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**Guiding Population Health Strategy with Visual Data**

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An emerging management approach in healthcare delivery is that of a migration towards comprehensive examination of chronic diseases, and entire populations as a whole instead of the individual. In essence, slowly moving from episodic-quantity care to population-quality care. Managing the overall wellness or health status of an "assigned" risk pool or population of patients has been a constant for third party insurers for many years, but only more recently has it emerged on the provider side of healthcare delivery. Examination of the health status or wellness of a defined population can provide valuable insights, and is the premise behind our recommendation in harnessing visual data as an effective tool for providing healthcare services not only more cost efficiently, but at a same or higher quality and for greater populations.

The field of epidemiology has historically demonstrated that a person's health can be markedly affected by the place or region where they are born or live. When basing a person's health on only one factor of the social determinants of health, healthcare professionals are not necessarily garnering a complete picture. In order to effectively forecast health conditions it is essential to look into a community's social, environmental and cultural factors. In a population healthcare delivery climate, the use of epidemiological metrics in a visual rather than numerical fashion may allow for more timely strategic decision-making.

As we begin to migrate towards new delivery models, and to harness new techniques for more effective strategic planning, it is prudent to examine some of the key terms and concepts in population health management.

**Population Health**

Population health is an up-and-coming real delivery model in the healthcare industry, and has been identified as a top strategic initiative (Punke 2013). With the shift in focus from episodic care to looking at the health of a population as a whole, organisations have to begin to think about how to take care of the patient across the continuum. Managing the overall wellness and health status of an assigned risk pool of patients is the primary goal of population health.

What exactly does population health and visual mapping have to do with strategy and planning? To truly understand their patient population, organisations must first understand who their population is. Many of the social determinants of health, such as social, environment, cultural and physical factors, are largely impacted by where the patient lives. Visual mapping should be utilised to develop a better understanding of not only who your patients are, but also what the day-to-day factors are that influence their healthcare needs. Understanding these interactions can lead to better decision-making.

**Accountable Care and The Medical Home**

Accountable Care Organisations (ACOs) and The Medical Home (Agency for Healthcare Research and Quality n.d.) must take a look at the entire population and their needs in order to align best with payment and care. Technology associated with population health will aid ACOs and The Medical Home. It is possible to see health status from state down to zip code, population growth, and three-dimensional rankings of chronic diseases by state, timelines of disease progression by state, hospital inpatient discharge data by disease, ambulatory surgery case data, emergency visit data and more. With this information you can start to predict what health conditions will arise

from the state to the city level. This will aid organisations in tailoring their specialties to provide the specific services that are needed.



**Figure 1.** Example of Microsoft Power Maps

**Bundled Instead of Episodic Payments**

Providers assume any cost that exceeds the fixed rate with bundled payments; essentially the provider has the financial risk. To help keep costs down providers can work to reduce episodes by connecting patients to prevention and care management programmes. In looking at what episodes to bundle, regional and statewide trends are assessed. To determine what acute or chronic conditions to bundle, the current "assigned" population is assessed and the episodes selected. Population health's effect on bundled payments is that it requires clinicians to think beyond their patient encounter. For example, surgeons must think past the operating room and consider the total impact and need for follow-up care. With bundled payments, clinicians are encouraged to emphasise prevention strategies, begin with conservation treatment, and work to enhance patients' understanding of diseases, treatments and prevention.
It is also prudent to note that growing debate exists regarding the educational infrastructure and ability to provide clinical services in a population health climate with nursing and physician shortages.

**Looming Shortage of Essential Personnel - Physicians and Nurses**

With the looming shortage of essential clinical personnel those in the field will need to be better utilised. This means strategically placing physicians and nurses in the communities they can best serve. Using population demographics to place physician practices the community can be better served with the appropriate number of clinicians. With a potential shortage coming physicians must be placed as efficiently as possible.

