CARE MANAGEMENT: USING PREDICTIVE ANALYTICS TO CHOOSE THE "ACTIONABLE" PATIENTS

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ARCADIA

INTRODUCTION

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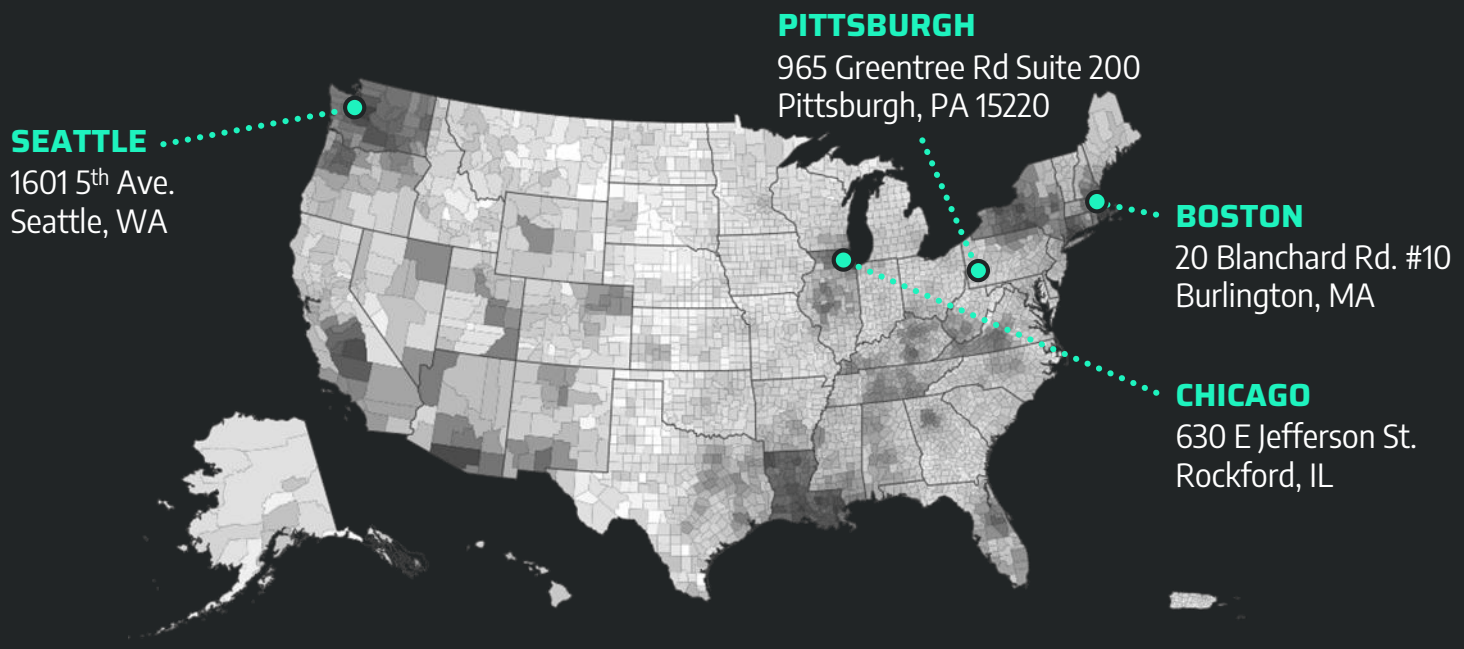
ABOUT ARCADIA

ARCADIA IS A **POPULATION HEALTH MANAGEMENT** COMPANY, SPECIALIZING IN DELIVERING VALUE-BASED CARE ANALYTICS AND CARE MANAGEMENT TO THE ENTERPRISE. WE CULTIVATE HIGH QUALITY DATA ASSETS ENABLING OUR CUSTOMERS TO EFFECTIVELY SHARE RISK.

ARCADIA HAS ANALYZED OVER **50 MILLION** PATIENTS NATIONALLY



50M **PATIENTS** MEASURED

2.5x **HIGHER ACO** PERFORMANCE

$8.9M **AVG SAVINGS** IN MSSP

40+ **EHR VENDORS** CONNECTED

2002 **YEAR** FOUNDED

No. 1 **VALUE BASED** SERVICES

AGENDA

1. Why do we need better patient stratification?
2. How do predictive analytics work?
3. How are health systems using predictive analytics for stratification?
4. How can predictive analytics be implemented to support care management?
5. Where do we go from here?

WHY DO WE NEED BETTER PATIENT STRATIFICATION?

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CASE STUDY

Manny is a **62 year old man** who is a single parent of a teenage son. He is unemployed and on disability. He used to work as a chemist and then a journalist until he began having **seizures** that made him unable to work. He had **personality changes** and run-ins with the law. Due to violent outbursts beyond his control, he spent time in jail. He does not smoke or drink alcohol.

He is stable now, but has **morbid obesity**, a seizure disorder, **chronic lymphedema and cellulitis of the legs**, **asthma**, **diabetes** and **chronic kidney disease**. He is on multiple medications, including a high dose of valium which helps control his seizures. Many providers don't understand his need for the valium and try to discontinue it when I am not present.

He has an excellent **relationship with his son** who is a junior in High School, and playing on the baseball team.

POPULATION HEALTH

POPULATION HEALTH -- from the Arcadia perspective -- is the ability to aggregate multiple sources of disparate patient related data, including claims, EHR data, and medications and use that curated data set for improving the health of the population, and at the same time optimizing the financial performance of the health care entity. Specific tasks within population health include: identifying and closing gaps in care, leveraging variation in utilization data to improve underutilized care and decrease overutilization, identify and correct under or overcoding, **power care management**, disease management and other registry based activities and support sophisticated financial management.

