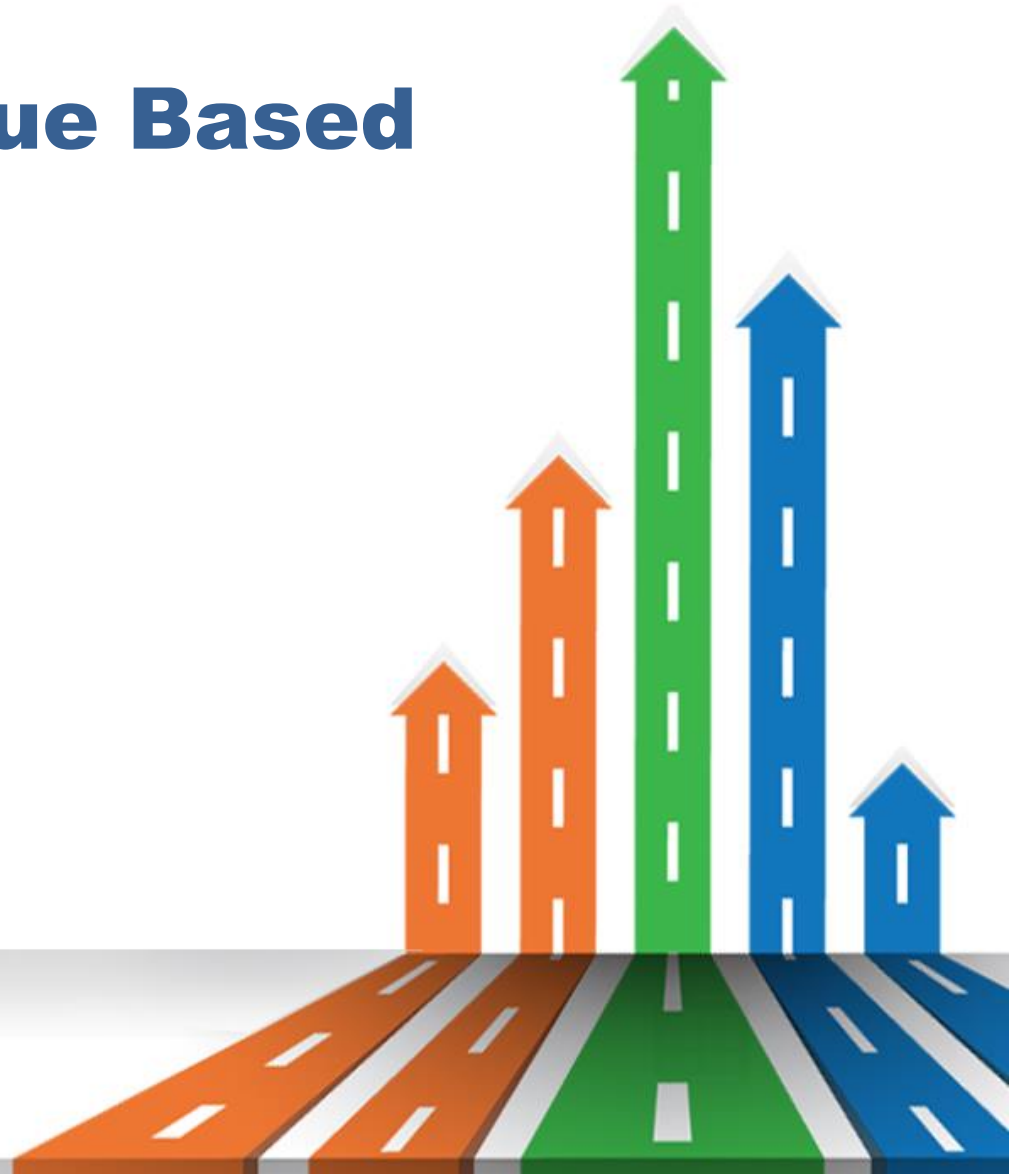# Analytics in a Value Based World

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Forward Looking Statement

This document may contain forward looking statements regarding future operations, product development, product capabilities and availability dates. This information is subject to substantial uncertainties and is subject to change at any time without prior notification. Statements contained in this document concerning these matters only reflect Citra Health Solutions' predictions and / or expectations as of the date of this document and actual results and future plans of Citra Health Solutions' may differ significantly as a result of, among other things, changes in product strategy resulting from technological, internal corporate, market and other changes. This is not a commitment to deliver any material, code or functionality and should not be relied upon in making purchasing decisions.

