rises (12). For example, what are the cold and hot food holding practices supporting the safety of time/temperature control (TCS) for safety food? TCS foods support bacterial growth when kept within certain temperature ranges for extended periods of time, commonly referred to as the “temperature danger zone” (3). Some food delivery systems allow drivers to simultaneously pick up multiple orders that are then delivered over an unknown or unmonitored period of time, potentially allowing food to be in the danger zone for an extended period of time (i.e., temperature abused). Improper temperature control is a known cause of several foodborne illness outbreaks (12, 22). Food handler hygiene and protecting food orders from biological adulteration must also be considered for food delivery systems (19, 22, 25). For example, the opening of sealed packages during delivery is thought to be common. In a 2022 online survey, 79% of food delivery drivers self-reported eating customer food orders (19). Drivers opening packaged food with unwashed hands increases the potential for bacterial and/or viral contamination (11).

Retail food safety research primarily focuses on food handling practices within the retail environment, and less on the transportation of food, be it from distributors to foodservice businesses, mail-order food subscriptions, or third-party delivery (1, 12). To further understand food handling practices during delivery, an exploratory study was conducted to 1) characterize the type of delivery models implemented within foodservice businesses; 2) describe safe food handling practices employed for food delivery orders; and 3) determine whether self-reported delivery practices differed between establishments based on the type of foodservice and/or the delivery system in place. Information about the type of food delivery system and temperature control methods used for delivery were gathered from owners and managers of foodservice businesses.

METHODS

An online cross-sectional survey of owners and managers of foodservice businesses in Ohio was conducted January through March 2022. Study participants were recruited using the Ohio Restaurant & Hospitality Alliance (ORHA) (16) membership list of approximately 16,000 individuals engaged in the retail foodservice industry. Seven recruitment emails were sent to members by ORHA and recruitment information was also included in the ORHA Business Impact News email. The survey was linked within the recruitment emails, including a statement indicating participation was anonymous. No direct follow-up attempts were made beyond

the recurring recruitment emails for non-responders or incomplete surveys.

The survey (Appendix A) was self-administered electronically through online Qualtrics software, presented in English, and designed to take no more than 20 minutes, including the time needed to review the informed consent information (18). The survey instrument contained questions about establishment characteristics such as business model (chain/corporate, franchise, independent); number of locations; foodservice type (e.g., bakery/coffee shop, buffet, carry-out only, catering only, fast food, full-service dining, other); delivery systems used; and business food safety policies and practices for food deliveries (i.e., packaging methods, time/temperature control practices, training requirements). For this study, franchise businesses were defined as chain businesses that have been separated from the corporation but retain the brand name. Food delivery systems were classified as Direct-to-Consumer (DTC) or Third-Party Delivery (TPD). DTC systems were defined to be those in which delivery personnel are directly employed by the foodservice business that produced the food order. TPD systems were defined to be those in which delivery personnel have a contract employment agreement with a third-party entity (e.g., UberEats, DoorDash) to pick up a prepared food order. Survey participants were also asked about their food safety knowledge and role within the business (data not shown).

Respondents were eligible to participate in the study if they 1) represented a food business located in Ohio that offered food delivery and 2) owned or managed the respective business between January 4th, 2022 and March 4th, 2022. Incomplete responses and responses from businesses not meeting inclusion criteria were excluded from the analysis. Descriptive statistics were used to assess establishment characteristics, practices, and the type of delivery system used across respondents. Logistic regression was used to summarize relationships between establishment characteristics, type of food delivery system, and food delivery practices. Results were displayed using Wald estimates and assessed for statistical significance using an alpha level of 0.05.

Analyses were performed using SAS v.9.4 for Windows (21). Procedures for this study were reviewed and determined to be exempt by The Ohio State University’s Institutional Review Board (IRB 2021E1316).

RESULTS

A total of 163 representatives of foodservice businesses responded to the survey and, of these, 76 (46.6%) met the inclusion criteria (Figure 1).

Establishment characterization

Respondents self-identified as representing independent (71%), franchisee (22%) and chain/corporate (7%) business models (Table 1). Most respondents characterized their main

