

► BUILDING CAPACITY



Darryl Booth, MBA

Internet of Things Builds Capacity for Automatic Temperature Logging

Editor's Note: A need exists within environmental health agencies to increase their capacity to perform in an environment of diminishing resources. With limited resources and increasing demands, we need to seek new approaches to the business of environmental health.

Acutely aware of these challenges, NEHA has initiated a partnership with Decade Software Company called *Building Capacity*. *Building Capacity* is a joint effort to educate, reinforce, and build upon successes within the profession, using technology to improve efficiency and extend the impact of environmental health agencies.

The *Journal* is pleased to publish this bimonthly column from Decade Software Company that will provide readers with insight into the *Building Capacity* initiative, as well as be a conduit for fostering the capacity building of environmental health agencies across the country.

The conclusions of this column are those of the author(s) and do not necessarily represent the views of NEHA.

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In my previous column, I spoke of how analytics can guide and make more accurate the work of health departments. The data present increasingly greater value as we move closer to their source. What if the data were immediate ... instantly available?

The Internet of Things is an emerging phrase among tech circles that characterizes a class of discrete devices, usually single purpose, each with a connection to the Inter-

net. Your new baby monitor, for example, may feature the capacity to check on your sleeping child using your iPhone down the hall or even across town.

The Internet of Things offers public health informatics on a smaller scale; that is, using devices in areas critical to public health to electronically capture and report, in real-time, such variables as the chemical thresholds in a public pool or the temperature in a

restaurant or warehouse refrigerator. Devices record on a regular basis (e.g., once an hour or once a minute) and store the data to internal memory or to a cloud-based service, where they are visible to anybody with proper access (Figure 1). Many devices feature an alarm system that will send threshold alerts via any combination of SMS, e-mail, audible alarm, visual indicator, or even a phone call.

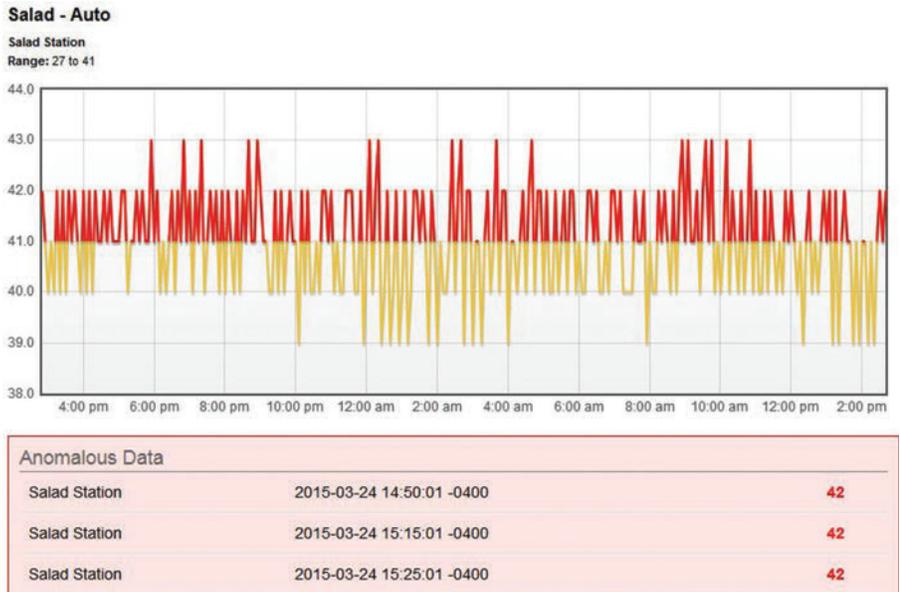
This is an emerging and somewhat ambitious concept. My circle of health professionals, briefed on the matter, tended to have to mull it over to consider the potential. I foresee that this technology will become increasingly commonplace, however, and that health departments should be ready to embrace these new datasets.

The market for this technology is growing quickly. The Food Safety Modernization Act (FSMA) called for, among other items, improved and speedier surveillance of food safety issues, placing more responsibility for safe food directly on entities involved in the food production process. "FSMA really opened the door for technology to be introduced into public health surveillance systems," says Timothy Akers, assistant vice president for research innovation and advocacy and professor of public health at Morgan State University. "I see this technology inevitably becoming a requirement in food safety; it's a great way for local health departments and other federal agencies to monitor and protect public health."

Indeed, the fourth hazard analysis and critical control points (HACCP) principle recommends that "monitoring should be continuous," and a regulator's manual for

FIGURE 1

Data Automatically Tracked in Salad Bar Monitor



Color code: yellow = normal range, red = above normal range. Image used with permission from Touchblock®.

applying HACCP principles to risk-based retail and food service recommends suggesting to operators the purchase of a “data logger to record cooling overnight.”

