



**2019 HEALTH**  
MEETING

JUNE 24-26 | PHOENIX, AZ



## **Session 133, Leveraging Real-World Data to Enhance Existing Actuarial Analytics and to Potentially**

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# Leveraging Real-World Data to Enhance Existing Actuarial Analytics and to Potentially Evolve Actuarial Methods and Value Drivers



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# Panel

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Optum

***David Van Brunt, PhD***

Head, Evidence and Analytics, Health Economics and Outcomes Research  
Abbvie

***Jim Dolstad, ASA, MAAA***

Vice President, Actuarial Consulting  
Optum

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Consulting Actuary  
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# Agenda

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Who?	What?	How Long?
Karl	Introductions and Context	10 minutes
David	A Health Economics and Outcomes Research (HEOR) perspective	20 minutes
Jim	Social Determinants	15 minutes
Andrew	RWD Data Framework	15 minutes
Audience & Panel	Q&A	15 minutes

# Context

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- Health care is a complex market with a wide variety of stakeholders
- These stakeholders have diverse business needs, requiring complicated data-driven decisions
- The analytics and research supporting these decisions are often dependent on the availability of real-world data (RWD)
- RWD includes a wide variety of data capture technology and data reflecting real treatment settings, including but not limited to:
  - Patient/member characteristics
  - Provider characteristics
  - Facility details
  - Treatment
  - Clinical outcomes
  - Humanistic outcomes
  - Financial outcomes

# Learning Objectives

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- Identify existing and emerging real-world data sources
- Consider how new types of real-world data might enhance existing actuarial analytic approaches
- Gain insight to the data-driven business needs of diverse health care stakeholders — and how pursuit and use of real-world data is driven by those business needs
- Explore how the use of real-world data by other health care stakeholders may contribute to evolving actuarial value drivers and methods

# Context

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- The diverse speaker panel includes:
  - Actuarial perspectives
  - Non-actuarial perspectives
    - Pharmaceutical industry
    - Health-care services business
    - Academia
- Each panel member was asked to address the following questions:
  - What are your business needs?
  - What questions do those needs drive?
  - What is an example of a study/analytics?
  - What gaps do you see? What data would be “data paradise”?

A health economics and outcomes research (HEOR)  
perspective



# Decision-Centered Science

# Healthcare decisions are made by many stakeholders



## Patients

Is it easy to use?

Will the product improve my quality of life?

What will it cost me?



## Prescribers

Is the product safe and efficacious?

Will my patients stay on treatment?

Will it work in the real world?



## Regulators

Is the product safe and efficacious?

Is it the appropriate patient population?

Are the appropriate outcomes affected?



## Payers

Is the product cost-effective?

What will the impact be to my budget?

Can it replace other products I fund?



## Policy makers

What is the societal burden of the disease/condition?

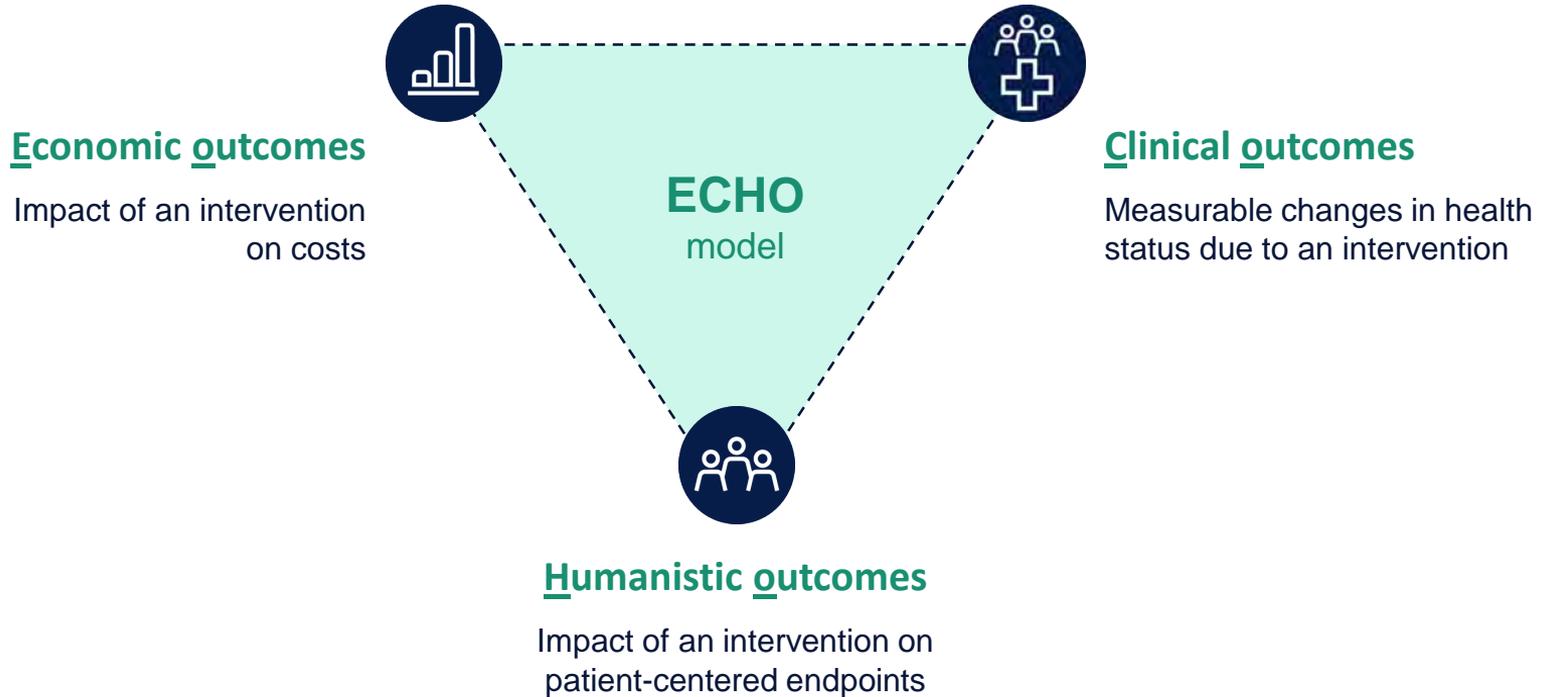
Can the product improve our current pathways of care?