Objective

- Explore how BIG Data is transforming Analytics – Buzz word or Reality?

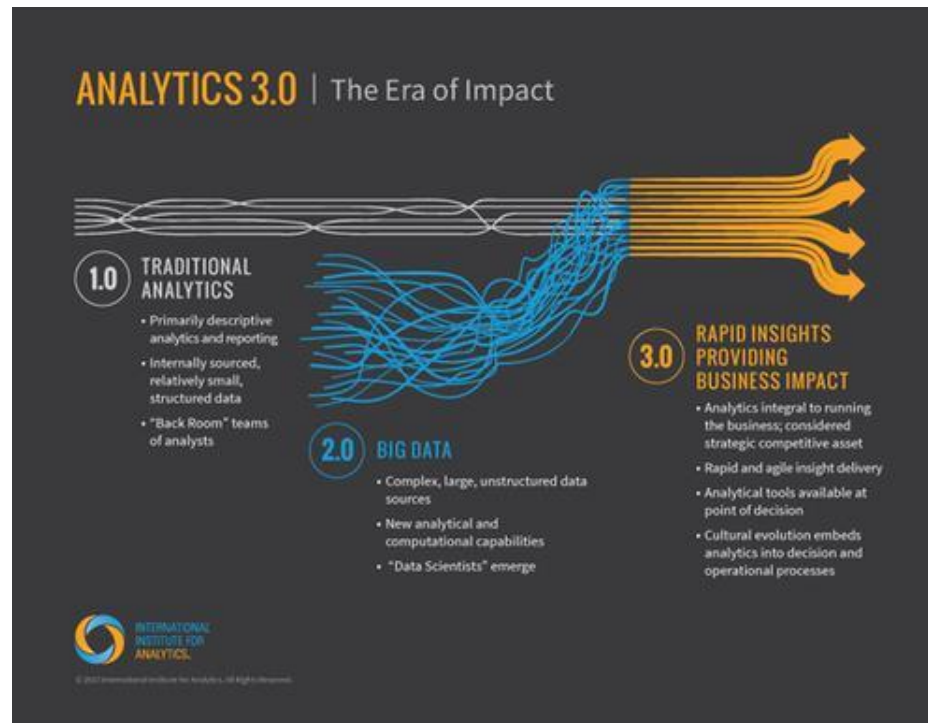- Analytics 3.0

- Analytics Framework for Value-Based Health Care

"Value" (Outcome/Cost) is the Currency of the New Healthcare

Analytics 3.0 – Fast Business Impact for the Data Economy

- Analytics 1.0 – Traditional Analytics
- Analytics 2.0 – Big Data
- Analytics 3.0 – Fast Impact for he Data Economy

Source: Analtyics 3.0 Opportunities for Healthcare, Phillps, Jack; Davenport, Thomas H., July 24,2013

Analytics 1.0 – Traditional Analytics

- Primary descriptive analytics and reporting
- Internally sourced, relatively small, structured data
- "Back Room" teams of analysts
- Internal decision support

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Analytics 1.0 - Ethos

- Stay in the back room – as far away form decision-makers as possible – and don't cause trouble

- Take your time – nobody's that interested in your results anyway

- Talk about "BI for the masses," but make it all too difficult for anyone but experts to use

- Look backwards – that's where the threats to your business are

- If possible, spend much more time getting data ready for analysis than actually analyzing it

- Keep inside the sheltering confines of the IT organization

Analytics 2.0 Big Data Era

- Complex, large, unstructured data sources
- New analytical and computational capabilities
- "Data Scientists" emerge
- Online firms create data-based products and services

Analytics 2.0 - Ethos

- Be "on the bridge" if not in charge of it
- "Agile is too slow"
- "Bing a consultant is the dead zone"
- Develop products, not Power Points or reports
- Information(and hardware and software) wants to be free
- All problems can be solved in a hackathon
- Share your big data tools with community
- "Nobody's ever done this before!"

