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# Lifecycle of a Successful Super-Utilizer Program: Denver Health Case Study

Virginia Center for Health Innovation

June 13, 2016

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Denver Health



# Acknowledgements and Disclaimers



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- Core Team, Clinical Teams, IT Team, Evaluation Team, ACS and Executive Leadership (past and present)
- Denver Health's 21st Century Care project is supported by Grant Number 1C1CMS331064 from the Department of Health and Human Services, Centers for Medicare & Medicaid Services.
- The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Department of Health and Human Services or any of its agencies.
- The analysis presented was conducted by the awardee. Findings may or may not be consistent with or confirmed by the findings of the independent evaluation contractor.
- The Colorado Multiple Institutional Review Board determined this project to be Quality Assurance, Not Human Subject Research.

# Session Agenda



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- **Context**
  - Denver Health: integrated safety net system
  - CMS/HCIA funding opportunity to accelerate work
- **Program development lifecycle**
  - DH case study
- **Implementation challenges**
- **State Medicaid agency opportunities**
  - Regulatory approach
  - Data analytics
  - Payment models

# Denver Health and Hospital Authority



Level One Care For ALL

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## Denver Health

An innovative healthcare system that is a model of success for the nation.

### OUR AREAS OF FOCUS

- Clinical Care**  
Highest quality, low cost provider\*
- Education**  
Academic center teaches the next generation of healthcare workers.
- Research**  
Ongoing, leading-edge research

**Community Health Centers**  
Offering total family care in 8 neighborhood centers where families need it the most

**Public Health**  
Keeps the public safe through tracking communicable disease and promoting healthy behaviors

**Rocky Mountain Regional Trauma Center**  
Region's top Level I Trauma Center for adults and Level II Center for children = whole family care

**School-Based Health Centers**  
Keeping kids in school by providing vital health care to DPS students through 16 in-school clinics, free of charge

**TOP 5% IN THE NATION**  
**Denver Health Medical Center**  
One of Colorado's busiest hospitals, ranked in top 5% for inpatient survival annually since 2011

**Rocky Mountain Center for Medical Response to Terrorism**  
Working every day to plan for the "what if" for 5 states

**Regional Poison Control Center**  
Trusted experts for multiple states and over 100 national and international brands

**Denver Health Medical Plan, Inc.**  
Keeping our community healthy by providing healthcare insurance to 77,000+

**Denver Health Foundation**  
Provides additional resources that bridge the gap financially to fund special projects and specific needs

**911 Response**  
Operates Denver's emergency medical response system, the busiest in the state

**NurseLine**  
Registered nurses advising on medical information, home treatment, and when to seek additional care, giving patients peace of mind 24/7

**Denver Cares**  
Provides a safe haven and detox for public inebriants

**Correctional Care**  
Providing medical care to prisoners in Denver's jails and via telemedicine

## Improve access and achieve Triple Aim:

*to deliver better care, spend health care dollars more wisely, and make our communities healthier*

### Enhanced clinical services through redesigned health teams (~\$9m)

- Clinical pharmacists
- Behavioral health consultants
- RN care coordinators
- Patient navigators
- Social workers
- Specialized high intensity teams

### Enhanced health information technology (~\$9m)

- Population segmentation/patient risk stratification
- 3M™ Clinical Risk Groups (CRGs)
- eTouch Services

### Administration and Evaluation (~2m)

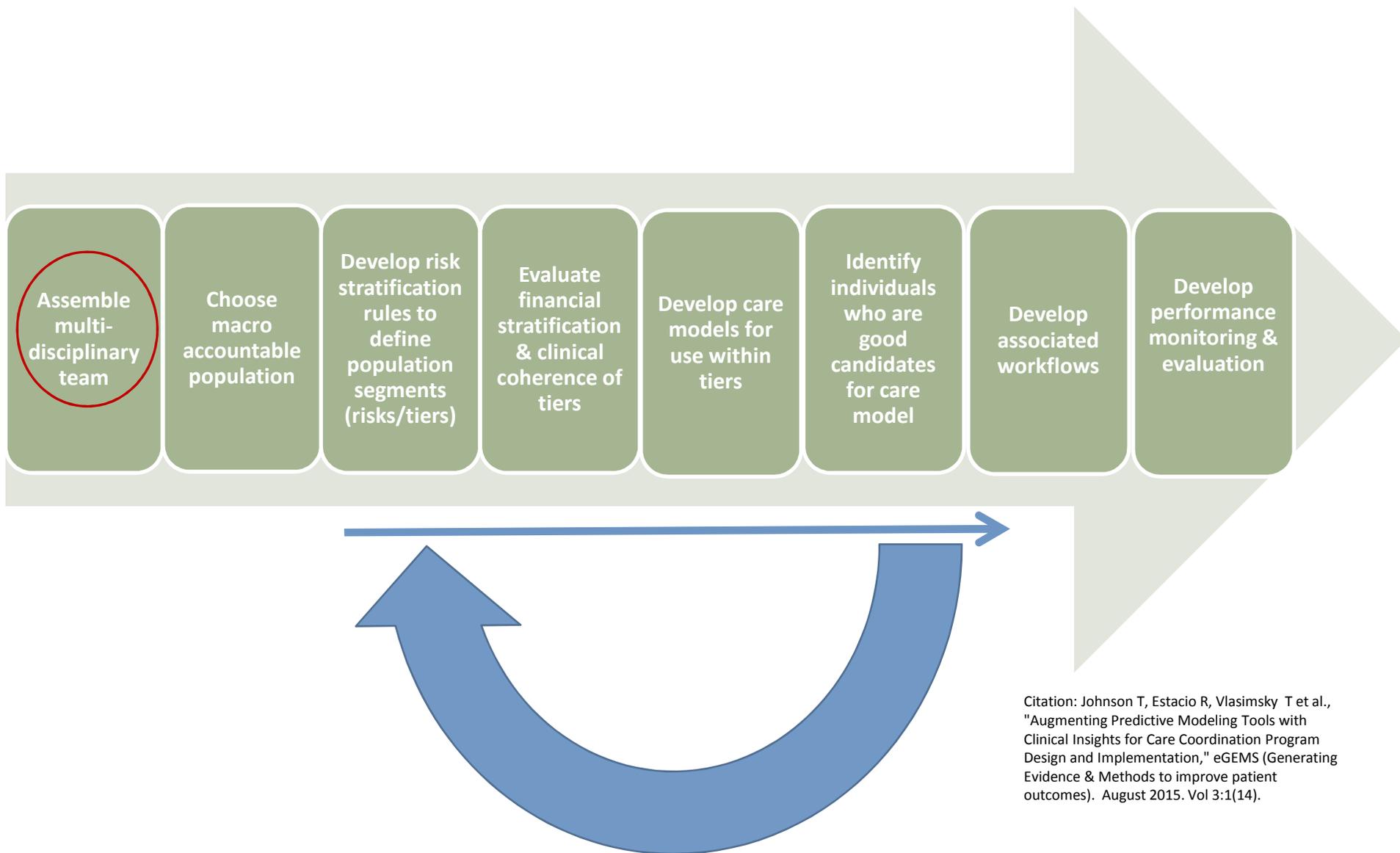
- Rapid Cycle Evaluation NOT Research

**CMMI Award**

2012

3 years

\$19.8 million



Citation: Johnson T, Estacio R, Vlasimsky T et al., "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," eGEMS (Generating Evidence & Methods to improve patient outcomes). August 2015. Vol 3:1(14).