Will it improve efficiency from a societal point of view?

“Price is what  
you pay; value  
is what you get”

Warren Buffet

# HEOR evidence that demonstrates value versus competitors comprises economic, clinical and humanistic outcomes



# AbbVie HEOR generates evidence and provides strategic insight across the product lifecycle



## Launch readiness

### HEOR deliverables

- Patient experience endpoint identification, development and/or validation
- Early economic models
- Evidence of unmet need and burden of disease
- Natural history description and target population identification
- Input to trial design in terms of comparator(s)
- Input to trial recruitment

- Validation of PCO measures of effect
- Analysis of phase III PCO data
- Cost effectiveness model
- Budget impact model
- Value dossier input
- Roll out, training and support for affiliates
- Early communication to prepare market for launch
- Planning for post-launch RWE collection

- RWE collection
- External communication of HEOR data
- Ongoing affiliate support
- Ongoing differentiation from new/existing competitors
- Ongoing activities to address challenges related to changing clinical practice

HEOR=health economics and outcomes research; LOE=loss of exclusivity; PCO=patient-centered outcome; RWE=real-world evidence

Diversity

# What data do we use for this?



## Randomized Clinical Trials



- Highly **select participants**
- **Controlled conditions**
- Limited duration
- Higher **internal validity**

## Real-World



- **Heterogeneous** populations
- **Routine practice conditions** and settings
- Reflects diverse patient behaviors
- Higher **external generalizability**

RCT=randomized controlled trial; RWE=real-world evidence

# Randomized Clinical Trial Data Isn't Enough



## Patients

~~Is it easy to use?~~  
Will the product improve my quality of life?  
~~What will it cost me?~~



## Prescribers

Is the product safe and efficacious?  
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~~Will it work in the real world?~~



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Is the product safe and efficacious?  
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~~Is the product cost-effective?~~  
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## Policy makers

~~What is the societal burden of the disease/condition?~~  
Can the product improve our current pathways of care?  
~~Will it improve efficiency from a societal point of view?~~

# What is Real-World Data (RWD)?

*Based on recent policy guidance<sup>1</sup>, Real World Data (RWD) typically meets two conditions:*

Reflects actual experience of patients during routine patient care



Gathered from sources outside of randomized control trials

Examples of RWD

## Administrative Claims



## Clinical EHR



## OTHERS

- Disease registries
- Patient chart reviews
- Patient & population surveys
- Lab data
- Genomic data
- Social Media

# What constitutes Credible Evidence?

## Professor Sir Michael Rawlins

**“Evidence has but one purpose:** to inform decision-makers; whether decisions affect an individual patient or an entire health system.

What is important is not the method itself, but whether the particular method is fit for purpose.”

abbvie



# There is growing regulatory interest in RWE



EUROPEAN MEDICINES AGENCY  
SCIENCE MEDICINES HEALTH

“ *These data have the ability to significantly contribute to the way the benefit-risk balance of medicines is assessed over their entire life cycle*”

–EMA 2016 Annual report<sup>1</sup>



“ *Key to understanding the usefulness of real-world evidence is an appreciation of its potential for complementing the knowledge gained from traditional clinical trials*”

–FDA Leadership,  
New England Journal of Medicine<sup>2</sup>



EMA=European Medicines Agency; FDA=Food and Drug Administration; RWE=real-world evidence  
Source: 1. European Medicines Agency. Annual Report 2016. 2017. Available at: [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/Annual\\_report/2017/05/WC500227334.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/Annual_report/2017/05/WC500227334.pdf) [last accessed: 29 May 2017]; 2. Sherman R, et al. N Engl J Med 2016;375:2293–7

# RWE can reveal the impact of treatment patterns



A delay in the diagnosis of psoriatic arthritis by >1 year is associated with worse clinical outcomes



CI=confidence interval; DMARD=disease-modifying anti-rheumatic drug; HAQ=health assessment questionnaire; MCS=mental component summary; PCS=physical component summary; RWE=real-world evidence; SF-36=36-Item Short Form Health Survey; TNFi=tumor necrosis factor inhibitor