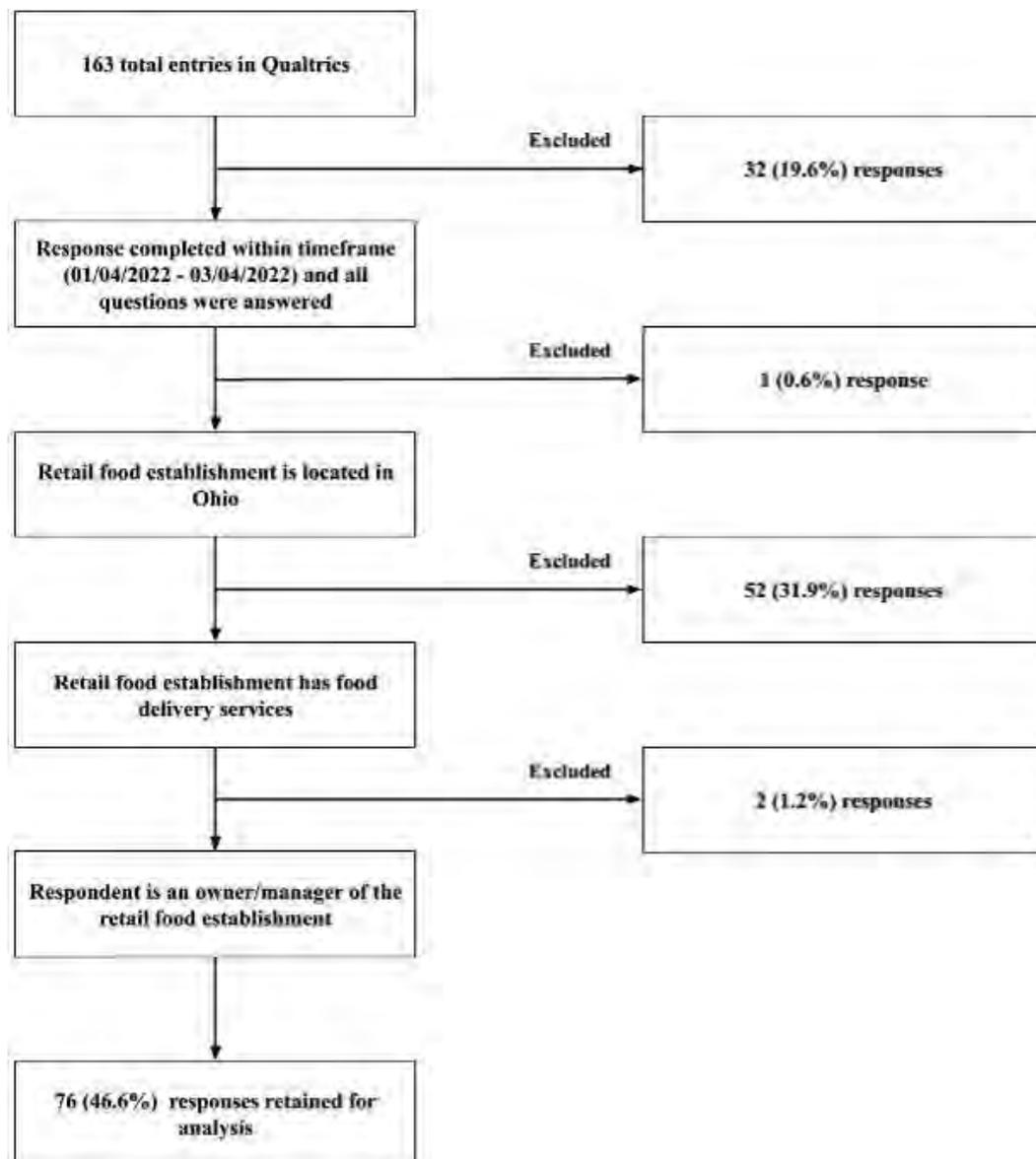


Figure 1. Participant Screening Flow Chart for Data Analysis.

type of foodservice as full-service dining (55%) or fast food (17%). Over half of the businesses (55%) only offered TPD services while just over a third (36%) only offered DTC food delivery; the remaining businesses (9%) used both systems of food delivery (Figure 2). This means that most businesses in our study did not utilize their own employees to deliver food, but instead utilized drivers affiliated with a third party.

Time and temperature control

Most respondents (63%) reported tracking delivery orders from the time the food is prepared to the time the order is delivered; 37% did not track time from ordering to delivery. Prior to pick up, most respondents (75%) reported TCS

food sitting in a temperature-controlled environment (e.g., refrigeration, heat lamp, warmer). For businesses that did not use a temperature-controlled environment prior to pick up (n=19), 95% indicated that the orders were picked up in less than a half hour; 90% indicated the max time orders were held for pickup was less than an hour; and 53% indicated that there were written policies in place for TCS orders that had not been picked up within 4 hours.

Most respondents (79%) reported using some form of temperature control packaging to prepare food for delivery (Table 2). Insulated containers (46%), followed by insulated delivery bags (42%) and foil wraps (38%), were the temperature control packaging most frequently used.

TABLE 1. Establishment Characteristics by Type of Delivery System

Characteristics	Total	Delivery System		
		DTC	TPD	Both
	N (%) 76 (100.0)	N (%) 27 (100.0)	N (%) 42 (100.0)	N (%) 7 (100.0)
Establishment Type				
Chain/Corporate Location	5 (6.6)	2 (7.4)	2 (4.8)	1 (14.3)
Franchisee	17 (22.4)	2 (7.4)	11 (26.2)	4 (57.1)
Independent	54 (71.1)	23 (85.2)	29 (69.1)	2 (28.6)
Food Service Type				
Full-Service Dining	42 (55.3)	10 (37.0)	30 (71.4)	2 (28.6)
Fast Food	13 (17.1)	5 (18.5)	3 (7.1)	5 (71.4)
Carry-Out Only (ex: Pizza Shop)	8 (10.5)	4 (14.8)	4 (9.5)	0 (0.0)
Catering Only	6 (7.9)	6 (22.2)	0 (0.0)	0 (0.0)
Bakery/ Coffee Shop	1 (1.3)	0 (0.0)	1 (2.4)	0 (0.0)
Buffet	1 (1.3)	0 (0.0)	1 (2.4)	0 (0.0)
Other	5 (6.6)	2 (7.4)	3 (7.1)	0 (0.0)

