HEALTH
DATA ANALYTICS
INSTITUTE

Predictive Analytics

Practical applications for improved patient outcomes

National Association of ACOs - Spring Conference

April 2022

HDAI delivers predictive analytics and insights to leading ACOs

Josh Gray
VP, Analytic Services

David Clain
Chief Product Officer

- Health Data Analytics Institute (HDAI) is **a predictive analytics company with access to every Medicare fee-for-service claim** between 1999 and last month
- We have built **hundreds of predictive models** to determine the risk of specific, actionable clinical actions and outcomes
- Our platform, ***Health Vision***, provides **network insights, performance analytics, and individual patient risk and care profiles** for a cohort of early adopter ACOs

We are—or ought to be—in a new era for ACO analytics

Care disruption

1

Care disruption and Covid-related health challenges mean more complex patients with less consistent care

Provider burnout

2

Provider burnout—already at worrying levels—has reached an untenable height during the pandemic

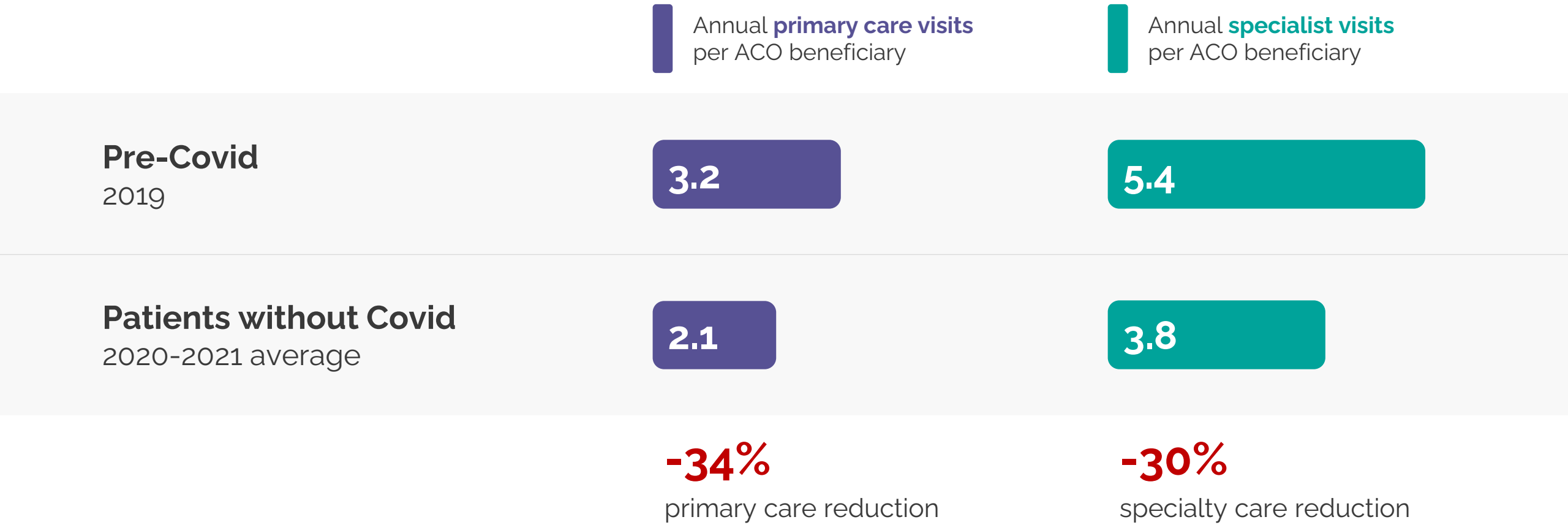
Rising expectations

3

The bar is rising for ACO performance, as national outcomes improve and two-sided risk becomes the standard

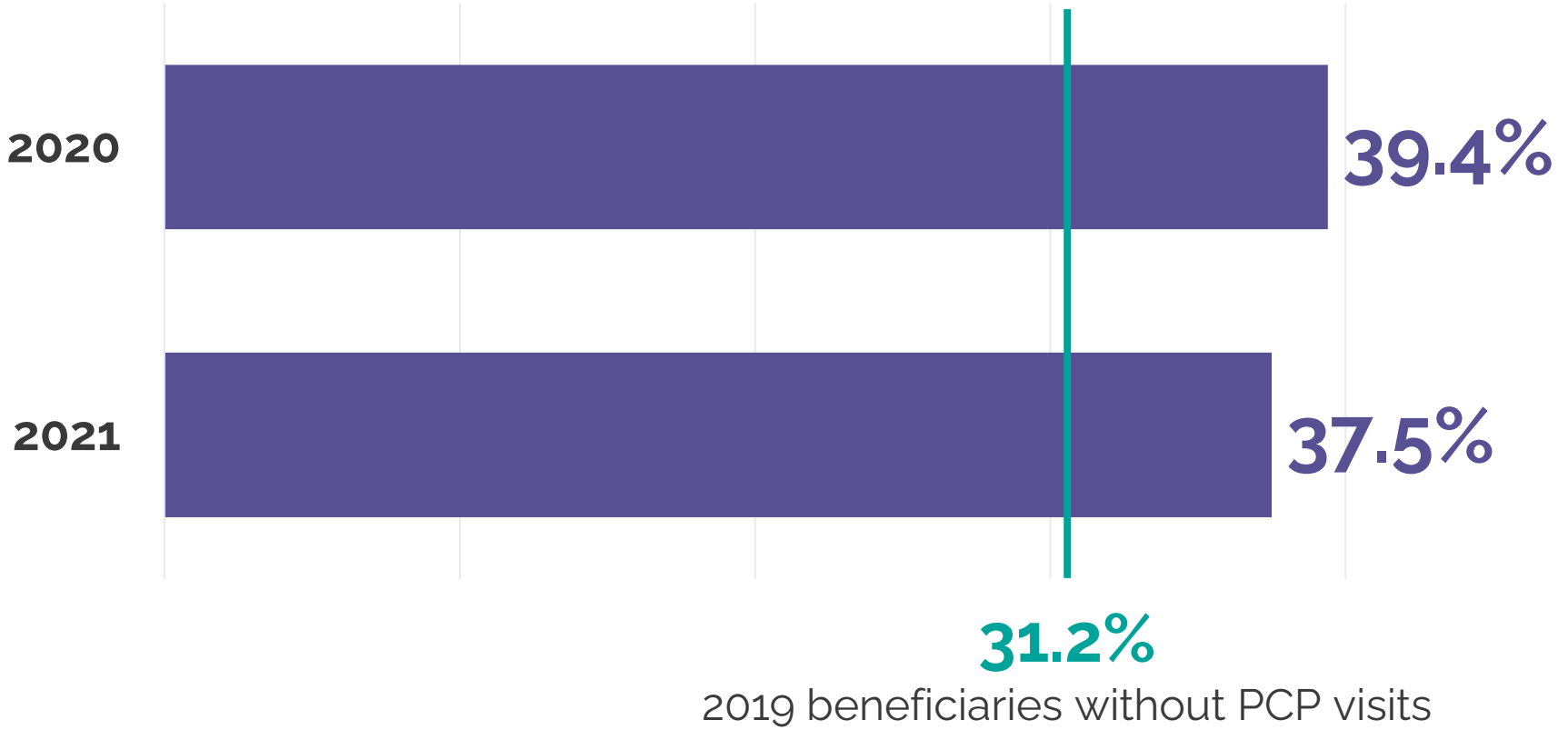
Significant disengagement among patients who avoided Covid

