OTHER VOICES

Mapping Out Care Delivery with an Assist from GIS

Are you wrestling with where to locate a new medical office building? Or, maybe you're doing long-range planning and wondering how having more data on your patients' race and ethnicity and where they've lived might impact their health risk factors. In these and other cases, a geographic information system could play an important part in filling data gaps. A small but growing number of health systems are realizing the value of GIS as a planning tool. **MICHAEL S. JOHNSON**, *director of Kaiser Permanente's utility for care data analysis, has led the implementation of an enterprise-level GIS program to better understand KP's members. Here, Johnson explains to* H&HN *Contributing Editor Bob Kehoe how KP deploys GIS.*

HOW DOES GIS HELP HEALTH CARE REPORTING AND ANALYTICS?

GIS enables us to associate location with both our members and our care delivery system. By doing that, we're able to bring into the analysis all sorts of information also indexed or organized by location. That includes all the demographic and socioeconomic information provided through the U.S. Census Bureau. That has enabled us to understand not just our members, which ordinarily we understand from the health care delivery system data, but also the communities in which they live and work.

HOW DOES THIS WORK?

Our starting point is the member's address: Where does the patient live? That allows us to understand the geographic distribution of our membership, and can be represented in the form of a map in any particular service area. On top of that, we can superimpose our care delivery system.

At that point we can ask the most basic question: Have we organized our care delivery system so that it is convenient for our members to access care? We're able to identify places where there may be holes or gaps in the care delivery system that make access difficult. Knowing where our members live also enables us to identify environmental and community characteristics that may influence their health, including air quality, point sources of pollution, traffic, crime, etc.

HOW IS KP USING GIS TODAY?

We use it in facilities planning. We begin with a geographic distribution of our membership when we're thinking about where to site a medical office or where to expand a service area or potentially locate a medical center. GIS enables us to do detailed analyses of drive times: How long will it take members to get to our facilities depending on where they live? It enables us to understand the potential economies in terms of logistics and materials management between our facilities.

We also use GIS to support our community benefit activities. KP is the largest nonprofit 501(c)3 in the United States, and we have a community benefit obligation that we take seriously.

With health care reform, we're beginning to think hard about how we meet the needs of the new populations coming into our care delivery system. Many of these new members will have low incomes and will have traditionally received their care from community safety net providers. GIS is enabling us to understand how our care delivery network meshes with the existing safety net system of community clinics and other safety net providers, and how we can work with those other systems to accommodate this influx of new patients over the next few years.

HOW DOES GIS HELP IDENTIFY DISPARITIES IN CARE AND OUTCOMES?

This is an interesting area. KP has a significant effort underway to find out from our members how they wish to be identified in terms of race and ethnicity. For a long time in health care this was a question that simply was not asked. In our system, we didn't ask because we've always been committed to the idea that everybody should be treated equally and there should never be discrimination or segmenting of services based on race or ethnicity. But we now understand that race/ethnicity is an essential thing to know about an individual. Unless we know that, it's impossible to verify that all groups within our membership are actually getting effective care. Also, we now know that some health care decisions should be informed by knowledge of an individual's race or ethnicity.

By knowing the member's address, which we know from the day he or she joins the program, we can harness census data that inform us about the racial and ethnic composition of the member's community. Combining those data with the member's surname, we can generate a probability distribution for that member's race and ethnicity. Now, that probability distribution cannot be used at the individual level. In other words, you can't really say anything about the race or the ethnicity of the individual based on this computation. But when you look at aggregates of numbers—for instance, if we look at 1,000 individuals and go through this process—we get a reasonable estimate for the racial and ethnic composition of that group.

Using GIS to fill in this data gap enables us to stratify our own quality measures and those we report nationally, so we can begin to understand whether there are significant disparities across the racial and ethnic groups within our membership. If we discover such disparities, we can dig deeper and begin to address those, and find out if they are related to the educational materials or the ways in which we're communicating with members. It allows us a much more comprehensive look at our quality measurements and potential disparities with race and ethnicity.

HAS KAISER PERMANENTE TAKEN SPECIFIC ACTIONS AFTER VIEWING GIS DATA?

I'm not aware of any specific cases in which we've identified disparities that have resulted in programmatic changes, but I know that that's under review. I would expect that over time we will see programmatic changes that are aimed at reducing disparities. The good news, from our perspective, is that since we did these stratifications, we've made tremendous strides in quality over the last two or three years. In fact, the groups for which we have the lowest performance now are actually at or above the performance of the membership as a whole from two or three years ago.

WILL GIS ULTIMATELY HELP IMPROVE QUALITY OF CARE IN HOSPITALS?

It will help care delivery systems—hospitals as well as ambulatory care delivery systems—

Original content published in the January 2011 issue of *H&HN, Hospitals & Health Networks* magazine, Vol. 85, No. 1.

improve quality, but I also think it will help us understand the degree to which we are meeting community needs as a whole. To make that distinction clear, I think it's quite possible for a hospital to achieve extremely high-quality care for the patients who get in the door and for the individuals who show up at the medical office or wherever. But, historically, it's been much more difficult over time to understand if the care delivery system that exists in a particular community really meets the needs of that community. Who is being left out or left behind? GIS is a powerful tool for understanding that community perspective on health care delivery.

WHAT WILL GIS DO FOR KP IN THE FUTURE?

Bill Davenhall, the leader of Esri's health care group, has proposed an idea that is taking off. I've tried it out on some of our physicians and it seems to resonate with them.

Bill argues that somewhere down the road an individual's history of where he or she has lived will become an important component of the medical record. Understanding what sort of environmental influences to which they've been exposed will become important information for a clinical practice in the same way that an individual's genetic makeup is going to become a significant piece of information. In some ways, it already has.

GIS, while it started off in the marketing and facility planning and service planning end of health care, is increasingly going to find application in the clinical aspects of health care. That's what we're planning for and what we expect in the next four or five years. ●

Ann Bossard,
Global Hospital & Health
Systems Spcialist

380 New York Street
Redlands, California
92373-8100 USA

1-800-GIS-XPRT (1-800-447-9778)
Phone: 909-793-2853
Fax: 909-793-5953
abossard@esri.com
esri.com/health

Offices worldwide
esri.com/locations

125389