CARE MANAGEMENT CHALLENGES

- **THE RIGHT PATIENTS** Who are the right patients to care manage? What is the right volume? Over selecting is wasteful and under selecting undermines value.

- **PANEL SIZES** How many patients should a care manager manage? How intense do you want the interventions to be?

- **MULTIPLE PROGRAMS** Will you also be running disease management programs for heart failure, CKD, COPD, DM, BH, and End Of Life Care? If so, how will they dovetail with your care management programs?

HOW TO DETERMINE ROI ON CARE MANAGEMENT

- **Faith-based method:** “We know it works, and we don’t have to expend resources proving it.”
- **Retrospective review** of cohort utilization
- **Case control** method

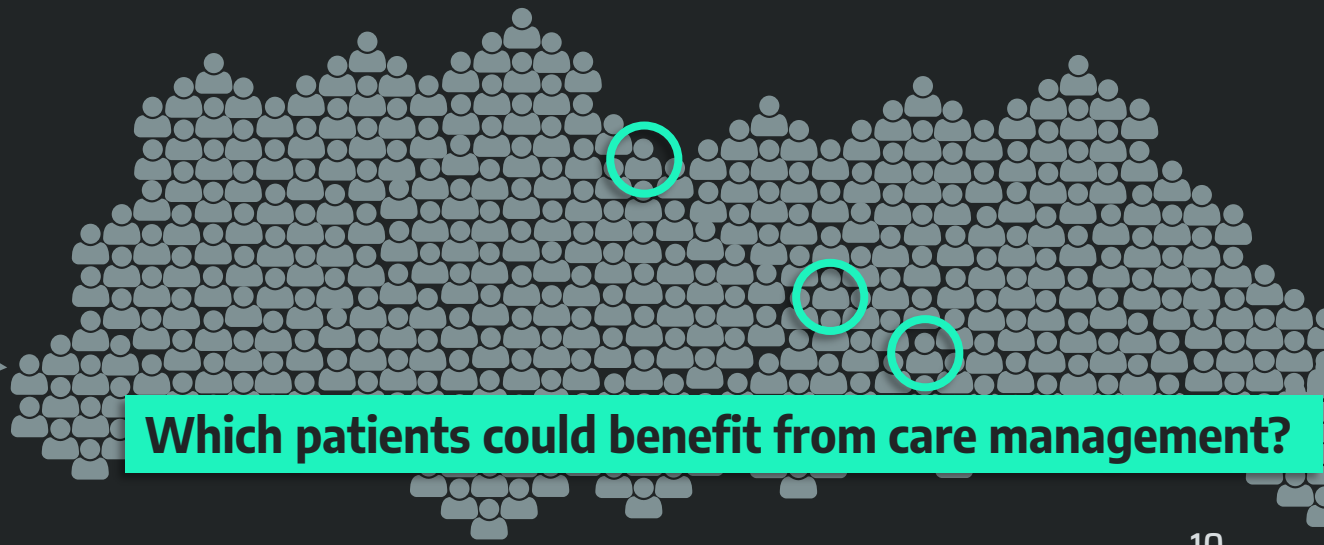
CARE MANAGER EMPANELMENT

IMPACTABILITY: Assign patients to nurse care manager panels based on their likelihood of benefiting from care management.

RISK ≠ IMPACTABILITY

5-10 nurse care managers...

...serving 100,000 patients.



Which patients could benefit from care management?

WHAT DOES CARE MANAGEMENT SUCCESS LOOK LIKE?

- **Which patients are most likely to respond to care management?** How do we measure that?
  - improvements in condition
  - reductions in cost and utilization

CHALLENGES WITH TRADITIONAL STRATIFICATION APPROACHES

- Highest risk/cost patients are not generally impactable with care management (cancer, accidents)
- Traditional risk algorithms are designed for risk adjustment more than population stratification
- Traditional risk algorithms do not include all the data needed to predict who will benefit from care management

WHAT IS PREDICTIVE ANALYTICS?

- It's **not** about finding out things that are happening right now.

  "How often are my diabetics going to the ED?"

- It's **not** about finding out exact outcomes in the future.

  "Which diabetics are going to end up in the ED next year?"

- It **is** about using existing information to identify patterns and to infer trends and potential outcomes in the future.

  "Which diabetics are likely to use the ED – but could be steered elsewhere?"

WHAT CAPABILITIES DO WE NEED?

- **Requirements for a better approach to stratification**
  - Does not just identify the sickest or highest cost patients.
  - Can be used in a variety of contexts and populations.
  - Can be used to report on diverse individuals regardless of background.
  - Can help clinicians identify clusters of patients within a population for inclusion in programs

HOW DOES IT WORK?

