



SESSION #2  
**The Four Eras of Analytics**

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## Four Eras of Analytics

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## Poll Question #1

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On a scale of 1-5, how important to you believe analytics are to the future of healthcare and population health?

- 1) Not at all important
- 2) Somewhat important
- 3) Moderately important
- 4) Very important
- 5) Extremely important
- 6) Don't know / not applicable

# Analytics and Data in Health Care—Where Are We?

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## Still mastering small data

- ▶ EMR
- ▶ Cost
- ▶ Operations

## Big data's already here

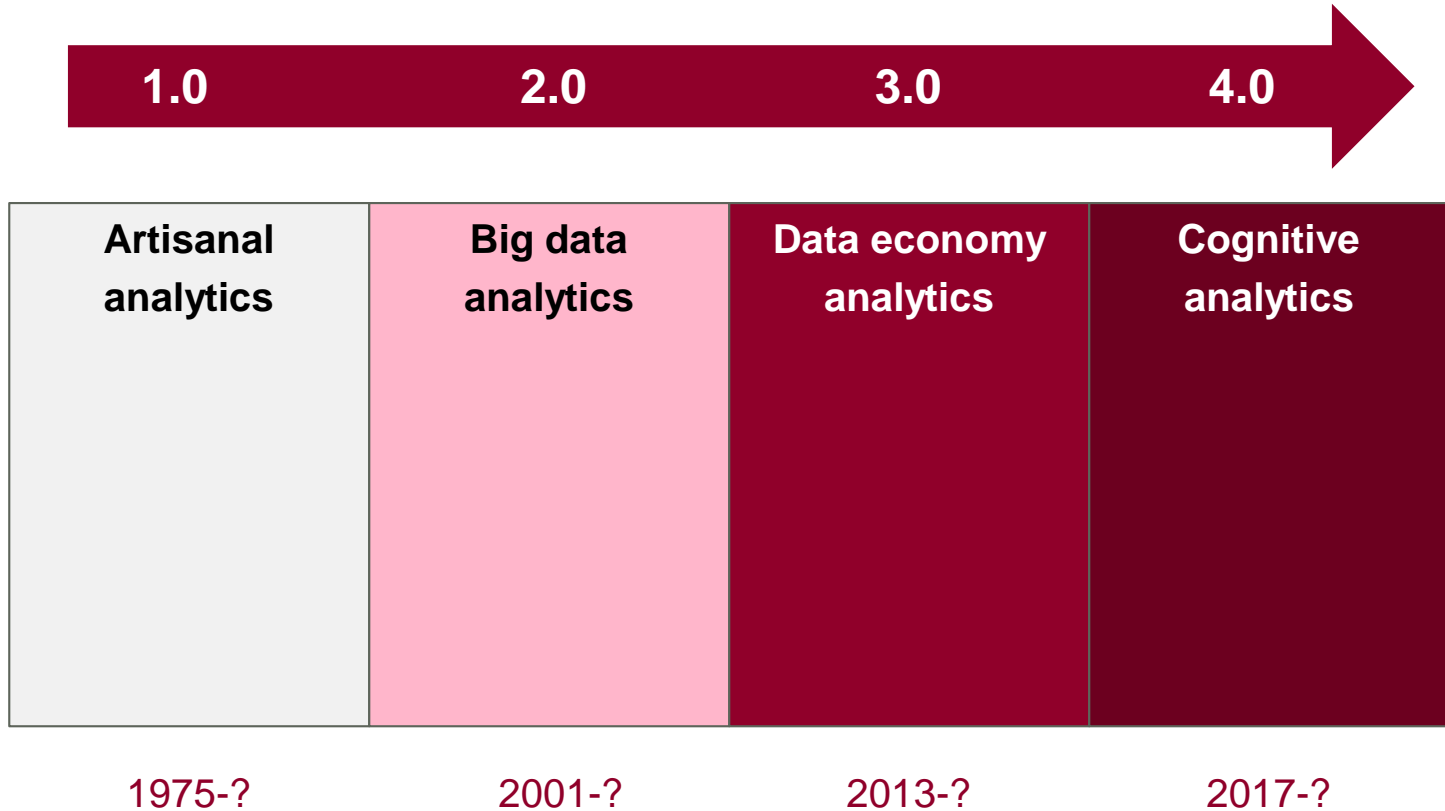
- ▶ Genomic
- ▶ Medical device
- ▶ Activity and behavior tracking
- ▶ Clinical notes