Neither are the challenges ...

50%

Do not have an effective information strategy in place

98%

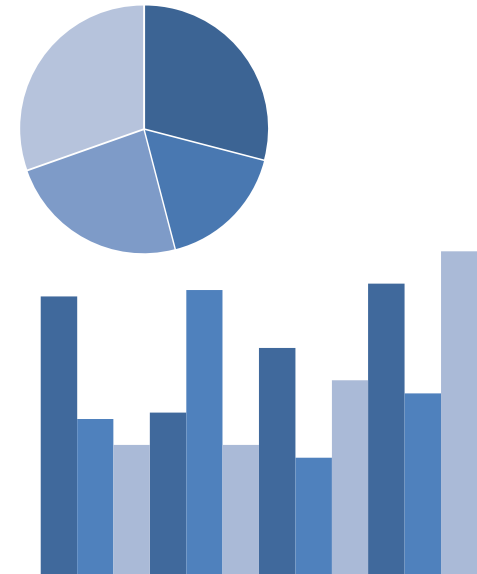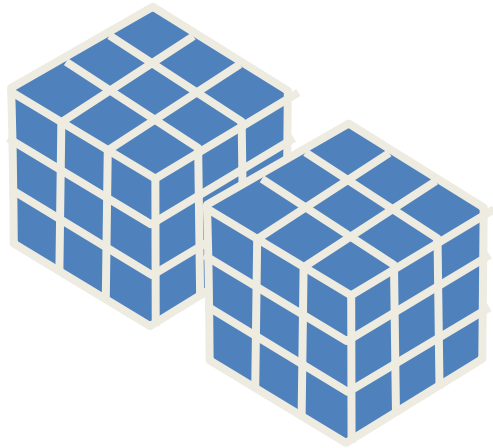**Cannot deliver the right information at right time**

34%

Say half their information is unused

35%

Are not effective at accessing enterprise information

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Today, data analysis is slow, painful and costly

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Legacy architectures were built for a different world

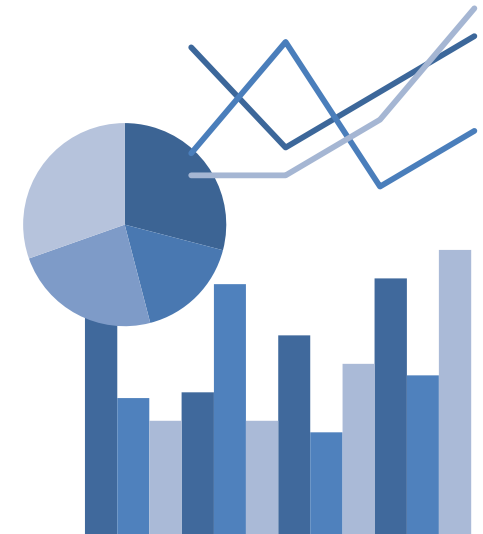Yesterday's data warehouse and analytic infrastructure

- Proprietary
- Expensive
- Centralized, monolithic
- Process laden
- Batch
- Summary
- Slow

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Imagine a world where a conversation with your data bring answers in near real time

Unlimited scope across structured & unstructured data

Near real time, iterative queries

Dramatically lower TCO

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EZ-ANALYTICS Uses Technology Designed for Answers

Columnar storage and execution

Achieve near real-time performance with unique HP Vertica column store

Clustering

Add resources on the fly with linear scaling on commodity hardware

Compression

Store more data, provide more views, 90% less storage required

Continuous performance

MPP allows 24x7 load and query with concurrency and no administration

Database design
Automated performance tuning

Advanced analytics
Time-series, geospatial, click-streamand an SDK for more

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When It Comes to Healthcare

BIG DATA Is a BIG Opportunity

Allowing new insights never seen before

There is an estimated

50 Petabytes

of data in the healthcare realm

1024 Kilobytes = 1 Megabyte
1024 Megabytes = 1 Gigabyte
1024 Gigabytes = 1 Terabyte
1024 Terabytes = 1 Petabyte
1024 Petabytes = 1 Exabyte