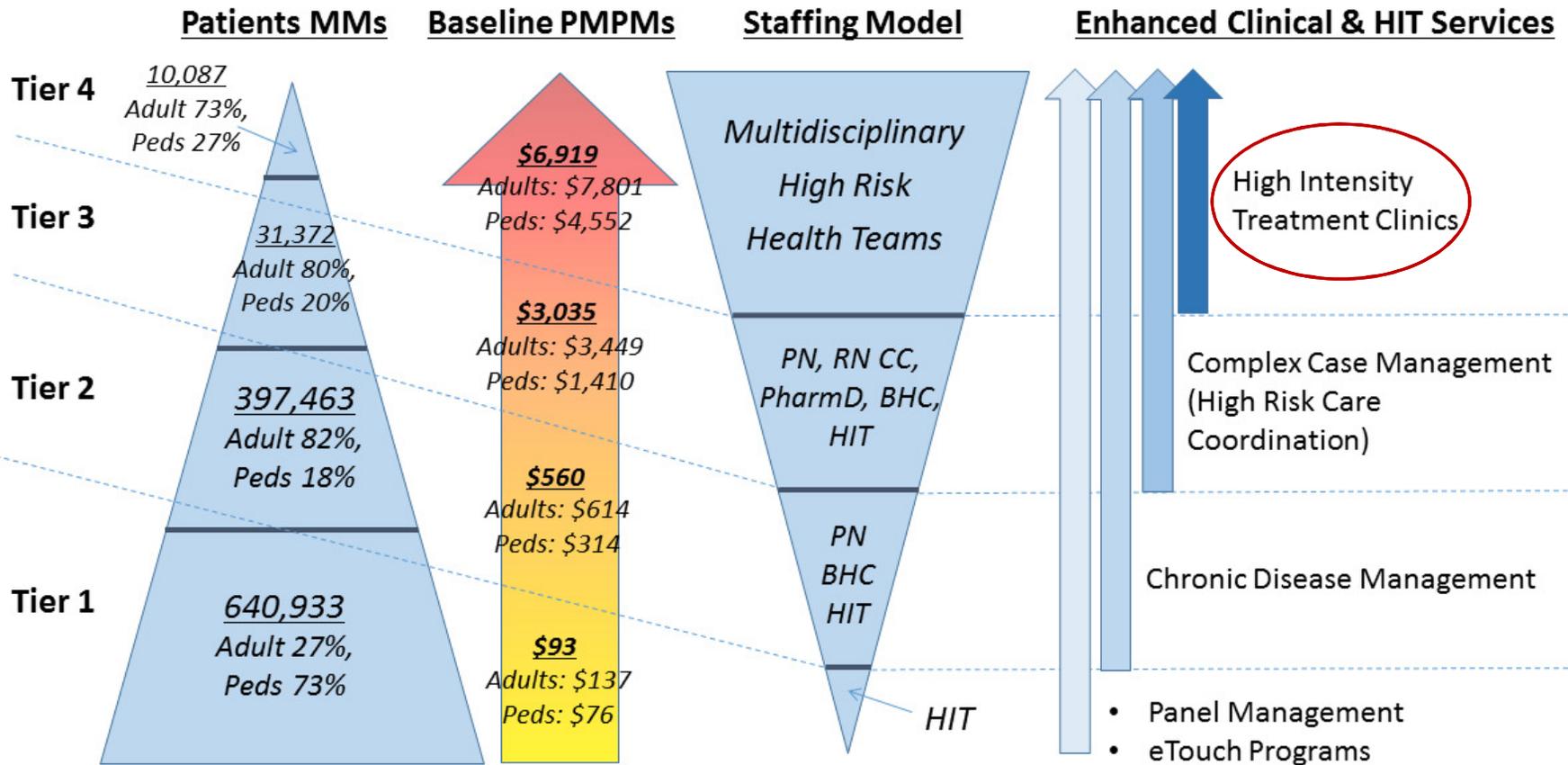
**Iterate to optimize population segmentation & patient identification**

Inspired by Institute for Healthcare Improvement (IHI) BHLC Collaborative

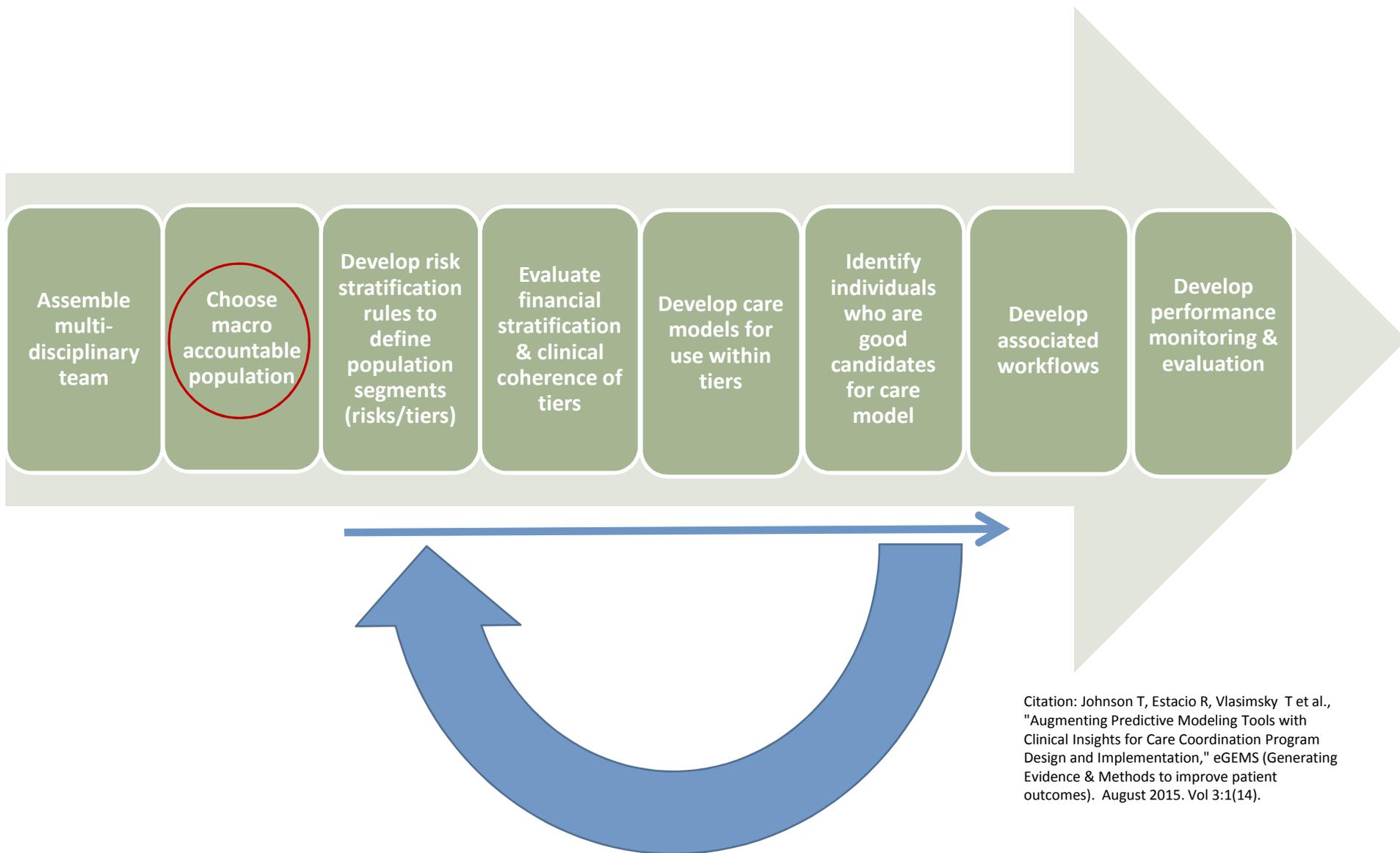
# 21<sup>st</sup> Century Care: Population Health “Tiered” Delivery of Enhanced Care Management Services



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Notes: Baseline period is July 2010 through June 2011. This initial "proof of concept" tiering algorithm was implemented by Milliman using CDPS predictive modeling tool thresholds to define tiers. Tier sizes were pre-determined according to estimated resource capacity. The attributed managed care population was identified through membership files, whereas the fee-for-service population was selected at a single point in time at the beginning of the time period and fixed for the duration. All attributed individuals were tiered. MM: Member months, PMPMs: Per member per month, PN: Patient Navigator, RN CC: Nurse Care Coordinators, PharmD: Clinical Pharmacist, eTouch: Health Text Messages Programs. Grant tiers (Beta version).