Primary care and specialist visits per patient, before and during the pandemic



With Covid, many patients skip primary care altogether

Percentage of non-Covid patients without a primary care visit



Providers never more essential—or burned out

Advanced analytics require a multi-dimensional view of patient health

Clinical and Temporal Drivers

Supporting ACOs through advanced predictive analytics

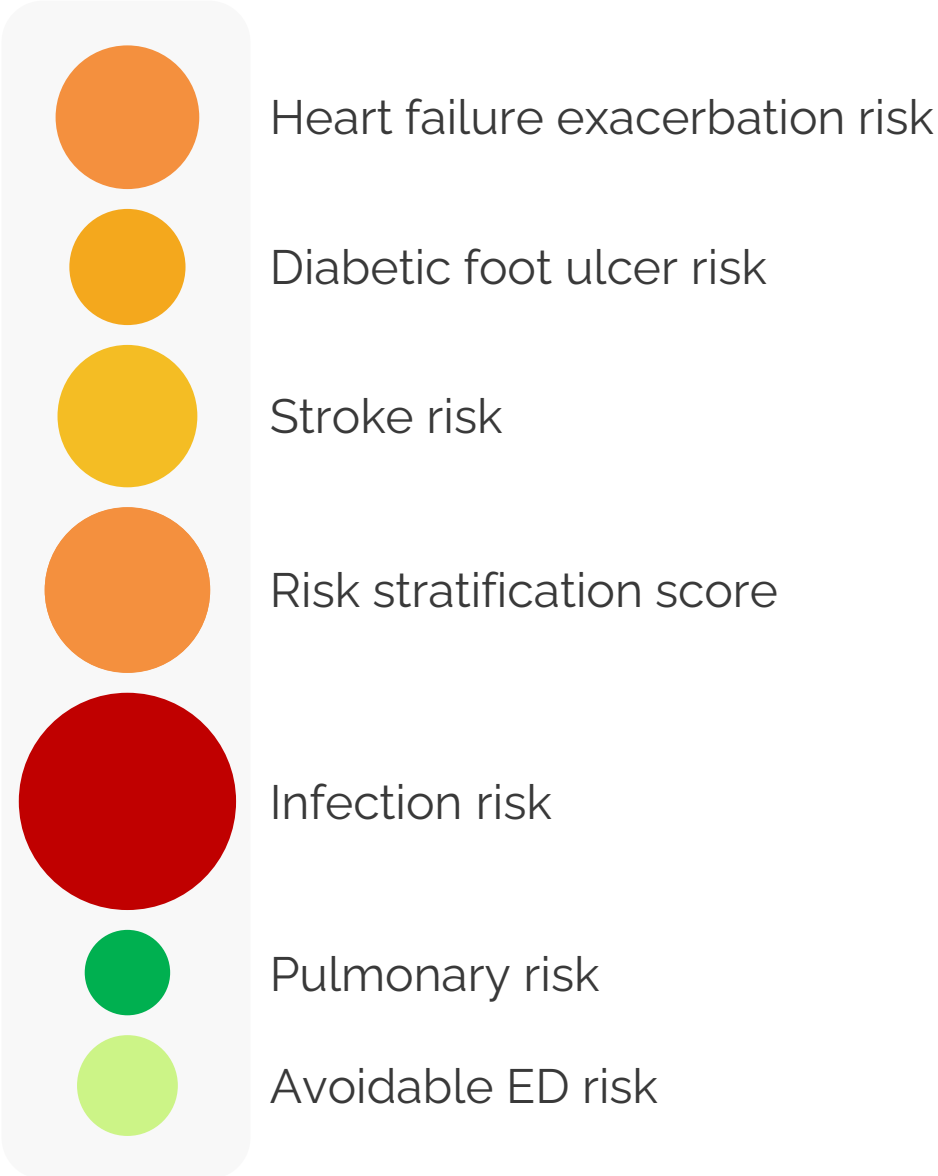
Three case studies from our partner ACOs

1. Granular predictions of specific patient risks
2. Mapping a patient's risk trajectories over time
3. Applying predictive analytics to providers and networks

Predictive analytics should capture patients' many dimensions

Clinical dimensionality

No single risk score can capture the clinical complexity of a patient. Understanding a patient's health status requires evaluating dozens or hundreds of distinct risks.



