GIS Technology Speeds the Journey to Population Health Management

Geographic Information System tools boost hospitals' analytic powers to recognize patterns, glean intelligence, and pinpoint trends

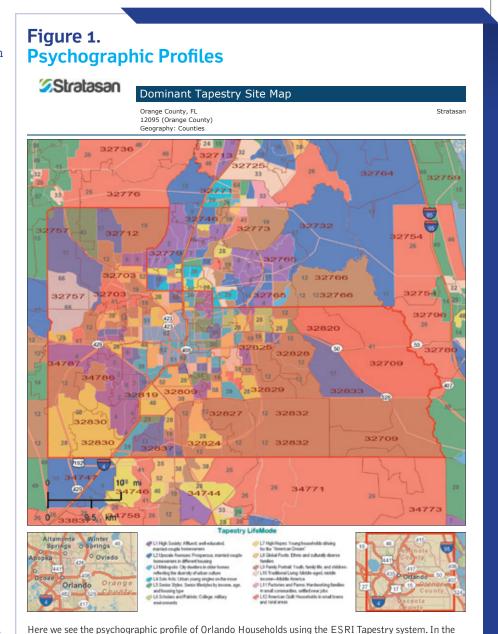**By J. Tod Fetherling and Aaron Frazier**

The healthcare industry is steadily moving toward a new paradigm, in which payment is tied to the documented ability to improve the health of entire populations, not just individual patients.

This requires a new approach to risk-sharing and a brand new skill-set. In the past, hospitals and health systems didn't need to master the intricacies of demographic and psychographic research—something most Fortune 500 companies have been doing for decades. But in order to more cost-effectively serve the Medicare/Medicaid populations while better meeting the needs of younger, healthier populations, healthcare organizations, especially accountable care organizations (ACOs), will need to know a lot more about these groups: who and where they are in terms of age, income, ethnicity, education, mobility, employment status, family make-up, home ownership, etc.; what their interests, attitudes, and buying habits are; and, most important, how this information affects their health.

Strategic planners and marketers are already beginning to be buried in vast amounts of data, very little of it in an easy-to-digest, actionable format: state and federal data, patient records from payers, physician utilization databases, reams of information from leading market research

Figure 1.
Psychographic Profiles

Dominant Tapestry Site Map

Orange County, FL
12095 (Orange County)
Geography: Counties

Stratasan

Here we see the psychographic profile of Orlando Households using the ESRI Tapestry system. In the eastern suburbs of Orlando (Orange County), we see an area that's home to many up-and-coming young families and is projected to grow the most rapidly in the next five years.

firms. What they need are powerful analytic tools that help them amalgamate, understand, and capitalize on those data.

Location, Location, Location

Enter Geographic Information System (GIS) technology, which can be integrated into any enterprise information system framework. Instead of having to wade through mountains of print reports, planners can now use machine learning or intelligent robots to study pattern recognition and glean intelligence that they need to track and truly understand increasingly mobile constituencies.
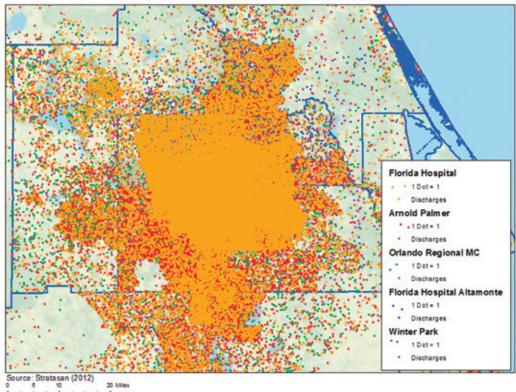
By overlaying demographic and psychographic information, GIS can help organizations swiftly answer any number of critical questions. For example:

- Who should we contract with to cover the market with services we don't provide?

- What are our geographic strengths and weaknesses?

- What is our best vertically integrated strategy for success?

- Are there opportunities to carve out service lines in communities that already have a center of excellence?