A comprehensive study by McKinsey Global Institute (MGT) found that if BIG DATA was used effectively...
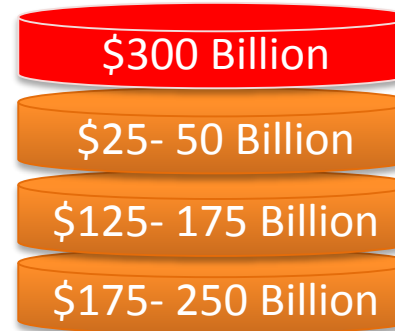
The US Healthcare sector could make $300 Billion in savings every year

$300 Billion	8% Reduction
Poorly Coordinated Care	$25- 50 Billion
Fraud & Abuse	$125- 175 Billion
Administrative & Clinical Inefficiency	$175- 250 Billion

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Analytics 3.0 – Fast Business Impact for the Data Economy

- A seamless blend of traditional analytics and big data
- Analytics integral to running the business; strategic asset
- Rapid and agile insight delivery
- Analytic tools available at Point of Decision
- Cultural evolution embeds analytics into decision and operational processes

Analytics 3.0 – Competing in the Data Economy

- Every organization – not just online firms – can create data and analytics-based products and services that change the game

- Not just supplying data, but insights and guides to decision-making

- Use "data exhaust" to help members use your products and services more effectively

- Start with data opportunities or start with business problems? Answer is yes!

- Need "data products" team good at data science, customer knowledge, new product/service development

- Opportunities and data come at high speed, so quants must respond quickly

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Express Scripts

- Uses analytics on data from 1.5 billion prescriptions/yr to drive behavior change and process improvement

- Developed proactive, customized messages to educate about more cost effective methods of filling prescriptions

- Using predictive analytics to identify patients at risk of skipping doses and proactively intervene

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United Healthcare

- Using social network analysis to identify potential fraud
- Analyzing speech-to-text data from call centers to understand likely attrition candidates
- Predicting likelihood of success in disease management candidates
- "Health in numbers" marketing

Using Value Based Analytics

- In Healthcare, the days of business as usual are over

- Every health care system is struggling with rising costs and uneven quality

- Countless Fixes have been tried - with little impact
  - Attack fraud
  - Reducing errors
  - Enforcing practice guidelines
  - Making patients better "consumers"
  - Implementing EHR systems

- It's time for a fundamentally new strategy

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Using Value Based Analytics

- Maximizing value for Patients – achieving the best outcomes at the lowest cost.

