

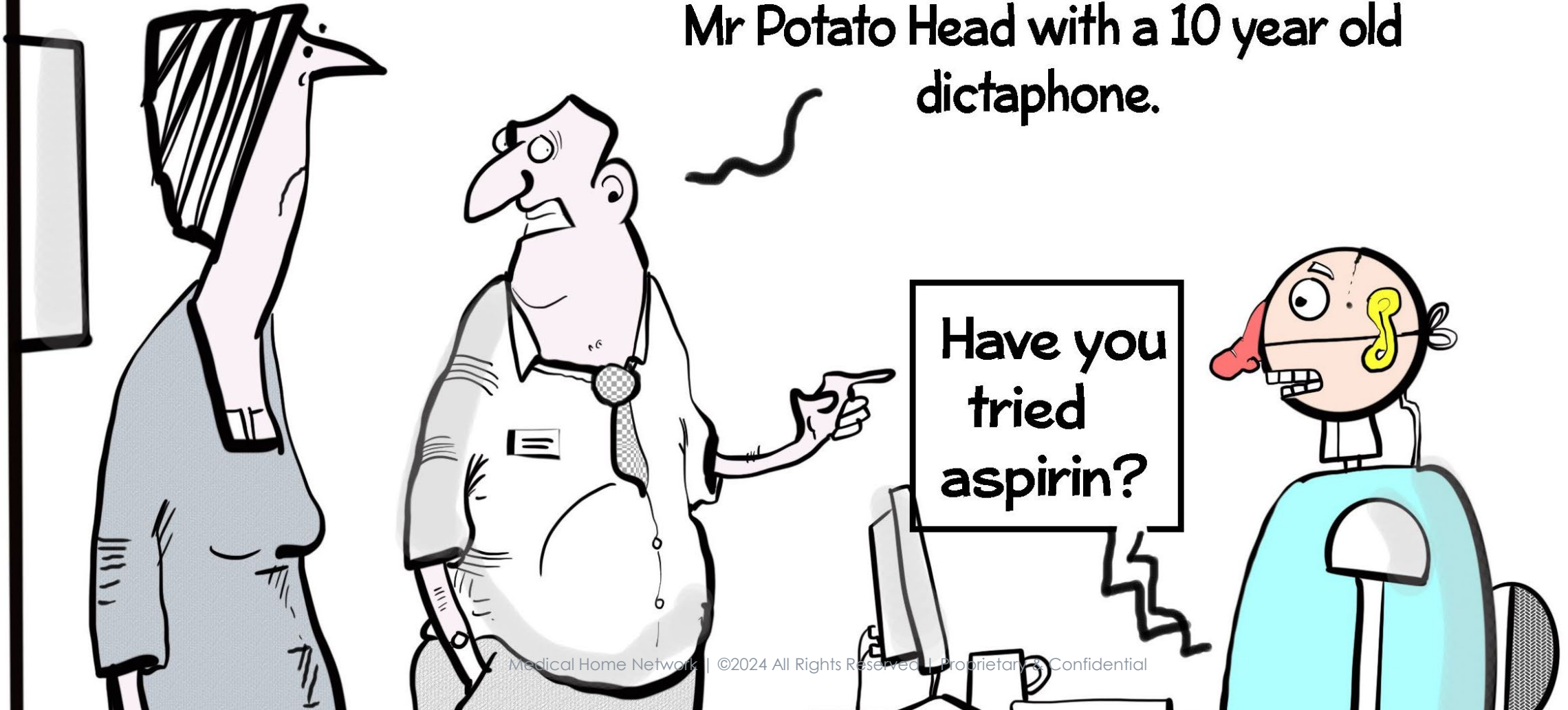


MEDICAL HOME NETWORK

Embracing AI, ML, NLP Tools for ACO

April 11, 2024

The aspiration was cutting edge software and state of the art technology.. The budget was Mr Potato Head with a 10 year old dictaphone.



MHN's Mission: To Transform Care and Build Healthier Communities in the Safety Net

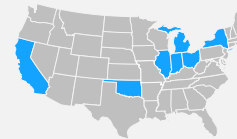
A proven, replicable model and approach enables care transformation and success under value based care



14

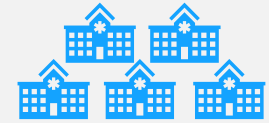
Year History

Medicaid
+
ACO REACH
+
MSSP



7

States



60+

FQHCs



300,000+

Lives Impacted



\$1.3B+

Medical Spend



\$120M+

Shared Savings

MHN's AI Model Use Cases

Goal:

Enable dynamic, proactive care management to improve outcomes, enhance quality and reduce total cost of care for members

How:

Leveraging all available data sources – claims, Rx, SDoH, care management, ADT, clinical data...



SDOH powered dynamic risk stratification



Transitions of Care – reduction of readmission risk



Managing high cost, high risk



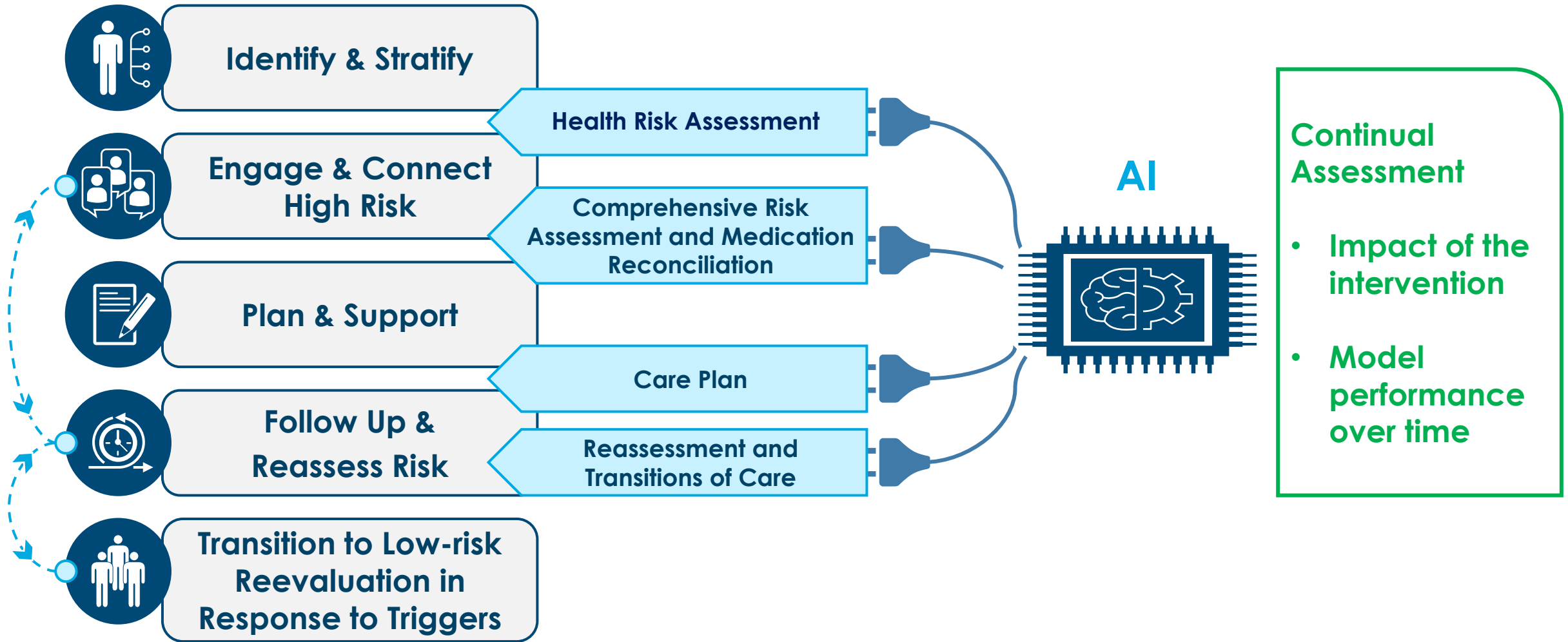
Identifying the rising risk



Generative AI

MHN AI Powers Dynamic, Personalized Care Management

AI Enhances Standard Workflows and Prioritizes Tasks



MHN Predictive SDoH Powered Risk Stratification in Medicaid

Social Risk Factor Reduction of High & Medium Risk Adults

Social Risk Factor	Initial HRA	Latest HRA	% Change	Predictive of Future Cost and/or Utilization*
Total Social Factors	11,124	6,963	-37.4%	
Rates overall health as Fair or Poor	2,019	1,578	-21.8%	✓
Difficulty making appointments	685	396	-42.2%	✓
Difficulty getting to appointments or filling prescriptions	1,396	885	-36.6%	✓
Untreated Depression	1,172	511	-56.4%	
Untreated Drug/Alcohol Use	304	156	-48.7%	✓
Difficulty securing food, clothing, or housing	1,717	868	-49.4%	✓
Currently homeless or living in a shelter	126	68	-46.0%	✓
Difficulty paying for meds	1,000	270	-73.0%	✓
Does not feel physically or emotionally safe at home	213	143	-32.9%	
Refused Smoking Cessation program	607	226	-62.8%	

