DATA LEADERSHIP: BUILDING A DATA-DRIVEN ORGANIZATION

Marc L. Berger, MD
Vice President
Real World Data & Analytics
Global Health & Value
Pfizer, Inc

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THIS PRESENTATION PROVIDES THE VIEWS OF THE SPEAKER AND IS NOT INTENDED AS COMPANY VIEWS OR POSITIONS
Data, data, everywhere .... And all the servers did creak. Data, data everywhere, for insights do we seek.**

Little Data vs. Big Data… Does it Matter?

** With apologies to Samuel Taylor Coleridge
“Water, water, everywhere, And all the boards did shrink; Water, water, everywhere, Nor any drop to drink”
The Age of Digital Data in Healthcare

Data Source Explosion
- EMR
- laboratory surveys
- PHR
- social
- Sensors/Wearables
- ‘Omics*

Technology Evolution
- cloud
- massively large databases
- SaaS
- advances in distributed computing
- PaaS

Big Data
- machine learning
- NLP
- SVM
- neural networks
- geo-spatial predictive modeling

Advanced Analytics Techniques
- clinical data analysis
- Precision Medicine / patient subgroups
- ‘Omic* Analyses
- drug-drug interaction
- healthcare productivity
- drug value

Expanding Applications

GLOBAL HEALTH & VALUE
Real World Data (RWD) and Big Data

Real World Data is healthcare data used for decision making that is not collected in conventional randomized controlled trials (RCTs).

Big Data is defined by its size (too large to be readily processed by standard database management tools or available processing tools), its variety, or the velocity of its accrual. Real World Data can be “Big Data” when vast in quantity and multiple sources are combined.

Sensors and Health Monitoring Devices

Genomic Imaging
EMR Unstructured Notes

Claims, Laboratory
EMR, PHR
Surveys: Health Risk
Assessments, Health Status
Assessments
Pt Reported Outcomes
Revealed Pt Behaviors and Preferences (ex. Purchasing Habits, Google Trend)


1 Terabyte = 1024 GB
1 Petabyte = 1 million GB
1 Zetabyte = 10^9 GB
Potential and Ongoing Uses of Data in Pharma

Discovery
- Discover drug pathways, NMEs
- Precision Medicine Strategy (ex. linking genomic data & RWD)
- Estimate unmet clinical need
- Profile target populations – tx patterns, understand patient heterogeneity
- Inform disease area strategies

Development
- Estimate RCT sample size
- Optimize RCT in-/exclusion criteria; increasing diversity of enrollees
- Identify clinical trial sites, investigators
- Quantify burden of illness / disease
- Market development
- Guideline development
- Inform Forecasting Models

Launch
- Development of evidence plans and value dossiers
- Comparative effectiveness
- Physician segmentation
- Compliance / adherence profiling
- Inform Forecasting Models

Lifecycle
- Payer value proposition & Product Defense
- Comparative Effectiveness
- Price optimization
- Supply chain and inventory management
- Uncover new indications
- Pharmacovigilance
- Inform Forecasting Models
- Customer Engagement – Data Analysis, Dz Mgmnt (e.g. MOS, RMRS, etc)

Cross Life-Cycle Activities
- Support Government Relations, Policy, External Affairs (reputation of biopharma, partnerships)
- Inform market research activities (ex. understand persistency/adherence)
- Patient Engagement
- Predictive Modelling / Advanced Analytics
But … What about **GIGO**?

"Garbage In, Garbage Out."

A computer science acronym that implies bad input will result in bad output.
"essentially, all models are wrong, but some are useful"

“all data is dirty, much of it is sparse, a lot of it is useful"

Berger, Marc L. (2014)
Potential Users range from data wizards to decision makers.

Organization that routinely develops insights by interrogating data to inform decision making.

- Decrease Barriers To Interrogating Data (ex. Visual Dashboards)
- Data Organized & Curated
- Monitored Access
“Culture eats strategy for lunch Everyday”

Senior-leader involvement and organizational structure play a critical role in how effective (or not) a company’s analytics efforts are.

<table>
<thead>
<tr>
<th>Ensuring senior-management involvement in data and analytics activities</th>
<th>Most significant reason for organizations’ effectiveness at data and analytics¹</th>
<th>Most significant challenge to organizations’ effectiveness at data and analytics²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of respondents at high-performing organizations, n = 138</td>
<td>% of respondents at low-performing organizations, n = 64</td>
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<tr>
<td>Designing effective data architecture and technology infrastructure to support analytics activities</td>
<td>15</td>
<td>11</td>
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<td>Securing internal leadership for analytics projects</td>
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<td>Providing business functions with access to support for both data and analytics</td>
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<td>Tracking business impact of analytics activities</td>
<td>9</td>
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<td>Creating flexibility in existing processes to take advantage of new analytics insights</td>
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<td>1</td>
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<tr>
<td>Designing an appropriate organizational structure to support analytics activities</td>
<td>7</td>
<td>25</td>
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<tr>
<td>Attracting and/or retaining appropriate talent (i.e., both functional and technical)</td>
<td>6</td>
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<td>Constructing a strategy to prioritize investment in analytics</td>
<td>6</td>
<td>14</td>
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<tr>
<td>Investing at scale in analytics initiatives</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

¹Respondents who answered “other” or “don’t know” are not shown.
²Respondents who say their organizations have been effective at reaching the main objective of their data and analytics activities, and have more developed analytics capabilities than industry competitors. This question was asked only of respondents who said their organizations have met their analytics objectives effectively.
³Respondents who say their organizations have been ineffective at reaching the main objective of their data and analytics activities, and have less developed analytics capabilities than industry competitors. This question was asked only of respondents who said their organizations have not met their analytics objectives effectively.

McKinsey&Company
What can help?

Make the Possible as Easy as Possible