- Must move form supply-driven health care toward a patient-centered

Driving Meaningful Medication Adherence

Drug Adherence – Safety Issue

- "Drugs don't work in patients who don't take them"   ..C Evertt Koop, MD

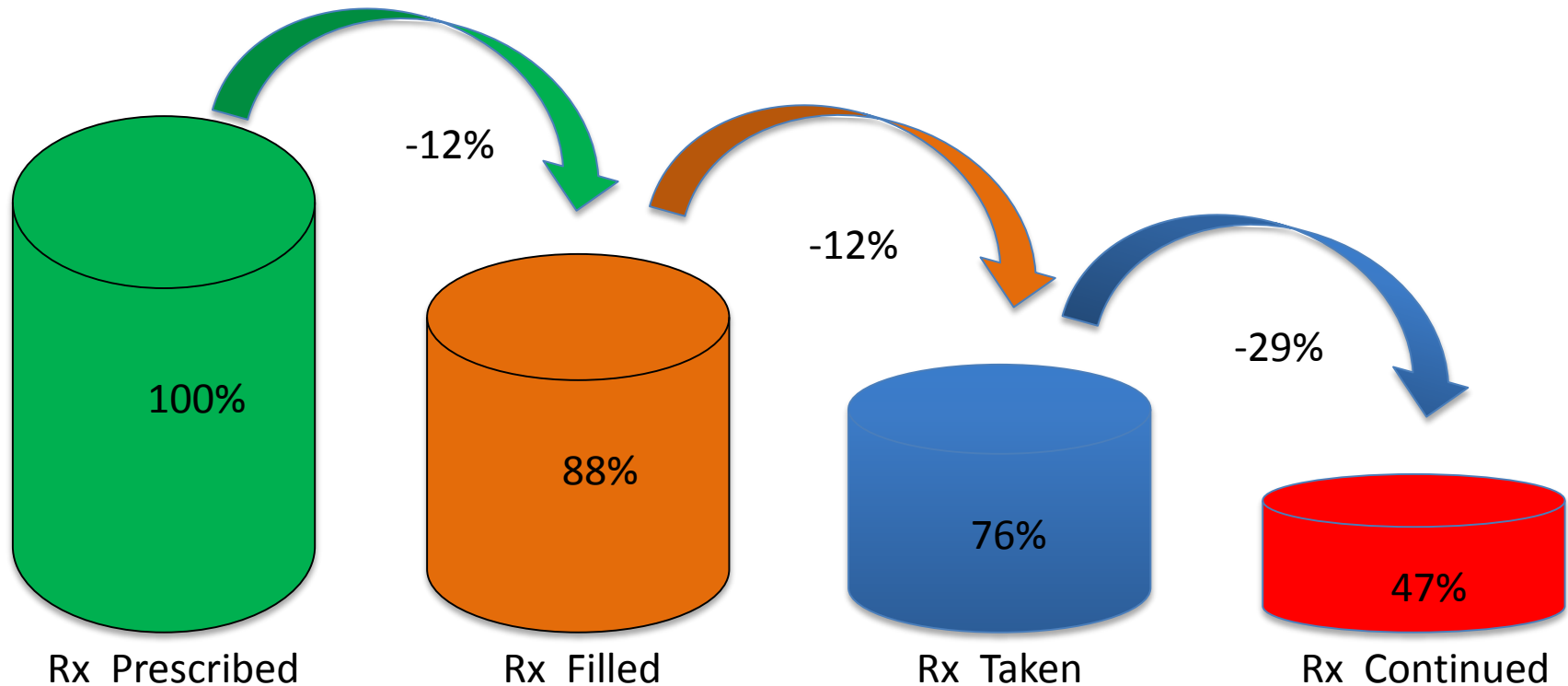- "Medication adherence is America's new drug problem"   … Carolyn Clancy, MD

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Driving Meaningful Medication Adherence

Poor Medication Adherence is a Problem of Striking Magnitude

- 32M use 3+ medications per day
- 75% non-adherent in some way
- Non-adherence is related to
  - 1/3 of medication-related hospitalizations
  - 125,000 deaths annually (4th leading COD)
- Annual US impact estimated at $300B
- Addressing non-adherence could cover the cost of healthcare for 45M

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Driving Meaningful Medication Adherence

-12%

-12%

-29%

100%

88%

76%

47%

Rx Prescribed

Rx Filled

Rx Taken

Rx Continued

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Source: Chronic medication-taking behavior (AHA, 2002)

Reasons for Medication Non-adherence

72 million US adults take 5+ Medications/Day

Healthcare provider related

- Errors in Discharge Instructions
- Harmful Drug Interactions
- Dosing Problems

Patient related

- Failure to fill/refill Rx
- Confusion
- Don't Take Meds
- Forgetful or Busy
- Can't Keep Track of Multiple Meds
- Don't Like Side Effects

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Medication Non-Adherence Outcomes

$47 billion in medication mis-management hospitalizations
$177 billion in US healthcare costs

60% take meds incorrectly
40% of elderly hospital admissions
60% of nursing home admissions
Hospital readmissions

CHF: 27% (30 Day); 47% (1yr)
All Disease: 18% (30 Day); 56% (1yr)