TABLE 2. Packaging Methods by Type of Delivery System

Self-Reported Packaging Methods		Total	Delivery System		
			DTC	TPD	Both
		N (%) 76 (100.0)	N (%) 27 (100.0)	N (%) 42 (100.0)	N (%) 7 (100.0)
Use Temperature Control Packaging		60 (78.9)	24 (88.9)	30 (71.4)	6 (85.7)
Method Used*	Foil Wraps	29 (38.2)	9 (33.3)	15 (35.7)	5 (71.4)
	Insulated Bags	32 (42.1)	18 (66.7)	10 (23.8)	4 (57.1)
	Insulated Containers	35 (46.1)	11 (40.7)	21 (50.0)	3 (42.9)
	Coolants	8 (10.5)	7 (25.9)	1 (2.4)	0 (0.0)
	Other	4 (5.3)	3 (11.1)	0 (0.0)	1 (14.3)
Use Seal Packaging		66 (86.8)	22 (81.5)	38 (90.5)	6 (85.7)
Method Used*	Tied Bags	32 (42.1)	7 (25.9)	20 (47.6)	5 (71.4)
	Folded Edge of Bag	16 (21.1)	6 (22.2)	8 (19.1)	2 (28.6)
	Stickers or Tape	35 (46.1)	9 (33.3)	21 (50.0)	5 (71.4)
	Staples	17 (22.4)	7 (25.9)	7 (16.7)	3 (42.9)
	Other	5 (6.6)	4 (14.8)	1 (2.4)	0 (0.0)

*Each method used was individually measured for each respondent. Each percentage shown is a column percentage for a binary indicator of self-reported behavior. For example, 60 (78.9%) of the 76 respondents indicated at least one form of temperature control packaging. Further, 9 (33.3) of the 27 respondents reporting a DTC system indicated the use of foil wraps.

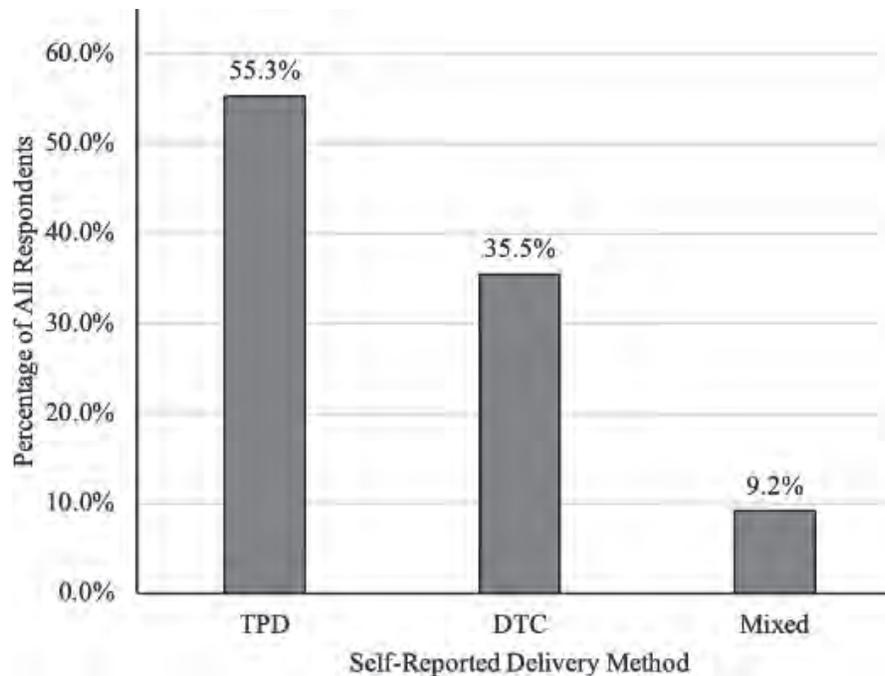


Figure 2. Type of Delivery System across All Respondents.

Self-reported use of insulated delivery bags was positively associated with businesses using DTC systems when compared to businesses using TPD system (OR=6.40; 95% CI= (2.20, 18.65)) (Figure 3). Additionally, self-reported use of coolants was positively associated with businesses using DTC systems (OR=14.35; 95% CI= (1.65, 124.73)) compared to businesses using TPD systems. This means that businesses who utilized their own employees for food delivery were more likely to use insulated delivery bags and coolants. Franchise businesses were more likely to self-report use of foil wraps for packaging food compared to independent businesses (OR= 3.11; 95% CI= (1.01, 9.56)). The type of foodservice offered was also associated with the type of temperature control packaging used. Carryout only (OR=9.60; 95% CI= (1.67, 55.29)) and fast-food service (OR=7.20; 95% CI= (1.82, 28.48)) establishments were more likely to self-report use of insulated delivery bags compared to full-service dining establishments. Catering-only establishments were more likely to self-report use of insulated delivery bags (OR= 6.40; 95% CI= (1.02, 40.29)) and coolants (OR= 13.00; 95% CI= (1.79, 94.62)) compared to full-service dining establishments.