Source: Haroon M, et al. Ann Rheum Dis 2015;74:1045–50

# RWE can improve understanding of healthcare delivery and patient behavior

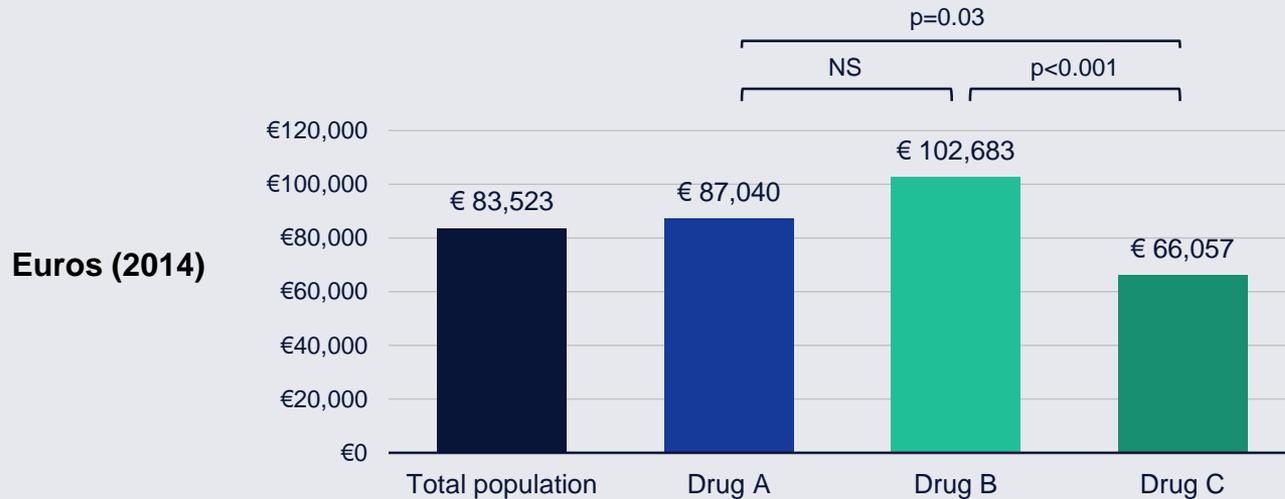


A real-world study found the perceived importance of factors, which influence the decision to escalate therapy in RA, to differ radically between patients and rheumatologists

Most important reasons to change	Rheumatologist ranking	Patient ranking
Swollen joints	1	12
DAS28 scores	2	17
Rheumatologist impression of overall disease activity	3	8
Worsening erosions past year	4	27
Disease activity now compared to 3 months ago	5	19
Physical functioning and mobility	7	1
Patient's motivation to get better	23	2
Patient's trust in their physician	45	3
Patient's satisfaction with current DMARD	21	4
Painful joints	13	5

# RWE can be used to assess comparative effectiveness of diverse treatment options

A retrospective analysis of the Spanish CREATE registry examined the average cost per patient achieving clinical remission\* at 2 years post biologic therapy initiation



\*Remission=28-joint disease activity score (DAS28)  $\leq$ 2.6  
 DAS=disease activity score; NS=non-significant; RWE=real-world evidence  
 Source: Cárdenas M, et al. Rheumatol Int 2016;36:231-41