THE ARCADIA IMPACT SCORE IS A PREDICTIVE MODEL DEVELOPED FROM A MACHINE LEARNING ALGORITHM BASED ON AGGREGATED DATA

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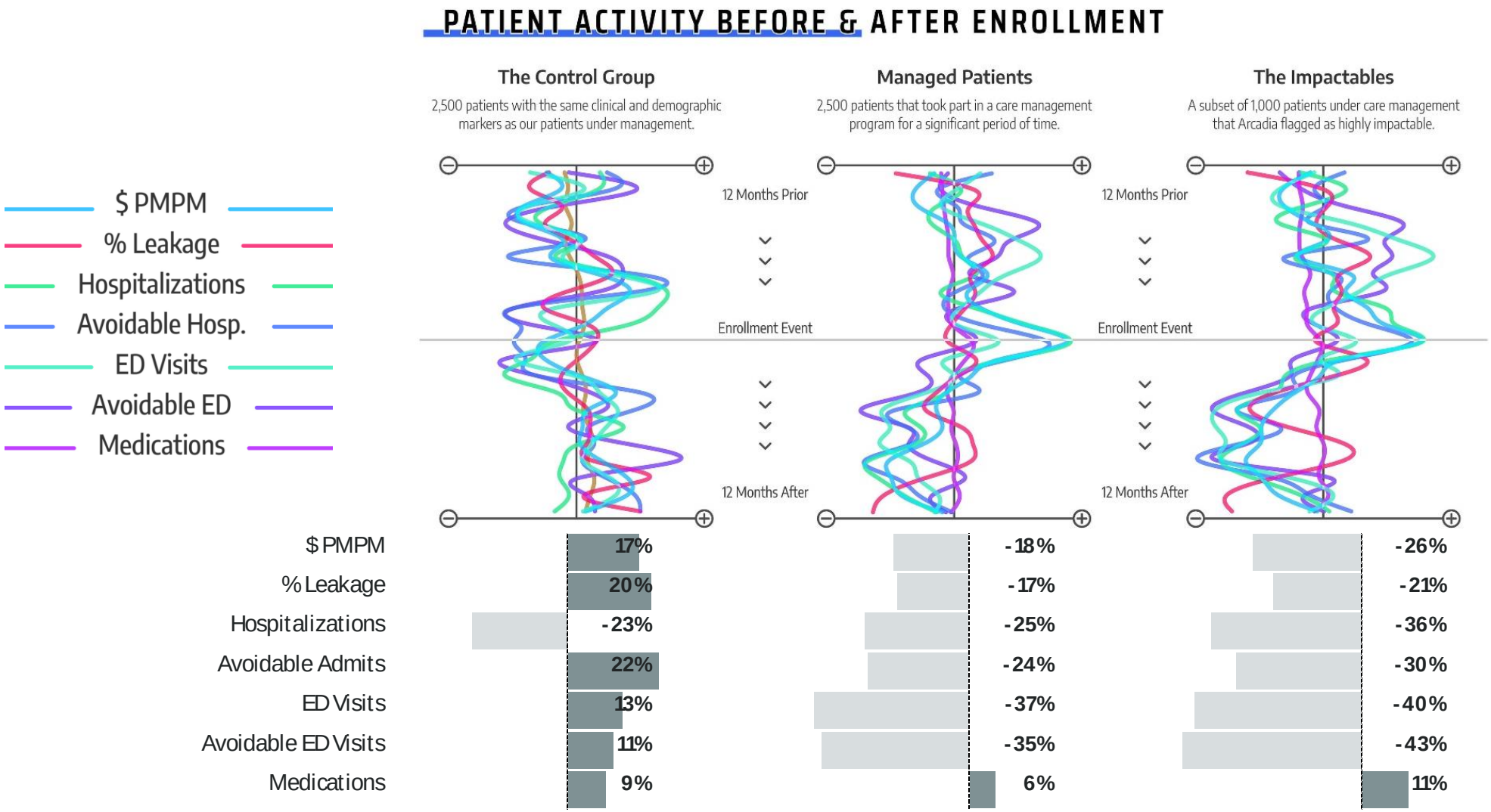
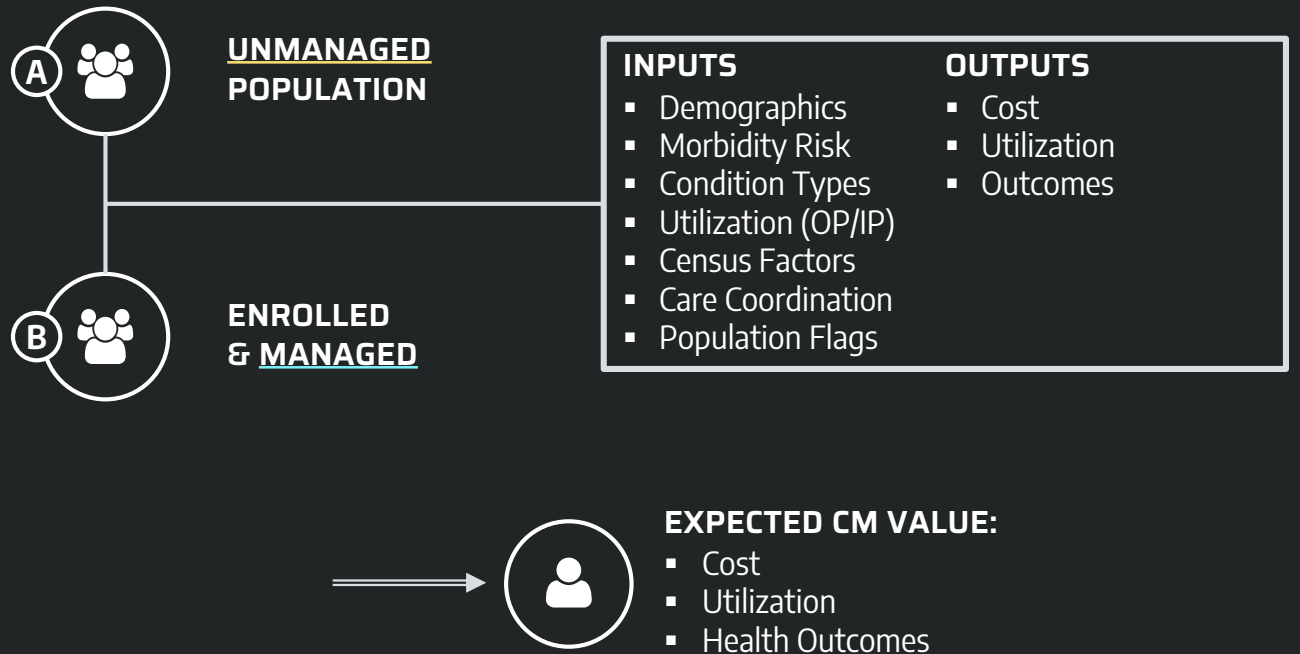
FINDING THE IMPACTABLE COHORT



HOW DOES IT WORK?