Mired in descriptive analytics, when we desperately need predictive, prescriptive, and autonomous



# Four Analytical Eras—Accelerating!

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# Analytics 1.0 | Artisanal Analytics

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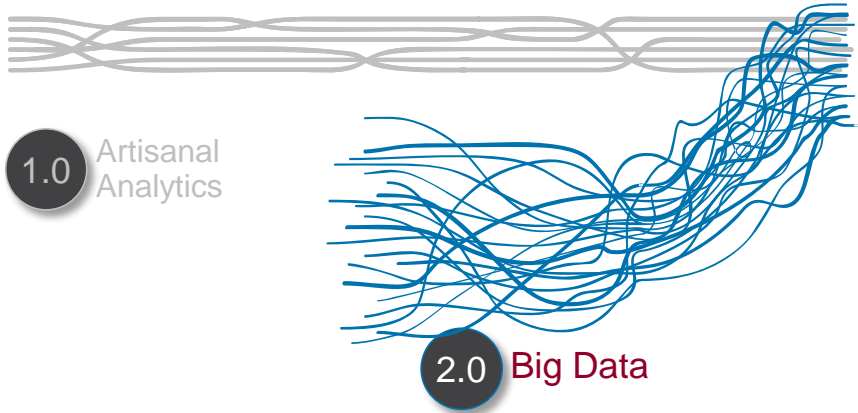


## 1.0 Artisanal Analytics

- ▶ Primarily descriptive analytics and reporting
- ▶ Internal, small, structured data
- ▶ “Back office” teams of analysts
- ▶ Internal decision support focus
- ▶ Predictive models based on human hypotheses
- ▶ Still the norm in healthcare