no taxis



no real estate



no writers



no phone lines



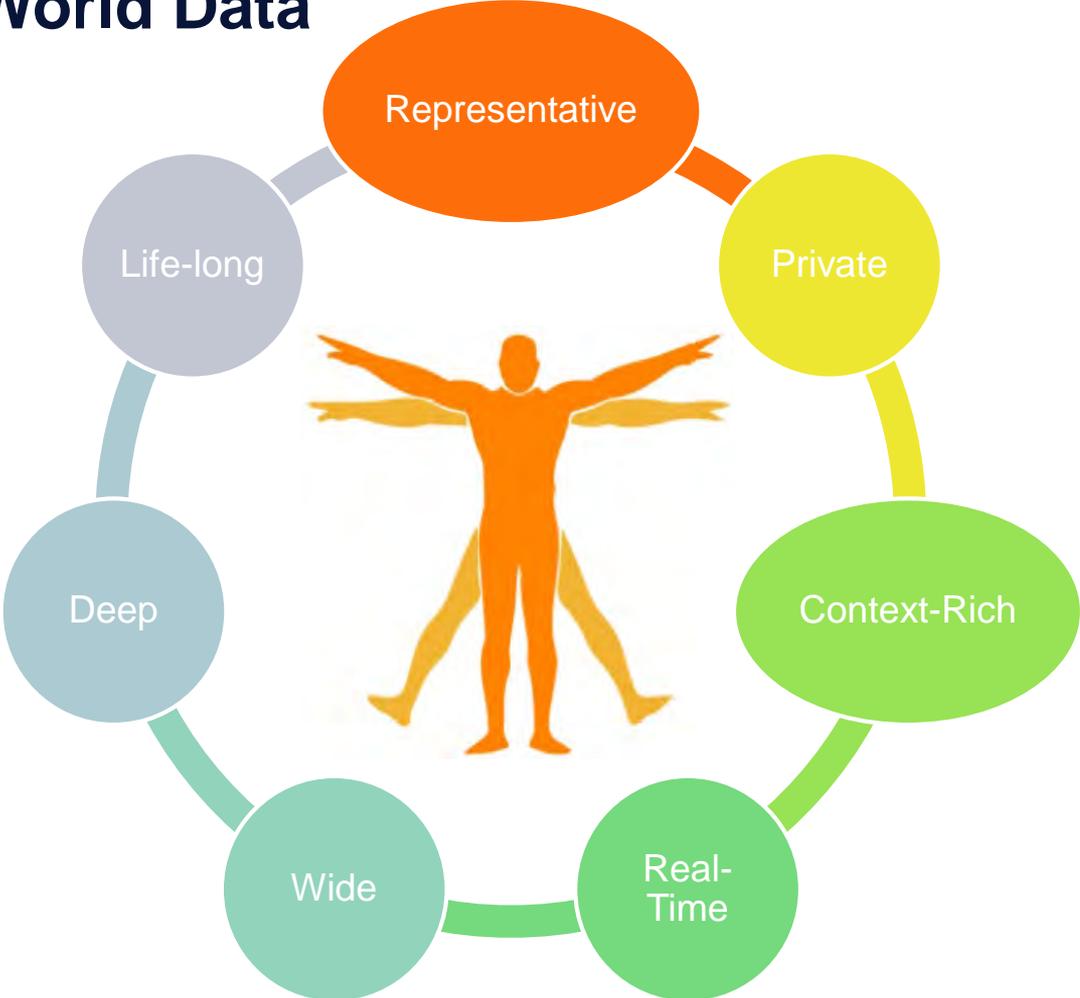
no inventory



no theatres

*What is next for Healthcare?*

# Ideal Real-World Data



A health economics and outcomes research (HEOR)  
perspective



# Decision-Centered Science



**TACKLING**  
THE BIGGEST  
**CHALLENGES**  
IN HEALTH CARE

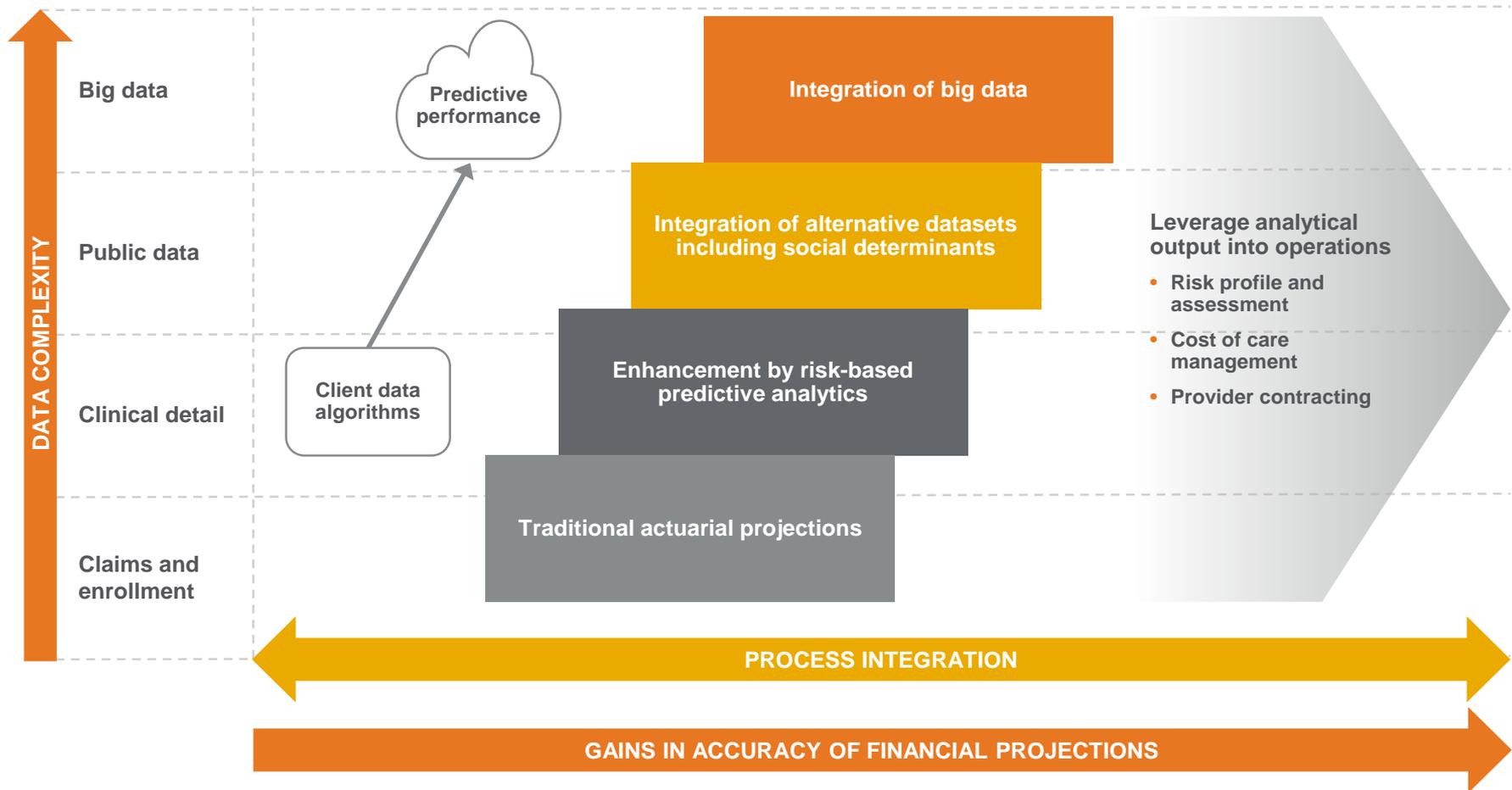
Leveraging Real World Data

June 26, 2019



# Business Needs

New information, improved accuracy