Even sophisticated ACOs using low-resolution “worklists”

These worklists categorize patients based on (often) opaque logic with little supporting information

Complex Chronic Care Worklist
Abbreviated patient list for Care Manager A

Micah Evans

82yo male
Aged/dual

Maria Suarez

73yo female
Aged/non-dual

Rupert Swift

77yo male
Aged/non-dual

CLINICAL DIMENSIONALITY

Patients' risks are not uniform across the clinical spectrum

Lists of prioritized "high-risk" patients, without any justification, add to the care manager or provider's workload, rather than offloading the triage burden to predictive algorithms

		Predicted one-year risk of event or condition onset				
	Prioritized	Mortality	ED visit	CHF exacerbation	Fall-related injury	Diabetes
Micah Evans	✓	6%	48%	9%	3%	ACTIVE
Maria Suarez	✓	16%	70%	11%	18%	3%
Rupert Swift	✓	1%	27%	1%	1%	14%

Providers need flexibility in targeting patient risks

Chronic Conditions: 2 conditions — Dementia X — Osteoporosis X

At High Risk of Developing: At least one of — Depression X

At High Risk for: At least one of — Falls or Fall-Related Injuries X

Provider Group: All

PCP: All

Exclude Deceased Patients

Clear all filters

52 patients matched selected criteria out of **34773** total **(0.15%)**

Patient	Date Of Birth	Falls Or Fall-Related Injuries	ER Visit	Unplanned Admission	COPD Exacerbation	Heart Failure Admission	Acute Kidney Injury	Infection
Flanders, Luke	DOB (88Y)	20.8%	73.9%	56.6%	22.8%	10.6%	3.5%	27.7%
Parker, Harry	DOB (79Y)	20.6%	74.6%	27.4%	1.4%	0.3%	1.3%	10.8%
Hunt, Lily	DOB (79Y)	19.9%	41.2%	21.5%	0.2%	1.1%	2.1%	10%
Mason, Priscilla	DOB (89Y)	19.5%	60.5%	38%	0%	5.2%	3.4%	15.9%
Villiger, Erica	DOB (79Y)	17.4%	56.1%	25.2%	0.1%	1.9%	2.2%	9%
Tyrrell, Barney	DOB (81Y)	17.4%	39.3%	11.4%	1.7%	0.2%	0.5%	3.8%
Clark, Owen	DOB (78Y)	15.8%	74.8%	32.1%	1%	1.2%	2.6%	11.9%

Deep—and growing—library of clinical measures and predictors

We work with ACOs to understand whether these outcomes occur more often than expected, and for most outcomes we provide models predicting specific patient-level risk

Category	Current count	Selected examples
Adverse Event	**46**	AMI, respiratory failure, diabetic foot ulcer, stroke, acute kidney injury, fall-related injury, infection, sepsis
Chronic Conditions	**87**	Current status flags and predictions of advanced heart failure, CKD, hypertension, diabetes, atrial fibrillation, COPD
Intervention	**8**	Coronary revascularization, diagnostic coronary catheterization, total joint replacement, endoscopic sinus surgery
Low Value Care	**4**	Sinus CT for uncomplicated acute rhinosinusitis, head imaging for syncope, low-value PSA screening, cervical cancer screening > 65
Preventive Screenings	**22**	Mammograms, aortic aneurysm preventive screening, HbA1c screening, serum creatinine, depression preventive screening
Utilization	**35**	ED visit, unplanned hospitalization, total cost of care, skilled nursing admissions, ambulatory visits for each of 14 specialties
Total	**202**	

Targeting with specificity at Buena Vida y Salud ACO

The ACO's care management team is using our data to understand not just which patients are high risk, but which specific risks need to be managed

> The value this brings is that it **gives us a more targeted insight** into the adverse outcomes that could affect our population. We have general risk indicators that tell us which patients require heightened attention, now this **helps us dive deeper to understand the likelihood of specific adverse events**, such as hospitalization for CHF.

Dr. Sheila Magoon

Executive Director

Buena Vida y Salud and South Texas Physician Alliance

Predictive analytics should capture patients' many dimensions

Temporal dimensionality

Health and risk are constantly evolving. To manage patients effectively, providers should understand the trajectory of their patients—whose risks are rising and whose are falling.

For any single risk, a point-in-time prediction obscures trends

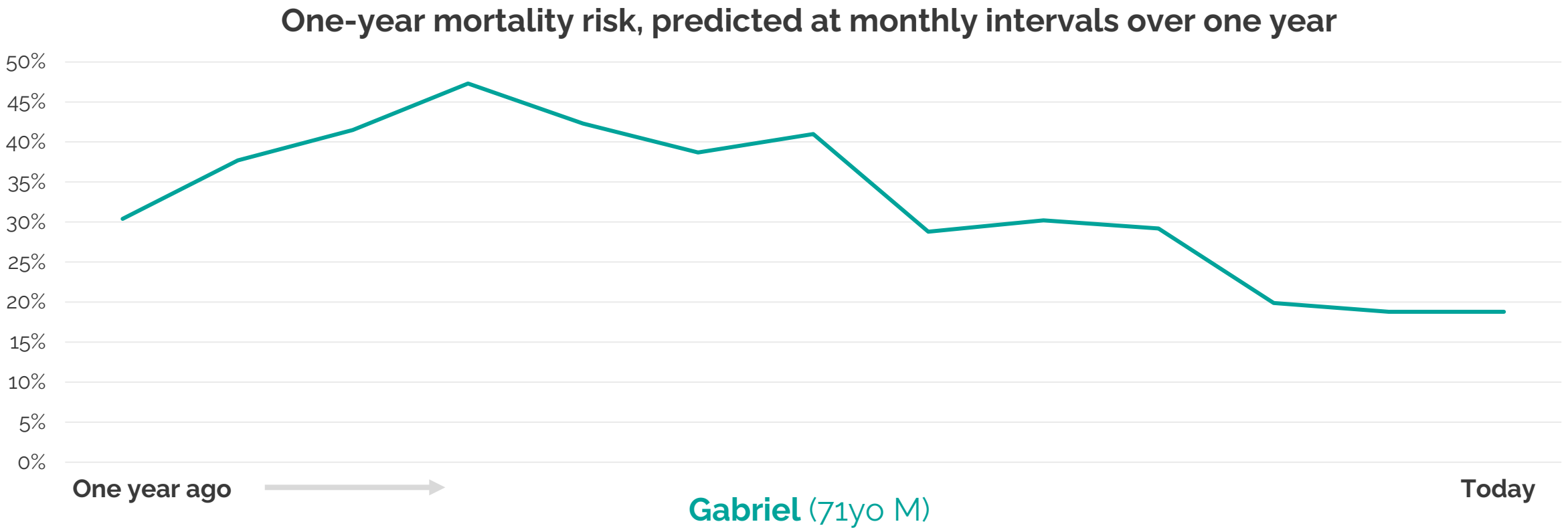
A single risk—or even a combination of risks and a careful curation of recent health history—does not reflect the trajectory of a patient's health

