



# Challenges/opportunities in the use of 'Big Data' in health care services setting (pharmacy/insurer)

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# We know that Data & Analytics (D&A) have the potential to “Unlock the Value of Insight” – impacting the traditional approach for Clinical Trials and Protocol Design



Healthcare Providers are already leveraging D&A to better understand the impact of their care processes across the continuum of care.



Compare the Total Cost of Care (Cost = Reimbursement) and outcomes for patients who receive care for a disease of interest at your facility / physician with patients who receive their care at specific competitors (TCC Analytics).  
*E.g., for Cancer, Readmissions, LOS, Pediatrics etc.*



Help providers understand what to do with all their investments in data (EHR). Answer questions like “How do I leverage all this data I’m collecting to make better decisions?,” “What is my big data strategy?.” (Analytics Maturity Roadmap)  
*E.g., for an entire IDN, to ACO and ACO-like configurations, to stand-alone hospitals*



Determine your hospitals regional market share in comparison with other providers? Analyze the distribution and utilization of services. (Market Share Analytics)  
*E.g., Share of patients, utilization of services like surgery, radiology, etc)*



Determine the characteristics of “your patients” who received follow-up / future inpatient services at competitors (Volume Leakage Analytics)? Analyze by geography, specialty, providers, etc.  
*E.g., for Cancer, Asthma, Cardiology. Also consider for Readmissions, LOS, etc.*

# And we know key trends will shape our approach to Oncology, Neurology, Diabetes and Cardiovascular - requiring D&A (D&A) capabilities "to put our arms around it"

			Prevention				Diagnosis				Real cure			
			Oncology	Neurology	Diabetes	Cardiovascular	Oncology	Neurology	Diabetes	Cardiovascular	Oncology	Neurology	Diabetes	Cardiovascular
New therapies (selected examples)	Enablers													
	<b>Genetics</b>	Gene editing, genotype, genetic profiling and mapping, gene therapy												
	<b>Cellular programming</b>	Stem cell therapies												
Advances in technology	<b>3Dprinting</b>	3D printed models, organs, cells												
	<b>Nano-technology</b>	Nanobots, nanoparticles, nanochips												
	<b>Bionics</b>	Artificial organs, implants, prosthetics, assistive devices, exoskeletons												
	<b>Predictive analytics</b>	Artificial intelligence, big data analytics												
Consumerization of health	<b>Patient access to data and technology</b>	Wearable monitoring devices, apps, gamification and digital medicine												

# And while some Life Sciences are already deploying targeted D&A solutions....

## Increase In Usage of Real-world Data for Commercial



- Opportunity assessment
- Forecasting
- Market understanding
- Targeting
- Segmentation
- Adherence

## Integration, Aggregation Of Big Data From Other Groups In R&D, Internal, External, Social Data Sources



- APLD, Disease and Treatment data for enhanced population and healthcare market insights
- Social data for patient/HCP behavior, tracking & marketing

## Targeting Of Disease Prevalence And Patient Outcomes For Top Brands



- Establish a foundation for the treatment - capitalize on first mover advantage
- Mine for outcomes to justify either one to be a first-line therapy
- Optimizing commercial potential of smaller drugs

## Patient Risk Stratification, Engagement Platforms, Journey Simulations via Digital Capabilities



## Statistical & Advanced Analytics Techniques For Pricing & Contract Profitability / Optimization



## Changing The Game With Payers



# Only a fraction of CIO's in the Healthcare and Life Sciences are building D&A capabilities with "Industrial Strength"

A survey of 112 hospital CIOs by the College of Healthcare Information Management Executives and KPMG found that 38% are making electronic health records integration their top spending priority

Followed by accountable care (population health technology) and consumer, **clinical and operational analytics at 21% and 16%, respectively**. Other technology spending priorities for hospital CIOs include virtual/telehealth technology enhancements at 13%, revenue cycle systems and replacement at 7% and enterprise resource planning systems at 6%

Institutional Investor Research and KPMG reveals that there are clearly a lot of opportunities & challenges – but it's not so clear what the priorities are or what will deliver the most ROI:

"Of all respondents, 62% say that they would view a company favorably if it were to use D&A specifically to improve operating performance by controlling costs, shrinking inventory, and allocating resources optimally"

"...respondents are much more likely to find fault with issuers' integration of data and analytics into their business strategies... 40% fault companies for devoting inadequate attention to their D&A strategies."

"38% strongly or somewhat agree that the opportunity for better business performance from D&A has begun to be realized, while only 21% disagree"

# What has worked? Why?

## The Problem

**Healthcare providers are asking questions about the impact and cost of high quality care.**

- Can I demonstrate that the higher quality of care at my institutions actually leads to lower total costs when considering the continuum of care?
- How can I test my hypothesis that patients who receive most of their care at our institutions (across all care settings) do 'better' (outcomes, cost) when compared to our peer group?
- Are our investments in high quality care actually leading to better outcomes?
- How do we change our care plans to align with high quality care while staying competitive?

## The Challenge

**Healthcare providers often lack the data and tools to measure the total cost of care for a patient.**

- Patients may receive care in many provider settings (hospitals, rehab facilities, nursing facilities, etc) both inside and outside of the provider's facilities.
- Analytics can help to link data in a patient-centric and disease-centric view across the treatment continuum.

