



Laura Green Brown

EHS-Net Restaurant Food Safety Studies: What Have We Learned?

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

In this column, EHSB and guest authors from across CDC will highlight a variety of concerns, opportunities, challenges, and successes that we all share in environmental public health. EHSB's objective is to strengthen the role of state, local, and national environmental health programs and professionals to anticipate, identify, and respond to adverse environmental exposures and the consequences of these exposures for human health. The services being developed through EHSB include access to topical, relevant, and scientific information; consultation; and assistance to environmental health specialists, sanitarians, and environmental health professionals and practitioners.

The conclusions in this article are those of the author(s) and do not necessarily represent the views of CDC.

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The Centers for Disease Control and Prevention's (CDC) Environmental Health Specialists Network (EHS-Net) is a collaborative network focused on understanding factors that contribute to foodborne illness and improving environmental public health practice (see www.cdc.gov/nceh/ehs/EHSNet/index.htm). EHS-Net includes environmental public health and food safety professionals from federal, state, and local public health organizations.

During the past 10 years, EHS-Net has conducted a number of studies on restaurant

food safety. We have focused specifically on restaurants because they are an important source of foodborne illness outbreaks; half of all foodborne illness outbreaks are associated with restaurants (Lynch, Painter, Woodruff, & Braden, 2006). To better understand the environmental causes of restaurant-related foodborne illness outbreaks, and subsequently reduce or mitigate them, EHS-Net studies have been designed to investigate food preparation practices and other factors that could contribute to these types of outbreaks. Our studies have

focused on topics that include, among others: ill worker behavior, hand hygiene practices, and egg preparation practices. With each of these studies, we have gained a better understanding of restaurant food preparation practices and the factors that may negatively affect those practices and cause foodborne illness outbreaks.

Our studies have revealed some trends concerning factors related to safer food preparation. These factors fall into three broad categories: food worker and manager food safety training and experience, restaurant and food worker busyness, and restaurant ownership (chain vs. independent).

Training and Experience

Our data suggest that food safety training and experience are related to restaurant food safety practices.

- Workers in restaurants that provide food safety training are more likely to wash their hands when they should than workers in restaurants that do not provide this training (Green et al., 2007).
- Restaurants with food safety–certified kitchen managers are less likely to be associated with foodborne illness outbreaks than restaurants without these managers (Hedberg et al., 2006).
- Restaurants with food safety–certified kitchen managers are less likely to have critical violations on their food safety inspections than restaurants without these managers (Cates et al., 2009).
- Workers in restaurants with more experienced managers are less likely to work while experiencing vomiting or diarrhea than workers in restaurants with less experienced managers (Sumner et al., 2011).

- Workers say that food safety training positively affects their ability to prepare food safely (Green & Selman, 2005).

These findings support Food and Drug Administration and state and local health department promotion of manager food safety certification. These data indicate that while food safety training may not be the only thing needed to ensure food safety, it is clearly a necessary one.

Busyness

Our data suggest that restaurant and food worker “busyness” are related to food safety practices.

- Workers are more likely to wash their hands when they should when they are less busy (i.e., engage in fewer work activities) than when they are busier (Green et al., 2007).
- Workers in less busy restaurants (i.e., restaurants serving fewer meals per day) are less likely to work while experiencing vomiting or diarrhea than workers in busier restaurants (Sumner et al., 2011).
- Workers say that being busier negatively affects their ability to prepare food safely (Green & Selman, 2005).

These findings suggest that restaurant and food worker busyness is a potentially important factor affecting safe food preparation. These data are concerning because restaurants can’t necessarily control their busyness in terms of customer volume. Restaurants can, however, control their staffing. They can attempt to ensure that they are well staffed during busy times, and they can implement on-call staffing schedules to ensure that shifts are covered in case a worker is unable to work.

Restaurant Ownership

Our data suggest that restaurant ownership type is related to food safety practices.

- Workers in chain restaurants are more likely to use thermometers to check final temperature of cooked foods than independently owned restaurants (Green et al., 2005).
- Chain restaurants are more likely to serve pasteurized shell eggs than independently owned restaurants (Lee et al., 2004).
- Workers in chain restaurants are more likely to wear gloves than workers in independently owned restaurants (Green et al., 2007).

These findings suggest that chain restaurants may be more likely to use safe food

preparation practices than independent restaurants; they do not explain why this difference exists. Chain restaurants may be more likely to have tested and verified operating procedures, and they may have better resources, equipment, and staffing. More investigation is needed to determine the underlying causes of this difference in safe food preparation practices.

EHS-Net Future

EHS-Net’s restaurant food safety research has produced valuable findings that can inform food safety research and prevention and intervention efforts. We are pleased with this outcome, but also realize more work is to be done. Future EHS-Net studies will focus on developing a better understanding of the underpinnings of the relationships described here and on developing effective food safety interventions informed by our work. 🍷

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References

- Cates, S.C., Muth, M.K., Karns, S.A., Penne, M.A., Stone, C.N., Harrison, J.E., & Radke, V. (2009). Certified kitchen managers: Do they improve restaurant inspection outcomes? *Journal of Food Protection*, 72(2), 384–391.
- Green, L.R., Radke, V., Mason, R., Bushnell, L., Reimann, D.W., Mack, J., Motsinger, M.D., Stigger, T., & Selman, C. (2007). Factors related to food worker hand hygiene practices. *Journal of Food Protection*, 70(3), 661–666.
- Green, L., & Selman, C. (2005). Factors impacting food workers’ and managers’ safe food preparation practices: A qualitative study. *Food Protection Trends*, 25(12), 981–990.
- Green, L., Selman, C., Banerjee, A., Marcus, R., Medus, C., Angulo, F.J., Radke, V., Buchanan, S., & EHS-Net Working Group. (2005). Food service workers’ self-reported food preparation practices: An EHS-Net study. *International Journal of Hygiene and Environmental Health*, 208(1–2), 27–35.

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- -Centers for Disease Control and Prevention
- U.S. Food and Drug Administration
- U.S. Department of Agriculture
- -California Department of Public Health
- -Minnesota State Department of Health
- New York State Department of Health
- State of Rhode Island Department of Health
- Tennessee State Department of Health
- New York City Department of Health and Mental Hygiene
- -Cerro Gordo County Department of Public Health
- -County of San Mateo Health Services Agency

Hedberg, C.W., Smith, S.J., Kirkland, E., Radke, V., Jones, T.F., Selman, C.A., & the EHS-Net Working Group. (2006). Systematic environmental evaluations to identify food safety differences between outbreak and nonoutbreak restaurants. *Journal of Food Protection*, 69(11), 2697–2702.

Lee, R., Beatty, M., Bogard, A., Esko, M., Angulo, F., Selman, C., & EHS-Net Working Group. (2004). Prevalence of high-risk egg-preparation practices in restaurants that prepare breakfast egg entrees: An EHS-Net study. *Journal of Food Protection*, 67(7), 1444–1450.

Lynch, M., Painter, J., Woodruff, R., & Braden, C. (2006). Surveillance for foodborne-disease outbreaks—United States, 1998–2002. *Morbidity and Mortality Weekly Report*, 55(SS10), 1–34.

Sumner, S., Brown, L.G., Frick, R., Stone, C., Carpenter, L.R., Bushnell, L., Nicholas, D., Mack, J., Blade, H., Tobin-D’Angelo, M., Everstine, K., & the EHS-Net Working Group. (2011). Factors associated with food workers working while experiencing vomiting or diarrhea. *Journal of Food Protection*, 74(2), 215–220.