→ **Results: Reduced social risk drivers that impact health by 37.4%**

Member, Cost, & Utilization by Risk Level

HRA Risk Profile	Member Count	% Members Total	ER Visits / 1000	Inpatient Admits / 1000	Medical + Rx Cost PMPM	Relative Cost
Low	1,606	21%	415.3	56.66	\$217.1	100%
Low-CHW	4,181	54%	620.2	96.39	\$349.4	161%
Medium by Social Factors	663	9%	742.1	143.29	\$423.3	195%
Medium by Utilization	320	4%	1,856.3	281.25	\$479.9	221%
High by Social Factors	127	2%	834.6	125.98	\$404.7	186%
High by Utilization	865	11%	1,653.2	679.77	\$821.4	378%
Total	7,762	100%	757.8	165.29	\$387.2	178%

* Note: This analysis includes ACA adults who were continuously enrolled for twelve months post Health Risk Assessment (7,762 observations) and their associated claims cost during that period.

→ **Capturing social-driven costs and utilization that would have been missed under a traditional approach**

Validation to Drive Clinical Practice Adoption

Goal 1: Improve accuracy in the identification of high & medium risk members in high utilizers

Goal 2: Reduce false positives among members with low utilization that are stratified as high risk

Medicaid -ACA

45%

AI correctly identifies 45% more members in the top 5% of high utilizers as high or medium risk

96%

AI correctly identifies 96% more members in the top 5% of high utilizers

70%

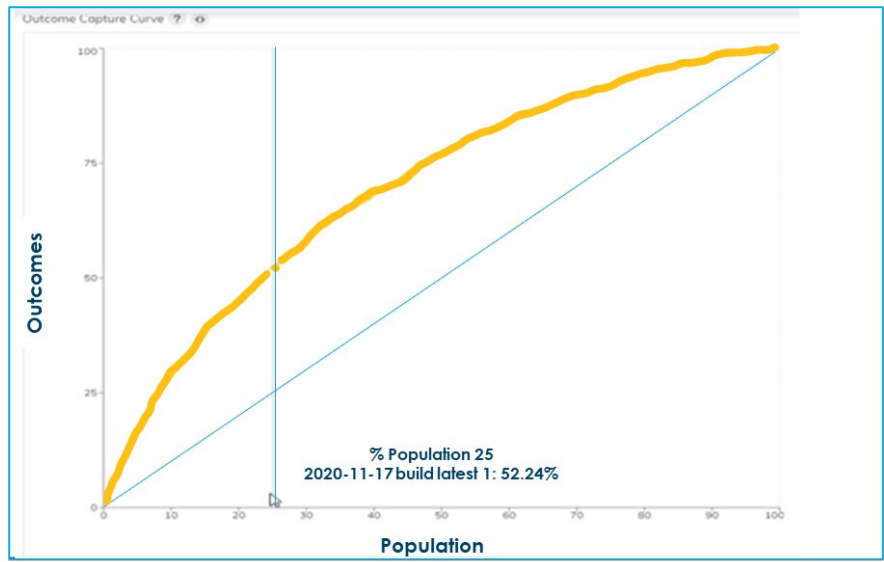
AI reduces members identified as high risk that are actually in the bottom quartile by 70%

73%

AI reduces members identified as high risk that are actually in the bottom quartile by 73%

MHN AI Transitions of Care: Rate of Readmission Validation

Outcome Capture Curve for Readmission Model



**Top 25% of AI risk =
52% of actual readmissions**

MHN Readmission Rates by Prediction
Admissions 2022-11 to 2023- 10 paid through 2024-01

Prediction Deciles	# Index Admits	# 30-Day Re-Admits	Rate	Prediction Range		
				Min	Median	Max
0	859	510	59.4%	86	93	100
1	832	250	30.0%	68	77	85
2	843	160	19.0%	50	58	67
3	851	138	16.2%	37	42	49
4	848	120	14.2%	28	32	36
5	761	66	8.7%	21	24	27
6	882	56	6.3%	14	17	20
7	875	62	7.1%	7	10	13
8	792	27	3.4%	3	4	6
9	836	21	2.5%	0	1	2
	8,379	1,410	16.8%	0	28	100

MHN AI High Risk, High-Cost Opportunity

Model surfaces the most impactable patients

PMPM vs...