**Measure Total Cost of Care Across Treatment Continuum**

# What has worked? Why?

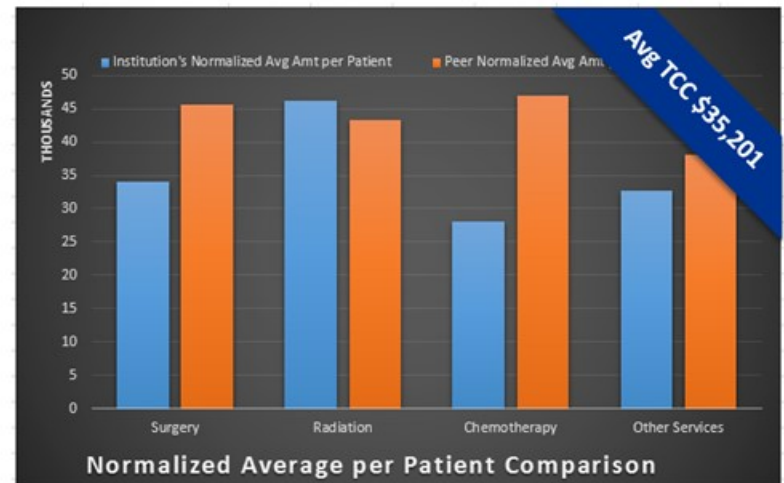
## The Problem

The approach was to develop a patient centric and diagnosis specific total cost of care analysis across various provider settings

- ❑ Leverage National Claims Database (100M+ covered lives, refreshed quarterly) across the entire treatment continuum
- ❑ Use proprietary algorithms to construct a patient and disease-centric longitudinal and episodic view of care, across the boundaries of service lines, providers, and geographies within and outside your organization.
- ❑ Apply the cost of care analysis with your organization's peer groups to provide comparison metrics on cost and quality

## Use Case

For an academic center, it was demonstrated that their total cost of care for cancer patients treated at their hospital was **26% less** than their peers despite a higher cost of acute treatment.



# What hasn't worked? Why

## The Problem

### Subject recruitment for Oncology

- ❑ Only 5% of cancer patients actually join clinical trials
- ❑ 37% of clinical trials fail to reach recruitment goals and 11% of sites fail to recruit a single patient according to the National Cancer Institute
- ❑ Multiple Data sets are available – social media, registries, etc – but Data is not curated

## The Hypothesis

### Subject recruitment for Oncology

- ❑ Leverage Data & Analytics for identification and recruitment
- ❑ Further expand into identifying new therapies based on biomarkers, simulate adverse event responses in sub-populations, etc.
- ❑ Create a repeatable methodology that could be expanded for PAA

# What hasn't worked? Why

## Challenges

### Subject recruitment for Oncology

- ❑ Data Ownership and Data Governance – How to keep an evergreen data set?
- ❑ Data Privacy – What are the ethical considerations?
- ❑ Operating Model – What are the insights, the data curations and the approval process/risk mitigation strategy

## Results / Learnings

### Subject recruitment for Oncology

- ❑ Privacy concerns reshaped narrowed the scope to only provide insights to inform and to guide decisions but not for recruitment purposes.
- ❑ As a Pilot it was a success, but it failed to evolve to an Industrial strength solution
- ❑ The take-away is that to be successful, these initiatives are as much of a Change Management effort as they are a D&A

# What are the key obstacles we need to overcome?

**Extracting** data from multiple systems and **transforming** it into actionable information - Spending **too much effort** collecting and reporting quality data.

**Engaging** Chief Privacy Office, Compliance, and CIO organization from Business Case to Execution

Heavy burden on employees to compile information into a **format** that can be **utilized**.

Getting the **right information** and the right time when data is in multiple formats and locations - Garnering **real time**, dynamic insights from the data

**Educating** key stakeholders on concepts like “Minimum Viable Product”

Clarifying data **ownership and accountability** internally.

# What have we learned from industry applying D&A in a Clinical Trial Setting

The biggest challenge with real world evidence and real world data generation is understanding how to apply it and when to use the data. One size does not fit all. FDA and other HA have yet to provide clear guidelines.

Effective monitoring for at risk patient populations should make the patient “centric” to the analysis. Here, the patient must become an active participant in their course of treatment and personalize medicine becomes the standard.

As medicine becomes more personalized and drugs become targeted for smaller populations, traditional, large-scale RCTs will become increasingly less feasible. Adaptive approaches can be an effective method for some types of drugs; especially oncology.

Adaptive pathways would use “real time” and “real world” data collected virtually through a combination of personal monitoring devices, smartphone apps, phone calls, and virtual visits. This would allow better management of risk because more data, and more timely data, would be gathered from a bigger cohort, leading to earlier and more robust information from which to create risk profiles.

Game Changes – “adaptive trials” with patient consent and access to IoT in patient monitoring. Building an active surveillance program between Private and Public Partnerships that is more inclusive – Payer, Pharma, Regulatory and Patient Advocacy Groups.

The key difference is “real time” analysis leading to quicker hypothesis generation, treatment and fast track for at risk patients. A RCT trial thru phase II and III can take at minimum 4 to 6 years. This time is longer than the “life span” for Compassionate Use Case patients.