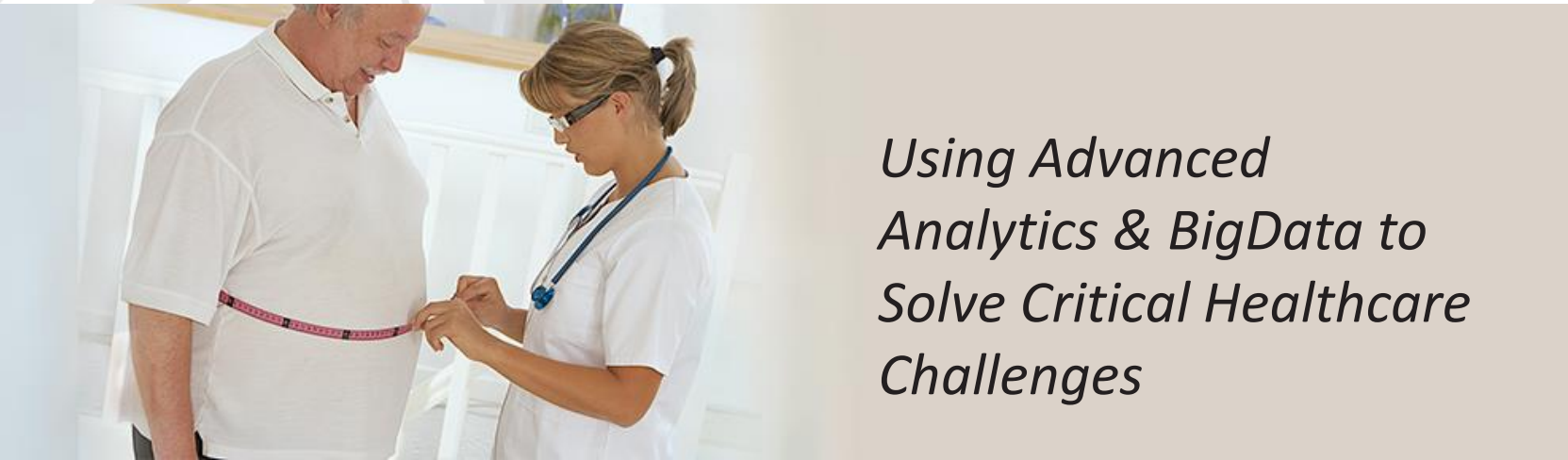


OBESITY & DIABETES

Using Advanced Analytics & BigData to Solve Critical Healthcare Challenges



1 Obesity

2 Diabetes

3 The Challenge

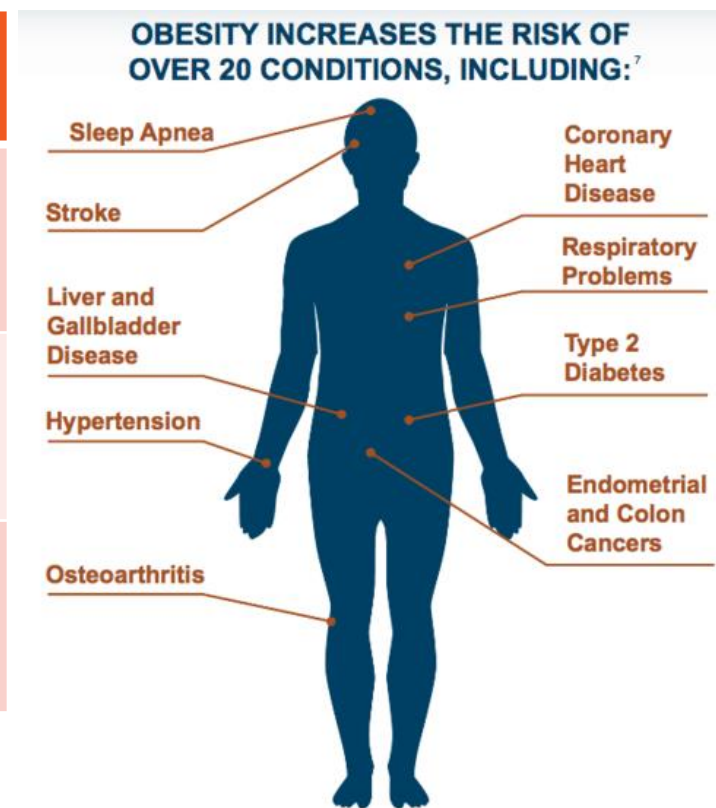
4 What can we do?