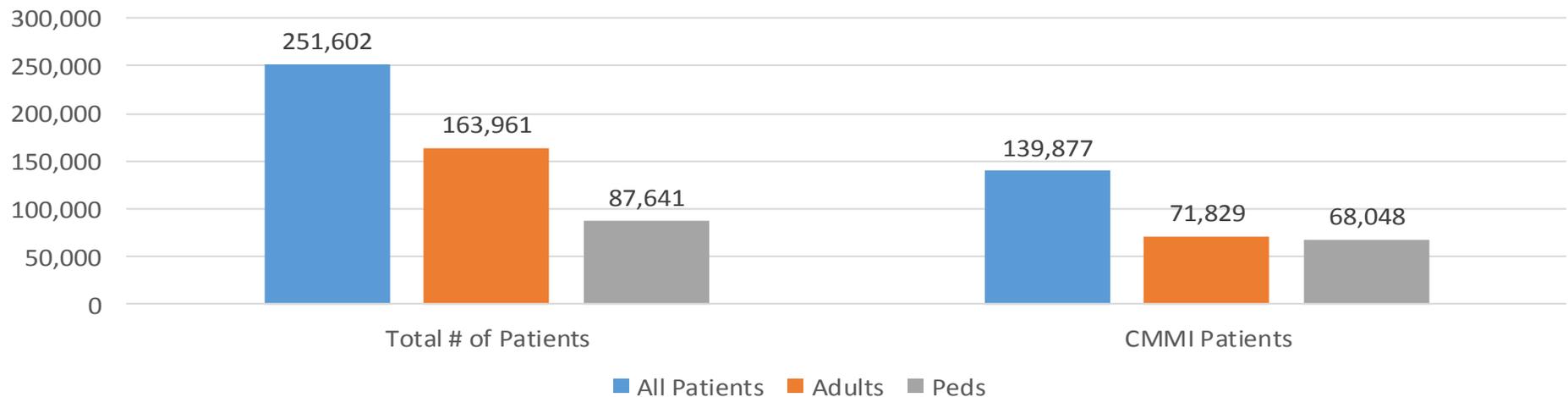
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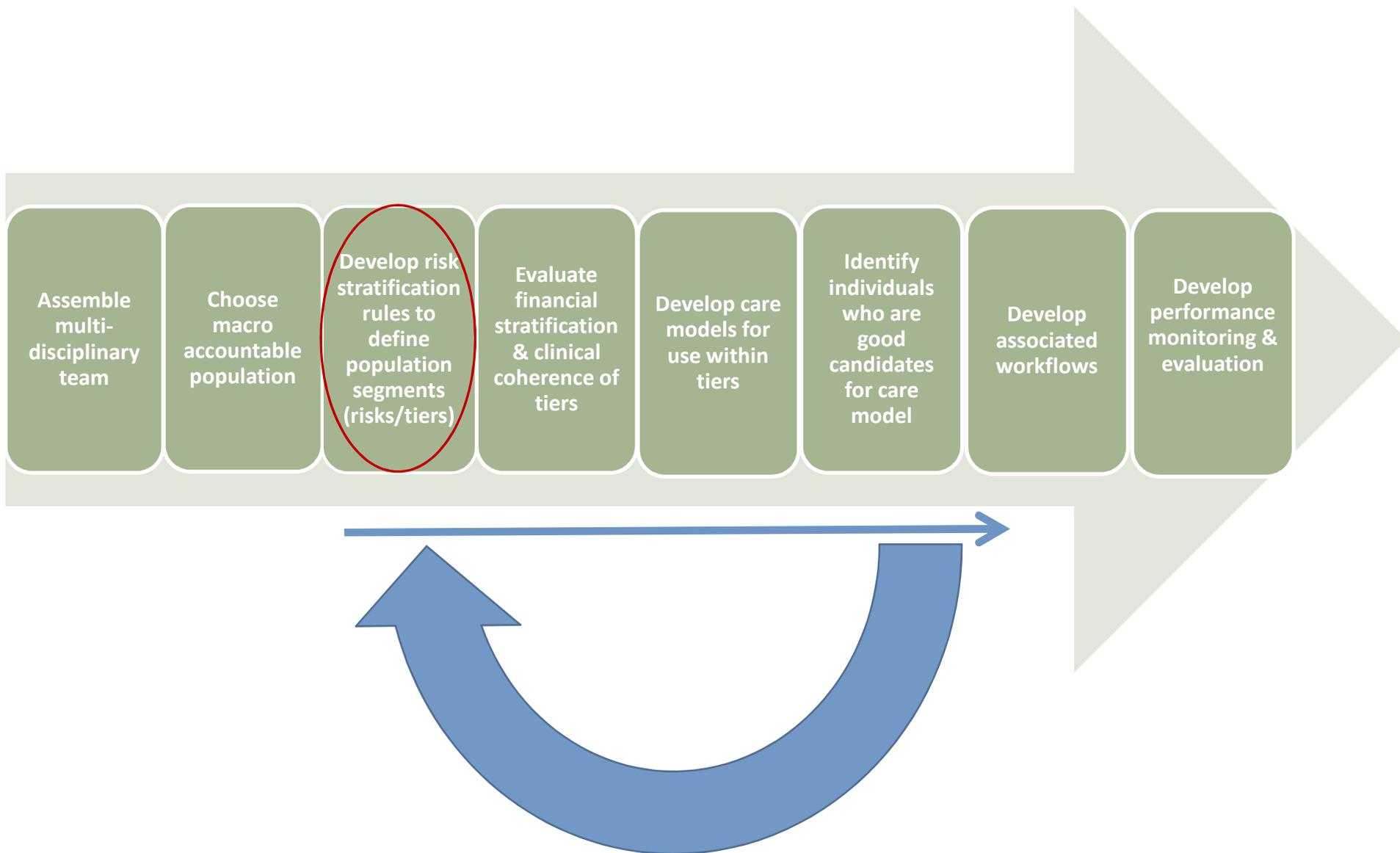
Inspired by Institute for Healthcare Improvement (IHI) BHLC Collaborative

# Who Do We Tier?

- All patients who have had a visit to a Denver Health facility in the previous 18 months (includes clinic visits, hospital, ED, urgent care, public health visits, etc.)
- Medicaid, Medicare, CHP Managed Care patients, regardless of whether they have been to DH or not
- Run daily, with full population refreshes monthly