# Opportunity Areas

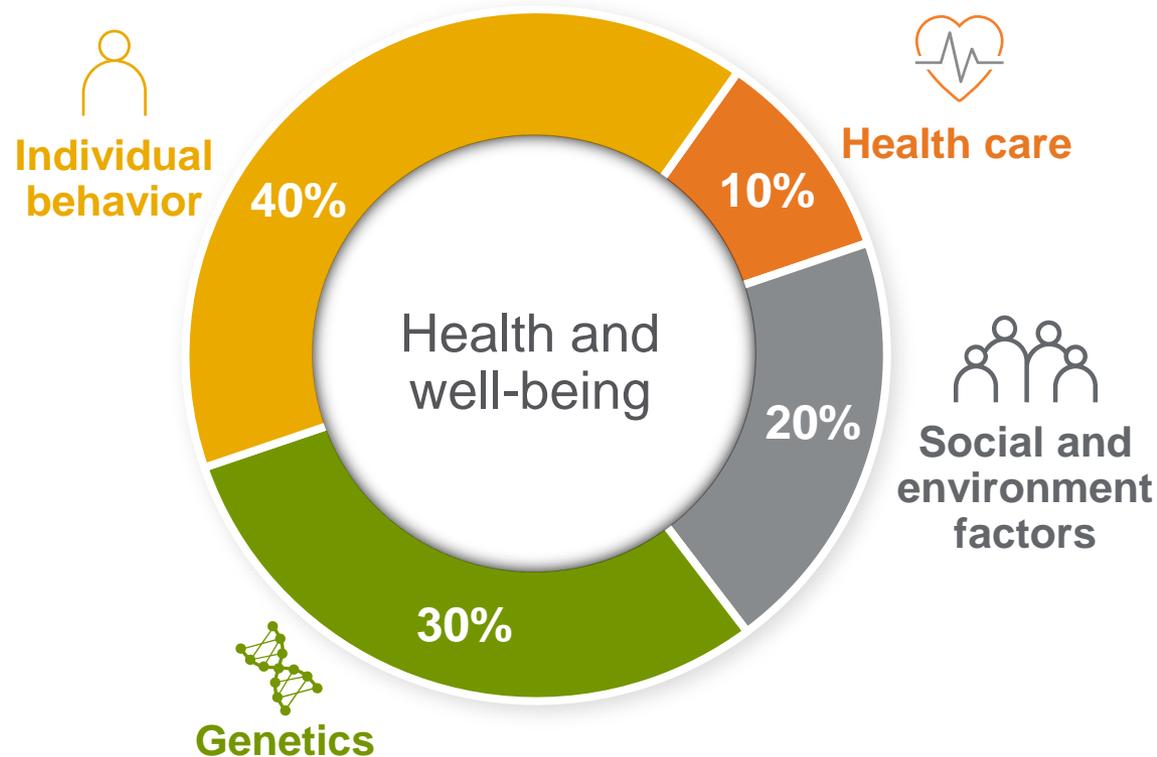
What can be accomplished with more accurate information

The results of consumer analytics/social determinants of health can be used across all lines of business and numerous business units to improve clinical outcomes and financial results at lower operational costs



# Going beyond the patient

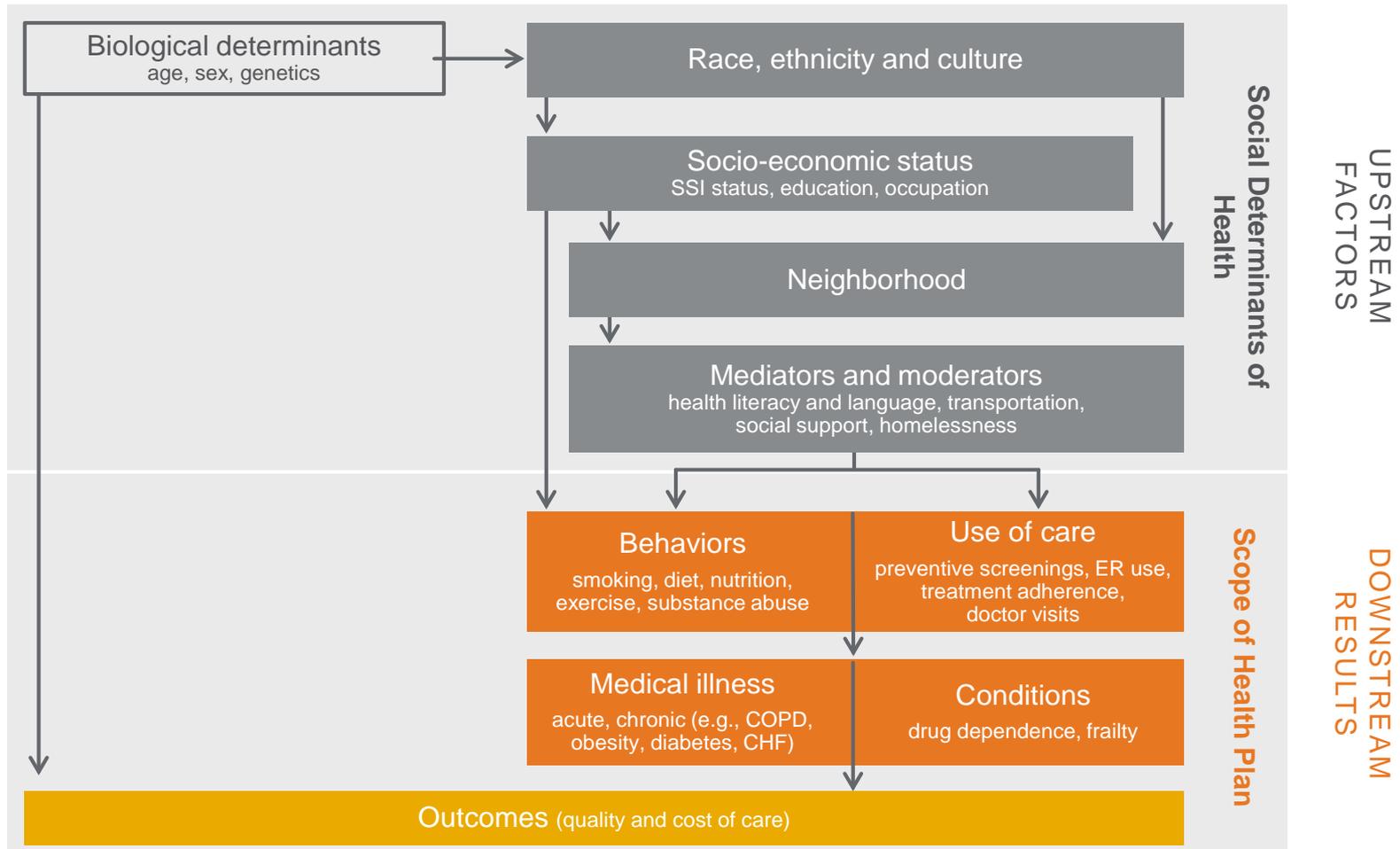
## Impact of different factors on risk of premature death