BUILDING AN IMPACTABILITY MODEL



EXPECTED CM VALUE:

- Cost
- Utilization
- Health Outcomes

HOW DOES IT WORK?

POTENTIAL MODEL INPUTS

COMBINED EHR/CLAIMS/ADMIN LONGITUDINAL RECORD

COST STRATA
- 12-month true cost
- 6-month true cost
- Predicted future cost

MORBIDITY STRATA
- 100 disease groups
- Concurrent morbidity risk
- Dx clusters
- Expected mortality

CARE STRATA
- Care coordination risk
- Care team density
- Frailty
- Hospice

SOCIAL STRATA
- Education levels
- Income levels
- Public assistance
- Access to transportation
- Veteran, Homeless indicators
- Home status

UTILIZATION STRATA
- Recent ED utilization
- Recent IP utilization
- Medication utilization and polypharmacy
- IP and ED predicted utilization

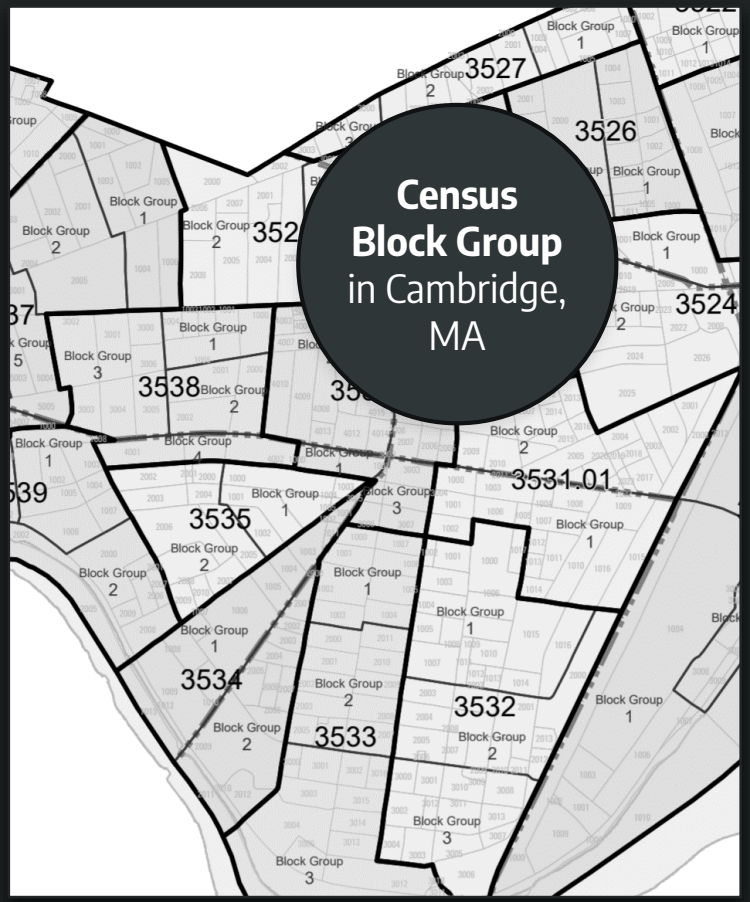
PERFORMANCE STRATA
- Quality gaps
- Activation and adherence
- Coding gaps
- Coding/Quality and revenue opportunity
- Wellness visit adherence

PREDICTIVE IMPACTIBILITY SCORES

HOW DOES IT WORK?