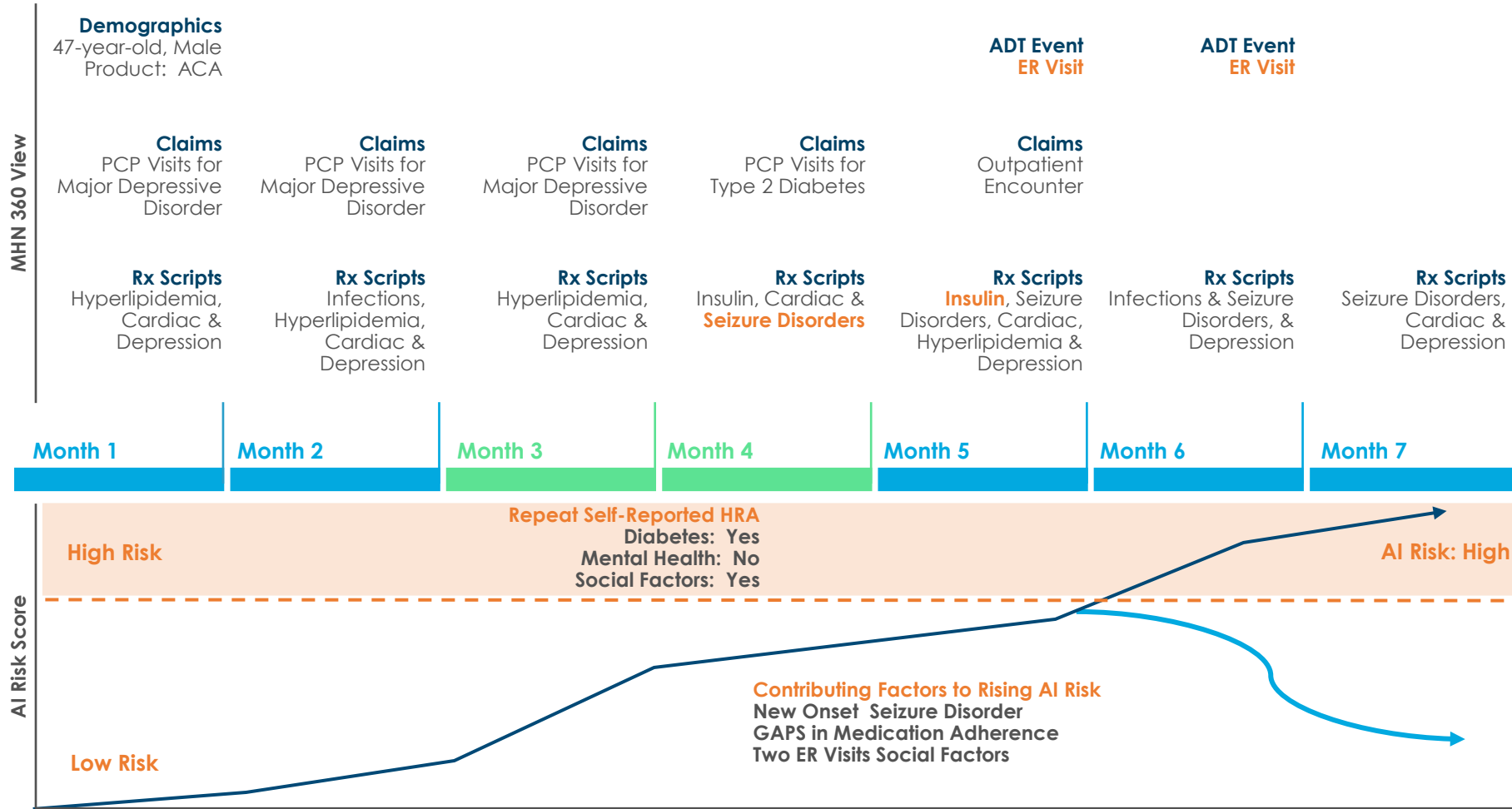


Social Determinants of Health



Chronic Conditions

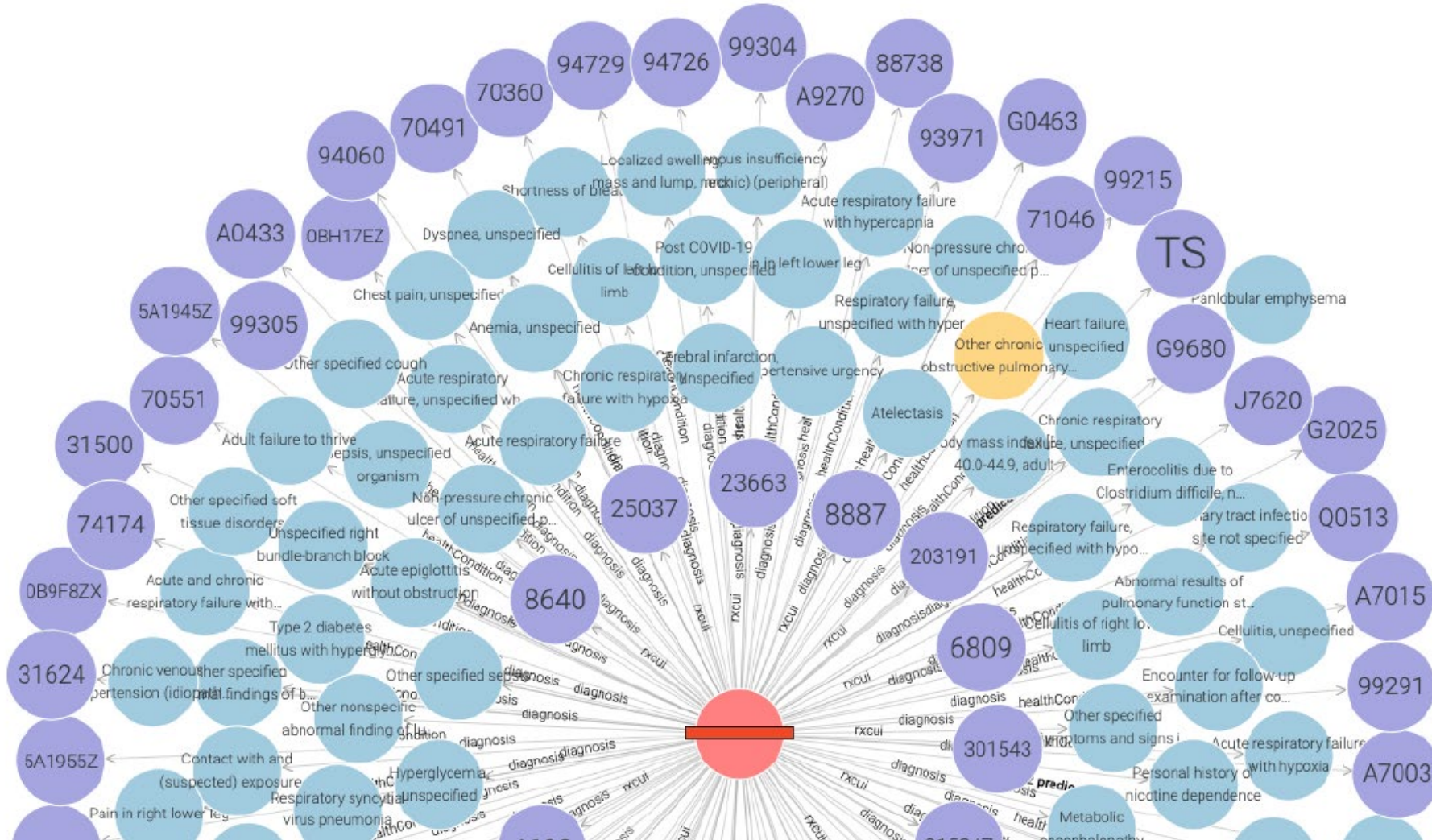
MHN Proactive Care Management: Dynamic Identification of High Risk and Rising Risk



AI identifies trends in patient outcomes and utilization and **triggers clinical workflows** that respond to them

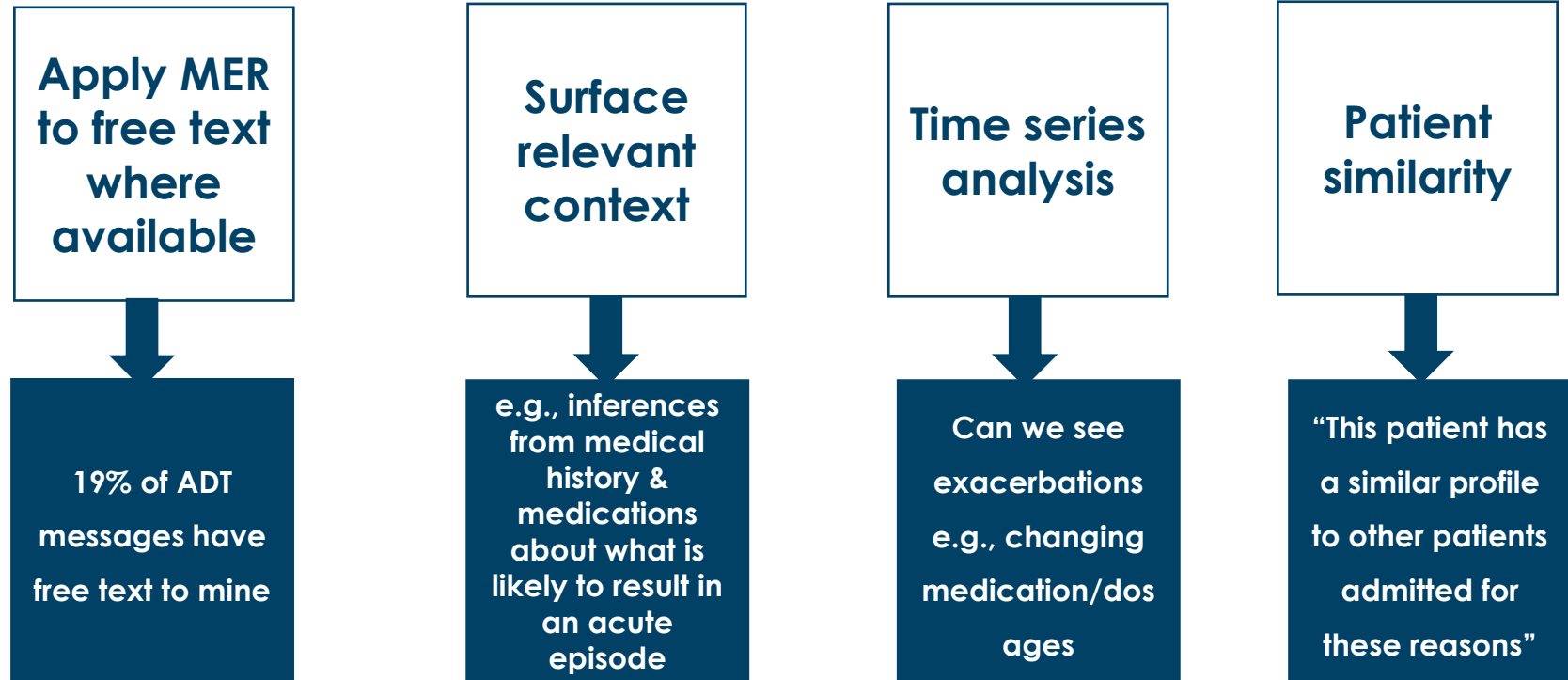
AI-identified rising risk clinical intervention **prevented escalation to "High"**

