Healthcare Analytics

What is it?

- Systematic analysis of data collected from health care domains

- Allows for the examination of patterns in various healthcare data in order to determine how clinical care can be improved while limiting excessive spending

Healthcare data

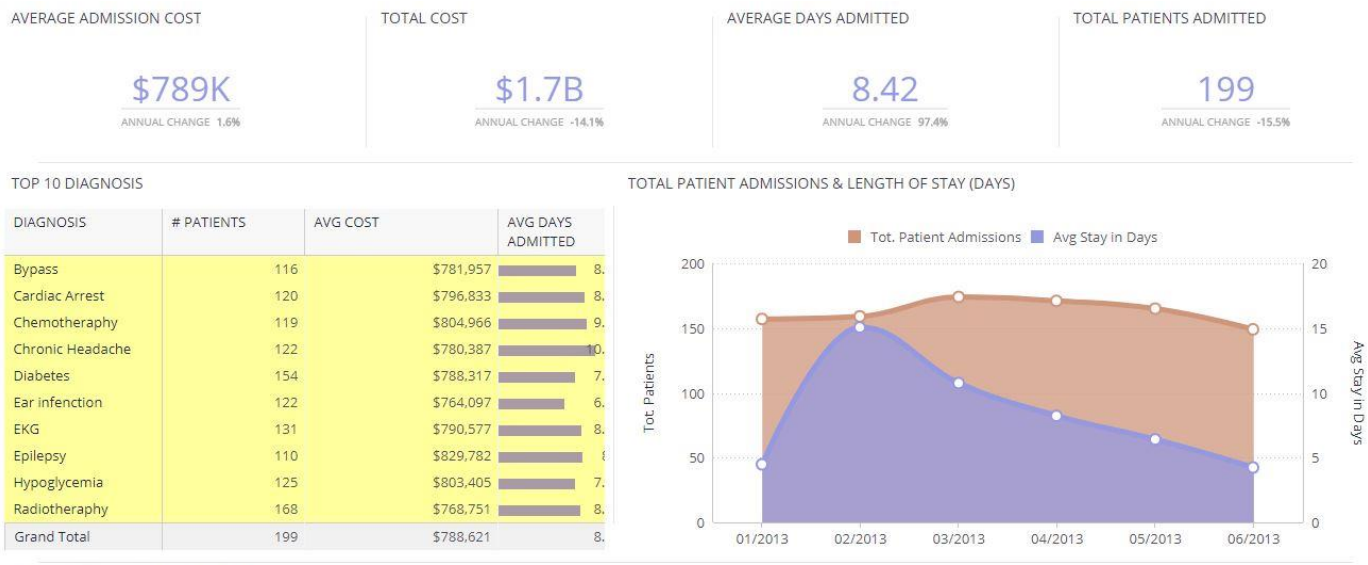
- Claims and cost data
- Pharmaceutical and research and development (R&D) data
- Clinical data (collected from electronic medical records (EHRs))
- Patient behavior and sentiment data (patient behaviors and preferences)

Why analytics?

- Helps healthcare managers to operate better
  - by providing real-time information that can support decisions and deliver actionable insights.

How analytics?

- Business intelligence suites and data visualization tools in healthcare analytics



How it helps?

- Claims and cost data
  - Assists administrators with identifying areas to streamline operations and increase savings in a concrete fashion
- Pharmaceutical and research and development (R&D) data
  - providing new innovative solutions and treatments that can be properly tracked, measured, and analyzed.
- Data from wearable devices for monitoring vital signs

How it helps?

- Clinical data (collected from electronic medical records (EHRs), Wearable devices)
  - Determine what areas of their service need to improve, and offer more granular information regarding treatment effectiveness, success rates, and more.
- Patient behavior and sentiment data (patient behaviors and preferences)
  - understanding what patients and clients are feeling and how they react to service and treatment is critical when working towards extending ever-improving services