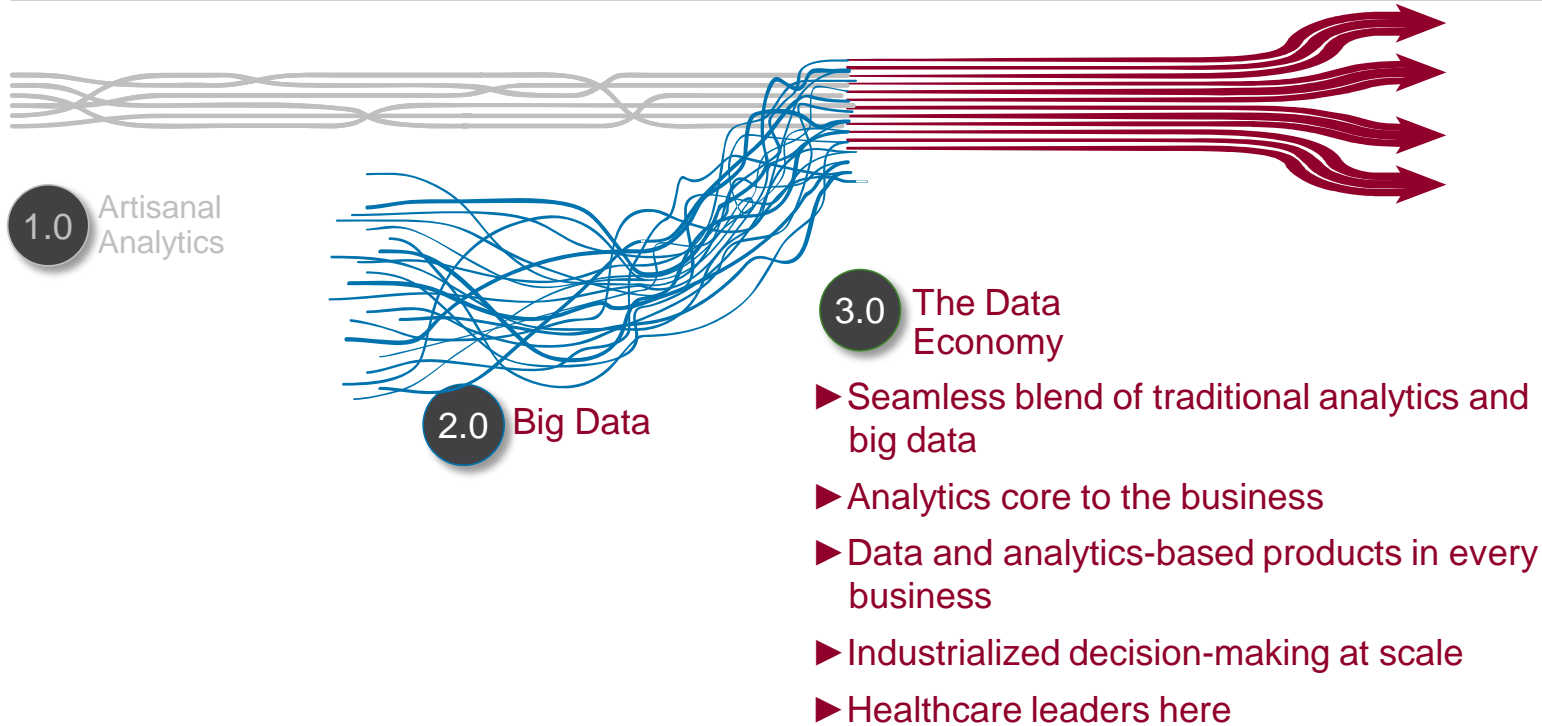
# Analytics 2.0 | The Big Data Era

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- ▶ Complex, large, unstructured data
- ▶ New computational capabilities required
- ▶ “Data Scientists” emerge
- ▶ Online firms create “data products”
- ▶ Healthcare examples rare

# Analytics 3.0 | The Data Economy







- ▶ \$2B initiative in software and analytics, with \$7B in digital revenues in 2017
- ▶ Primary focus on data-based products and services from “things that spin”
- ▶ Reshaping service agreements for locomotives, jet engines, turbines
- ▶ Marketing new industrial data platforms and brands like “Predicity” and “Predix”
- ▶ Moving to 4.0 with machine learning-based “digital twins” and business data unification

# United Healthcare 3.0

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- ▶ “Health in Numbers” ad campaign
- ▶ Converts call center speech to text and mines it for indications that Medicare patients might attrit
- ▶ Real-time fraud intervention stops claims payment before it happens
- ▶ Scoring of all UHC members in terms of predictive disease profiles, propensity to enroll and succeed in health management
- ▶ OptumHealth, a \$67B business, sells healthcare data, analytics, and technology