Physical protection of food

Most respondents (87%) use some form of sealed packaging to prepare food for delivery (Table 2). Stickers or tape were most frequently used to keep the package closed (46%), followed by tying bags (42%), and stapling containers shut (22%). Businesses that reported mixed (i.e., both TPD

and DTC) delivery models were more likely to self-report tying delivery bags to seal food packages compared to businesses that solely use DTC delivery (OR= 7.14; 95% CI= (1.12, 45.52)). There was no association between how packaged food orders were sealed, and the type of establishment or the role the respondent holds within the business (results not shown).

DISCUSSION

Ohio regulations require foodservice businesses to be licensed and inspected according to their Risk Level, which is decided by the type of food preparation and food handling practices employed at the establishment (14, 17). DTC systems associated with a foodservice business are assumed to be the same risk level as the business/establishment and inspected by the local health departments accordingly. In contrast, TPD systems, which only handle packaged/sealed ready-to-eat foods (RTE), are categorized as Risk Level I (i.e., the lowest risk) and may or may not be inspected (13, 17). While local health departments license and inspect Risk Level I businesses, they only do so if the operation has a physical location within the state of Ohio, which is not the case for many TPD systems (13, 17).

Over half of respondents indicated the use of TPD systems, which is not surprising. User penetration for TPD increased from 13.6% to 17.8% during the COVID-19 state of emergency (2). One reason for this change could be cost efficiency. Businesses who directly employ drivers (i.e., DTC systems) have added expenses beyond employee salaries that