Beneficiary	1-year mortality risk
Gabriel (71yo M)	19.6%
Elise (72yo F)	19.6%
Rachel (77yo F)	19.7%
Henry (79yo M)	19.7%

[1] Past year

TEMPORAL DIMENSIONALITY

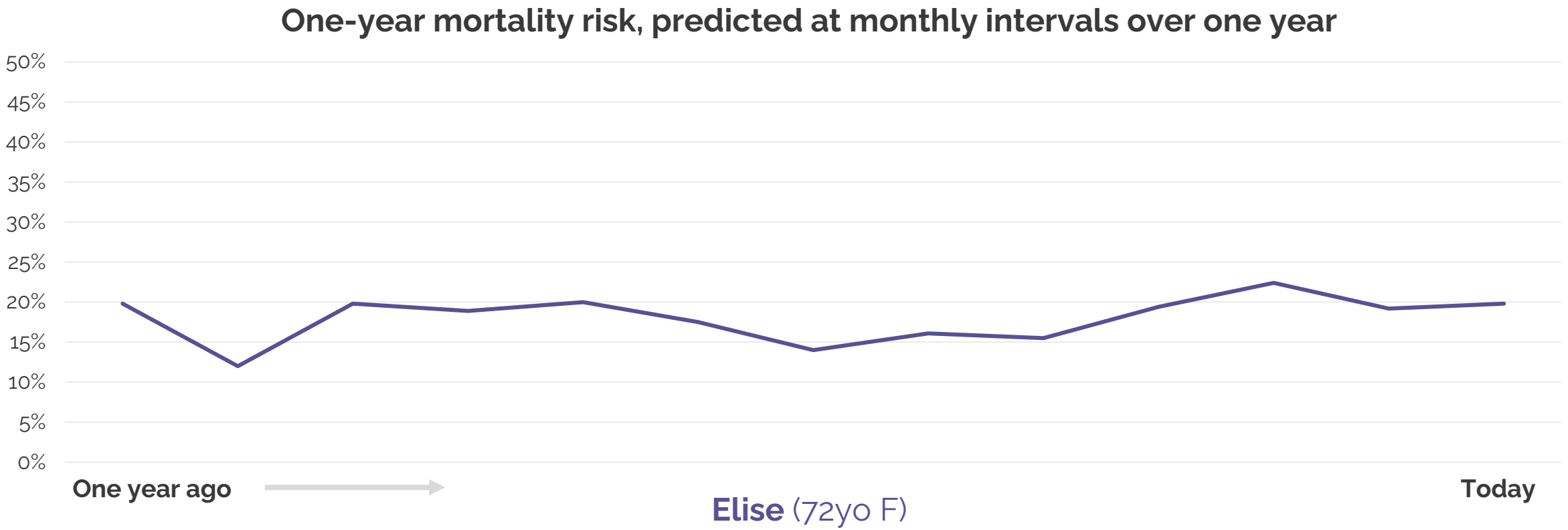
Patients' health and risks are constantly evolving



RISK TRAJECTORY	CHRONIC CONDITIONS	RECENT UTILIZATION	PLAN
Steadily falling	**13**	**1 hospitalization 2 ED visits**	**Continue existing management strategy**

TEMPORAL DIMENSIONALITY

Patients' health and risks are constantly evolving

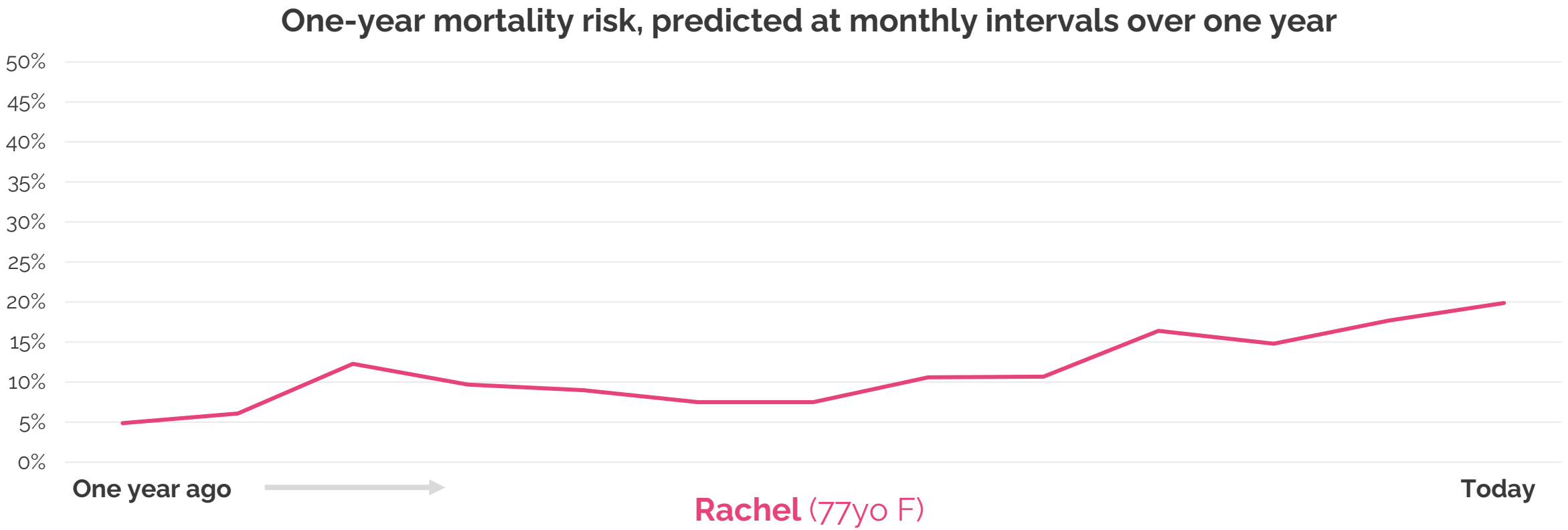


Elise (72yo F)