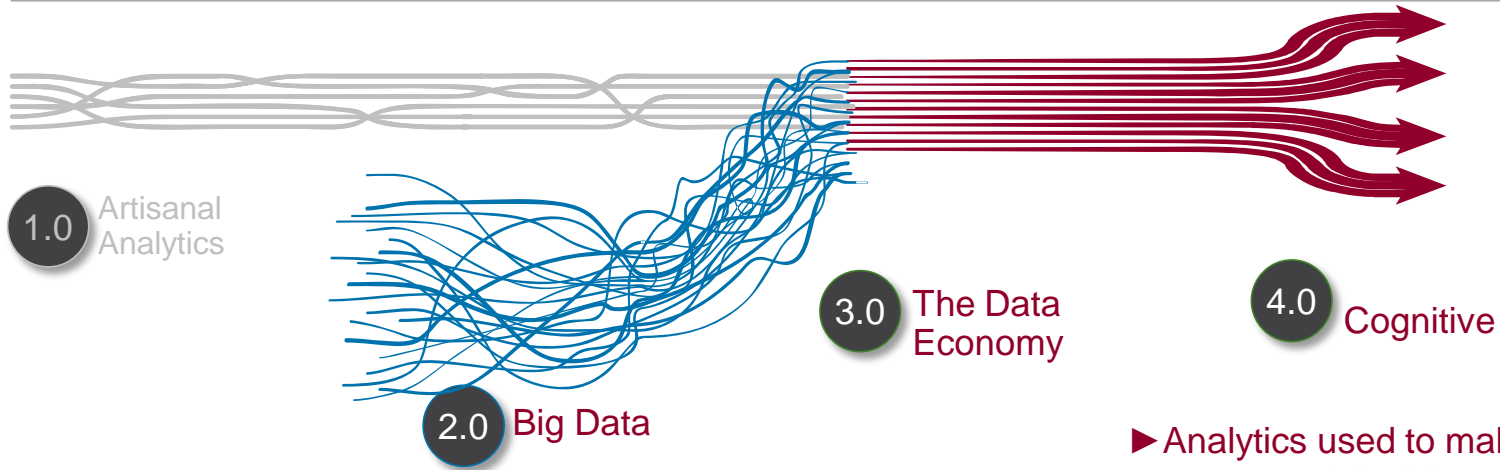
# Intermountain Healthcare 3.0

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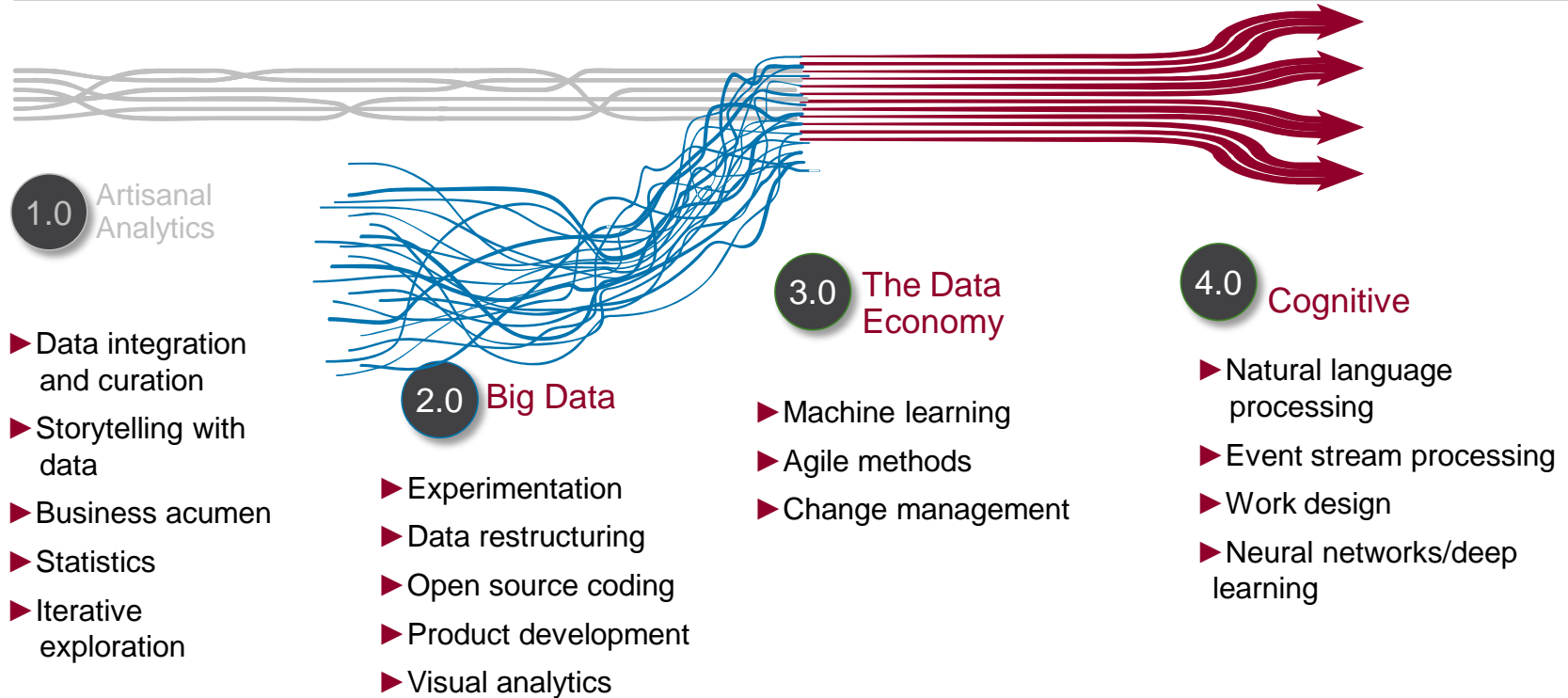
- ▶ From Brent James' "science experiments" to "perfecting the clinical work process"
- ▶ Cost of treatment can be monitored by clinicians along with other variables
- ▶ 70 informatics researchers in Homer Warner Center for Informatics Research
- ▶ Intermountain offers software and services (with Deloitte) on health outcomes analysis based on 90 million EHR records over 40 years
- ▶ Using Hadoop to store and analyze clinical notes, machine and sensor data in ICUs, and other pressing issues
- ▶ Modest 4.0 activities involving juvenile diabetes

