



From Algorithm to Action

How Chicago Operationalized its Predictive Analytics for Food Inspections

BY [SEAN THORNTON](#) • OCTOBER 30, 2015

Armed with open-source tools and troves of city data, Chicago's Department of Innovation and Technology (DoIT) has been championing advanced analytics initiatives in order to enhance municipal operations. The city's most recent milestone, the completion of a pilot program that optimizes the city's food inspections process, was a success: by using an analytics-based procedure, Chicago was able to discover critical violations seven days earlier, on average, than if they had used the traditional inspection method. Done in collaboration with data scientists at Allstate Insurance and officials at the city's Department of Public Health (CDPH), Chicago's model has provided it with a blueprint for integrating advanced analytics into city operations going forward.

Yet for any advanced analytics project, developing and testing a model is only part of the process; embedding these models into regular operations is a different story. Using its open-source model as its base, DoIT also designed an application for the city's food inspections team to use on a regular basis. This app, now currently active, is the centerpiece tool for operationalizing food inspection forecasting.

For an app like this to be successful, its development requires a learning process and regular communication between developers and eventual users—a process that's more familiar in the startup world than it is in municipal government. Food inspectors at CDPH are experts in food sanitation rules, regulations, and practice, not advanced data analytics. With this in mind, DoIT's process for creating its food inspections app was a learning experience for everyone involved—and a source for key insights on how to effectively apply advanced analytics to government operations.

BEGINNINGS

In 2014, discussions had already begun between DoIT and CDPH on how to collaborate around the city's growing analytics program. DoIT had already begun constructing the [SmartData Platform](#), an open-source predictive analytics platform supported by a \$1,000,000 award from Bloomberg Philanthropies' Mayors Challenge.

CDPH and Chicago Chief Data Officer Tom Schenk, the leader of the effort, both saw potential in using analytics to optimize the city's food inspections processes. After they partnered with [Civic Consulting Alliance](#) (CCA), a local organization that pairs corporations with city departments to engage in pro-bono projects, Chicago met with Allstate, the local insurance giant with a history of [community involvement](#), and soon afterwards began getting to work.

Gerrin Butler, Chicago's Manager of Food Protection Services, was hired earlier that year. Although analytics conversations were already in motion, none of this was of concern to Butler yet: her top priority was to lead Chicago's best possible food protection and inspection efforts. And from her experience, developing a wholly new, algorithm-based program without knowing how effective it would be did not sound like the way to do so. "When I first heard of Tom's plans for predicting violations, I first thought 'How are they going to do this? How will it work? This is ridiculous,'" said Butler.

What did pique Butler's interest were conversations with Schenk's team on the City's first and already-completed analytics pilot program, which focused on enhancing the [Department of Streets and Sanitation's rodent baiting efforts](#). DoIT's work with rodents had led to a 20% increase in staff productivity, or time available for rodent baiting, a point not lost on Butler.

"Our team did a good job of explaining the value that analytics projects can have," noted Gene Leynes, data scientist at DoIT. "But what's important is that Gerrin actually wanted this product. She and CDPH have had more exposure to research and data than other departments, and knew it could potentially have a positive impact. This really gave us momentum for the project, on both sides." With one department endorsement, little precedent, and a lot of goodwill, Schenk, Butler, and their teams set out to implement the new program.

THE COMMUNICATIONS PROCESS

From the start, Butler envisioned the new program as an app with the means to better understand which food establishments are most likely to face a critical violation. With such information, Butler would be able to put her staff and resources to better use, thus improving food safety outcomes and maximizing efficiency.

Yet for any of this to come to fruition, both sides first needed to know a bit about each other's priorities and processes. This would be necessary for the development of the model and the app, both of which came from Schenk's team .

The first task was for Butler to walk DoIT's team through a typical day in the life of City of Chicago Sanitarian. Conversely, DoIT's team was to bring Butler up to speed on what information about the Food Safety Team's processes would be most useful, and how that information could then be turned into a final, usable product.