RISK TRAJECTORY	CHRONIC CONDITIONS	RECENT UTILIZATION	PLAN
Consistent over time	**5**	**0 hospitalizations** **4 ED visits**	**Engage care managers to look for opportunities**

TEMPORAL DIMENSIONALITY

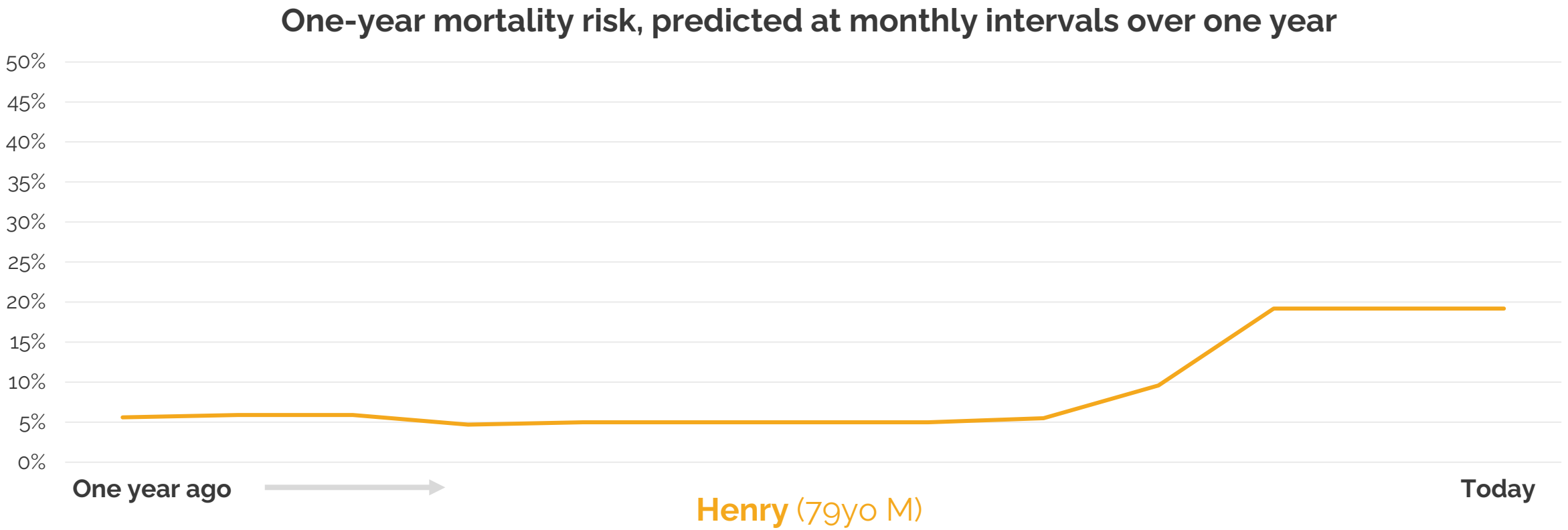
Patients' health and risks are constantly evolving



RISK TRAJECTORY	CHRONIC CONDITIONS	RECENT UTILIZATION	PLAN
Gradually increasing	**13**	**3 hospitalizations 0 ED visits**	**Assess access, drug fills, and other challenges**

TEMPORAL DIMENSIONALITY

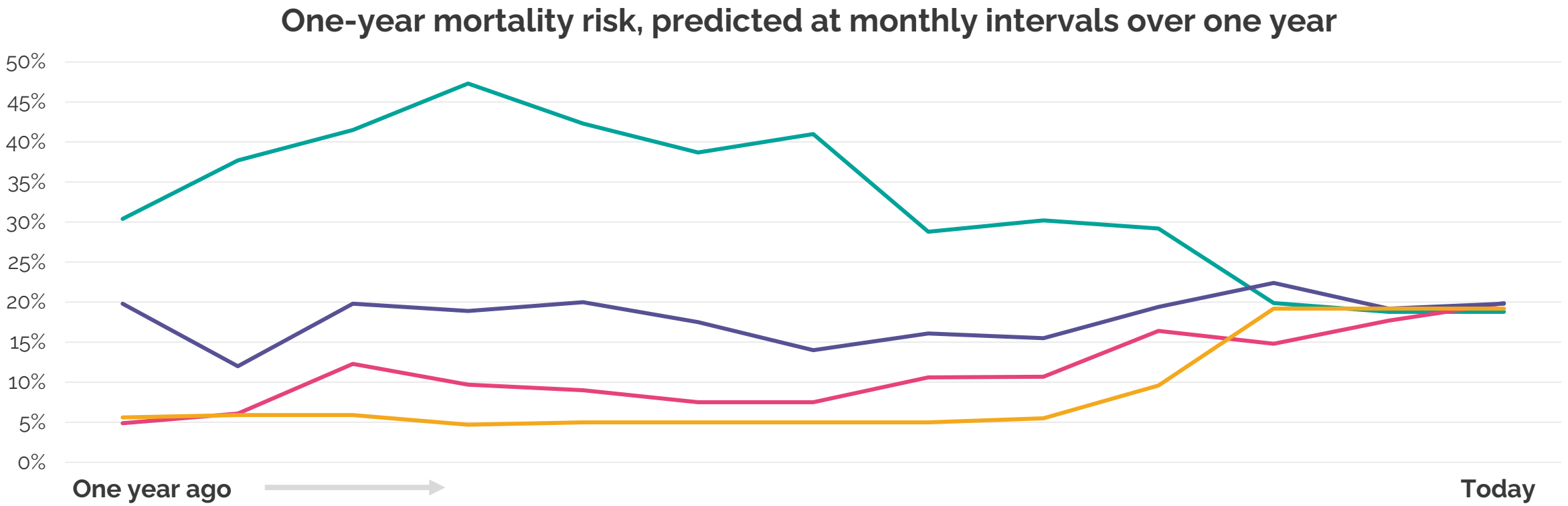
Patients' health and risks are constantly evolving