# of Patients



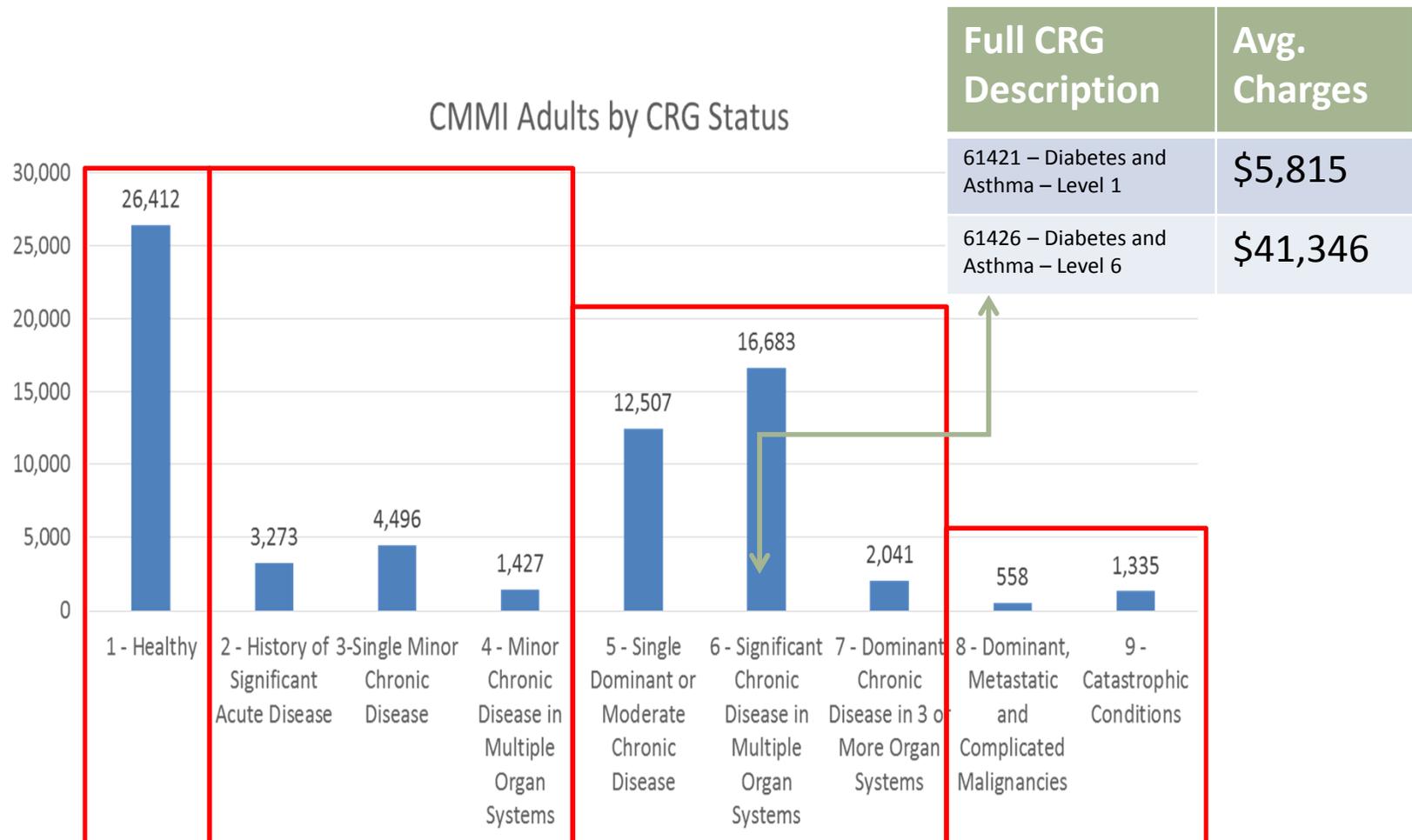


**Iterate to optimize population segmentation & patient identification**

Inspired by Institute for Healthcare Improvement (IHI) BHLC Collaborative

# CRG Status

CRG Status is a primary building block for constructing DH's tiered population



# Adult Risk Stratification Using Predictive Modeling and Clinical

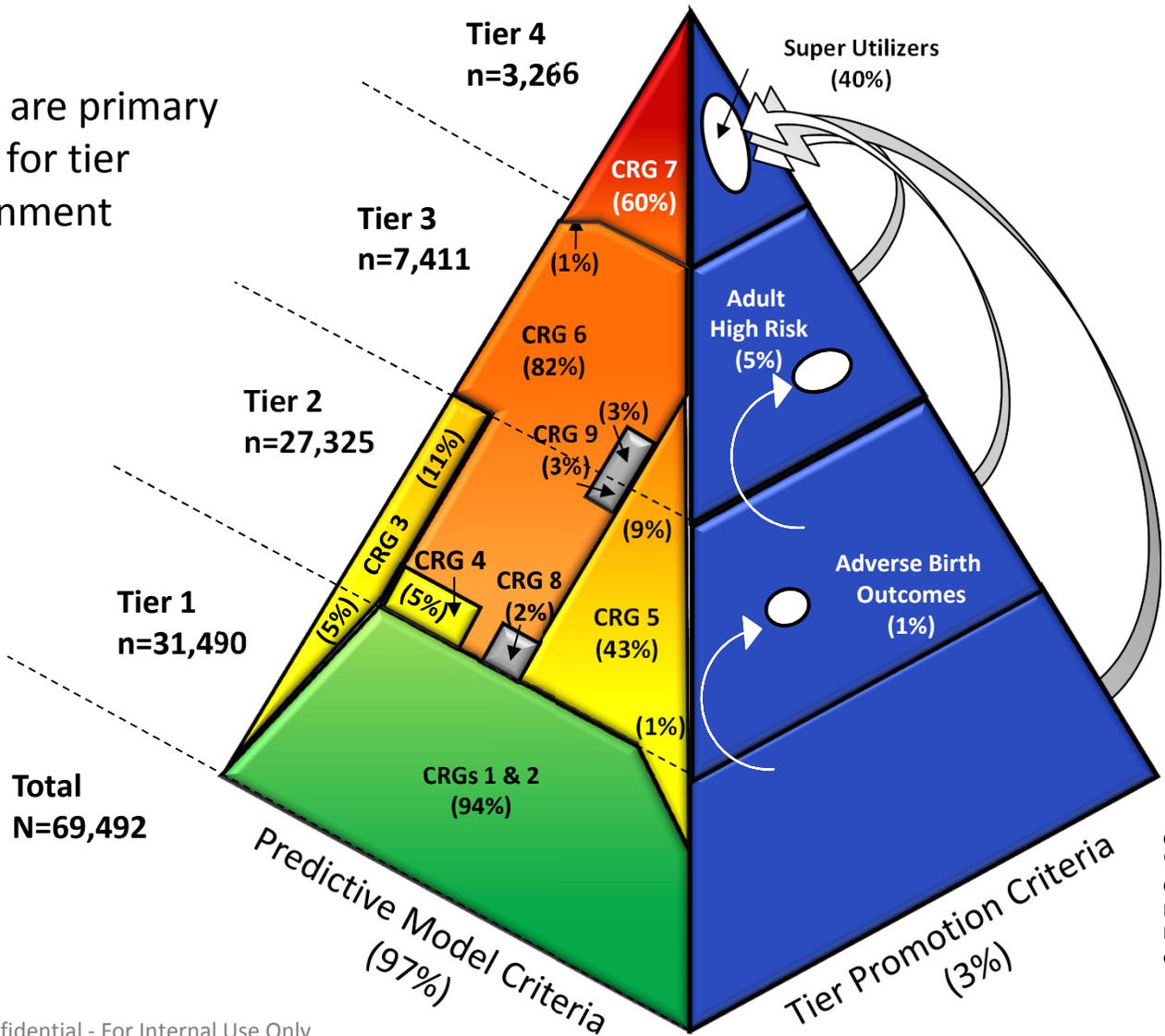


Level One Care For ALL

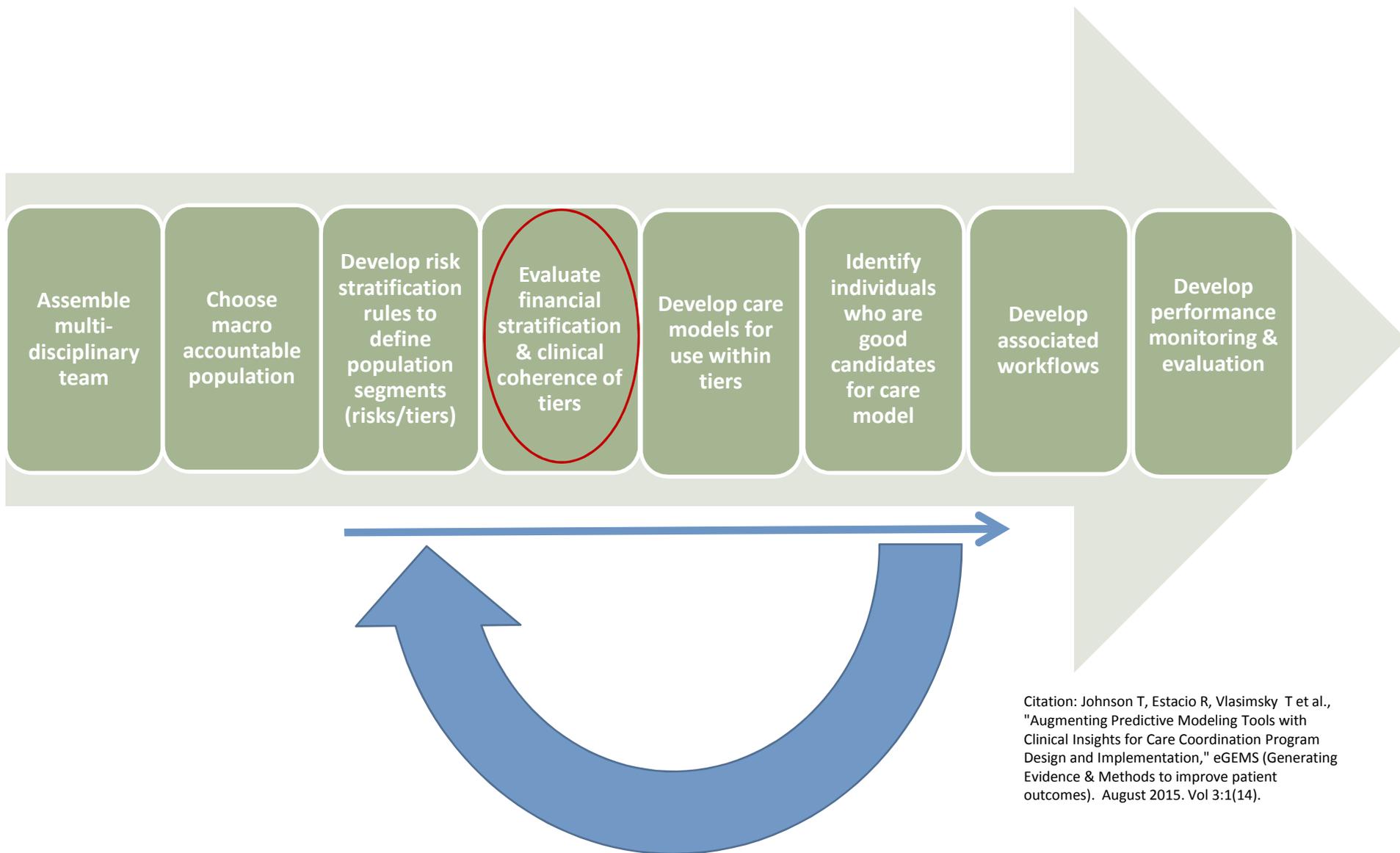
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CRGs are primary basis for tier assignment

Utilization may override CRG-assigned Tier



Citation: Johnson T, Estacio R, Vlasimsky T et al., "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," eGEMS (Generating Evidence & Methods to improve patient outcomes). August 2015. Vol 3:1(14).