Generative AI: Power to Put Structured and Unstructured Data in Context for Care Planning



Generative AI: Leveraging Unstructured ADT Data to Identify Likely Reason for Admission

71% of ADT Events have no Diagnosis Data



Unstructured Data Capture

Thank you for referring this rambunctious elderly lady who I reviewed today in memory clinic. Ms **Haberdasher** attended with her niece, who described a four month history of increasing forgetfulness. These memory problems relate to daily activities and seem anterograde in nature. Both Ms Haberdasher and her niece denied any signs of mood disturbance or hallucinations. Ms Haberdasher lives alone in a sheltered accommodation, with daily **check-ins** by onsite staff, walks with a stick and wears a falls pendant. She is otherwise independent with all ADLs. Notable medical history include **osteoporosis** with a fractured NOF in **2019**, for which she received a hemi-arthroplasty at Charing Cross hospital, and subsequent problems with **venous drainage** in that leg. She has no cardiovascular history, with a **normal cholesterol measurement** in September 2020.

Considerations: What Makes a Good AI Model

Implementable	Transparent	Provable
<ul style="list-style-type: none">Clearly defined question (Y/N answer)	<ul style="list-style-type: none">Provides actionable insights	<ul style="list-style-type: none">Accurate predictions
<ul style="list-style-type: none">Addresses capacity issues / helps prioritize	<ul style="list-style-type: none">Shows what contributes to risk (explainability)	<ul style="list-style-type: none">Consistent results over time
<ul style="list-style-type: none">Availability of historical data for training	<ul style="list-style-type: none">Makes intuitive sense	
<ul style="list-style-type: none">Data timeliness		
<ul style="list-style-type: none">Ties to a workflow		

Key Takeaways: Building an Accurate AI Powered Risk Model for your Members

1

Avoid off-the-shelf predictive models

- Accuracy of an ML model drops if training population not representative of target population.
- Pre-trained models may rely on data unavailable to your organization.

2

Train models on local populations

- Each subpopulation and outcome of interest need to have their own trained model to maximize accuracy.

3

Include any/all relevant data types

- Individual-level SDoH and barriers to care can contribute substantially to predictive accuracy but are not typically captured in a standard format or system.

4

Monitor performance & retrain as necessary

- Capture true outcomes, anomalous predictions, and evidence that the population is changing (“feature drift”) to retrain models and refine performance.

THANK YOU!



MEDICAL HOME NETWORK



CASTELL



Intermountain
Health

Automation in a manual world

Embracing AI, ML, NLP Tools for ACOs Without
Breaking the Bank

Dave Henriksen, MHA – VP Operations(Castell) COO (Trinsic)

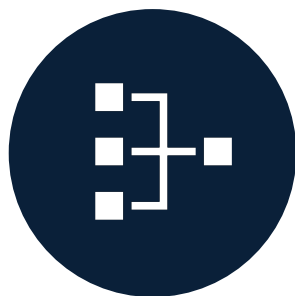


CASTELL

Castell is Intermountain's population health company

We support the system and aligned partners in transitioning to population health and value-based care.

What does Castell do?



Helps providers enter value-based arrangements

Develop value-based contracting and programs with payers and large employers.



Perform in those value-based arrangements

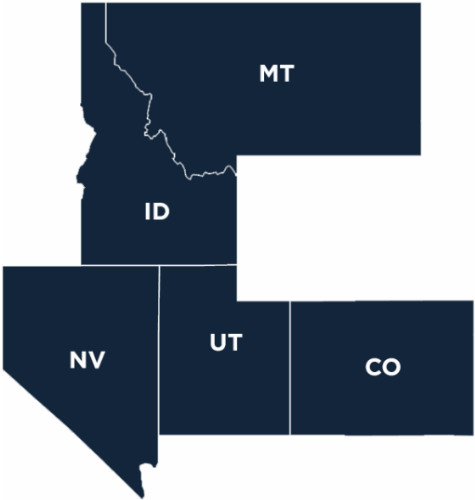
Care processes that allow providers to focus on managing their patient panel for outcomes. State of the art technology and analytics that provide real-time information to manage patients and improve efficiencies.



Castell At A Glance



Intermountain Health's Population Health Platform Company



5 states



~1.2 Million

lives under management



~\$5 Billion

in value-based care arrangements



600
employees



Advanced data &
analytics platform



860

employed
providers



840

affiliate
providers

Multi payer value-based relationships

Full spectrum of value-based care arrangements

Medicare Shared Savings

Medicare Direct Contracting

Medicare Advantage

Managed Medicaid

Individual ACA

Commercial

ACO Stats

- Intermountain owns and Castell manages two ACOs.
- Castell Accountable Care participates in the ACO REACH program
 - Providers across Idaho, Utah, and Nevada
 - About 51,000 attributed beneficiaries
 - Joined MSSP in 2018 and has achieved savings every year of participation in MSSP and REACH
 - Stats for 2022:
 - \$46.8M in gross savings (second highest in REACH)
 - \$34.3M in shared savings received from CMS (second highest in REACH)
 - \$20.6M shared with provider groups
 - Top REACH ACO on readmissions
 - Second best REACH ACO on unplanned admissions for chronic conditions