RISK TRAJECTORY	CHRONIC CONDITIONS	RECENT UTILIZATION	PLAN
Sudden risk increase	**8**	**0 hospitalizations** **1 ED visit**	**Address new acute issues to stabilize patient's risks**

TEMPORAL DIMENSIONALITY

Patients' health and risks are constantly evolving



Gabriel (71yo M)
Steadily falling risk, continue existing management strategy

Elise (72yo F)
Consistent risk over time, engage care managers to look for opportunities

Rachel (77yo F)
Gradual increase over time, assess access, drug fills, and other challenges

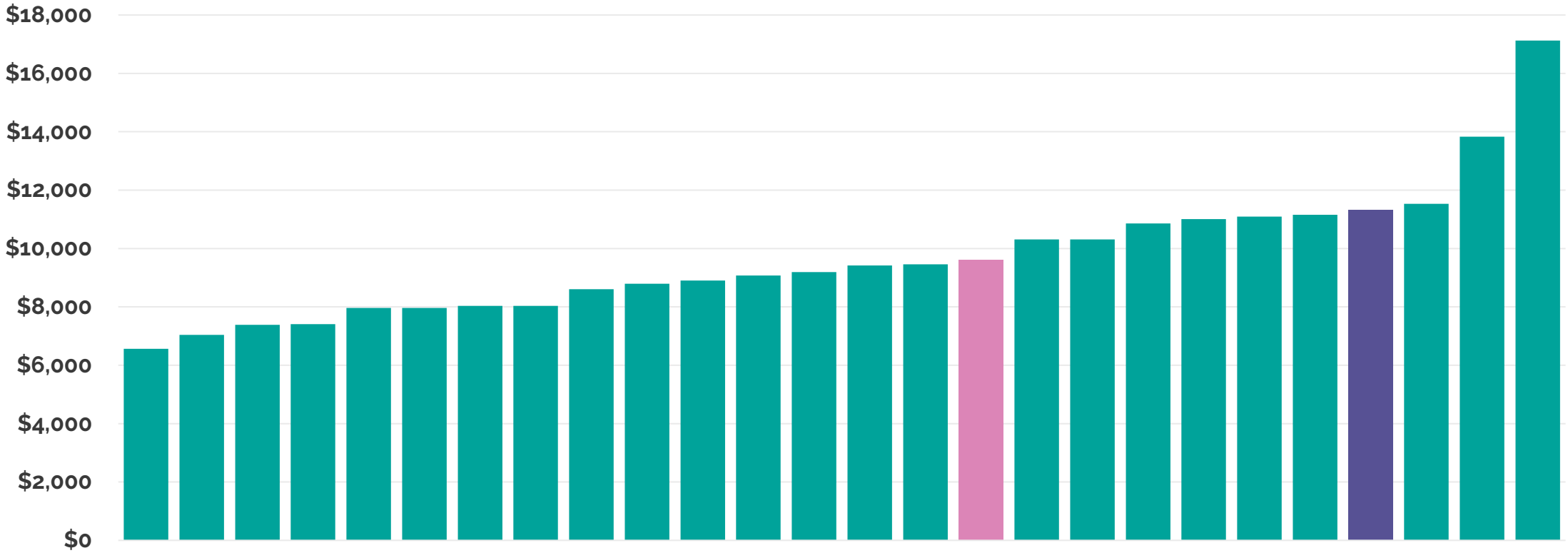
Henry (79yo M)
Sudden risk increase, address new acute issues to stabilize patient's risks

Just like patients, providers can't be evaluated with one number

Per-patient costs, without a rigorous benchmark, are not a meaningful indicator of provider quality