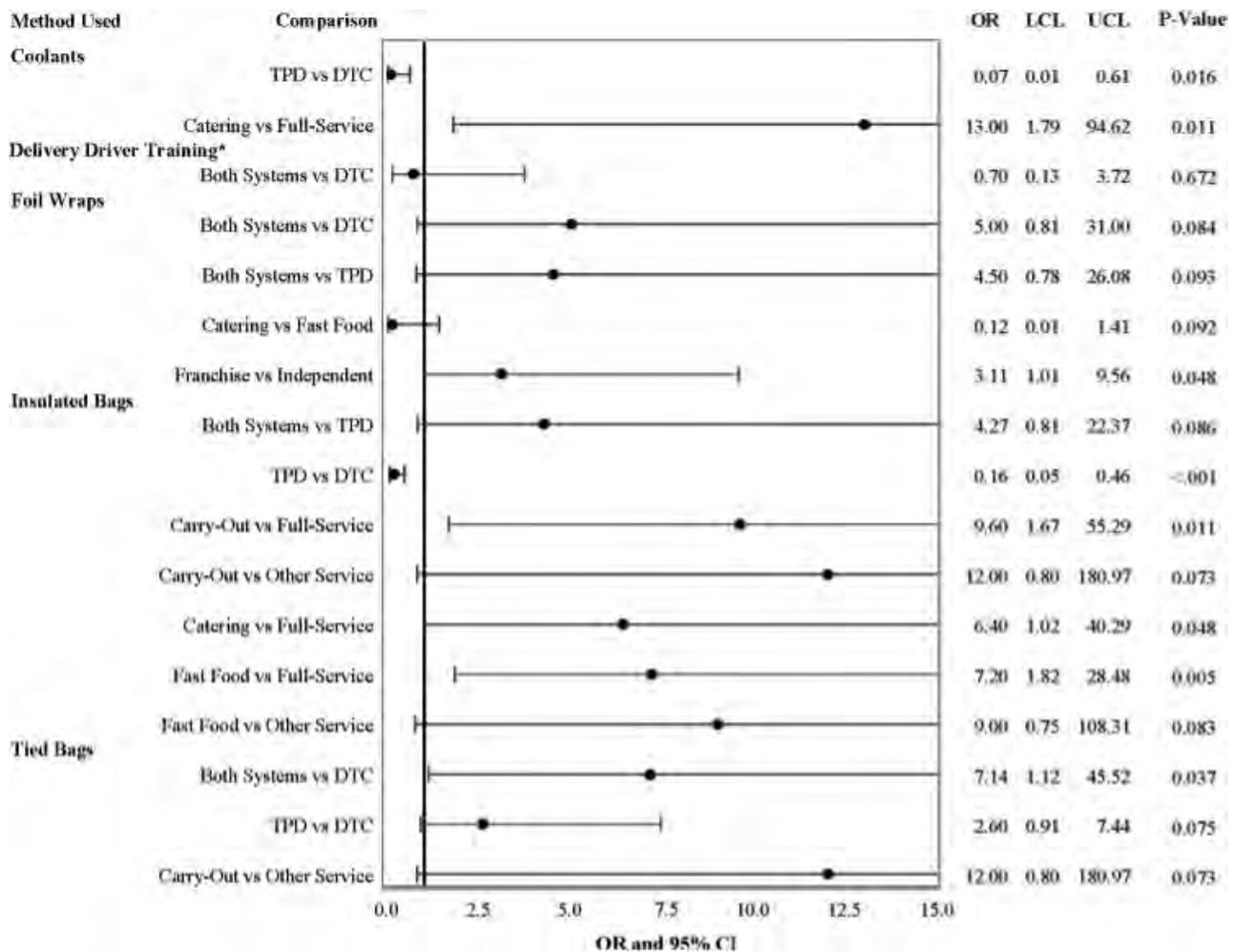


Figure 3. Univariate Odds Ratio Plot: Association between Method and Establishment Characteristics.

*Only systems with directly employed delivery drivers can be tested considering it is not possible to mandate food safety training in TPD system.

must be considered. For instance, foodservice businesses must pay for vehicle insurance, fuel, and maintenance, or mileage for employees who use their personal vehicles. Additionally, if the business has specific policies related to delivery drivers (e.g., requiring a food safety certification), they may also bear the cost of implementing those policies.

Insulated delivery bags and coolants were widely used by businesses reporting DTC services. This could be because businesses are willing to invest in reusable packaging methods given the insulated bags are designed to help keep RTE foods either hot or cold, and help preserve quality (20). Similarly, coolants can help keep RTE foods at a low temperature that reduces the risk of bacterial growth. It is hypothesized that since DTC delivery drivers are directly employed, there is limited risk in the loss of the reusable items. TPD drivers are contractors and it may be difficult to ensure TPD drivers would return the insulated

delivery bags and coolants back to the food business once the delivery was complete. The odds of insulated bag and coolant usage were higher among fast food, carry-out and catering establishments compared to full-service dining establishments. This could be because these establishments already have business models intended for packaging RTE orders or have an inherent transportation component (i.e., catering). Catering businesses may also be more likely to use coolants than full-service dining establishments because caterers are required to use temperature control methods established by the Ohio Food Code (15).

Full-service dining establishments are often not equipped with reusable materials for transit, so they may rely on products that are easily accessible and inexpensive, such as foil. The use of foil wraps by franchise establishments suggests sustainability is a factor in selecting a temperature control method. It is hypothesized that large corporations are

often pressured to choose more environmentally sustainable methods for packaging their food. Aluminum foil is a highly recyclable material which can provide financial benefits to corporations (8). Franchise establishments also have larger buying power, which reduces the cost of foil wraps and makes this option cost efficient as well as sustainable. Foodservice businesses that use both DTC and TPD systems were more likely to tie their food order bags than businesses using only DTC systems. Most likely, employees were taught to tie bags, regardless of delivery type, since knots are harder to tamper with than stickers or tape. Tied bags also presumably present fewer potential physical hazards than other sealing methods such as staples and are often more cost effective than stickers or tape.

Limitations

While attempts were made to mitigate bias in results, there are a few notable limitations to this study. First, the results may not reflect the true practices within the Ohio foodservice business population. Delivery practices were self-reported by survey participants and were not confirmed through other methods (e.g., direct observation, self-monitoring), and actual time/temperature data was not recorded/taken. Second, the anonymous, self-administered format of the survey may have introduced self-selection bias and prevented verification of survey responses. While face-to-face administered surveys could have mitigated such biases, the ongoing COVID-19 pandemic precluded such an approach. Third, there is the potential for sampling error. Specifically, it is not known if the membership list used to recruit participants included inactive or duplicate email addresses (e.g., multiple individuals affiliated with the same foodservice business), and it could not be determined if an individual participant completed the survey more than once. As a result, the effects of survey clustering or duplication are unknown, and a response rate could not be formally calculated. Finally, the sample size does not provide an adequate level of statistical power to appropriately mitigate the chance of failing to detect a difference that is truly there (i.e., obtaining a false negative result). As a result, these findings cannot be generalized to all foodservice businesses that use some form of food delivery within Ohio. Potential improvements for future research include using multiple recruitment methods, utilizing a unique survey participant identifier to limit the possibility of duplicate survey responses, and obtaining a larger sample size to reduce the potential for false negative results.

Conclusion

The results of the survey indicate foodservice businesses implement practices that protect food during delivery, but data on how these practices were carried out were not collected. While specific packaging and delivery policies are not yet required within TPD systems, businesses in Ohio

are implementing practices that aim to retain food quality and safety during delivery (e.g., methods used to seal food packages). It is important to continue to monitor food safety practices within different food delivery systems, and across establishment types, for the purpose of consumer safety. Such monitoring could inform decision-making around food safety oversight of food deliveries and safe food handling practices that retail foodservice businesses could implement and incorporate into their day-to-day operations. To inform such decision-making, suggested future research includes measuring food transit time from holding at the retail location to delivery to the consumer, food transit practices such as number of orders picked up at one time, exposure of food to any adulterants, and food handling practices within the delivery vehicle (e.g., placing the food on the car floor in front of an air conditioning vent). Future studies with larger sample sizes, more robust data collection methods (i.e., direct observation of food orders and their packaging and delivery), and a broader geographic scope would provide valuable information for potential interventions. For example, this could include obtaining data that provide a more in-depth look at public health risk, such as collecting actual temperature data of TCS foods. We also recommend TPD businesses complete a third-party review of their delivery practices considering that state regulatory officials do not have the purview of reviewing these systems with the goal of ensuring consumers receive safe food. Additionally, more awareness and education are needed using already existing resources such as the Conference for Food Protection's Guidance Document for Direct-to-Consumer and Third-Party Delivery Service Food Delivery (22).