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# CRGs Provide Financial Stratification with Clinical Meaning



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<b>CRG* Status</b>	<b>2012 Cohort average charges</b>	<b>2013 Cohort average charges</b>	<b>2014 Cohort average charges</b>
<b>1 - Healthy</b>	\$2859	\$3,058	\$1,940
<b>2 - Acute Only</b>	\$5686	\$5,820	\$3,450
<b>3 – Single Minor Chronic</b>	\$5243	\$5,843	\$3,213
<b>4 – Multiple Minor Chronic Disease</b>	\$6572	\$7,055	\$4,346
<b>5 – Moderate Chronic Disease</b>	\$7474	\$7,571	\$4,084
<b>6 - Significant Multiple Chronic</b>	\$17,413	\$18,437	\$9,909
<b>7 – Dominant Multiple Chronic</b>	\$45,277	\$42,380	\$29,353
<b>8 - Cancer</b>	\$39,243	\$48,771	\$34,689
<b>9 - Catastrophic</b>	\$81,538	\$87,993	\$48,372

Citation: Johnson T, Estacio R, Vlasimsky T et al., "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," eGEMS (Generating Evidence & Methods to improve patient outcomes). August 2015. Vol 3:1(14)

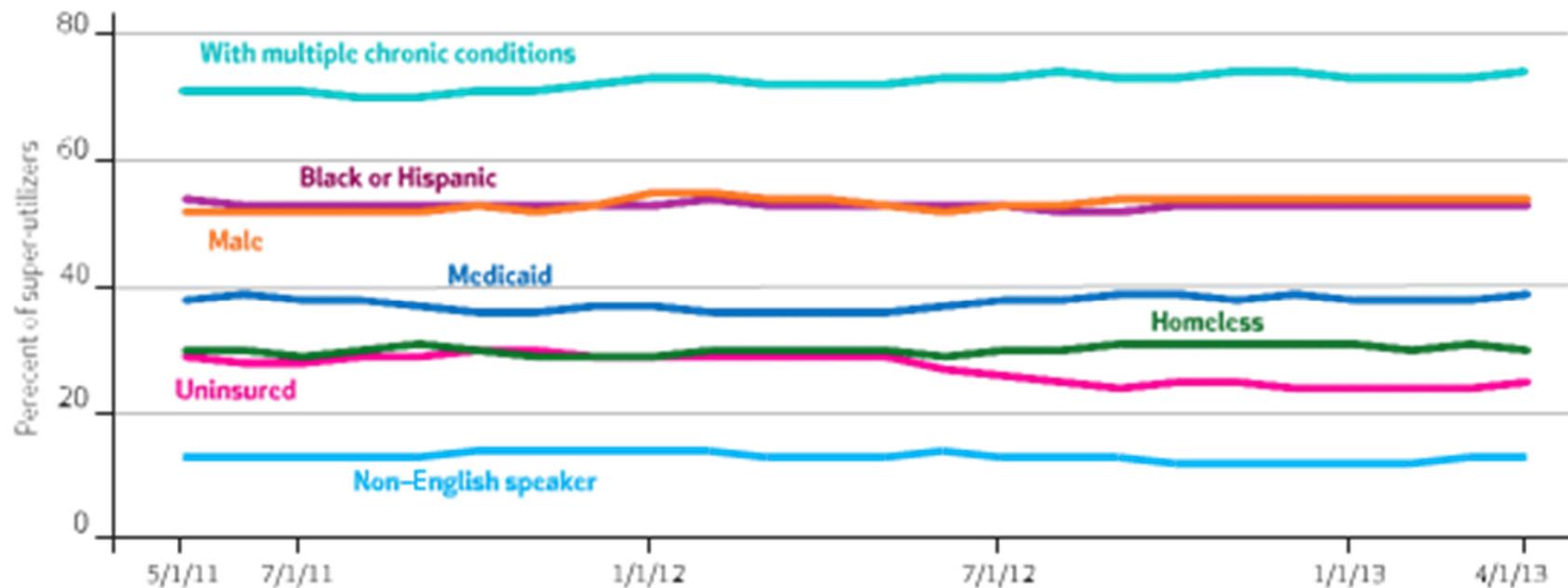
# Super-Utilizer Demographics & Health Status



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Percentages Of 4,774 Adult Super-Utilizers In Denver County, Colorado, With Selected Characteristics, May 1, 2011–April 30, 2013

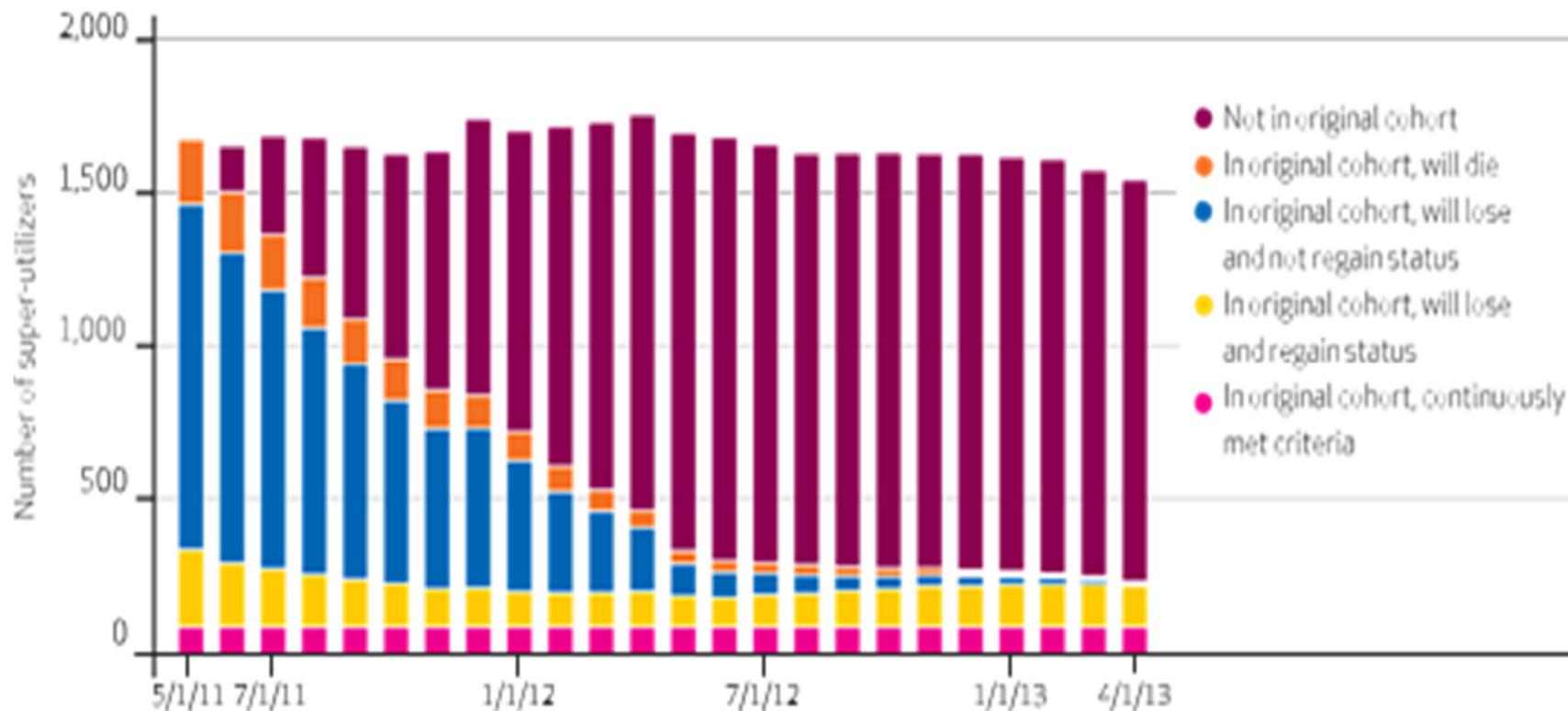


SOURCE Authors' analysis of data from the data warehouse of Denver Health. NOTE Each population characteristic percentage was calculated from the cross-sectional snapshot of patients identified as super-utilizers in that month.