Source: Schroeder, SA. (2007). We Can Do Better — Improving the Health of the American People. NEJM. 357:1221-8.

# Adding social determinants to create new pathways

## New upstream factors help predict membership health outcomes



Advisory Board, "Using IT to Help Address the Social Determinants of Health," 2018. <https://www.advisory.com/research/health-care-it-advisor/research-reports/2018/using-it-to-help-address-the-social-determinants-of-health>. Accessed August 2018.

# Where people live influences their health

	Orange Co. California	Hennepin Co. Minnesota	Tuscaloosa Co. Alabama	Philadelphia, Pennsylvania
Premature death	4,100	5,000	8,400	9,300
Adult smoking	10%	13%	20%	20%
Adult obesity	19%	23%	33%	29%
Access to exercise opportunities	97%	99%	68%	97%
Excessive drinking	17%	25%	19%	22%
Primary care physicians	1,050:1	850:1	1,380:1	1,460:1
Mental health providers	440:1	300:1	860:1	440:1
Children in poverty	15%	14%	22%	37%
Severe housing problems	28%	17%	17%	24%

Source: [County Health Rankings & Roadmaps A Robert Wood Johnson Foundation Program](#) Robert Wood Johnson Foundation program. Accessed August 2018.

# Understanding the member

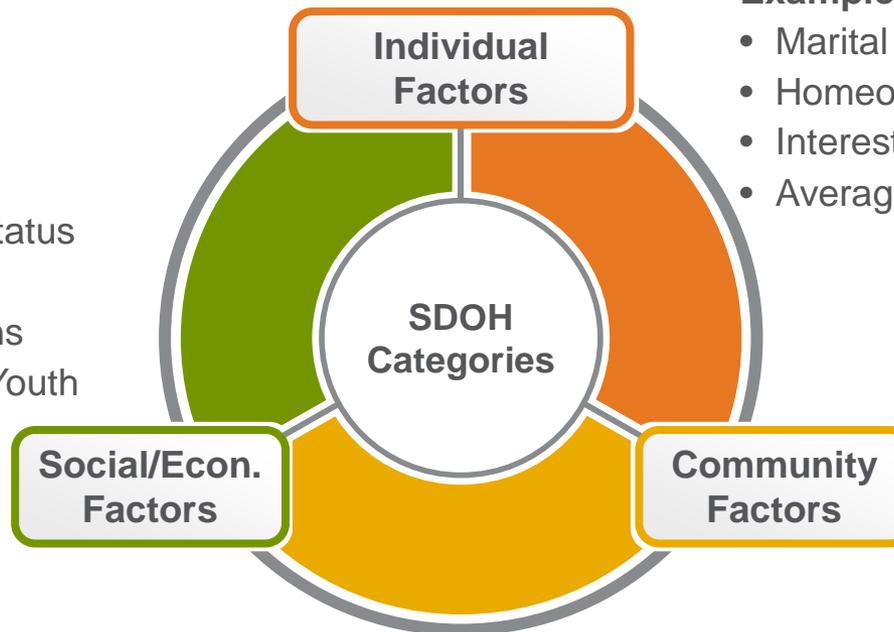
## Individual, socioeconomic and community factors

Three categories of data are used to develop the consumer propensity models:

- **Individual factors:** Include consumer and health behavior measures
- **Community factors:** Include clinical access, housing, transportation, safety and food security measures
- **Socioeconomic factors:** Include education, income, poverty, family and social support

### Examples:

- Socioeconomic Status
- % below poverty
- Social associations
- % Disconnected Youth
- Education level



### Examples:

- Marital status
- Homeowner status
- Interests and hobbies
- Average online spending

### Examples:

- Violent crime rate
- Food access and security
- Transportation access
- Access to clinical care

# Actionable data

## Model effectiveness

Meaningful relationships can be identified between **social Isolation Indexes, utilization, and healthcare costs**

**SOCIALLY ISOLATED TIER**

Past 1 year hospital activity** by tier	1 (Highest)	5 (Lowest)	Spark-line	Top Tier vs. Average
<b>SPEND BY DIAGNOSIS CATEGORY*</b>				
Percent visiting an ER	16%	9%		23%
Circulatory system	\$257	\$142		35%
Respiratory system	\$60	\$35		26%
Other diagnoses (excluding pregnancy)	\$1,210	\$1,065		11%
Pregnancy related	\$33	\$182		-98%

Source: \*\*Optum analysis based on medical claims data that broke down the SI tier (top 20% based on SI probability vs bottom 20% based on SI probability) over a rolling 12 months.