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Driving Meaningful Medication Adherence
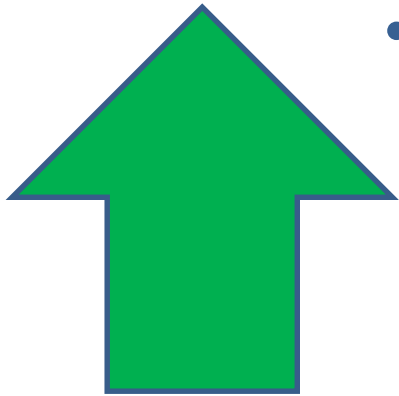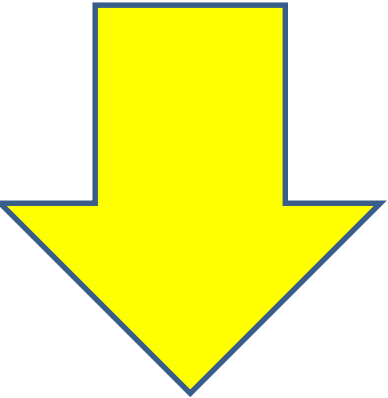
- **Personalized interventions**
  - No single approach has been shown effective across all people, conditions and settings
  - Need to be tailored to the risks, characteristics and circumstances of individuals

- **New Health System Capabilities**
  - Accurately assess who is most at risk
  - Identify what influencers of adherence differ for different people
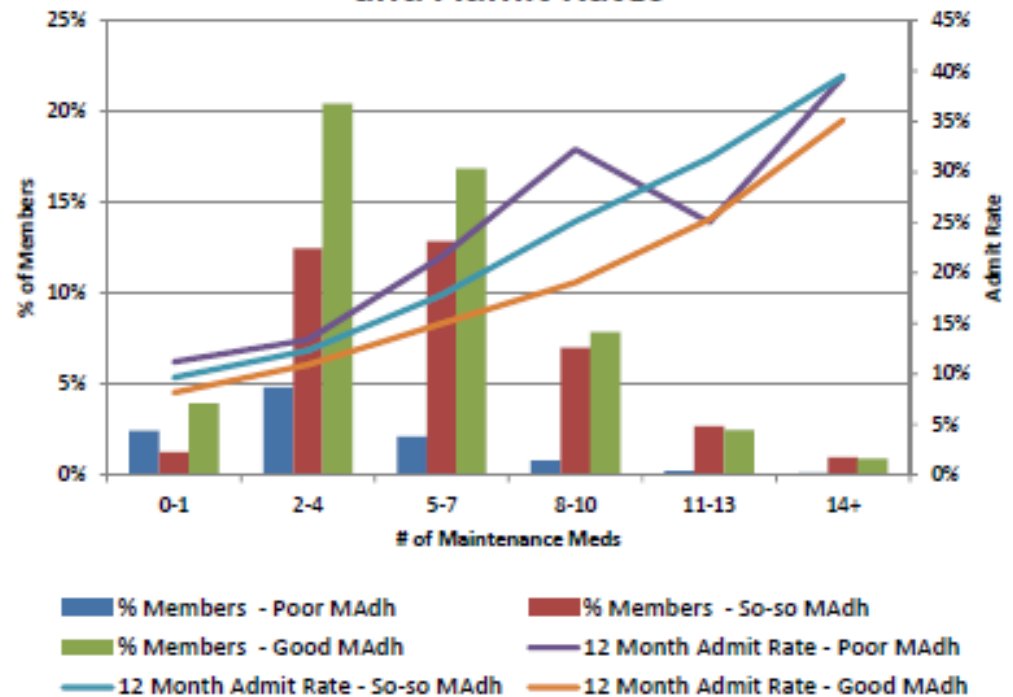 - Match people's risk with tailored interventions

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Driving Meaningful Medication Adherence