Average cost per member per year for potential providers to recruit

Within selected counties analyzed for partner ACO

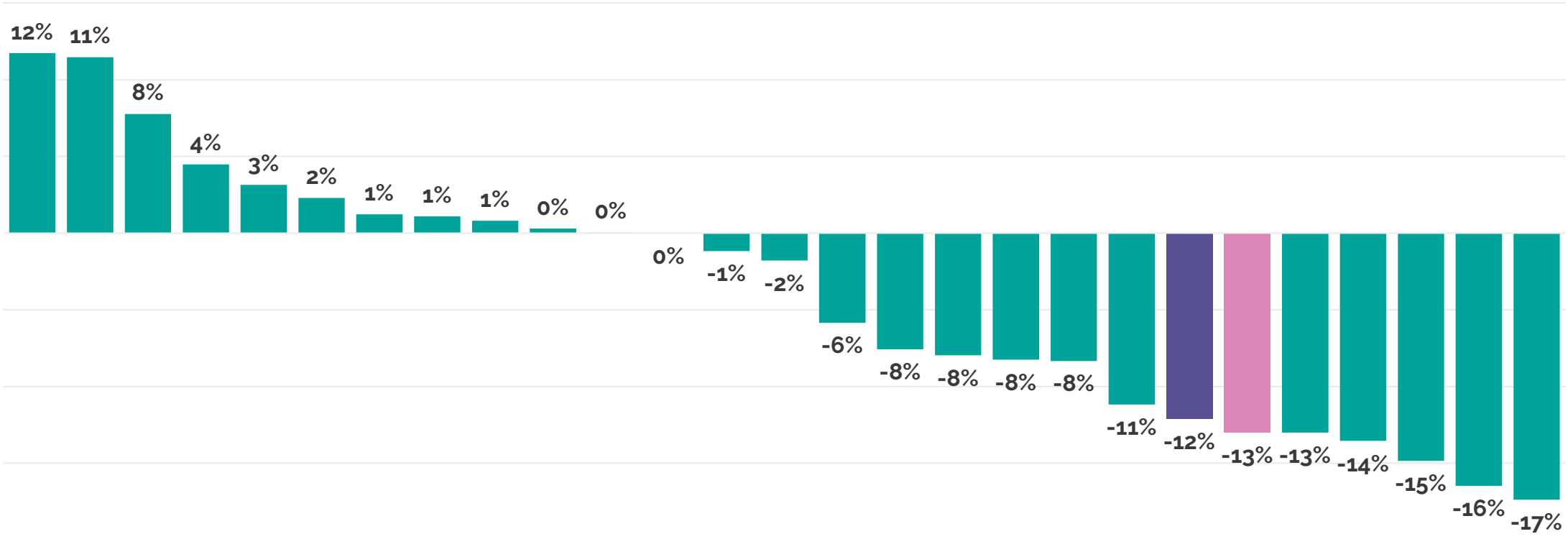


Applying our methodology to analyze outcomes outside an ACO

To help ACOs recruit high-quality providers and groups, we analyze outcomes across their regions

Cost vs. expected for providers with > 250 attributed beneficiaries

Within selected counties analyzed for partner ACO



Patient complexity should be reflected in panel-level analyses

We work with ACOs to recruit physicians with a full picture of how they manage their panels

Dr. Maria Garcia 276 beneficiaries		Dr. Gary Smart 299 beneficiaries
$11,325 (-12%)	Cost (vs. expected)	$9,600 (-13%)
159 (-29%)	Unplanned admission per 1k (vs. expected)	224 (11%)
7.1 (35%)	Average primary care visits (vs. expected)	3.5 (4%)
6.8 (-6%)	Average specialist visits (vs. expected)	7.3 (3%)

Despite similar cost performance, a closer look suggests signs of better management of Dr. Garcia's patients.

HDAI's Health Vision platform

HDAI's Health Vision Platform

NETWORK INSIGHTS

Identify top-performing and lagging groups/facilities across your network and the country

PERFORMANCE ANALYTICS

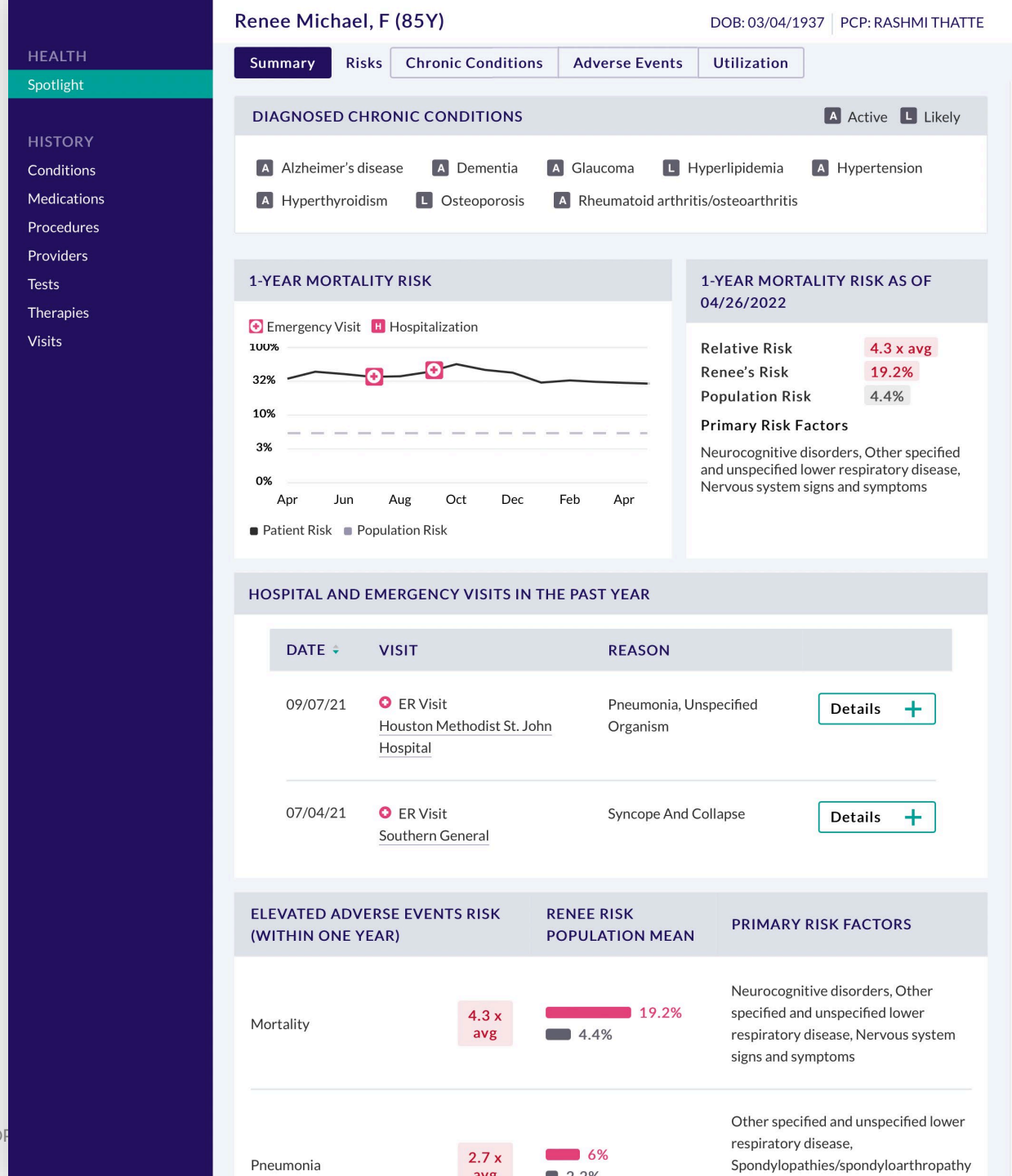
Understand cost and quality outcomes by provider, group, facility, and subpopulation