ACKNOWLEDGMENTS

We would like to acknowledge The Ohio State University's Department of Food Science and Technology FoodS.U.R.E program for supporting this work.

AUTHOR CONTRIBUTIONS

Michala Krakowski: Methodology, Investigation, Formal Analysis, Data Curation, Visualization, Writing – original draft.

Janet Buffer: Project Administration, Supervision, Writing – review & editing.

Gina Nicholson Kramer: Project Administration, Supervision, Writing – review & editing.

Laura Morrison: Investigation, Resources, Writing – review & editing.

Nicole L. Arnold: Methodology, Supervision, Formal Analysis, Visualization, Writing – review & editing.

Barbara Kowalczyk: Conceptualization, Methodology, Supervision, Formal Analysis, Visualization, Writing – review & editing.

REFERENCES

1. Agarwal, M. 2014. Prevalence of pathogens and indicators in foods ordered from online vendors. Rutgers University Libraries. RUcore: Rutgers University Community Repository. Available at: <https://doi.org/10.7282/T3F47M7R>. Accessed 25 March 2024.
2. Chen, L. A., and L. House. 2022. The rise of the ghosts-The impact of the pandemic on food purchases. *Choices*. Available at: <https://www.choicesmagazine.org/choices-magazine/submitted-articles/the-rise-of-the-ghosts--the-impact-of-the-pandemic-on-food-purchases>. Accessed 14 April 2024.
3. Food and Drug Administration. 2022. Food Code 2022: Recommendations of the United States Public Health Service Food and Drug Administration. *U.S. Dept. HHS*. Available at: <https://www.fda.gov/media/164194/download?attachment>. Accessed 11 May 2024.
4. Hong, C., H. Choi, E. K. Choi, and H.W. Joong. 2021. Factors affecting customer intention to use online food delivery services before and during the COVID-19 pandemic. *J. Hosp. Tour Manag.* 48:509–518. Available at: <https://doi.org/10.1016/j.jhtm.2021.08.012>. Accessed 26 June 2024
5. Jaracz, J. 2023. 10 stats that show how COVID-19 impacted food delivery services. Available at: <https://www.routific.com/10-stats-that-show-how-covid-19-impacted-food-delivery-services>. Accessed 26 June 2024.
6. Kaplan, M., S. Hotel, and K. Heaslip. 2023. How has COVID-19 impacted customer perceptions and demand for delivery services: An exploratory analysis. *Transp. Policy*. 134:217–230. Available at: <https://doi.org/10.1016/j.tranpol.2023.02.020>. Accessed 23 March 2024.
7. MacDonald, J. 2020. Restaurants are saying goodbye to third-party delivery apps. *FSR Magazine*. Available at: <https://www.fsrmagazine.com/feature/restaurants-are-saying-goodbye-third-party-delivery-apps/>. Accessed 24 March 2024.
8. Mahmud, M. Z. A., M. H. Mobarak, and N. Hossain. 2024. Emerging trends in biomaterials for sustainable food packaging: A comprehensive review. *Heliyon*.10:e24122. Available at: <https://doi.org/10.1016/j.heliyon.2024.e24122>. Accessed 4 April 2024.
9. Marchesi, K. 2024. Pandemic-related increase in consumer restaurant spending using mobile apps continued through 2022. Available at: <https://www.ers.usda.gov/amber-waves/2024/january/pandemic-related-increase-in-consumer-restaurant-spending-using-mobile-apps-continued-through-2022/>. Accessed 27 June 2024.
10. Marchesi, K., and P. W. McLaughlin. 2024. Food spending shifted in response to pandemic: Changes for food away from home continued through 2022. Available at: <https://www.ers.usda.gov/amber-waves/2024/january/food-spending-shifted-in-response-to-pandemic-changes-for-food-away-from-home-continued-through-2022/#:~:text=Even%202%20years%20after%20the,sales%20were%209%20percent%20higher>. Accessed 26 June 2024.
11. Minnesota Department of Health. 2023. Food contamination and foodborne illness prevention. Available at: <https://www.health.state.mn.us/people/foodsafety/prevention.html#:~:text=Pathogens%20can%20be%20introduced%20into,Hand%20Hygiene%3A%20Wash%20Your%20Hands!>. Accessed 27 June, 2024.
12. Navarro C., G. Cadieux, A. Said, T. Patel, A. Maki, N. Brandon. 2020. Outbreak of disease caused by *Salmonella* Typhimurium associated with an online meal subscription service in Toronto, Canada. 2016. *Food Prot. Trends*. 40:95–100.
13. Ohio Administrative Code | Ohio Laws. 2010. Rule 3701-21-02.3 | Risk Level of food service operations. Available at: <https://codes.ohio.gov/ohio-administrative-code/rule-3701-21-02.3>. Accessed 20 March 2024.
14. Ohio Administrative Code | Ohio Laws. 2015. Rule 3701-21-02.4 Food Service Operation Frequency. Available at: <https://codes.ohio.gov/ohio-administrative-code/rule-3701-21-02.4>. Accessed 20 March 2024.