CENSUS DATA

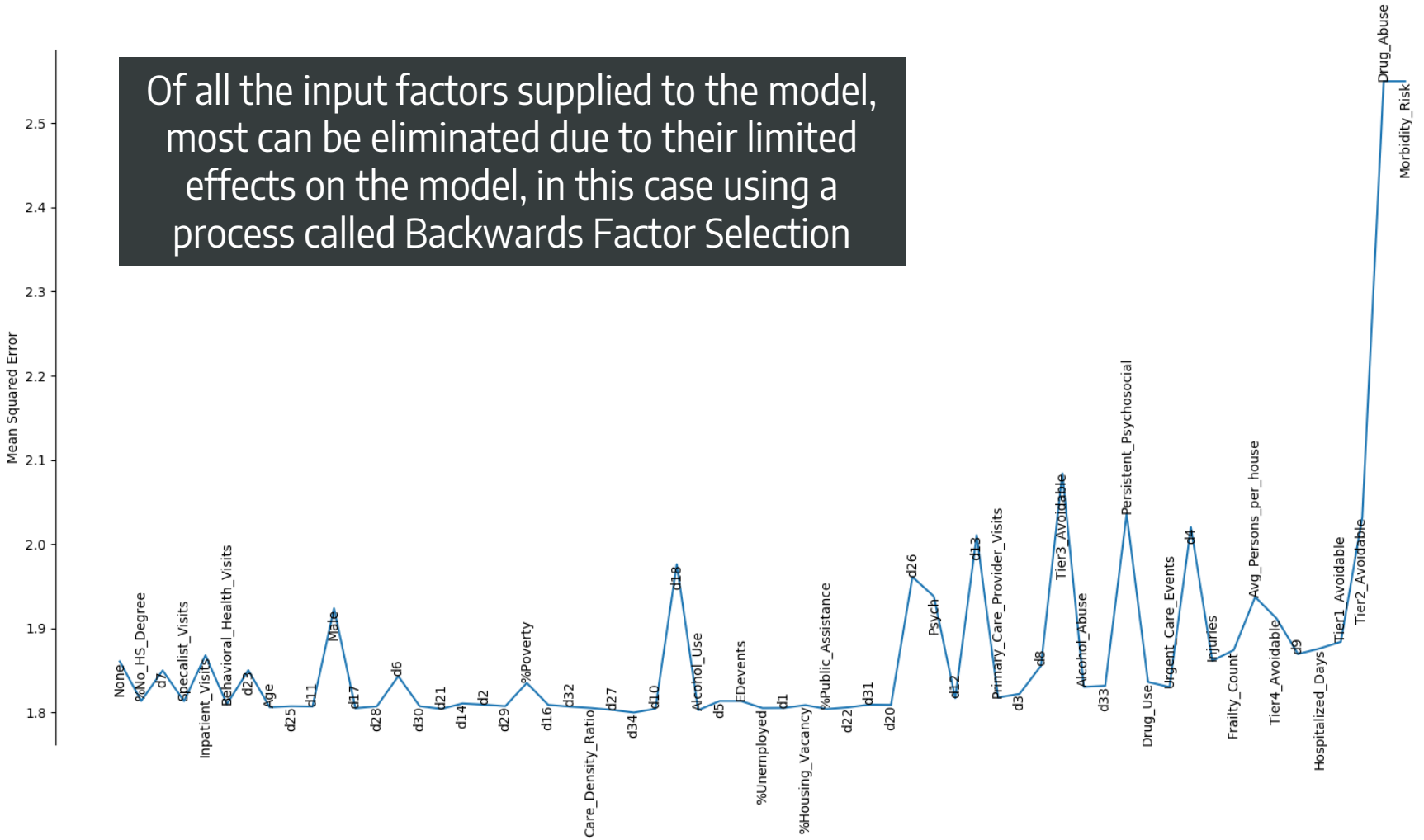
Where SDOH data are not provided on a patient level, census data from the American Community Survey presented at a Census Block Group level can provide a high-resolution picture of socioeconomic status.



- Population
- % Males
- % Females
- % Under 18
- % 18 - 44
- % 45 - 64
- % 65+
- % High School
- % Bachelors
- % Graduate Degree
- Median Earnings (Real Dollars)
- Female Earning Ratio (Median Female Earnings/Median Male Earnings)
- % Population by Race
- % Population by Race - American Indian or Alaskan Native
- % Population by Race - Asian
- % Population by Race - Hispanic
- % Population by Race - Black
- % Population by Race - White Non-Hispanic
- Persons per Housing Unit
- % Families w/ Incomes < 100% of Federal Poverty Level
- % Families w/ Incomes < 200% of Federal Poverty Level
- % Adults who are Unemployed
- % Households Receiving Public Assistance
- % Households w/ No Car
- % Households with Children and a Single Parent
- % People Age 25+ w/o High School Degree

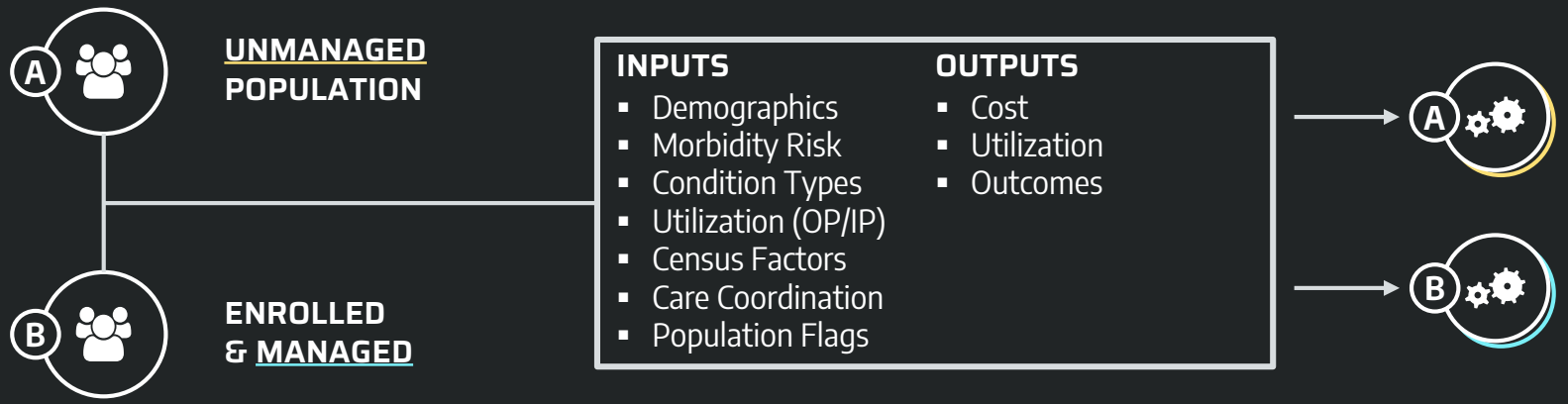
FACTOR SELECTION

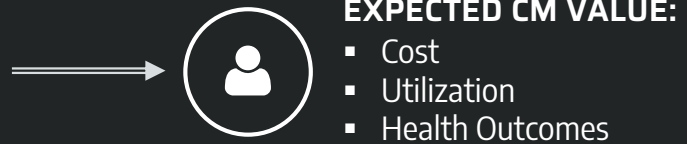
Of all the input factors supplied to the model, most can be eliminated due to their limited effects on the model, in this case using a process called Backwards Factor Selection



HOW DOES IT WORK?