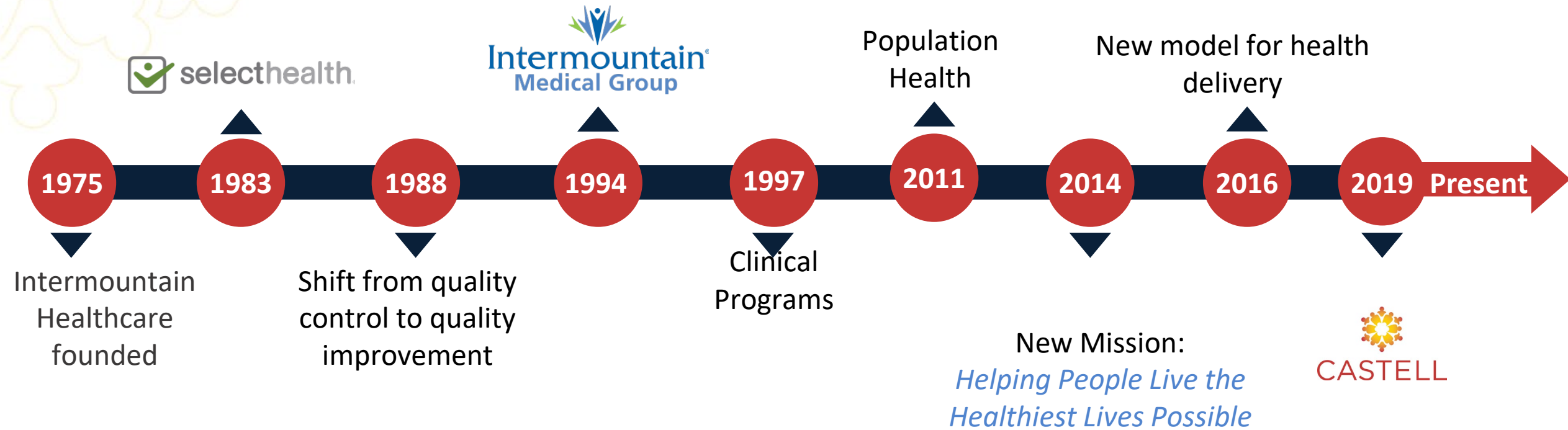


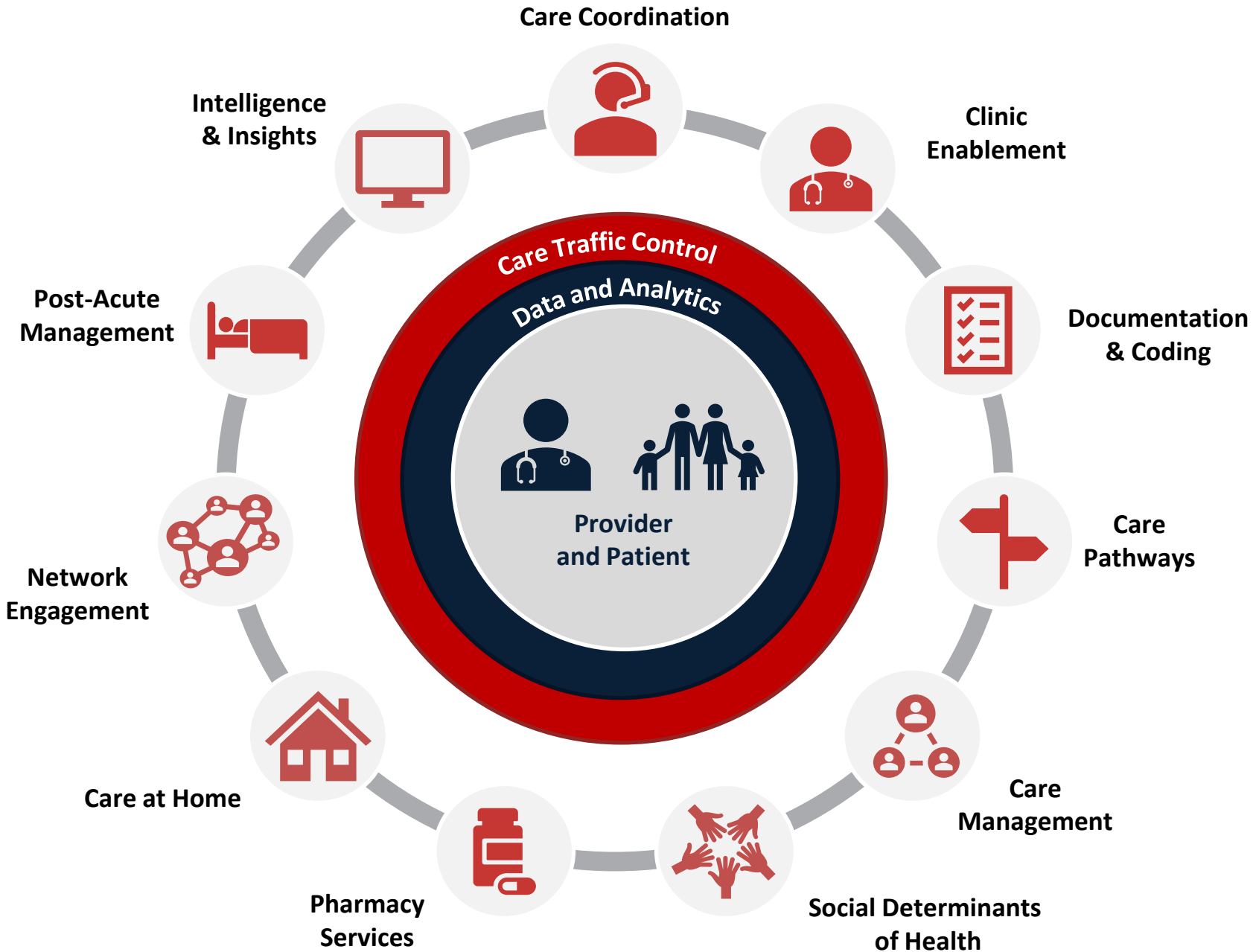
ACO Stats

- Rocky Mountain Accountable Health Network is currently in the Basic Track of MSSP
 - Providers across Colorado and Montana
 - About 26,000 attributed beneficiaries
 - Joined MSSP in 2014
 - Consistently strong quality performance
 - Working to improve savings performance



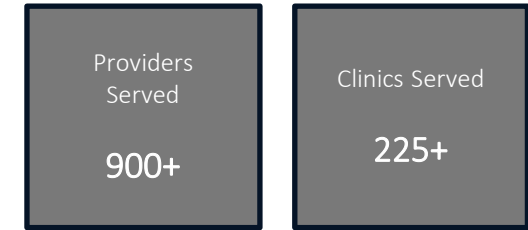
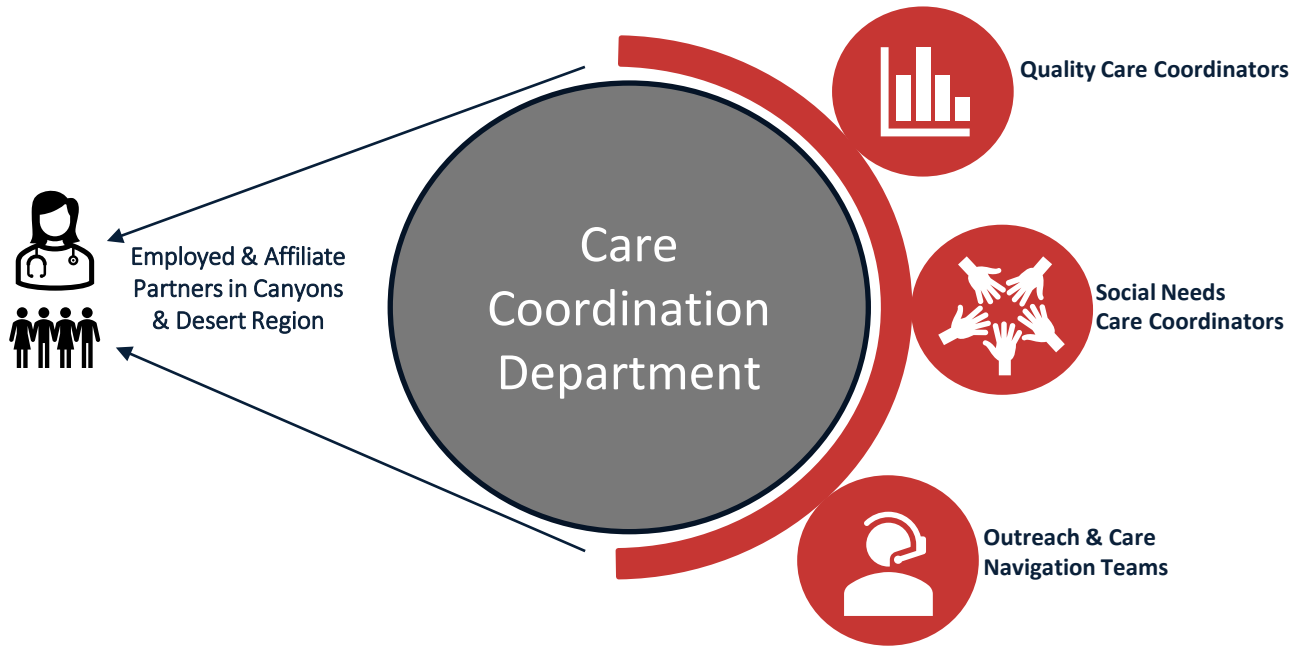
Our Journey to Value Based Care



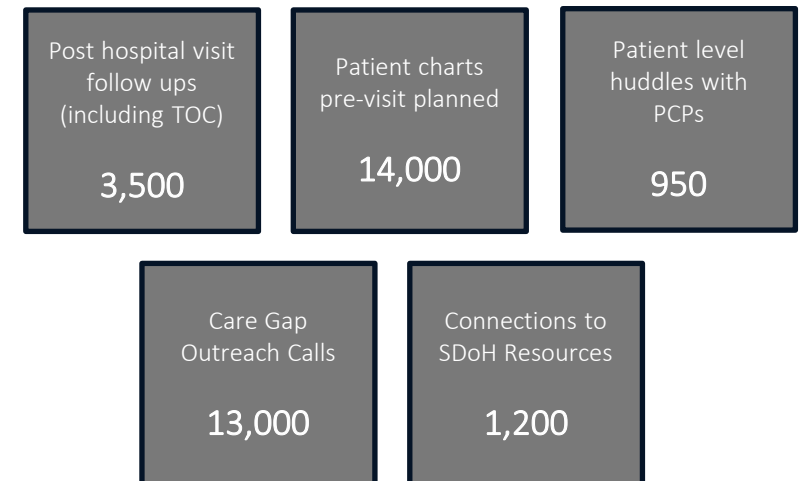


- Incredible resources with tremendous opportunity for automation
- Opportunities identified by shadowing