15. Ohio Administrative Code | Ohio Laws. 2023. Rule 3717-1-03.4 | Food; limitation of growth of organisms of public health concern. Available at: <https://codes.ohio.gov/ohio-administrative-code/rule-3717-1-03.4>. Accessed 20 March 2024.
16. Ohio Restaurant & Hospitality Alliance. n.d. Available at: <https://www.eatdrinkohio.org/about>. Accessed 14 September 2024.
17. Ohio Revised Code | Ohio Laws. 2001. Section 3717.44 | Endorsement to provide services of retail food establishment—determination of license required. Available at: <https://codes.ohio.gov/ohio-revised-code/section-3717.44#:~:text=%28A%29%20The%20person%20or%20government%20entity%20holding%20a,provide%20the%20services%20of%20a%20retail%20food%20establishment>. Accessed 2 July 2024.
18. Qualtrics. Qualtrics XM—Experience Management Software. First release: 2020. Copyright: 2022. Provo, UT, USA. Available at: <https://www.qualtrics.com/>.
19. Reinblatt, H. 2022. Do you know your courier? *Circuit*. Available at: <https://getcircuit.com/route-planner/blog/courier-confessions>. Accessed 23 January 2024.
20. Restaurant Supply.com. 2023. What is an insulated food delivery bag? Available at: <https://www.restaurantsupply.com/blog/what-is-an-insulated-food-delivery-bag#:~:text=Food%20Delivery%20Bag,An%20insulated%20food%20delivery%20bag%20is%20designed%20to%20keep%20food,keeping%20it%20hot%20or%20cold>. Accessed 24 March 2024.
21. SAS software, Version 9.4 of the SAS System for Windows. Copyright © 2022. SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.
22. Schaffner, D., A. Espinoza, A. Auffray, N. Beyer, C. Bongo-Box, R. Brown, C. Feeney, C. Friel, J. Graham, C. Hernandez, R. LaFleur, V. Madamba, C. Millwood, J. Navin, T. Patton, J. Rogers, L. Yang, and J. Zetlau. 2020. Guidance Document for Direct-to-Consumer and Third-Party Delivery Service Food Delivery. *Conf. for Food Protect*. Available at: http://www.foodprotect.org/issues/packets/2020Packet/attachments/III_004_content_c.pdf. Accessed 24 April 2024.
23. STATISTA. 2023. Coronavirus: impact on restaurant food delivery in the U.S. – statistics & facts. Available at: <https://www.statista.com/topics/9996/coronavirus-covid-19-impact-on-restaurant-food-delivery-in-the-us/#editorsPicks>. Accessed 5 May 2024.
24. STATISTA. 2023. Online Food Delivery Worldwide. Available at: <https://www.statista.com/outlook/dmo/online-food-delivery/worldwide?currency=usd>. Accessed 26 June 2024.
25. STATISTA. 2024. Revenue of the online food delivery market in the United States from 2017 to 2028. Available at: <https://www.statista.com/forecasts/891082/online-food-delivery-revenue-by-segment-in-united-states>. Accessed 12 April 2024.
26. TAG The Acheson Group. 2022. Food delivery is target of new guidance. Available at: <https://achesongroup.com/food-delivery-is-target-of-new-guidance/>. Accessed 2 July 2024.

APPENDIX A: Survey Questionnaire

Question	Sub Questions
<p>Is this retail food service establishment located in Ohio?</p> <ul style="list-style-type: none"> • Yes • No 	<p>If 'No' is selected, end of survey.</p>
<p>Which of the following food delivery services does this retail food service business use? (Select all that apply)</p> <ul style="list-style-type: none"> • This business does not offer any form of delivery • Drivers directly employed by the business • GrubHub • DoorDash • UberEats • Postmates • EatStree • Other (Please Specify) 	<p>If 'This business does not offer any form of delivery' is selected, end of survey.</p>
<p>Designate your role regarding this retail food service establishment.</p> <ul style="list-style-type: none"> • Owner • Manager • Owner and manager • None of the above 	<p>If 'None of the above' is selected, end of survey.</p>
<p>What is the zip code of this retail food service business?</p> <p>_____</p>	
<p>What type of retail food service establishment is this?</p> <ul style="list-style-type: none"> • Independent • Chain/Corporate Location • Franchisee • Other 	
<p>What is the main type of service this establishment provides?</p> <ul style="list-style-type: none"> • Full-Service Dining • Fast Food • Carry-Out Only (ex: Pizza Shop) • Catering Only • Buffet • Institution (school, hospital, assisted living) • Bakery/Coffee Shop • Concessions • Convenience Store • Grocery Store/Market • Other _____ 	
<p>How many different locations does this retail food service business operate within Ohio?</p> <p>_____</p>	