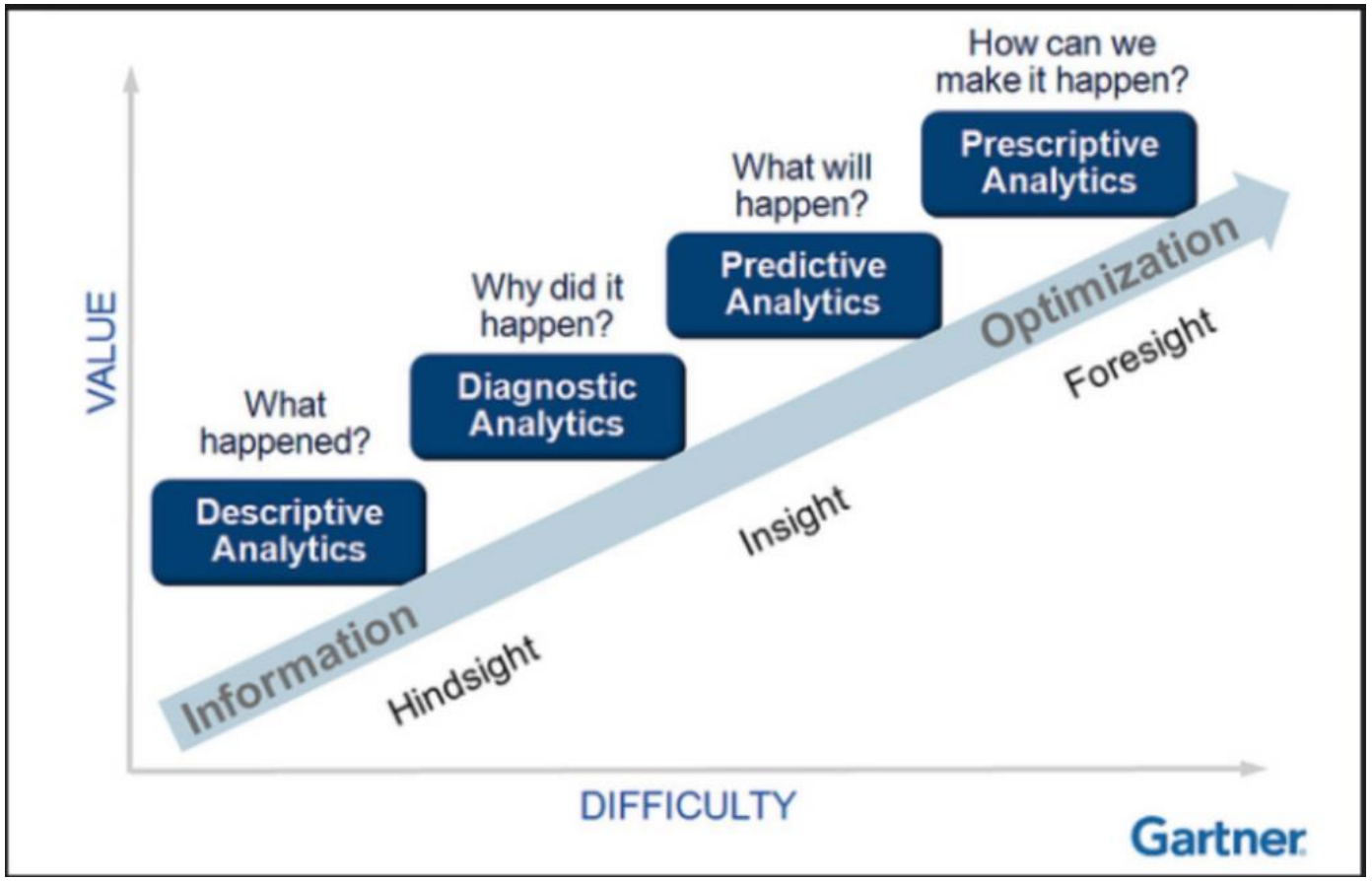
Applications

- Advancements in telemedicine
- Enhanced patient engagement
- Wearables that provide real-time alerts
- Disease prevention/population health
- Improving/refining treatment standards
- Improved staffing efficiency

Impact on other domains

- **Epidemiology:** Health care analytics professionals are experimenting with data visualization to identify and more quickly control disease outbreaks.
- **Clinical trials:** Health data analytics is expected to help researchers go to market faster with important new drugs.
- **Genomics:** Advanced understanding of how diseases affect different people will enable medical researchers to develop personalized medicine based on individual DNA makeups.
- **Social factors:** Heightened ability to analyze data about the social determinants of health (such as where patients live, work and shop, what they eat, conditions related to their environment, etc.) opens new possibilities to better predict disease trends and to develop health and disease prevention programs.

Gartner's Data Analytics Maturity Model



Descriptive Analytics

- Tells you what is happening in your practice
- Example:
  - Increase in denied claims over the past several months.
    - Has a negative impact on the financial performance of the organization.
- Reveals that the increase in denials is specific to a particular denial code. (code not enrolled in the Medicare system)

Diagnostic Analytics

- Allows you to identify the root cause
- Example:
  - Identify why the referring provider is not enrolled in the system.
    - would help to identify new referring providers.
    - would prompt to identify whether these new referring providers are enrolled in the system.

Predictive Analytics

- Allows you to learn from historical trends to predict what will happen in the future.
- Example:
  - will tell you the expected denials associated with the claims in future.

Prescriptive Analytics

- Assists in determining the best course of action from the information gathered from descriptive, diagnostic and predictive analytics.
- Example:
  - contact the new referring provider
  - express appreciation for the new referrals
  - Evidence that the provider's referrals are resulting in denied claims due to lack of enrollment.

Descriptive Statistics

- Practical application

Inferential Statistics

- Use a random sample of data taken from a population to describe and make inferences about the population
- Example:
  - To measure all the patients (whole population) with a symptom (e.g. hypertension) is usually not possible.
  - You can measure the data on a representative random sample of patients with the symptom.
  - You can use the information from the sample to make generalizations about the whole population of patients with the symptom (e.g. hypertension).
- Inferential statistics is about hypotheses testing.

Inferential Statistics

- Is there is a significant difference in the mean flight time for trauma and nontrauma patients? (T-test)
- Is there is a significant difference in mean systolic blood pressure for the control group, the group with drug A, the group with drug B, or the group with both drugs A and B? (ANOVA)
- Is there is a positive relationship between scene time and flight time? (Correlation)

Inferential Statistics

- Is there a relationship between intubation success and use of neuromuscular blockade? (Chi-square test)
- Do weight, height, and smoking status influence resting pulse rate? (Prediction)

Reference

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