"When we discussed our business practices with DoIT and Allstate, and then heard about theirs in return, it sometimes felt like we were speaking two different languages," Butler recalled. "A lot of our methods still rely on techniques from the pre-digital era, which was a surprise to many."

To ensure that these discussions would be productive, Schenk and his team instituted an agile process of software development. This meant that his team at DoIT would hold regular meetings and check-ins with Gerrin that focused on meeting short-term goals and checkpoints, providing the flexibility needed in the long run for developing an effective app.

After several months of work, DoIT and CDPH developed an application that met goals laid out by both parties in the first place. Chicago's food inspections app provides a simple display that allows its City-employed users to sort Chicago's more than 15,000 food establishments by name, address, business license number, and prediction score. Armed with this information, CDPH is now able to prioritize which establishments inspectors can go to first. The app is now up and running at CDPH, and helping discover critical violations, on average, seven days earlier than traditional inspection methods.

While the model and app-building process was ultimately successful, it was not always easy. According to Butler and Leynes, the City learned several key lessons during the app planning process:

1. EFFECTIVE COMMUNICATION IS CRITICAL.

Chicago's food inspections app was developed by a range of people from different disciplines and sectors. As such, key individuals frequently used field-specific jargon that others did not always understand. For cross-sector projects, a basic but often overlooked step to avoid jargon is to identify common, shared components of the project, and assign them with singular and universally agreed-upon terms.

Butler notes multiple instances of how both teams learned to improve communication over time, and how finding agreed-upon terms from the start would have been beneficial. "While we (CDPH) maintain an inspection list of all food establishments in Chicago, the Department of Business Affairs and Consumer Protection also maintains a 'master list' which includes all the city's restaurants," said Butler. "Without clear communication to differentiate the two, there was some confusion. This slowed down the project a bit, in the end it was a good learning experience."

Another key component of effective communication: having everyone keep their eyes on the prize. "Part of getting things going is really focusing on the mission—and to a certain extent, even suspending disbelief," Leynes commented. "I will never be a chief sanitarian, and Gerrin will never be a data scientist. We both know this—so instead of trying to over-focus on the less important details of each other's jobs, we focused on that common ground of enhancing inspections."

In addition to establishing common terms and keeping a shared focus on the project's goals, one of the most important effective aspects of communication is also the simplest: frequency. "When we called, Gerrin picked up the phone," Gene said. "It may seem obvious, but if there weren't people we could check in with often, the project would have taken a lot longer."

2. CREATING A PROCESS MAP IS ONE OF THE BEST WAYS THAT ALL PARTIES INVOLVED CAN UNDERSTAND THE PROJECT'S STRENGTHS, WEAKNESSES, AND NEEDS.

"Part of effective problem-solving is asking the right questions. And when no one knows what those questions are, the best way to do so is to create a process map," says Butler.

By defining what a business entity does, who is responsible, to what standard a process should be completed, and how the success of that process can be measured, all parties involved will be able to move forward in a productive manner that saves time in the short run, and more acutely addresses project goals in the long run.

3. **HAVING A MEMBER OF THE WORKING TEAM WHO IS WELL-VERSED IN BOTH THE PROJECT AREA AND ANALYTICS AND TECHNOLOGY PROCESSES IS INVALUABLE.**

Butler credits key members of CDPH's team, such as analyst Raed Mansour, who are able to understand processes from both sides in order to placate general misunderstandings and apprehension. Such individuals not only enhance communication, but can help both sides build trust more quickly over time. "Going in, Raed helped smooth out a lot of my initial concerns—in particular, that launching a pilot program would not be a disruptive process," Butler noted. "Having someone to help communicate this was really important."

In the end, all parties were able to seize upon the food inspection pilot's promising results by collaboratively developing a common-sense, easy-to-use application that Chicago's sanitarians now use on a regular basis.

"When I saw the app for the very first time—all that data there in one place—I was very impressed," said Butler. "All of that hard work and communication really led to a great new way that we can do business."