THE DANGERS OF OBESITY

- Obesity increases the risk of over **20 conditions** and causes **112,000 deaths** each year making it the **2nd leading cause** of preventable deaths in the US.
- There are more chronic conditions related to obesity than **smoking, drinking, or poverty**.

Obesity Stats	2008	2018 projection
% of obese Americans	34%	43%
Weight-related medical costs	\$147 billion	\$344 billion
% of total US health care spending	9.1%	21%

Source: Kenneth Thorpe, Emory University, as cited in USA Today



THE MOST IMPORTANT AND DAMAGING RISK CONDITION IS TYPE 2 DIABETES

- In spite of being some of the most studied conditions in all of medicine, with almost **\$2 billion** being spent annually by the NIH alone, obesity and diabetes are still on the increase. *Why?*

Today, **4,660** AMERICANS WILL BE DIAGNOSED **WITH DIABETES**

NEARLY **30** MILLION AMERICANS HAVE DIABETES



86 million Americans have prediabetes

More than the population of the east coast from Connecticut to Georgia



DIABETES AND PREDIABETES COST AMERICA **\$322 BILLION** PER YEAR

\$ 1 in 5 health care dollars is spent caring for people with diabetes

\$ 1 in 3 Medicare dollars is spent caring for people with diabetes

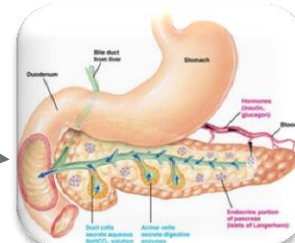
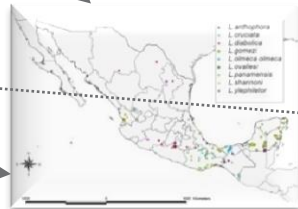
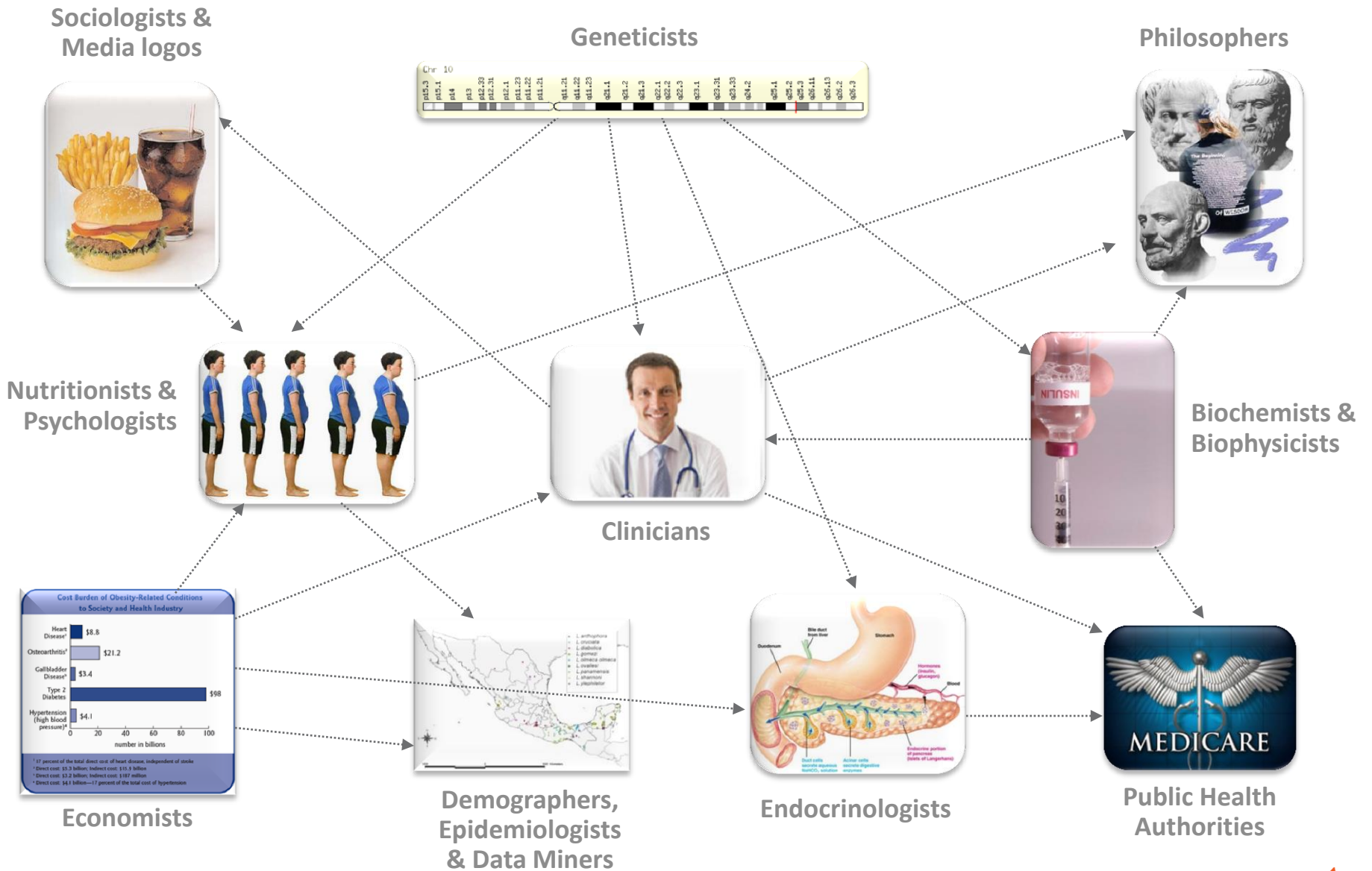
\$ People with diagnosed diabetes have health care costs **2.3 times higher** than if they didn't have the disease