**Strategic Planning and Visual Mapping**

Strategic planning is a critical component for every healthcare provider, and healthcare is truly location dependent. Executives can better understand where their patients come from in order to figure out what types of services to focus on, as well as where to place facilities for future growth. Some examples of useful visual mapping data include patient age, zip code, county, health status and diagnosis code. Other important data that could be utilised visually are 3D rankings of chronic disease, population growth, hospital inpatient discharge data, and also ambulatory surgery case data.
As far as visual mapping resources go, google Maps A PI ( developers. google.com/maps) and Microsoft Power Maps (Part of Microsoft's Business Intelligence Solutions-www.microsoft.com/en-us/powerBI/solutions/capabilities/mapping-sof tware.aspx) are two examples of affordable software. These software packages allow for dataset uploads, and commonly allow Microsoft Excel spreadsheets as well as other database sources. There are numerous online tutorials for visual mapping, which allow for a wide range of users. Visual mapping resources provide numerous opportunities not only for the executive management team, but also frontline managers.
While commercial data analytics are key to understanding where key patients are located, it is crucial that organisations leverage their own electronic health record (EHR) systems within their organisation. Many different analyses can be done within an EHR, such as viewing patient encounters and admissions in order to compare what chief complaints patients are visiting the facility for. Some of the other metrics that can be leveraged through an EHR are patient locations based on zip codes and patient demographic profiles, such as age, sex and ethnicity.
Use of an organisation's own EHR would better help them to understand and assess their patient population
in order to better understand the diseases that affect those individuals. With the use of an EHR, the ability to gain an understanding of patient disease states greatly improves and helps to better combat different episodes of care. Each patient and each patient disease requires significantly different methods of treatment and disease regulation.
Not only can leveraging an organisation's own EHR be a useful strategy, so can using public and proprietary available resources. Often these resources are not leveraged to their fullest potential. Some of these resources include healthcare websites, Hospital Association data resources and advisory board data statistics. These data can be obtained through manual or automatic data pulls, home build or commercial products and SQL databases. This data can be used to strategically plan and manage the care provided to a patient population.
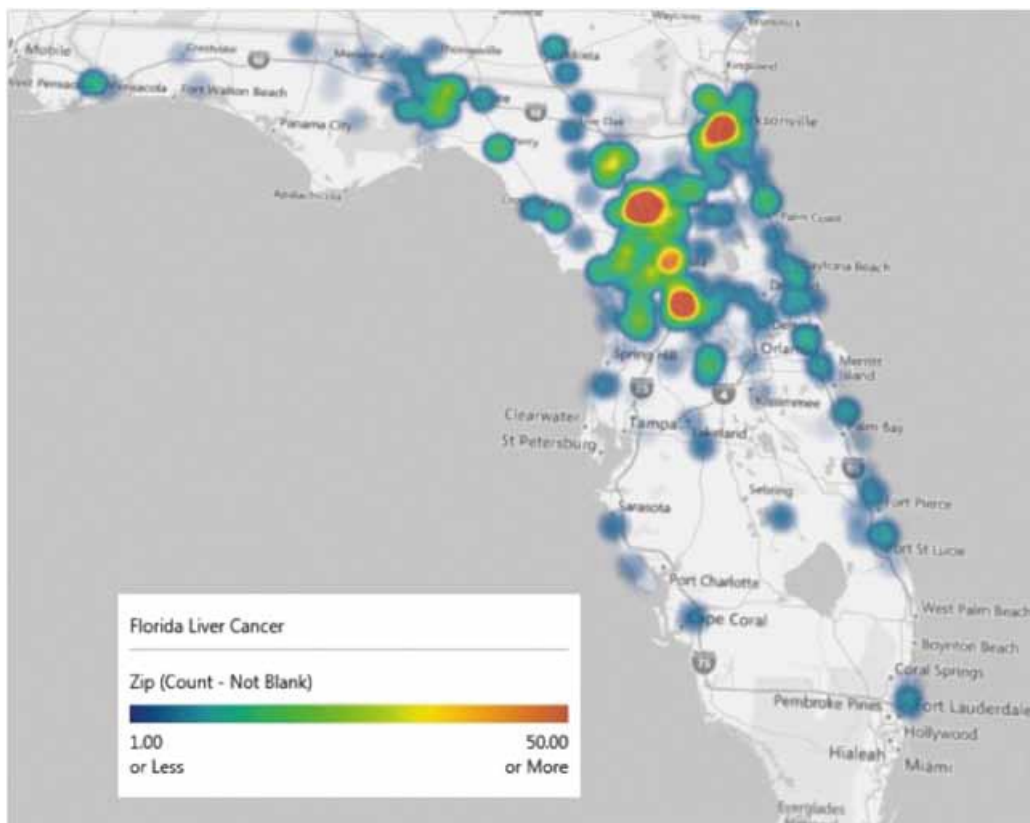
**Figure 2.** Microsoft Power Maps Example Showing Liver Cancer Incidence

**Conclusion**

With use of these various data sources, many organisations have now been utilising visual overlay-mapping as an effective tool for strategic and operations planning and to look at the current state and future state of opportunities within a market area. By using these maps, organisations are able to help better maximise resources such as clinicians, supplies, mobile outreach, physical space, etc. While maximising resources is key, it is also crucial that these maps can pinpoint patient populations in order to help better manage new payment modelling systems for the organisation in the future.

**Suggested Resources**

Below are a few resources that have been utilised by numerous organisations in order to take advantage of visual mapping tools. We are not in any way affiliated or compensated with these resource providers.
1. Caradigm Population Health Software Vendor provides great resources
a. www.caradigm.com/en-us/resources
2. Microsoft Power BI - Includes Power Maps
a. www.microsoft.com/en-us/powerbi/default.aspx
3. SmartDraw Software
a. www.smartdraw.com/software/map-software.htm
**Key Points**

- Healthcare delivery is moving from episodic care to a population health model.
- Managing the overall wellness and health status of an assigned risk pool of patients is the primary goal of population health.
- Use of epidemiological metrics in a visual rather than numerical fashion may allow for more timely strategic decision-making data.
- Data sources include organisations' own electronic health records as well as publicly available and proprietary resources.
- Maps assist in maximising resources and pinpointing patient populations in order to help better manage new payment modelling in future.

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