PATIENT-SPECIFIC RISK PROFILES

Curated histories and risk predictions for your patients at the point of care

We reconstruct your patients and predict future risks from their encounter histories

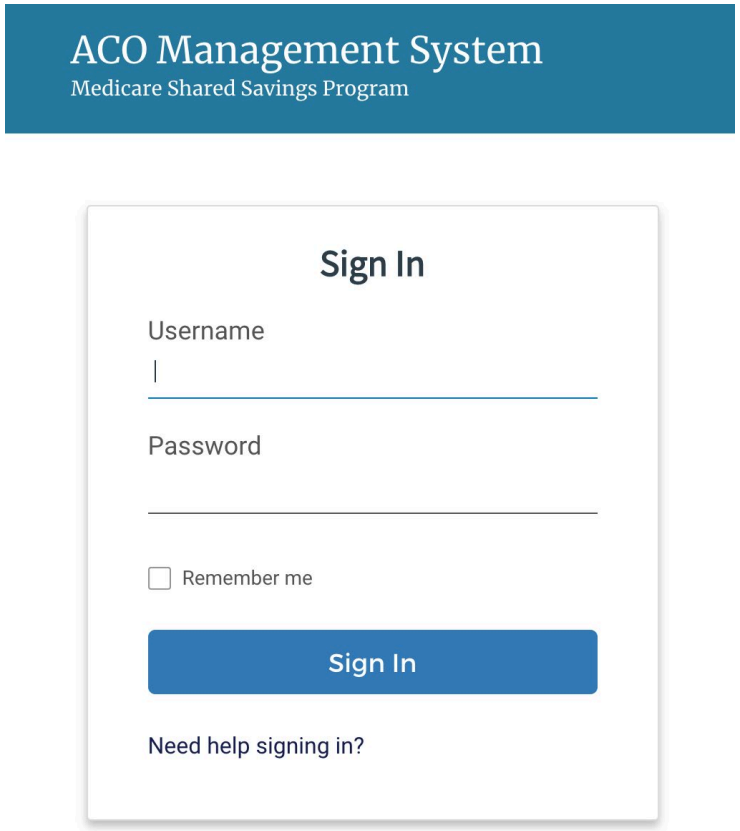
- **Full risk assessment** using our broad and growing suite of predictors, including for rising risks
- **Health trends** to highlight worrying trajectories and their causes
- **Chronic condition summaries** to reduce the need for “chart biopsies”
- **Utilization review** to flag recent encounters, even outside your ACO’s network
- **Drug fill analysis** to highlight critical gaps in prescription fills
- **Preventive care gaps** using specialty guidelines, with alerts for high-need patients using our models
- **Optional EHR integration** to measure risks in real-time across an acute episode



HEALTH DATA ANALYTICS INSTITUTE

We can deploy personalized predictive analytics in days

With the CMS Beneficiary Claims Data API (BCDA) and your ACO's permission, HDAI can curate, predict from, and display up to 8 years of claims history for each of your beneficiaries



- Generate patient-identifiable predictions
- Includes up to 8 years of claims history
- Data is updated weekly
- Medicare ACOs can generate vendor BCDA key in minutes
- Data comes directly from the Medicare servers so ACOs do not need to share any patient data directly

Beneficiary Claims Data API

Blue Button Download My Data

HDAI Early Adopter Partnership Program

Visit us at **Booth V** to learn more

What we offer

- **Dozens (soon hundreds) of specific, validated predictors** for each of your attributable beneficiaries
- **Targeting tools** to identify actionable cohorts for care management support
- **Care profiles that curate histories and predict risks** for each patient you serve, updated weekly
- **Rigorous assessments of your provider groups** based on baseline risks and matched clinical twins
- **12 months of partnership at no cost**, with no IT implementation
- **Ongoing analytic/implementation support from our team** of data scientists and healthcare experts

What we need to get started:

- Business Associate Agreement (BAA)
- Access to your data via Medicare's Beneficiary Claims Data API (BCDA)

Supporting partners beyond patient predictions and insights

Growth and recruitment report

Identify top-performing independent providers and groups in your market

Skilled nursing optimization analysis

Design a SNF network that matches patients to high-quality SNFs by patient health status

South Florida Network Analysis

March 2022

Inclusion and exclusion criteria for our analysis

- We attributed beneficiaries to TINs based on the MSSP attribution methodology: i.e. a patient was attributed to the TIN if the patient had a plurality of primary care billings from the TIN (first attributing to PCPs, then by specialist visits if there are no PCP visits).
- We focused on three different times periods: calendar years 2019 and 2020, plus the first nine months of 2021. We excluded groups that were not active in 2021.
- Our analysis included TINs that have more than half of their NPIs in the following counties in year 2020: **Palm Beach, Collier, Miami-Dade, Broward, Hendry**.
- For these TINs, we analyzed their entire population and their NPIs that are located in the counties of interest.
- We excluded any TIN that had fewer than 100 attributed beneficiaries in 2020 (the last full year we included in the analysis).

This initial universe includes **118** total TINs and **547** total providers.

Summary Table

The number of TINs and NPIs in each county.

County	TINs	NPIs	Patient Count	PMPM
Year 2019				
Broward	20	74	8032	$2,307.70
Collier	28	59	17469	$ 977.34
Hendry	3	4	1592	$1,059.00
Miami-Dade	17	118	8908	$1,786.37
Palm Beach	40	105	21983	$1,160.36
Year 2020				
Broward	23	138	9871	$2,382.33
Collier	30	63	18943	$ 993.04
Hendry	3	6	1492	$ 939.03
Miami-Dade	19	79	9450	$1,620.43
Palm Beach	43	126	25146	$1,076.56

Thank you for your time

We look forward to continuing the conversation.

Please visit us at Booth V to:

- Continue today's discussion
- See your ACO's data
- Learn more about partnering with HDAI