Care Traffic Control



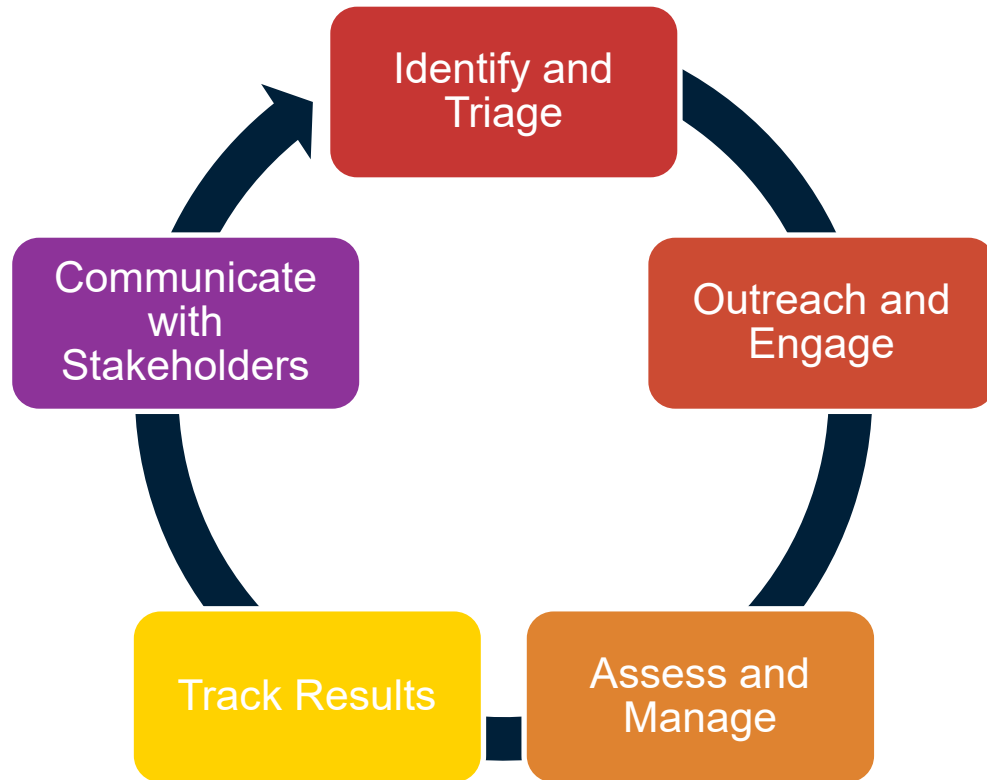
Weekly Care Traffic Control Department Averages



Care Management



Common Principles Across Programs



IHC Admit | IHC Discharge | UHIN Admit. | UHIN Discharge | Information Page

Intermountain | Inpatient Discharge 48 Hour Call List

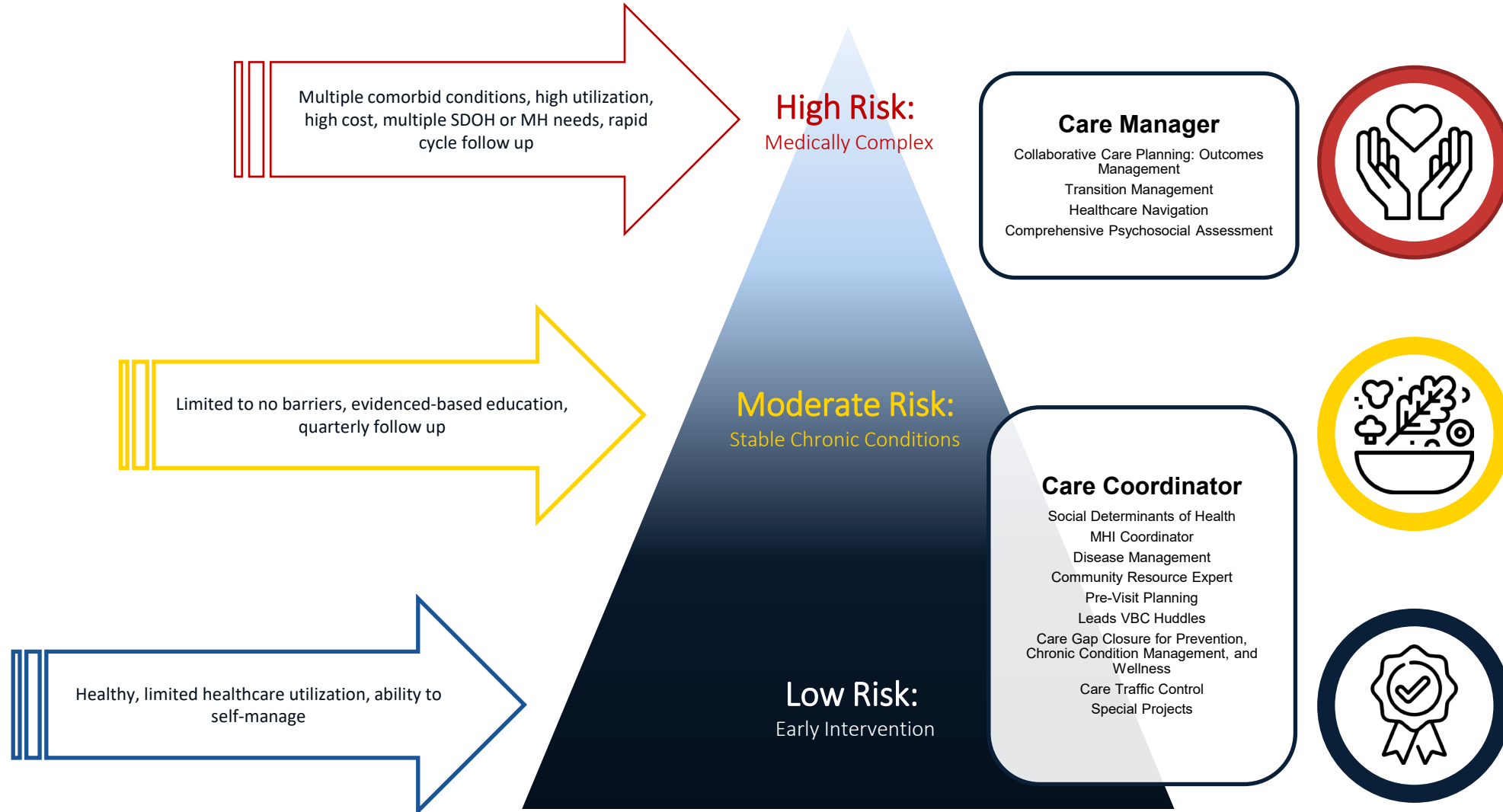
*Intermountain Inpatient Discharges = at risk patients (SH, ACO, PEHP, BPCIA) with a risk score of >= 60 that have been discharged from an Intermountain Facility in the last 48 hours.