# Analytics 4.0 | The Cognitive Era



- ▶ Analytics used to make automated decisions
- ▶ Emergence of “cognitive technologies”
- ▶ Replacement of human tasks—digital/physical
- ▶ Augmentation is human focus

# (Cumulative) Skills Across the Eras



## Poll Question #2

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As a whole, where would you assess your current healthcare organization is within the 4 Eras of Analytics?

- a) Artisanal analytics
- b) Big data analytics
- c) Data economy analytics
- d) Cognitive analytics
- e) Don't know / not applicable

# A Constellation of Cognitive Technologies

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- ▶ Machine learning
- ▶ Artificial intelligence/deep learning
- ▶ Natural language processing
- ▶ Rule engines
- ▶ Robotic process automation
- ▶ Text-based “cognitive computing,” e.g., Watson
- ▶ Custom integrations and combinations of these



# Ten Automatable Jobs in Health Care

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1. Radiologist—automated breast and colon cancer detection and treatment
2. Pathologist—automated Pap smears
3. Anesthesiologist—automated Propofol administration
4. Oncologist—automated cancer diagnosis and treatment recommendations
5. Surgeon—autonomous robotic surgery
6. Nurse—”robo-nurses” in Japan
7. Health insurance prior authorization—at Anthem and others
8. Clinical coder—automated medical coding
9. EMR system integrators—”robotic process automation” for data integration, conversion
10. Pharmaceutical scientist—cognitive computing for new drugs





# People: Automation or Augmentation?

- ▶ Augmentation—smart humans helping smart machines, and vice-versa
- ▶ People augment by aiding automated systems that are better at particular tasks, or by focusing on tasks at which humans are still better
- ▶ The classic example: freestyle chess
  - ▶ Better than humans or automated chess systems acting alone
  - ▶ Humans can choose among multiple computer-recommended moves
  - ▶ Humans know strengths and weaknesses of different programs
- ▶ Augmentation is what most organizations are doing
- ▶ Automation is a race to the bottom



# Five Steps to Surviving Automation

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- ▶ *Step in*—humans master the details of the system, know its strengths and weaknesses, and when it needs to be modified
- ▶ *Step up*—humans examine the results of computer-driven decisions and decide whether to automate new decision domains
- ▶ *Step aside*—humans focus on areas that they do better than computers, at least for now
- ▶ *Step narrowly*—humans focus on knowledge domains that are too narrow to be worth automating
- ▶ *Step forward*—humans build the next generation of automated systems



# Prescription for Surviving Data Disruption

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- ▶ Continue to evolve your capabilities for data management and analytics
- ▶ Adopt some pilots of cognitive tech
- ▶ Make sure you and your management team understand the opportunities and threats
- ▶ Pick the low-hanging fruit (e.g., M.D. Anderson)
- ▶ Hire some great quants
- ▶ Close the gap with other industries!



## Poll Question #3

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How soon can you envision your healthcare organization moving to where analytics is at the core of your business?

- a) 0-2 years
- b) 3-5 years
- c) More than 5 years
- d) I doubt we'll ever get to that point
- e) Don't know / not applicable



STRENGTH IN NUMBERS

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