Tracy L. Johnson, Deborah J. Rinehart, Josh Durfee, Daniel Brewer, Holly Batal, Joshua Blum, Carlos I. Oronce, Paul Melinkovich, and Patricia Gabow. For Many Patients Who Use Large Amounts Of Health Care Services, The Need Is Intense Yet Temporary. Health Affairs. August 2015; 34(8):1312-1319; doi:10.1377/hlthaff.2014.1186

# “Super-Utilizers” are Stable in Number, BUT Individual Turn-Over is High

## Population And Individual-Level Analyses of Adult Super-Utilizers in Denver County, Colorado, May 1, 2011–April 30, 2013



DATA NOTES: Authors’ analysis of data from the data warehouse of Denver Health. NOTES “Not in original cohort” is people who became super-utilizers after the study period began (members of all other categories were in the original cohort). “Will die” is people from the original cohort who died during the study period; some people who died also permanently or temporarily lost super-utilizer status. “Will lose and not regain status” is people from the original cohort who stopped being super-utilizers and did not regain that status during the study period. “Will lose and regain status” is people from the original cohort who stopped being super-utilizers and did regain that status during the study period. “Continuously met criteria” is people who met the criteria for super-utilizers throughout the study period. Some people classified as “not in original cohort” also died, permanently or temporarily lost super-utilizer status, or both during the study period. However, these super-utilizer status changes were not tracked. Only status changes affecting the original cohort are shown in the exhibit.

# Once a Super-Utilizer, Always a Superutilizer? ... Not So Much



AT&T LTE 8:59 PM 33%

< Tweet 🔍 ↗

 **Eric Topol**  
@EricTopol

From Hotspotters [nyr.kr/1oiZ8A7](http://nyr.kr/1oiZ8A7)  
by @Atul\_Gawande to Super-Utilizers [bit.ly/1gTDqG2](http://bit.ly/1gTDqG2)  
@Health\_Affairs

**THE HOT SPOTTERS**  
*Can we lower medical costs by giving the neediest patients better care?*  
BY ATUL GAWANDE 24 Jan 2011



**THE NEW YORKER**

**For Many Patients Who Use Large Amounts Of Health Care Services, The Need Is Intense Yet Temporary**

**The Super-Utilizers**

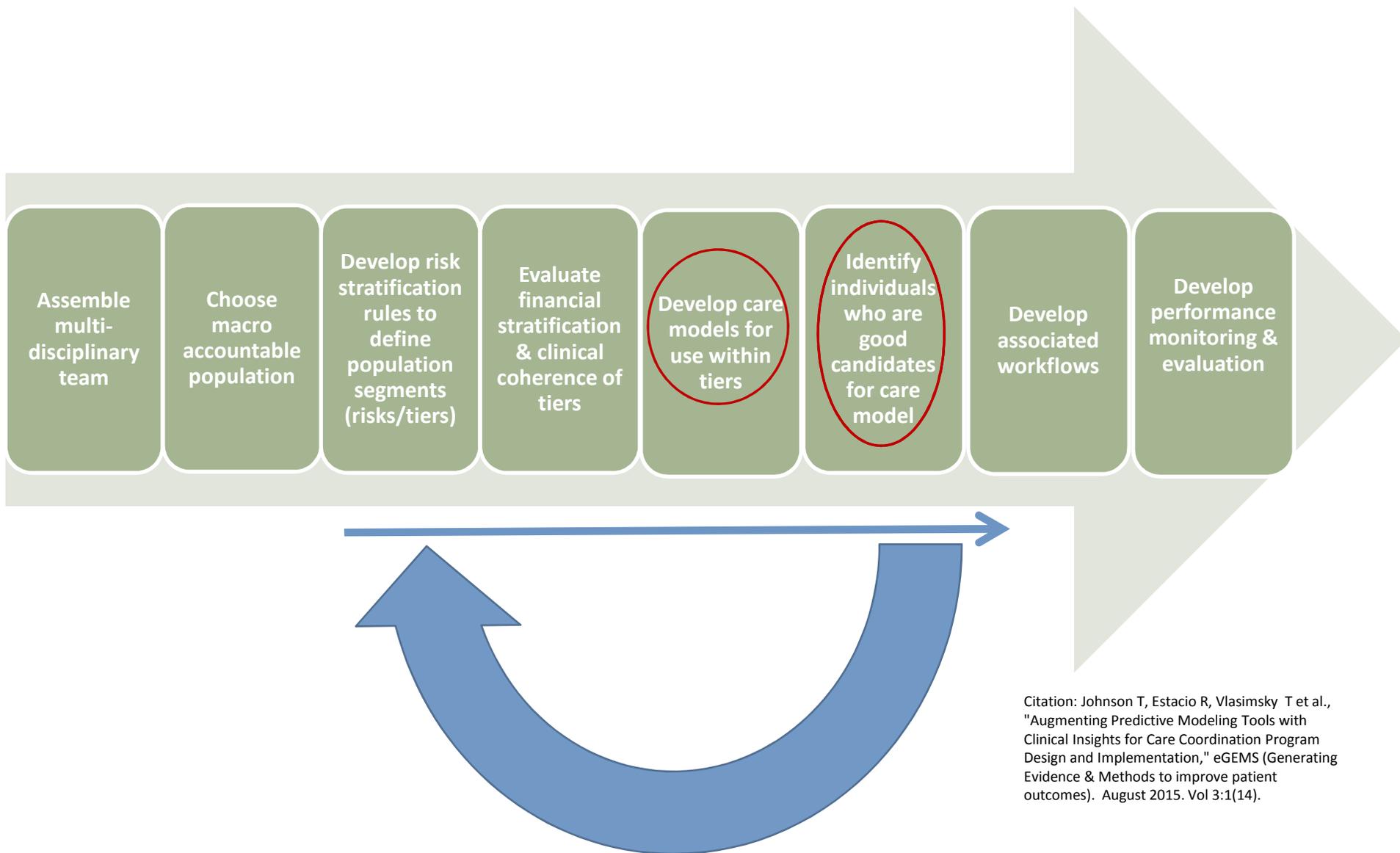
August 2015 **HealthAffairs**

**Subgroup**

- Recipients of emergency inpatient dialysis
- Terminal cancer patients
- Trauma patients
- Orthopedic surgery patients (not trauma related)
- Individuals with serious mental health diagnoses
- Patients with multiple chronic diseases/other

Reply to Eric Topol, Atul Gawande, Hea

Timelines Notifications Messages Me



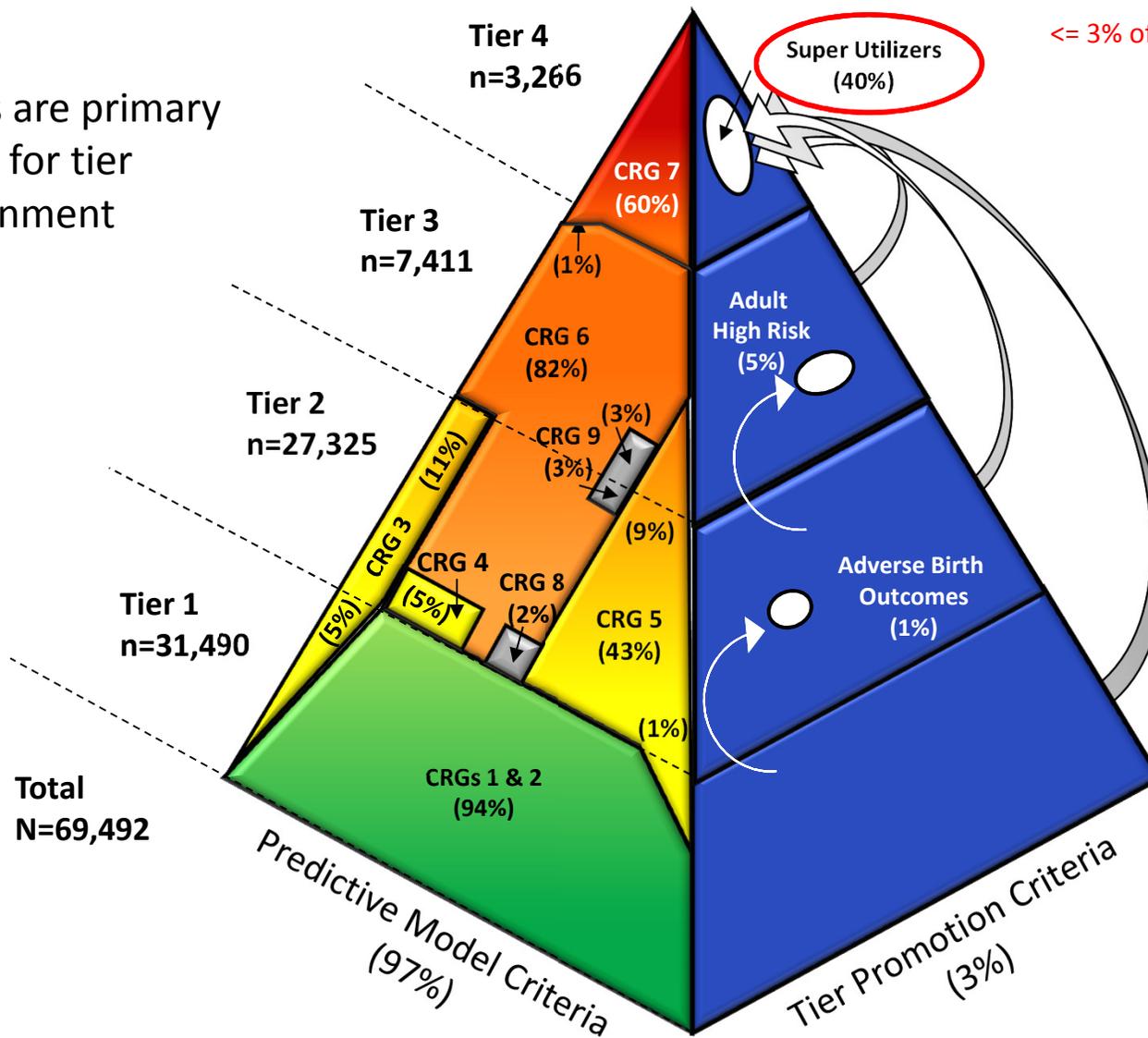
**Iterate to optimize population segmentation & patient identification**