BUILDING AN IMPACTABILITY MODEL

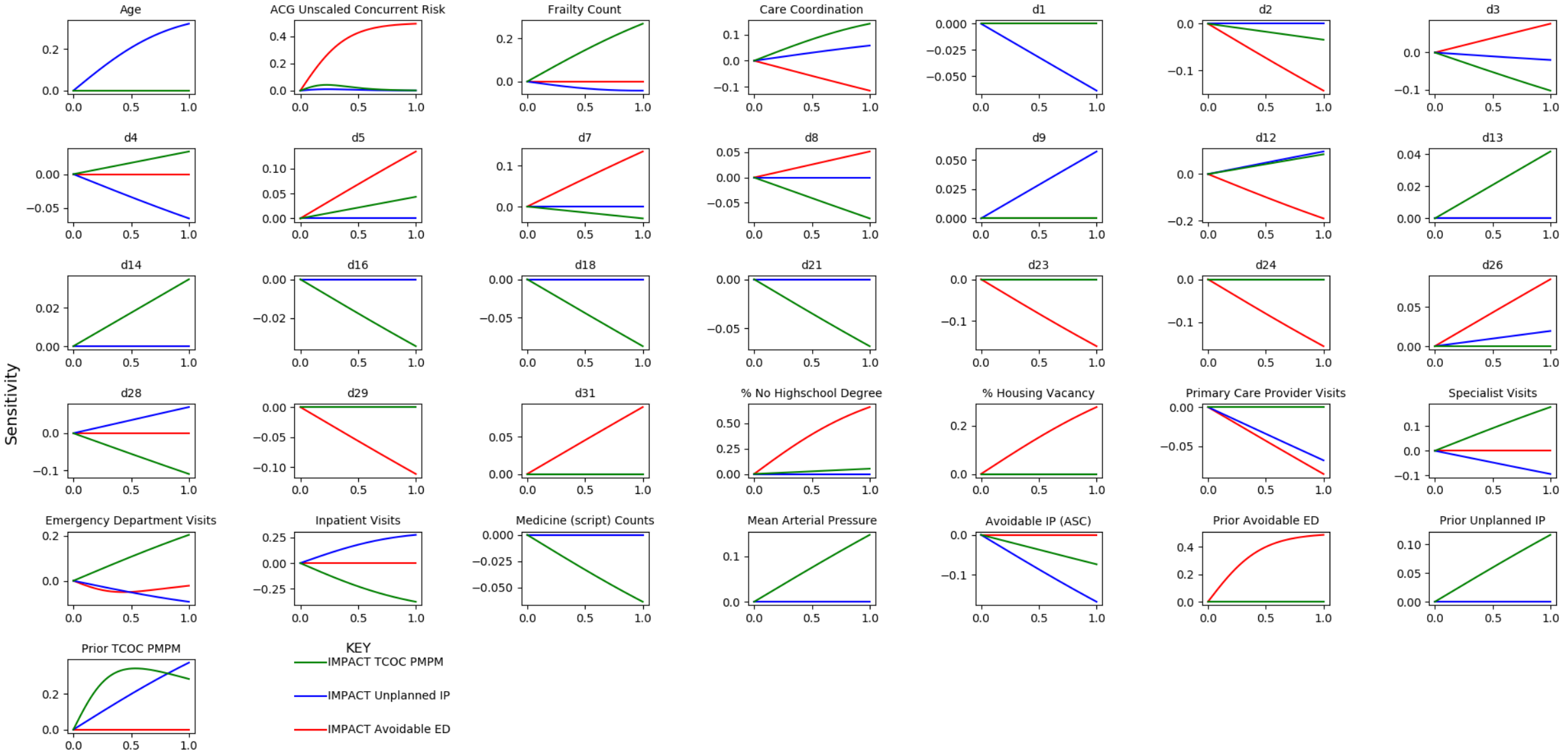




EXPECTED CM VALUE:

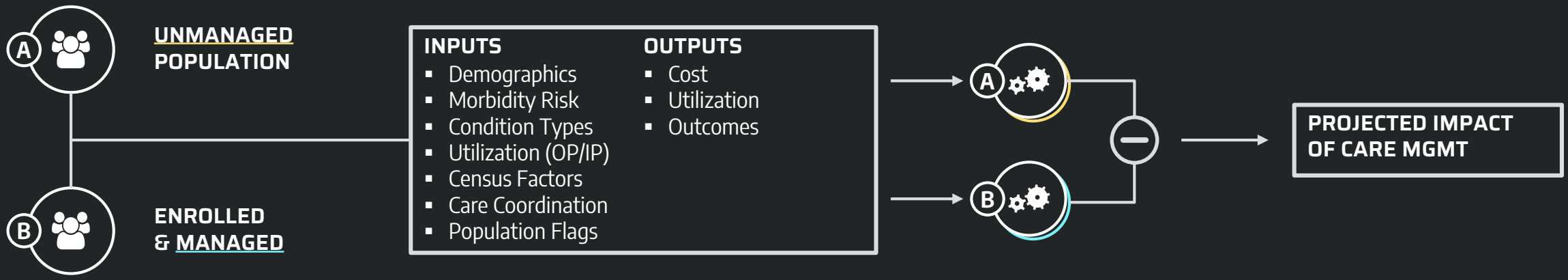
- Cost
- Utilization
- Health Outcomes

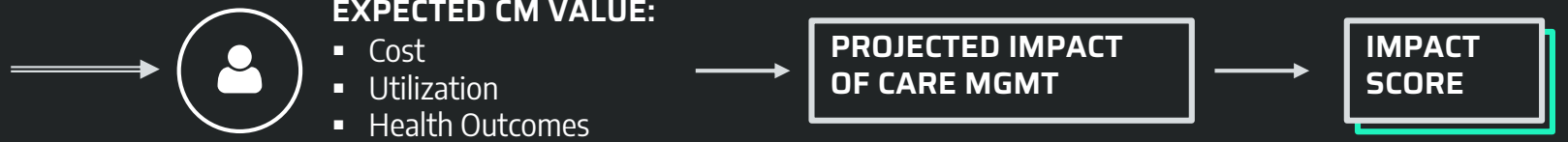
FACTOR SENSITIVITIES



HOW DOES IT WORK?

BUILDING AN IMPACTABILITY MODEL





The impact score describes the relative benefit projected for this patient from care management.

HOW IS IT USED?

FLEXIBLY! APPLICATION OF THE IMPACT SCORE DEPENDS ON THE NEEDS OF THE HEALTHCARE ORGANIZATION

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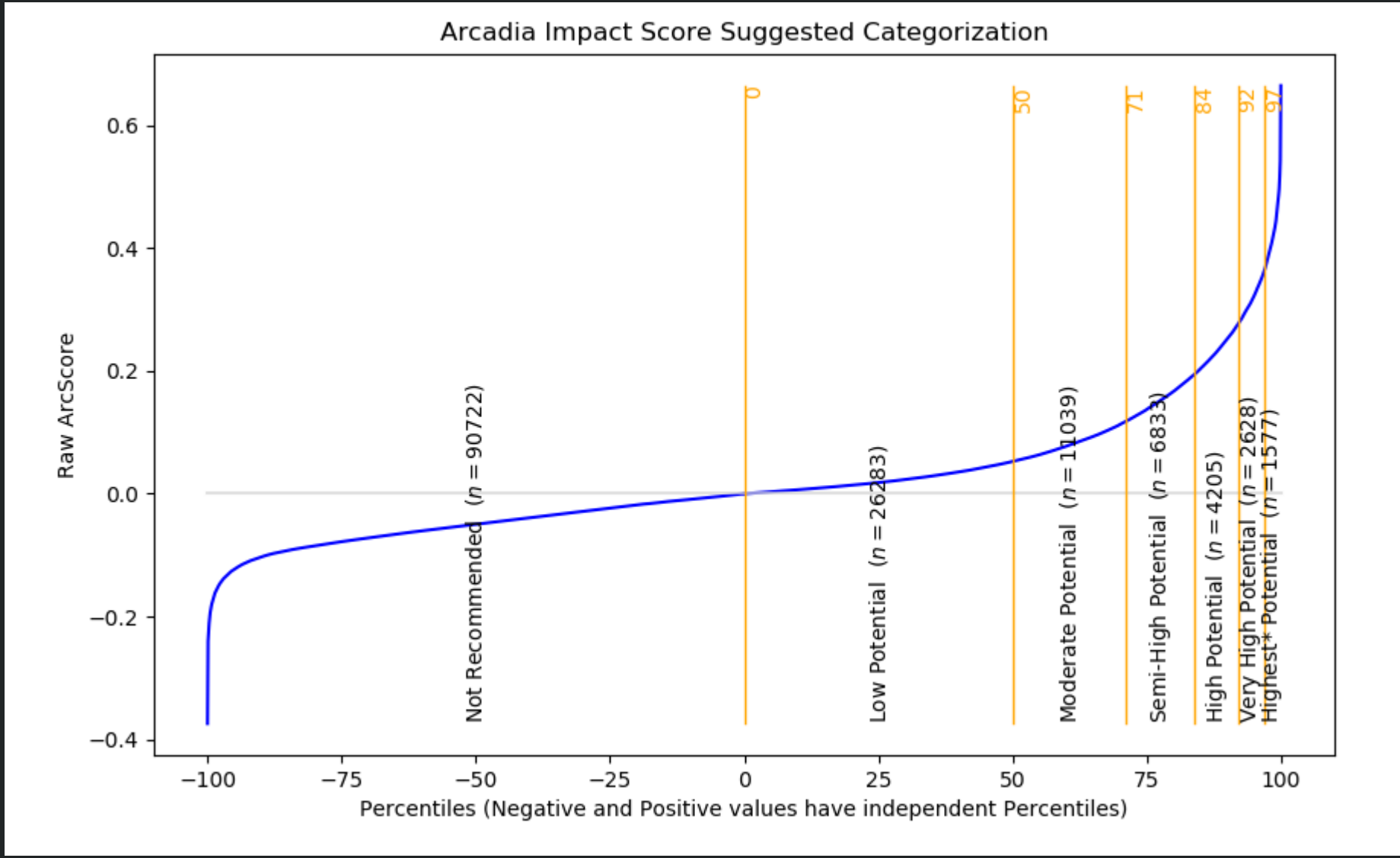
APPLICATIONS



APPLICATIONS

There are a number of ways the impact score can be used...

- Rank Stratification
- Score Clustering
- Population-Driven Segmentation
- Initiative-Driven Segmentation

APPLICATION: FIND CANDIDATES FOR CARE MANAGEMENT

Rank Segmentation

How: Rank your population by Impact Score and transmit the top "N" individuals for assessment.

Why: Simple way to sort the population and allow grass-roots professionals to make decisions.