# Data Wish List

Furthering our understanding of the customer

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## Improving the use of SDOH usage with claim coding

- Currently about 0.5% of claims have some level of SDOH coding

## Individual Health Records

- Movement towards real time information

## Wearable data

- Understanding activity levels

# Thank You

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# Session 133: Using Real World Data to Enhance Actuarial Models

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6/26/19

# AGENDA

1

Audience questions

2

Actuarial control framework applied to use and acquisition of RWD to solve business problems

3

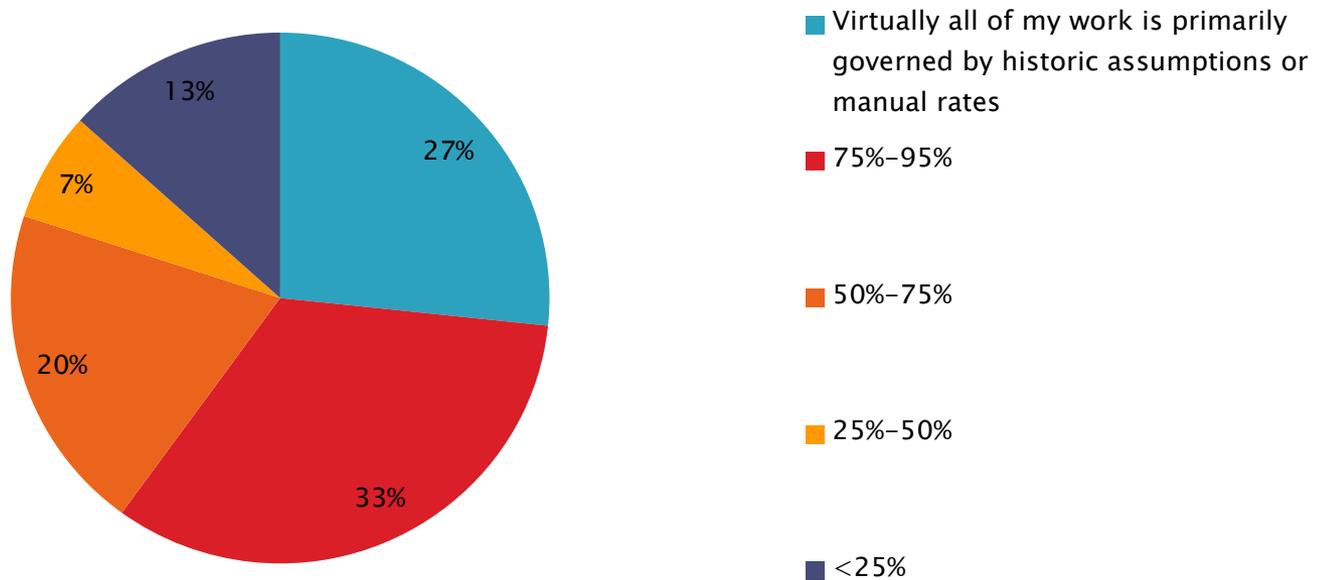
Case study on a Predictive Model

# Questions for the Audience

# Question 1

- ▶ What percent of the work you do is governed by historic assumptions or manual rates vs application of real world data?
  - A) Virtually all of my work is primarily governed by historic assumptions or manual rates
  - B) 75%–95%
  - C) 50%–75%
  - D) 25%–50%
  - E) <25%

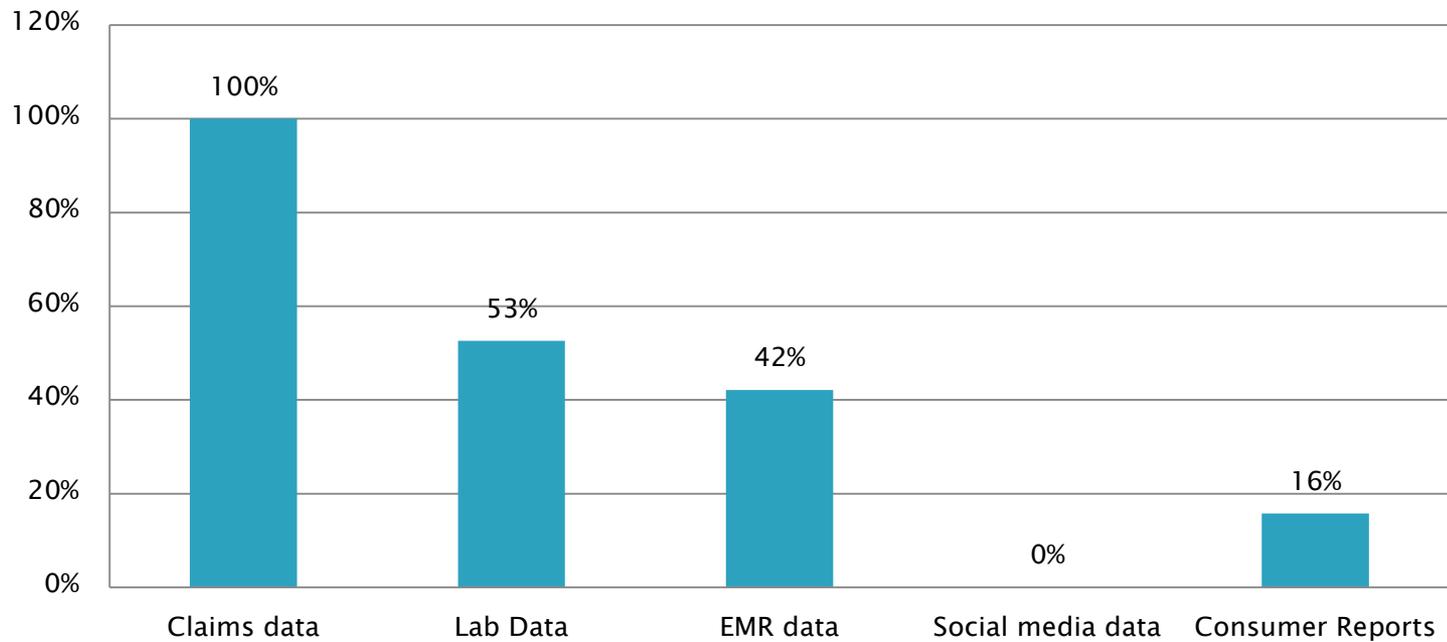
What percent of the work you do is governed by historic assumptions or manual rates vs application of real world data?