Predict People at Risk

Identify Key Influences

Tailor Interventions
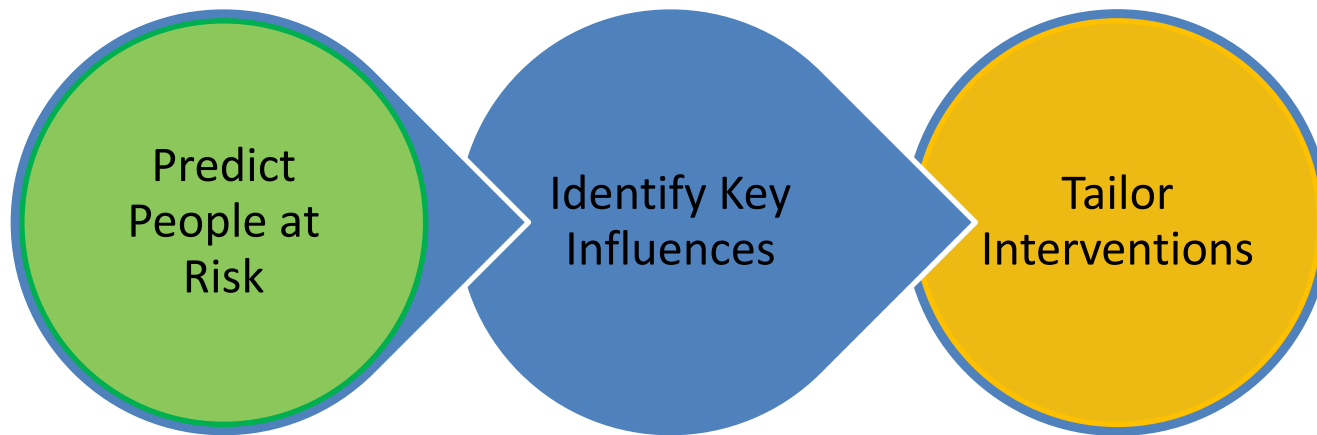
Driving Meaningful Medication Adherence

- Relationship between adherence and admissions can clearly be seen in the data

- As # of meds increase
  - Higher event rates
  - More co-morbidities
  - Fewer people with good adherence

- You can not manage what you can not report on and you canto prevent what you can not predict


Adherence, # of Maintenance Medications and Admit Rates

Legend:
- % Members - Poor MAdh
- % Members - So-so MAdh
- % Members - Good MAdh
- 12 Month Admit Rate - Poor MAdh
- 12 Month Admit Rate - So-so MAdh
- 12 Month Admit Rate - Good MAdh

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Driving Meaningful Medication Adherence

- Risk Based Targeting

- Adherence alone doesn't reveal risk

- Target population has very different risk of events

- Reveals meaningful sub populations

- Helps create tailored, risk based interventions to drive better outcomes

Actual Risk of Future Events in Target Population Vary Widely

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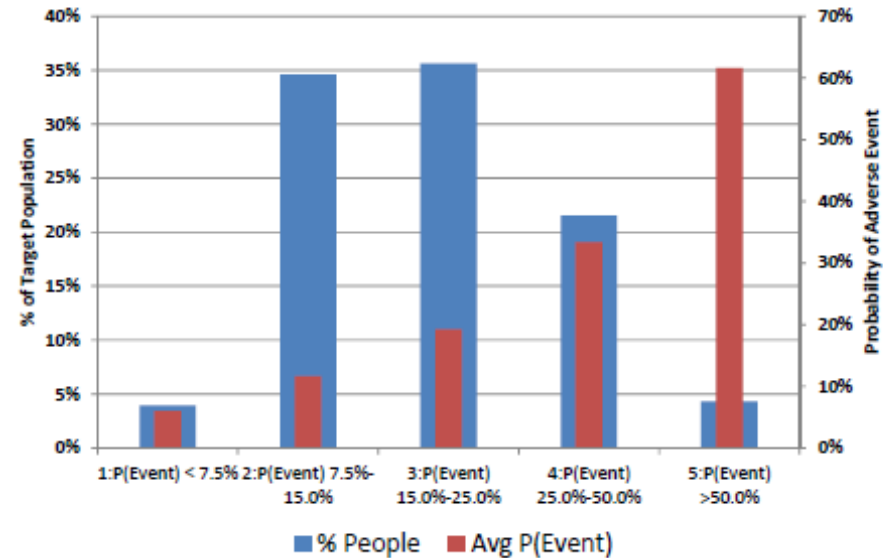
Leverage High Speed to Value

- Have the potential of a significant impact in the near term

- Enough data to begin (don't wait for perfect)

- Able to act on insights using current operations

- Outcomes can be measured

- Catalyze-test and learn culture

Final Thoughts

- Value based healthcare will bring about a lot of change in the near future

- To reward Value, we must learn what is valuable

- Big Data & Analytic technologies can help to:

  – Identify and drive meaningful actions

  – Instrument & measure our impact

  – Continually learn what works for whom

Questions ?