Inspired by Institute for Healthcare Improvement (IHI) BHLC Collaborative

Citation: Johnson T, Estacio R, Vlasimsky T et al., "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," eGEMS (Generating Evidence & Methods to improve patient outcomes). August 2015. Vol 3:1(14).

# Population Segmentation: Deep Dive

CRGs are primary basis for tier assignment



<= 3% of adults; 30% of facility costs

Utilization overrides CRG-assigned tier

Citation: Johnson T, Estacio R, Vlasimsky T et al., "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," eGEMS (Generating Evidence & Methods to improve patient outcomes). August 2015. Vol 3:1(14).

# Super-Utilizer Program Implications – Triggering is Key



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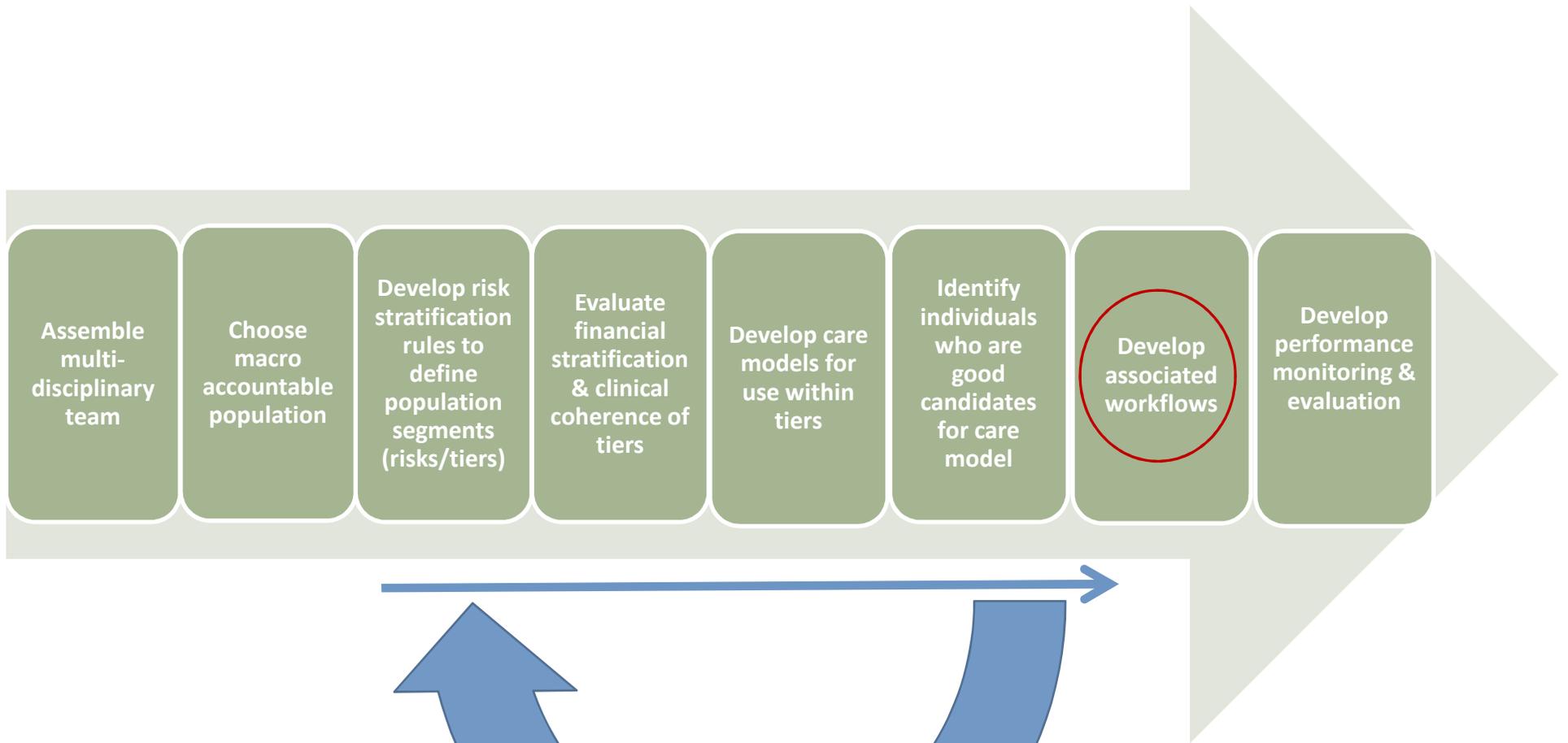
- **Real-time identification is critical**
  - Billing data is helpful for descriptive analysis but “too old” for program identification
  - Window of opportunity may be short
- **Where, when, how to intervene must be matched to the target population**
  - Subpopulations differ by primary care use, reasons for utilization, and cost trajectory
  - Non-target populations are likely to be identified
  - Many super-utilizers are not currently engaged in primary care

# Population Health Interventions for High Risk Patients



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- High Risk Clinics - Specialized primary care for high-risk/utilizing patients
  - Mental Health High Intensity Team (HIT) for patients with Persistent Mental Illness
  - Intensive Outpatient Clinic (IOC) for high hospital or ER utilization (aICU)
  - Child with Special Health Needs (CSHCN) Clinic
- Enhanced PCMH Teams in regular primary care
  - Transitions of Care interventions
  - Pediatric asthma outreach and home visits
  - Medication Therapy Management
  - Care Coordination for high risk subpopulations



Citation: Johnson T, Estacio R, Vlasimsky T et al., "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," eGEMS (Generating Evidence & Methods to improve patient outcomes). August 2015. Vol 3:1(14).

**Iterate to optimize population segmentation & patient identification**

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# Intensive Outpatient Clinic (IOC): Clinic Staffing Model Evolution Over Time



Intensive Outpatient Clinic (IOC): Special form of primary care focused exclusively on high-risk adults with a history of repeated readmissions. Patients identified via a daily list and screened for clinical eligibility. Patients recruited at the hospital. Care teams follows patients longitudinally and provides medical, behavioral health, and social support services.