- What is the maximum per member per month (PMPM) fee structure that we're willing to pay?

- What risk adjustment is required?

- How will we manage sections of the overall population appropriately?

- What cost savings are available?

GIS technology can dramatically streamline and simplify this kind of market analysis by providing detailed, visual assessments of individual neighborhoods within broader service areas, pinpointing healthcare trends such as patient origin, primary care physicians, readmission hot zones, and patient outmigration.

Hospitals in Orlando are in a fierce battle for market share. The map shows the dominance by geography of Orlando Regional Medical Center and Florida Hospital.

Identifying Opportunities Quickly

The three graphic images in this article, featuring Orlando and environs, demonstrate how and what hospitals and healthcare systems can learn from GIS tools.

With the information documented in Figures 1-2, plus population growth and household income trends (not shown) indicating high-end purchasing power in Orange County, strategic planners can start to make informed risk adjustments. For example, they might decide to carve out cardiology and orthopedics service lines in a community where they're seldom used. Clearly, an ACO would make sense for this area because of the high concentration of younger, healthy, affluent residents.
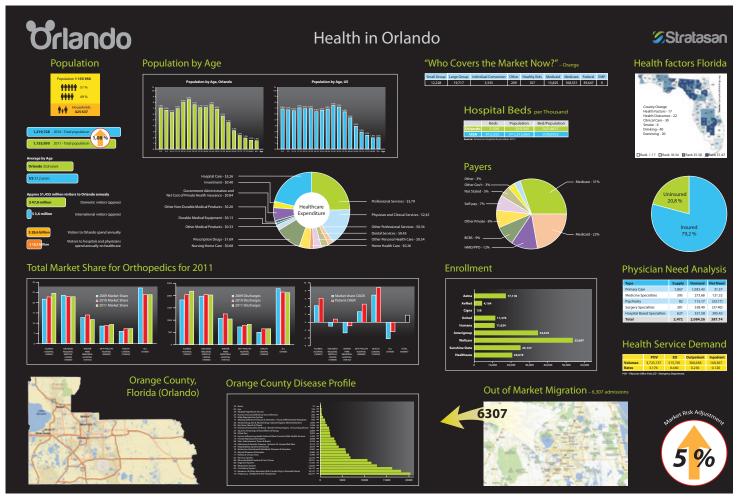
GIS tools also make it easier to predict where specialty practices are most needed. In Orange County, smoking is a relatively small concern, compared with Brevard County (home to Cape Canaveral), where it is a major problem. While there are other factors to consider, such as total demand, competition, and changes in care patterns, a pulmonology practice in Brevard County would undoubtedly do better than one in Orange County, especially among the younger residents of the eastern suburbs.

Some GIS analytic tools feature a dashboard that makes it easy to plug reliable numbers into this formula:

Health Service Demand/Population = Rate x Risk = Total Coverage/ Population - Carve Outs = PMPM (Per Member Per Month)

Using these types of visual summaries, healthcare executives in the area are now equipped to act quickly and confidently. In a matter of days, they can accurately

Figure 3.
Orlando Healthcare Dashboard

All the information gleaned about Orange County can easily be viewed in this single dashboard, which includes a risk adjustment (5%) at the bottom.

determine health service demand, contract value, and the most cost-effective PMPM, where it might take months to make these decisions if they were forced to work their way through hundreds of hard copy reports.

Advancing Accountable Care

The push toward ACOs is a bit like the 1849 gold rush: everyone is moving in quickly. While they vary greatly from one region to another—some are hospital-led, others primarily payer-driven, and still others have been launched by physician groups or county governments—ACOs are already available in markets covering 110 million people in the U.S. And as with the gold rush, the ones who get there first will reap the biggest financial rewards—*if* they've been smart about their market modeling.

The key to ACO success, as with population health management in other forms, is timely, actionable information that encompasses not just hospital discharge data but healthcare demographic information balanced with psychographic profiles. GIS technology makes it possible for healthcare organizations to make wiser decisions about how to allocate resources in a more timely manner.

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