<p>How long have you been the owner and/or manager of this retail food service business?</p> <ul style="list-style-type: none"> • Less than 2 years • 2-4 years • 5-7 years • 8-10 years • Greater than 10 years 	
<p>Have you ever received food safety training or certification (ServSafe, Learn2Serve, Super SafeMark, TAPSeries, NEHA, StateFoodSafety, local health department, etc.)?</p> <ul style="list-style-type: none"> • No • Yes 	<p>If 'Yes' is selected, then ask:</p> <p>What is the highest level of food safety training you have received?</p> <ul style="list-style-type: none"> • Level 1 (Person-In-Charge) • Level 2 (Certified Food Protection Manager) • Other (Please Specify) <p>_____</p> <p>When was the most recent time you received training and/or re-certification?</p> <ul style="list-style-type: none"> • Less than 1 year ago • 1-2 years ago • 3-4 years ago • 5-6 years ago • Greater than 6 years ago
	<p>What program did you receive your most recent training and/or re-certification from?</p> <ul style="list-style-type: none"> • ServSafe • Learn2Serve • Super SafeMark • TAPSeries • NEHA • StateFoodSafety • Local Health Department • Other (Please Specify) <p>_____</p>
<p>Does this retail food service business have any written policies in place for interacting with delivery orders?</p> <ul style="list-style-type: none"> • Yes • No 	
<p>Does this retail food service business use any of the following to keep foods hot or cold for food delivery? (Select all that apply)</p> <ul style="list-style-type: none"> • Foil wraps • Insulated delivery bags • Insulated containers • Coolants (ice packs, frozen gel packs, dry ice, etc.) • Other (Please Specify) <p>_____</p> <ul style="list-style-type: none"> • None of the above 	

<p>In what way does this retail food service business use additional methods to seal food orders for delivery? (Select all that apply)</p> <ul style="list-style-type: none"> • Tied bags • Folded edge of bag • Stickers or tape over bag/box opening • Staples • Other (Please Specify) <p>_____</p> <ul style="list-style-type: none"> • None of the above 	
<p>Are delivery order times tracked from the time the food is prepared to the time the order is delivered?</p> <ul style="list-style-type: none"> • Yes • No 	
<p>Does Time/Temperature Control for Safety (TCS) food sit in a temperature controlled environment utilizing approved equipment (i.e., refrigeration, heat lamp, warmer, etc.) before delivery pickup?</p> <ul style="list-style-type: none"> • Yes • No 	<p>If 'No' is selected, then ask:</p> <p>On average, how long after TCS food orders are prepared do the drivers pick up the order for delivery?</p> <ul style="list-style-type: none"> • Less than 0.5 hours • 0.5–1 hours • 1–1.5 hours • 1.5–2 hours • Greater than 2 hours <p>What is the maximum amount of time that TCS food delivery orders will be held for pickup?</p> <ul style="list-style-type: none"> • Less than 1 hour • 1–1.5 hours • 1.5–2 hours • Greater than 2 hours <p>Are there any written policies in place for interacting with TCS food delivery orders that have not been picked up within 4 hours?</p> <ul style="list-style-type: none"> • Yes • No
<p>Does this retail food service business require any training or certification for delivery drivers employed by the establishment?</p> <ul style="list-style-type: none"> • Yes • No • This retail food service business does not directly employ delivery drivers. 	
<p>Bacteria grows fastest within a temperature range of?</p> <ul style="list-style-type: none"> • 0°F (-18°C) and 220°F (104°C) • 0°F (-18°C) and 135°F (57°C) • 41°F (5°C) and 135°F (57°C) • 41°F (5°C) and 220°F (104°C) • I prefer not to answer. 	

<p>How long can you hold HOT food without temperature control before it needs to be thrown out?</p> <ul style="list-style-type: none"> • 30 minutes • 1 hour • 2 hours • 4 hours • 6 hours • I prefer not to answer. 	
<p>How long can you hold COLD food without temperature control before it needs to be thrown out?</p> <ul style="list-style-type: none"> • 30 minutes • 1 hour • 2 hours • 4 hours • 6 hours • I prefer not to answer. 	

IAFP's mentoring program, "Mentor Match," is officially underway,



and we invite you to participate! This valuable program was created to support our Members' professional development and help you **connect** and **share** your experiences with other IAFP Members.



Potential mentees have this great opportunity to connect with a knowledgeable mentor who can offer their insight and advice while helping you navigate the next stages of your career.



For potential mentors, this is your way to give back, become a stronger leader, and refine your personal skills and networks.

Visit the **IAFP Connect** link on our website at www.foodprotection.org to learn more and to enroll in the **Mentor/Mentee Match Program**.