...Complex & Dynamic

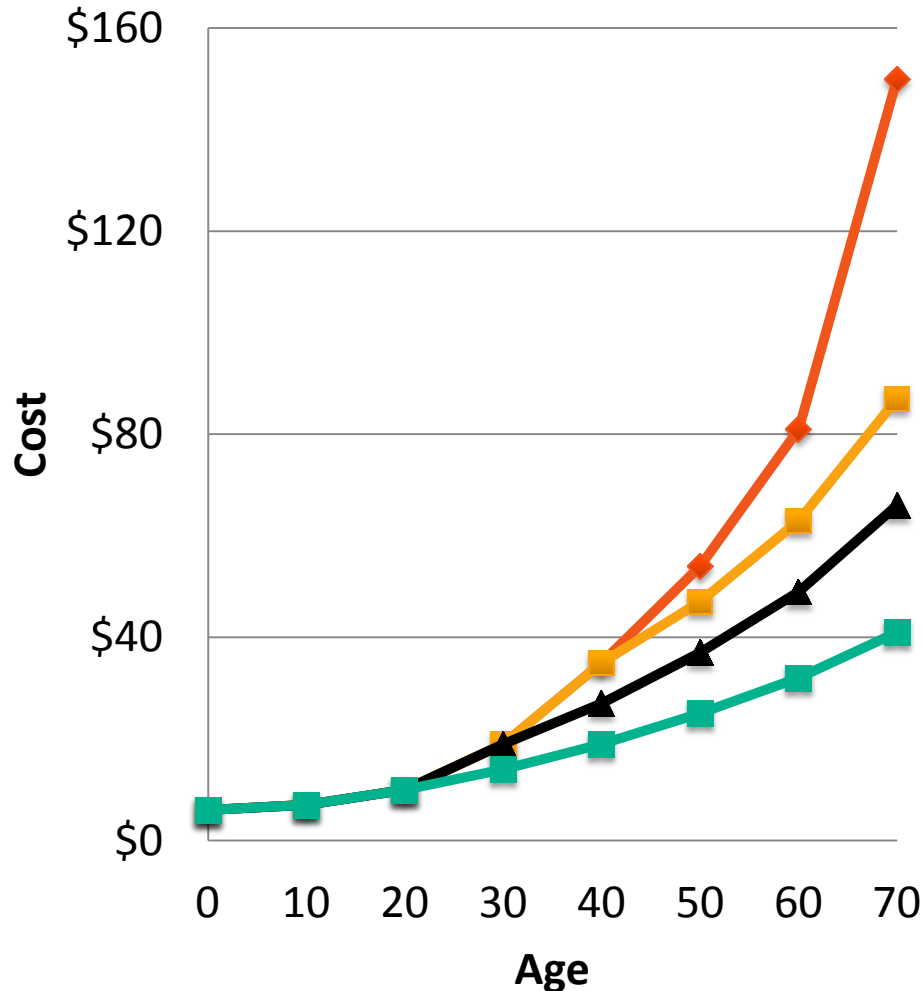
- **Complex, multifactorial** - A huge number of contributing factors are involved, ranging from the most microscopic (e.g., genetic susceptibilities) to the most macroscopic (e.g., politics of the food industry).
- **Dynamic and adaptive** - Risk factors, such as lifestyle changes, evolve in time over long periods and are associated with behaviors.