Caveat: Assumes all CMs are the same, no consideration of circumstances or conditions.

We want to give our Care Managers lists of likely candidates to review for entry into a program.

APPLICATIONS: LOAD CARE MANAGEMENT QUEUES

At any given time, we want to have a target number of patients enrolled in our care management programs.

Score Clustering

How: Group individuals into clusters by score (high/medium/low) and choose groups for assessment.

Why: Simple way to sort the population, but give grass-roots professionals more options.

Caveat: Requires more filtering by CMs, and still doesn't consider circumstances or conditions.

APPLICATION: FIND PATIENTS WITH SPECIFIC ATTRIBUTES

Population-Driven Segmentation

How: Segment your population by specific attributes, and then rank by score and transmit to CMs.

Why: Deliberate focus on features of the population drives decisions on care management.

Caveat: More complex process of determining segmentation; could ignore critical corner cases.

We want to find the most actionable patients within certain segments of our population.

APPLICATION: QUALIFY PATIENTS FOR PROGRAMS

Initiative-Driven Segmentation

How: Group individuals by qualification into specific initiatives, and then rank and transmit.

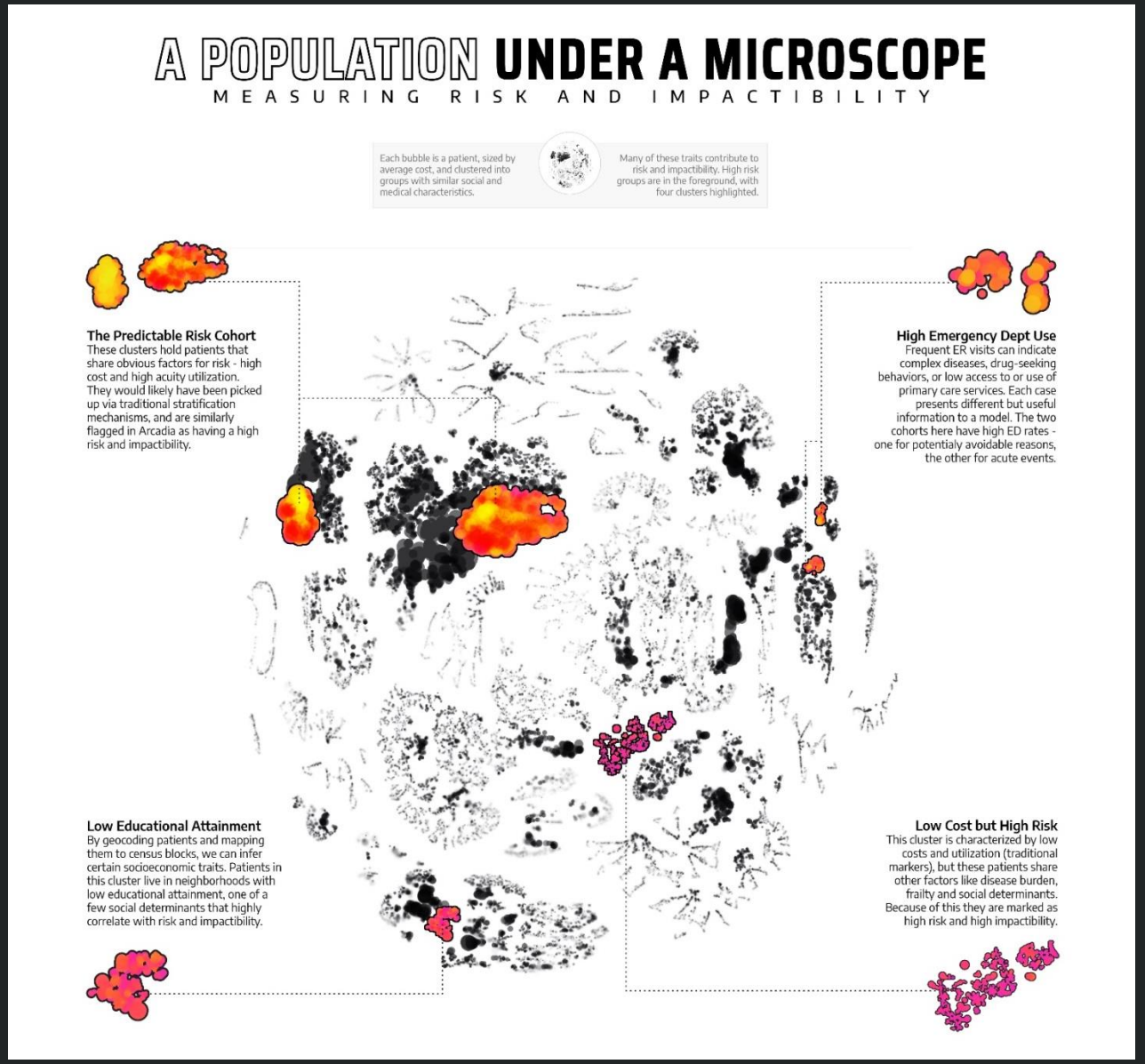
Why: Optimizes guidance of the score against actual use cases, making results more meaningful.

Caveat: Requires thoughtful initiative design and consideration of criteria; plus, not all initiatives apply to the same score.

APPLICATIONS

Predictive analytics offer insights that can be powerful, but that can also be counterintuitive.

Therefore, scores such as the Arcadia Impact Score should be just one tool among many in your risk stratification toolbox.



WHERE DO YOU GO NEXT?

PREDICTIVE TOOLS CAN HELP YOU BETTER UNDERSTAND OPPORTUNITIES AT A POPULATION LEVEL

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QUESTIONS?

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