Akers and Cynthia Tucker, PhD, MBA, RDN, LDN, research faculty in the nutritional sciences program at Morgan State, conducted a pilot test of a food safety informatics tool in a university student food service center (Tucker, Larkin, & Akers, 2011). Arguably the first of its kind, the study results show the benefit of automated temperature monitoring for cold and dry storage areas as a matter of proactive public health technology; over a period of just 24 hours, the sensors identified several breaches of temperature standards that upon investigation could not be attributed to deliveries or other variables.

Tucker told me that this concept is directly in line with the goal of FSMA. “These systems enable restaurants to be proactive instead of reactive, which is one of the stated goals of FSMA. Capturing this information in an automated, electronic manner is more credible than paper and pencil and helps them protect the consumer. Nothing can be erased or entered at

the last minute when you see an inspector walk through the door. In fact, it will make the health inspection run even smoother, as it speaks to how they run their organization.”

Agrees Akers, “When someone puts a pen to paper to write down their times for their food issues, the validity of that data immediately becomes suspect from a surveillance point of view. If there is an objective, surveillance-type system set up to collect real-time, accurate, and unbiased data, we put the nation’s safety in the forefront, and we also eliminate any biases.”

Five Guys Burgers and Fries, a popular burger chain, has been using informatic technology since 2009 to capture temperatures in coolers and prep rooms every minute and for HACCP compliance. The brand that they use, Touchblock® (product name in process of being changed to ComplianceMate), also provides the restaurants with a Bluetooth probe: as the employee temps all the items required in the checklist, the device uploads that information electronically to the cloud.

“I know from experience throughout my career in the restaurant industry that paper

logs are only as good as the people who actually fill them out,” says Jim Gibson, vice president of food safety and quality assurance at Five Guys. “When I heard about the technology, I thought, ‘this is a great tool.’ It speeds up the time it takes to temp products, and provides automated, documented, and validated data that is visible to those who need it—the store, managers, corporate, and local regulators.”

Restaurants are, of course, legally compelled to provide food safety logs during a health inspection. Having this data doesn’t have a huge impact on the inspection, says Jeanelle Rogers, a health inspector with Fairfax County’s Division of Environmental Health, but it is good to see. “This concept matches the requirements of active managerial control. It helps the certified food manager be proactive. It’s not the sole evidence that we use when capturing temperatures during inspections, but it does make us feel much better about the facility. They can catch a problem even when we aren’t there and do something about it. It helps them demonstrate knowledge and control.”

Electronically captured data can also aid reported foodborne illness investigations. “In the past four or five years, we’ve had to utilize the data about 25 times with health departments to confirm and prove that we weren’t the cause of a claim of foodborne illness,” notes Gibson.

We’d most likely all agree that a health department can’t advocate for one compliance device over another, so long as compliance is reached. But within your capacity as the regulator, you likely can make recommendations, ranging from behaviors to training to methods, that will help restaurants keep their patrons safe. Other more subtle options exist, such as economic or branding incentives for restaurants that have this software. I’m thinking here about awards of excellence that I’ve seen awarded to facilities (along with a permit discount) that consistently go above and beyond to ensure food safety compliance. It wouldn’t be inappropriate, I think, to call out the financial benefits. For example, Gibson told me that Five Guys has caught 300 cases of failed coolers in the last five years. “We’ve been able to get people to the store to save tens of thousands of dollars of product. The dollar amount is incredible in regards to savings.”

I would like to see federal regulatory agencies pursue this subject further; I wouldn't be surprised to find this topic rising in the spotlight in the coming years. Speaking philosophically, what if health departments could interact directly with the data in the cloud? What if the data were pooled into a national repository for analysis?

From Tucker and co-authors' study:
 . . . [P]ublic health is confronted with a myriad of challenges, a complex taxonomy of risks that can go unexamined without standardized data collection systems. The most significant challenge to establish a public health imperative has been educating policy makers and federal, state, and local regulators about the hazards of contaminated foods that are consumed by people in both public and private foodservice facilities. In contrast, if mandated, industry adapts quickly when evidence-based policy helps to guide industry down a path of efficiency (Tucker et al., 2011).

"From a national security point of view," says Akers, "if counties were collecting this type of informatic data, it would be to our advantage to run, for example, some type of analysis to find patterns in food safety data and guide food safety efforts through predictions."

These systems are relatively cheap, easy to install and maintain, and absolutely beneficial for any industry player handling food, says Gibson. "With anything in food safety, it's kind of like insurance—you're purchasing something that hopefully you'll never have to really use, if that makes sense. Some look at it as throwing money into a hole. But really its not a matter of "if" it's going to happen but "when."

The charter of this column is to expose right-minded technology projects that promise increased capacity. These opportunities may arise from your colleagues, your municipality, or from the private technical sector. By remaining open to these opportunities as they emerge, you reserve the power to be a contributor to the concept, and build up and develop it for your constituency.

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Reference

Tucker, C.A., Larkin, S.N., & Akers, T.A. (2011). Food safety informatics: A public health imperative. *Online Journal of Public Health Informatics*, 3(2). Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3615782/>



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