Filters: IMG Group: (All), Readmission Risk: HIGH, Discharge Time: (All), PCP Clinic: (All), Facility: (All)

Name	Address	Room	Unit	Next PCP Visit	PCP	PCP Clinic
CC_Med Surg			Null		Corry, Mark W.	Intermountain Valley View Family Medic..
LH_Mat			Null		Heder, Lane O.	Ogden Clinic - Davis Family Physicians
IM_Med Tele			Null		Sandygren, Nolan A.	Intermountain Kearns Clinic
IM_Surg Trnsplt			Null		McPeck, Jennika Lyn	Intermountain Wasatch OB/Gyn - Layton
IM_Neuro Med			Null		Whittington, Richard A.	Intermountain Alta View Internal Medici..
UV_F08 AAU			Null		Jackson, Eileen K.	Intermountain Moroni Clinic
IM_Thoracic ICU			Null		Tran, Sally M.	Intermountain Cottonwood Family Pract..
IM_Surg Trnsplt			Null		Marcoft, Patrick W.	Intermountain South Jordan Clinic
LD_BHU			Null		Null	Null
LD_Oncology			Null		West, Jared A.	Intermountain Sevier Valley Clinic
BR_Med Surg			Null		Francis, Michael R.	Intermountain Budge Clinic - Internal Me..
MK_SIMC			Null		Browne, Michael T.	Ogden Clinic - Canyon View
UV_F05 AAU			Null		Lunceford, Troy A.	Revere Health - Salem
UV_F08 AAU			Null		Hadley, Jeremy R.	Intermountain Central Orem Clinic
CA_Med Surg			Null		Higgins, Devin K.	Cassia Family Medicine
DX_Med Onc			Null		Frame, Joshua L.	Southwest Internal Medicine
IM_Med Onc			Null		Null	Null
IM_Ortho			Null		Heitz, Luke J.	Intermountain Taylorsville Clinic
DX_Med Onc			Null		Gulbranson, L. Kyle	Intermountain River Road Internal Medi..
IM_Surg Trnsplt			Null		Sharp, Daniel S.	Intermountain Logan Clinic
UV_F06 AAU			Null		Fisher, Mahana S.	Family Health Care - St George
IM_Neuro Med			Null		De Jesus, Diana Dela Cruz	Cottonwood Medical Clinic - Internal Me..
IM_Ortho			Null		Null	Null
IM_Med Onc			Null		Greenwood, Mark R.	Intermountain Alta View Clinic
UV_F05 AAU			Null		Harp, Cyndie S.	Premier Family Medical Clinic - Lindon
LD_Med Surg			Null		Manfredini, Connor J.	Midvale Valley Family Medicine

Provider Referrals & Castell Analytics

A Team Approach to Care



Local care teams have access to a specific Care Coordinator and Care Management team

Clinical Documentation Support

- Clinical Documentation Specialists (CDS) provide longitudinal record reviews
 - Identify Suspect HCCs
 - Review accuracy of Persistent HCCs
- Partner with physician to support their success in coding and documentation

Longitudinal Review Process

Specialty Views

CCR Tool

- 1 - Verify accuracy of problems that have not been addressed this year
- 2 - Verify problems that have been added this year
- 3 - Determine validity of suggested conditions

Problem List

- 4 - Note any historical problems that should be removed or changed to a "history of"
- 5 - Note accuracy of any HCCs that have not been addressed
- 6 - Note HCCs that more specificity can be added
i.e. depression, chest pain, macular degeneration, renal conditions
- 7 - Review resolved chronic problems and all problems added to this visit

Documents

- 8 - Scan for documents completed by specialists
- 9 - Review last AWV
- 10 - Review last Pulmonary Function Tests (if applicable)

Histories

- 11 - Review social history for alcohol/substance use disorders

Imaging

- 12 - Scan for conditions that have not been readdressed
i.e. Heart Failure, Pulmonary Hypertension, Atherosclerosis of the Aorta

Home Medications

- 13 - Review for medications that could be treating conditions not on the Problem List
i.e. antidepressants, HF, AF meds, nitro, continuous oxygen use

Labs

- 14 - Scan through labs, note anything out of normal range
 - a. A1C
 - b. Albumin
 - c. GFR
 - d. Platelets
 - e. VitD, CA+, & PTH

Scales & Assessments

- 15 - Check PHQ scores

Vital Signs

- 16 - Check BMI
- 17 - Review vitals (O2 sats, oxygen LPM use)

Documentation in iCentra

- 18 - Note past echo
- 19 - Documentation imported through MyHealth Portal
i.e. PHQ / HRA

Three primary goals of the Castell-Notable partnership

Goal 1

Improve patient outcomes across quality measures & chronic care management

Goal 2

Improve operational efficiency and up-level team to top-of-license work

Goal 3

Drive the right action for patients in and outside visits



AI for healthcare operations

Notable analyzes structured and unstructured data in your EHR and other systems to deliver AI-powered personalized experiences that patients love. Enable your team to improve quality of care while driving top-of-license work.

1M+

daily automated tasks

32M+

cumulative patients served

10K+

sites live

**Personalize the patient experience.
Automate the work.**

Simplifying clinician and provider workflows to drive quality performance & accurate risk capture

Care Gap Chart Review

Close care gaps with structured and unstructured data automating chart prep for over 470 providers

Payer Attestation

Close payer-reported open care gaps across multiple payers via automated chart review (100,000+ and growing)

HCC Suspecting

HCC chart prep integrated directly into native provider workflows for 86,000 patients

Care Management Outreach

Automate pre-visit assessment reducing 60+ minute call times for care coordinators

Care Program Enrollment

Increase Omada and CareCentra enrollment via embeds in existing patient experiences and automated outreach

2021

2022

2023

\$2.8M

annual cost savings in chart review ROI alone

47 FTE

FTE capacity created

6.9%

increase in avg. care gap closure rate across five care gaps

>400

HCC captured (3x increase of weekly charts reviewed compared to manual equivalent)

96%

average patient satisfaction

3x

higher Omada enrollment rate

CASTELL



Intermountain
Health



Reducing outpatient documentation burden with AI

Nathan Moore, MD
BJC ACO
St. Louis, MO
Nathan.Moore@BJC.org

Countering Physician Burnout

- AMA's 2022 National Report states that 51% of providers are experiencing burnout
 - Oncology rate of burnout: 69%
 - Family medicine: 59%
 - Critical care medicine: 51%
- Burnout is highest in providers that are 6-10 years post training (58%)
- Physician assistants have the highest burnout rate, followed by NPs, and then physicians

Our goal is to leverage artificial intelligence to improve your efficiency and job satisfaction to decrease your risk of burnout

Ambient Listening Note Generation

Ambient Listening Note Generation

Generative AI creates structured summaries of patient conversations in real time

- Use your phone (Epic Haiku app or a third-party app) to allow the AI to listen to your encounter
- The generated note is then available for your review a few minutes later
- You are able to make edits directly in your note and the AI learns from your feedback

Goals:

1. Create better notes, faster
2. Providers can be more present
3. Improve provider wellbeing

Ambient Listening Note Generation

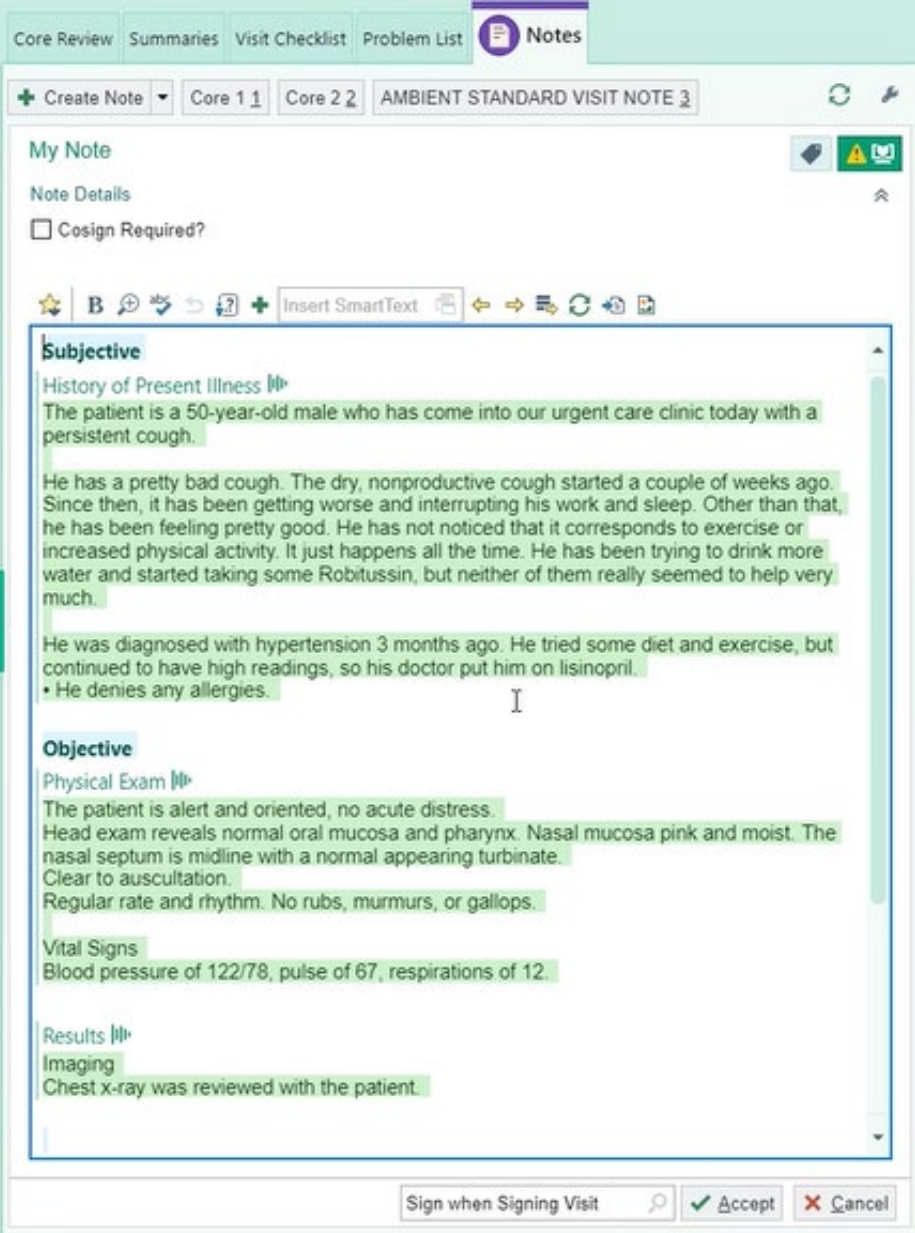
- Listens passively via smartphone app
- Large Language Model
- Not integrated into patients chart (labs, etc)
- Can include exclude HPI, physical exam, results and A/P

Ambient Listening Note Generation

- Currently will not select diagnosis codes
- Recordings are kept for 30 days for auditing purposes only
- Fairly good at not including "small talk" (non medical)
- Feedback has been generally positive, but providers say the notes are too long and sometimes it just reports what the patient says at face value.

Ambient Listening Note Generation

- Green highlight indicates text written and recognized by the AI
- You can edit this text after seeing the patient on your Desktop
- Note that once you manually edit green text, you can no longer use the AI to edit it (it becomes read only to the AI)



The screenshot displays a medical notes application interface. At the top, there are navigation tabs: 'Core Review', 'Summaries', 'Visit Checklist', 'Problem List', and 'Notes'. Below these, there are buttons for '+ Create Note', 'Core 1 1', 'Core 2 2', and 'AMBIENT STANDARD VISIT NOTE 3'. The main content area is titled 'My Note' and includes a 'Note Details' section with a checkbox for 'Cosign Required?'. A rich text editor toolbar is visible, featuring icons for bold, italic, underline, link, and 'Insert SmartText'. The note content is organized into sections: 'Subjective', 'Objective', and 'Results'. The 'Subjective' section includes 'History of Present Illness' with a paragraph of text highlighted in green. The 'Objective' section includes 'Physical Exam' with several lines of text highlighted in green. The 'Results' section includes 'Imaging' with one line of text highlighted in green. At the bottom right, there are buttons for 'Sign when Signing Visit', 'Accept', and 'Cancel'.

In Basket Draft Response Generation

In Basket Draft Response Generation

AI model reads messages from your patients and generates a draft response

- This AI-generated message sits in your In Basket for your review
- You can edit or delete the response prior to sending back to the patient

Goals:

1. Create better messages, faster
2. Provide “soft” content that patients value
3. Improve provider wellbeing

In Basket Draft Response Generation

- Large Language Model
- Prompts: Meds, Results, Vaccines, General Medical
- Instructed to ignore patient demands (“I need an MRI”)
- Chart integration for Labs, Meds, Imaging, Pharmacy
- Instructed to recognize red flag symptoms and recommend calling 911/988

In Basket Draft Response Generation

----- Message -----

From: Sarah Test

Sent: 12/5/2023 12:06 PM CST

To: James Pitt, DO

Subject: Vaccine

Should I get a pneumonia vaccine this year?

Dear Sarah,

Based on your immunization history, it appears that you have not received a pneumonia vaccine. According to the CDC guidelines for 2023, it is recommended that individuals aged 65 and older receive a pneumonia vaccine.

[CDC Website for Vaccines & Immunizations](#)

Please schedule an appointment to discuss this further and potentially receive the vaccine.

Appointment Options: [Click here](#) to schedule an appointment with your primary care provider. If you need more immediate care, you can [click here](#) to be seen by our Virtual Care Center, or [here](#) to learn more about our Convenient Care locations and availability.

Best regards,
Dr. James B. Pitt

BJC Medical Group Primary Care

Generated Draft Reply

Pioneering Feature

Dear Sarah,


I'm sorry to hear that you're not feeling well. It's important to stay hydrated and rest as much as possible. If your fever persists or if you develop any other symptoms, I recommend scheduling a telemedicine visit so we can further discuss your symptoms and determine the best course of action.

Thank you,

BJC Medical Group Primary Care

 [Learn more](#)

 Start with Draft

 Start Blank Reply

Did you find the draft reply helpful?



This was helpful



This was not helpful



(Newest Message First)

[View All Conversations on this Encounter](#)

Sarah Test → P Wuca Grant Medical Clinical Pool (supporting Nancy Fuegner, NP)

2 weeks ago

ST

I have had a few for 2 days now, what should I do?

I am having problem with numb toes on the bottom of the front on both feet. I have intermittent neuropathy from the front of my knees down to my toes at night. I was going to take the Cymbalta you prescribed, however, I still take Meloxicam. Can you take Cymbalta with Meloxicam And do you think that drug will help. As you know I am not a fan of taking drugs. I also have a full tear Gluteus Minimus that I am being treated for, presently. I use to think I was a sturdy person, however, not anymore.

Dear Bev,

I understand your concerns about taking multiple medications. Yes, you can take Cymbalta and Meloxicam together. Cymbalta is often used to help manage neuropathy symptoms, so it may help with the numbness you're experiencing in your toes.

For your Gluteus Minimus tear, continue with the current treatment plan and follow up with the treating provider with ongoing concerns.

Remember, it's important to take care of yourself and listen to your body. You're still sturdy, Bev. We're just addressing some maintenance issues.

Just wondering if all the results are in yet and if you have had a chance to review them. Thanks

Yes, all your recent test results are in and have been reviewed. Here are the key findings:

- Your POCT urinalysis dipstick test showed some abnormalities, including glucose levels and trace amounts of blood.
- The Immunofixation urine test results are available, but they require further discussion for a complete understanding.
- Your 24-hour urine volume and period were recorded as 3,650 mL and 1,410 minutes respectively.
- The Protein electrophoresis test for your urine over 24 hours showed an abnormal result with a protein level of 354 mg/24H, which is high.
- Your PSA screen, Hemoglobin A1c, Thyroid Function Cascade, and T4, free tests all returned normal results.

Please remember that you can view these results in MyChart, under "Test Results".

Given the abnormal results in your urinalysis and protein electrophoresis tests, it would be beneficial to discuss these in more detail.

{Appointment Options:65076}

In Basket Draft Response Generation

- Feedback has been generally positive
- 35% use rate
- Limited response to <150 words
- Vaccine recs are difficult because guidelines update frequently (LLM trained on historical data)
- Not currently shown to staff

End of Life

- Created LSTM machine learning algorithm to predict likelihood of dying within 30 days (inpatient) or 1 year (outpatient) using EMR data
- Combined with provider training and clinical workflows to support advance care planning for high risk patients
- Have seen substantial increases in ACP conversations and documented code status

Future AI Enhancements

- Assistance with inpatient documentation
 - Discharge summaries
 - Hand offs
 - Daily notes
- Coding

Questions?