THE COMPLEXITY OF OBESITY AND DIABETES



DYNAMIC, ADAPTIVE, EVOLVING NATURE OF OBESITY AND DIABETES

- **Different stages** in terms of health outcomes - life, hospital stay, disease, etc.
- **Different risk factors** and associated interventions across these stages



Scenario 1

- Onset of obesity at 20
- Continued obesity and onset of metabolic syndrome at 40
- Onset of diabetes at 50
- Onset of renal failure at 60
- Death at 70

Scenario 2

- Onset of obesity at 20
- Continued obesity and onset of metabolic syndrome at 40
- Onset of diabetes at 50
- Adequate control and treatment of comorbidities at 60
- Bad health and high cost at 70

Scenario 3

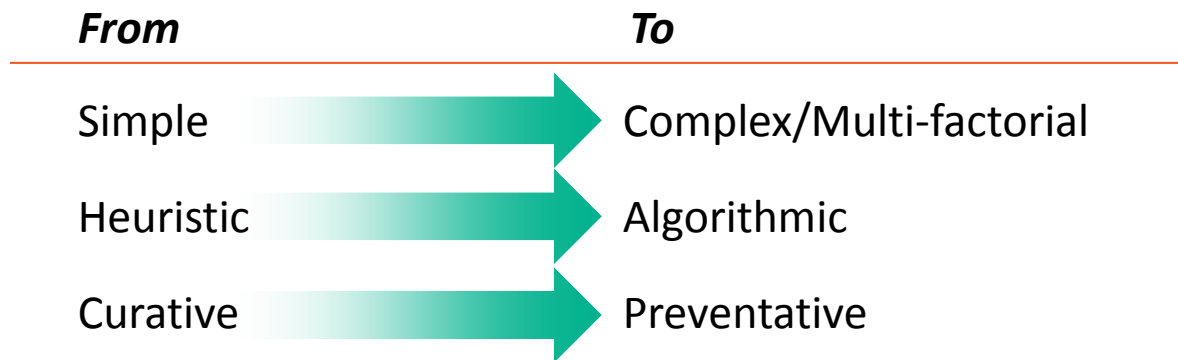
- Overweight at 20
- Obesity at 40
- Onset metabolic syndrome at 50
- Onset of diabetes at 60
- Continued diabetes but no serious comorbidities at 60
- Ill health and moderate cost at 70

Scenario 4

- Overweight at 30
- Obesity at 50
- Onset of metabolic syndrome at 60
- Onset of diabetes at 70 but relative health

WHAT CAN WE DO THAT'S DIFFERENT?

- The data revolution of the last few decades and the existence of big “deep” data is giving an **unprecedented opportunity for change** in medicine and healthcare and especially in chronic, complex diseases such as obesity and diabetes



- However, turning big, deep data into predictions and optimized interventions isn't just a question of “data mining” — it requires the ability to model Complex Adaptive Systems, to model **behaviors**

Few can do that... We can!

Healthcare institutions that grasp this opportunity will have the possibility of both improving outcomes and reducing costs

