Accolades are nothing new for Louisville, Ky., the largest city in the state. Perhaps best known for hosting the Kentucky Derby, Louisville consistently shows up in surveys as one of America’s most livable cities. Zagat and others call it a top getaway destination. The Center for Digital Government, the research arm of Government Technology’s parent company, e.Republic, recently recognized Louisville’s digital prowess with a first place 2012 Best of the Web award.

But Louisville Chief of Economic Growth and Innovation Ted Smith is working to remove the city’s name from a more dubious list not often mentioned by city boosters — one of the nation’s 10 worst cities for air quality. Air quality monitoring and a public notification system aim to inform citizens when the air is particularly impacted and likely to trigger symptoms for those with respiratory challenges.

“When I moved back to Louisville, one of the signs that greeted us as we crossed into the city essentially said, ‘Welcome to Louisville. Don’t go outside,’” Smith said.

Louisville residents and government discuss how asthmapolis is making a difference in the city.

Originally appointed by Mayor Greg Fischer in 2011, Smith brings a wealth of federal government and private-sector experience, as well as academic credentials in neuroscience. At the U.S. Department of Health and Human Services, he fostered
innovative health IT projects and partnerships between government and the private sector.

Smith had his work cut out for him in Louisville. With high levels of particulates, ozone and allergens spanning the city’s 450 square miles, Louisville also reports a high percentage of residents who suffer from asthma. And those numbers, like asthma rates across the country, are on the rise.

A chronic disease that follows sufferers throughout their lives, asthma brings respiratory symptoms like shortness of breath, coughing, wheezing and chest tightness, which can limit daily activities, and therefore quality of life. Most symptoms can be controlled by limiting exposure to both allergy-related and environmental triggers, and proper administration of prescription medications.

Ted Smith, Chief of Economic Growth and Innovation, Louisville

According to the Centers for Disease Control and Prevention, asthma treatment accounts for $56 billion in annual U.S. health-care costs, ranking it among the country’s most expensive diseases. But public health analysis to date, Smith explained, usually takes a broad view, rarely delving into analysis more granular than the county level.

Advocates for more specific health data collection argue that more data about the disease at the neighborhood or even block level can lead to more effective treatment.

“Maybe if we had a hot spot mentality,” Smith said, “we could actually start to better understand the extent of the situation at its worst, and what tools might be available in those circumstances.”

A Sensible Solution

Louisville officials began talking to Madison, Wis., based Asthmapolis, developer of a sensor that attaches to asthma inhalers, tracking data on precisely when and where individual asthma sufferers are administering their medication.
Asthma sufferers using the sensors can better establish how well controlled their asthma is, and work with their doctors to adjust their treatment plans to achieve better control. Asthmapolis boasts some impressive results in clinical trials to date, reporting decreases of 50 percent in uncontrolled asthma. A full 70 percent of sensor users improved their reported level of asthma control. Connected via Bluetooth technology to a user’s smartphone, the Asthmapolis sensor wirelessly transmits data, helping patients and their doctors track medications accurately and in real time. Patients are encouraged to supplement the automatically generated time and location data with information on symptoms they experienced and triggers that led them to take their medication.

“Just by identifying the time and frequency with which they use their rescue inhaler, we’re able to give them feedback about how well controlled their asthma is right now,” explained Tyler Heslinga, program manager at Asthmapolis.

The system generates tips to help asthmatics avoid triggers and work toward enhanced control of the disease. A new feature lets users set up a schedule for their medications and get reminders when a dose is due.

### Getting Granular

A pilot project is under way in Louisville, which is getting Asthmapolis sensors into the hands of asthmatics in order to generate some communitywide data that could help better manage the disease.

Private philanthropists and health-oriented foundations, including the Foundation for a Healthy Kentucky and the Norton Healthcare Foundation, are funding the $150,000 effort, which will implement 600 sensors in Louisville.

So far, Louisville has distributed about half of its sensors, through area Walgreens stores, as well as targeted community outreach. Officials also report widespread support from the medical community. Smith hopes that once data starts coming in from initial users, another couple thousand units can be funded.
And the city wants to make sure it maximizes the benefits it sees from the effort. In July, a team of data scientists from IBM went to Louisville — a beneficiary of the company’s 2012 Smarter Cities Challenge — to help the city consider as many ways to use the data as possible.

What exactly will materialize as a result of the data that’s collected remains to be seen. Smith is committed to exploring alternatives for reducing the impacts of asthma in the Louisville area, believing that the data collected by the sensors will help build community support.

The effort has started to generate some preliminary data, identifying some hot spots throughout the city where asthmatics are using rescue medication most often. Officials plan to layer this data over other relevant data sets, in their quest to stem the tide of asthma in Louisville. Asthmapolis data can be mashed up with related data sources, including air quality information, school absentee data and traffic patterns to inform future community decisions.

“And today, allergists and pulmonologists don’t ask you where you live or where you work. Presumably, with a little more of this data, many of them will start asking those questions,” Smith said, adding that this will directly impact care regimens. “Some of those patients will get different kinds of supervision, which will be a lot cheaper than everybody getting a lot more supervision.”

The hope is that this will lead to fewer medical consequences from the disease, like asthma attacks that require hospitalization — debilitating personally and financially at the individual and community level.

Smith makes a direct connection between data-driven community health programs like the Asthmapolis pilot in Louisville and real economic impacts.

Beyond just reducing health-care costs, better addressing community health can encourage local job creation. Companies considering potential locations now examine community health data too, which will directly affect their health insurance premiums, a significant business expense.

High rates of diabetes, stroke and other expensive diseases can also potentially be addressed with more data. The asthma sensors, then, are just the beginning.
“I think it’s going to be a cultural transformation for our city, and I think it will pay dividends in lots of other areas when people start asking for and expecting to have a lot more data that is more granular and more current,” Smith said.

http://www.govtech.com/e-government/Big-Data-Takes-on-Chronic-Disease.html