# Question 2

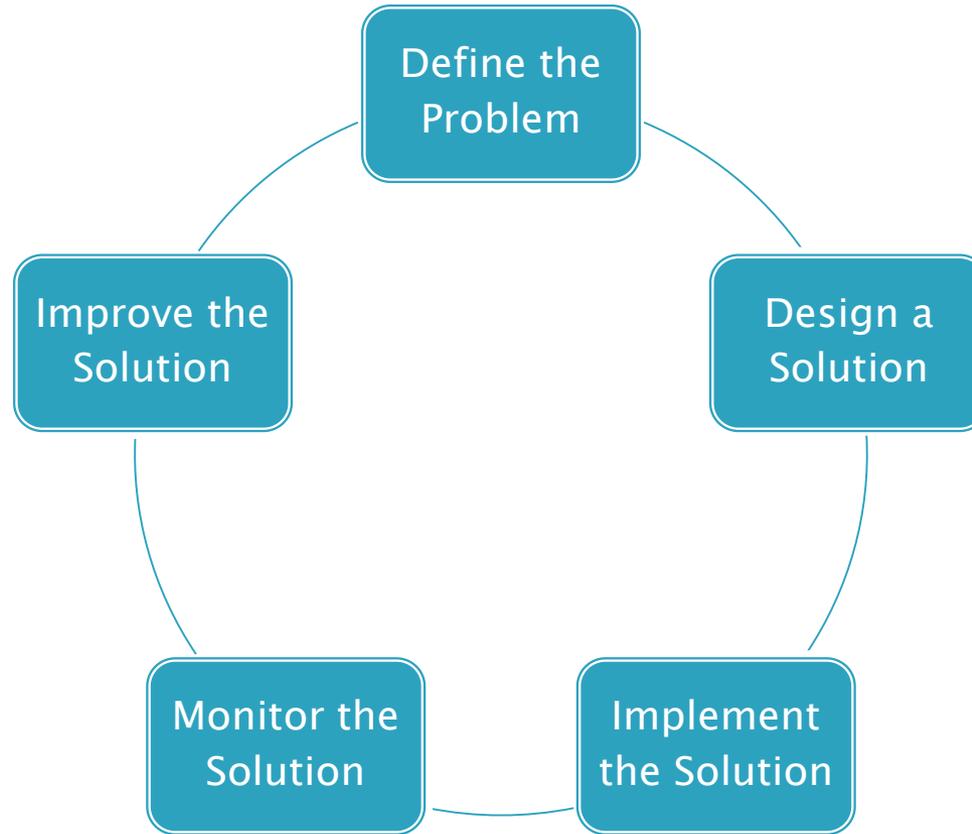
- ▶ Have you used any of the following data sources before in your work?
  - A) Claims data
  - B) Lab Data
  - C) EMR data
  - D) Social media data
  - E) Consumer reports

## Have you used any of the following data sources before in your work?



# RWD Data Framework

# Actuarial Control Cycle



# Key Questions to Explore

- ▶ What is the business problem?
- ▶ Economics
- ▶ Politics
- ▶ KPIs
- ▶ Value and cost of different data sources

# ASOPs

- ▶ ASOP 23, Data Quality, and 41, Actuarial Communication, are probably the most important ASOPs here but there will be others depending on the specific problem and solution development you are working on

# Case Study – Building a Predictive Model for Knee Surgery

# Define the Problem

- ▶ Quote from Ian Duncan, “there are a lot of solutions in search of a problem. We build solutions to address a specific problem.”
- ▶ How can we increase enrollment in a surgery coaching program?

# Design a Solution

- ▶ Focus on the MVP
- ▶ Considerations:
  - Data
  - Data acquisition
  - Economics
  - Politics
  - Sensitivity vs specificity

# Implement the Solution

- ▶ Acceptance from key stakeholders
- ▶ Collect testing stats
- ▶ MVP model implemented after discussion around outcome expectations and plan for operational infrastructure

# Monitor the Solution

- ▶ KPIs were established and tracked:
  - What % of future surgeries did we actually predict?
  - How many people were identified for outreach and how many of them were actually reached?
  - How many people were engaged?
  - What was the ROI?
- ▶ Were results within expectations? Why/why not?

# Improve the Solution

- ▶ After we exceeded our KPIs and demonstrated the value of the program, the solution was sold beyond the pilot client
- ▶ A new and improved model was built leveraging more advanced machine learning techniques and additional data features/elements
- ▶ Data that we explored included:
  - Enhanced features from medical and Rx data
  - Improved contact information from various online sources
  - Lab data