Conceptualized (250 Patients)		After Iterations (400 Patients)	
0.8 MD	1.0 Patient Navigator	1.0 MD	0.6 Psychologist
1.0 NP/PA	0.5 Pharmacist	2.0 NP/PA	0.1 Psych MD
1.0 RN	0.3 Psychologist	2.0 RN	1.0 Medical Assistant
1.0 CAC	1.0 Medical Assistant	1.0 LCSW	1.0 Clerk
1.0 LCSW	1.0 Clerk	1.0 Patient Navigator	

# Daily IOC List

Microsoft Dynamics CRM

Peter B. DenverH

File Intervention Screenings View Charts Add

New Edit Activate Deactivate Connect Assign Copy a Link E-mail a Link Run Workflow Start Dialog Run Report Import Data Export to Excel Filter Advanced Find

Records Collaborate Process Data

Workplace

My Work

- Dashboards
- Activities
- Calendar
- Imports
- Duplicate Detection
- Queues
- Articles
- Reports
- Announcements
- Screenings
- Enrollments

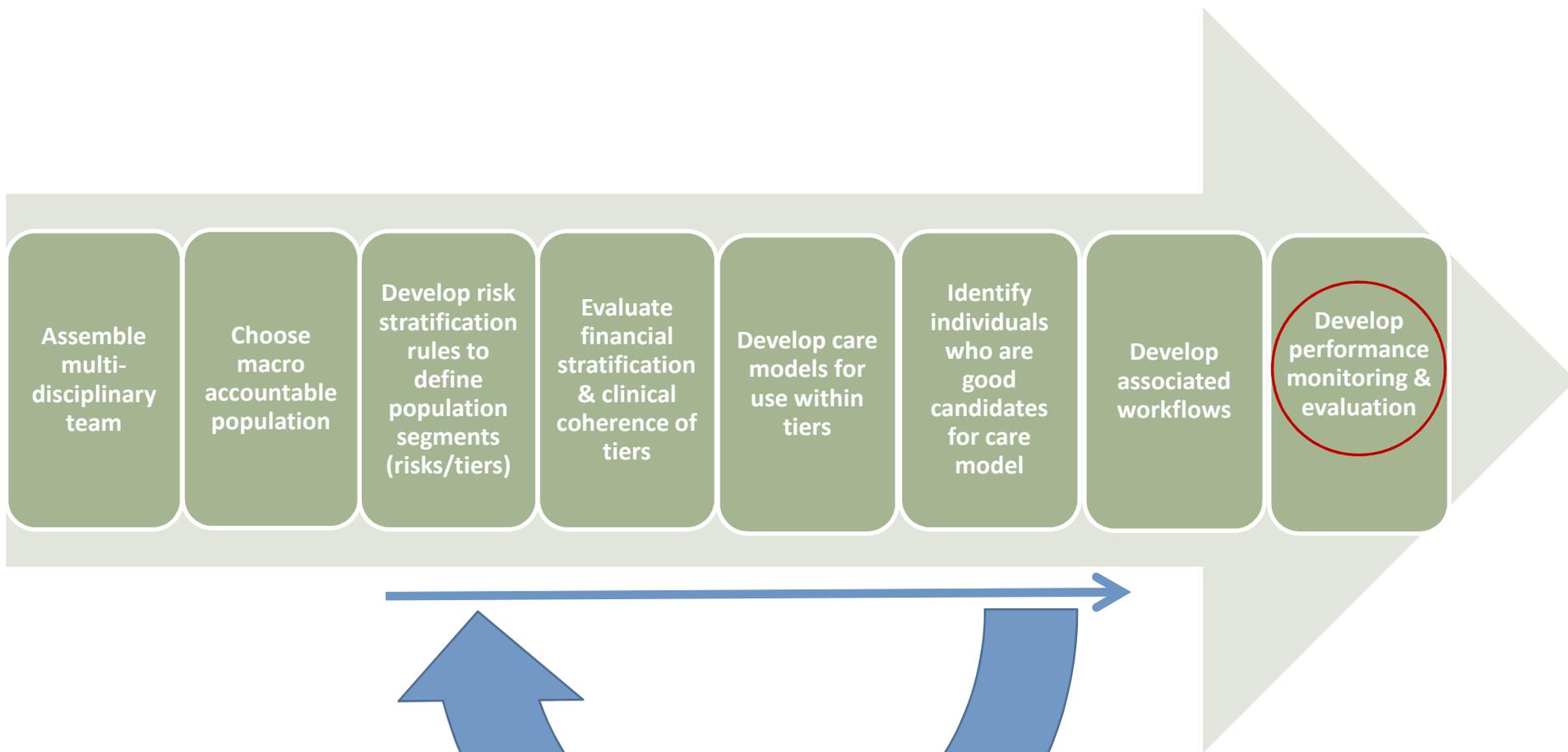
Extensions

- Events
- High Risk Screenings

Intervention Screenings Screenings Pending Enrollment

Name	Contact	Created On	Date Screened	Enrollment Meth...	Ready for Enroll...	Screening
Intervention Screening: Tier 4						IOC
Intervention Screening: Tier 4						IOC
Intervention Screening: Tier 4						IOC
Intervention Screening: Tier 4						IOC
Intervention Screening: Tier 4						IOC
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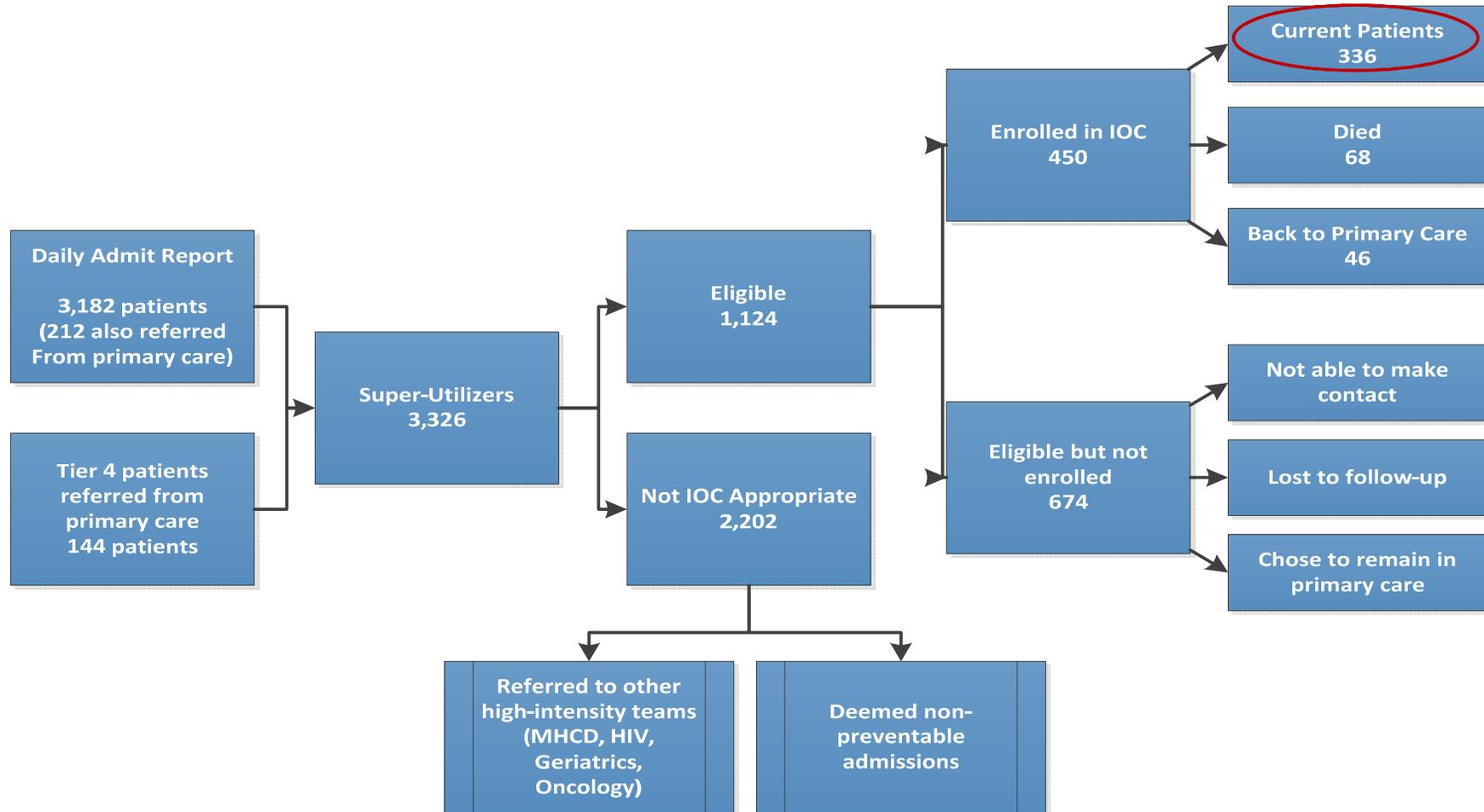
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# Patient Enrollment

## Intensive Outpatient Clinic (IOC) Patient Recruitment 3/1/2013-10/31/2015



Enrolled = Agreed to participate and has attended at least one in-person clinic visit.

# Evaluation: IOC Patient Experience



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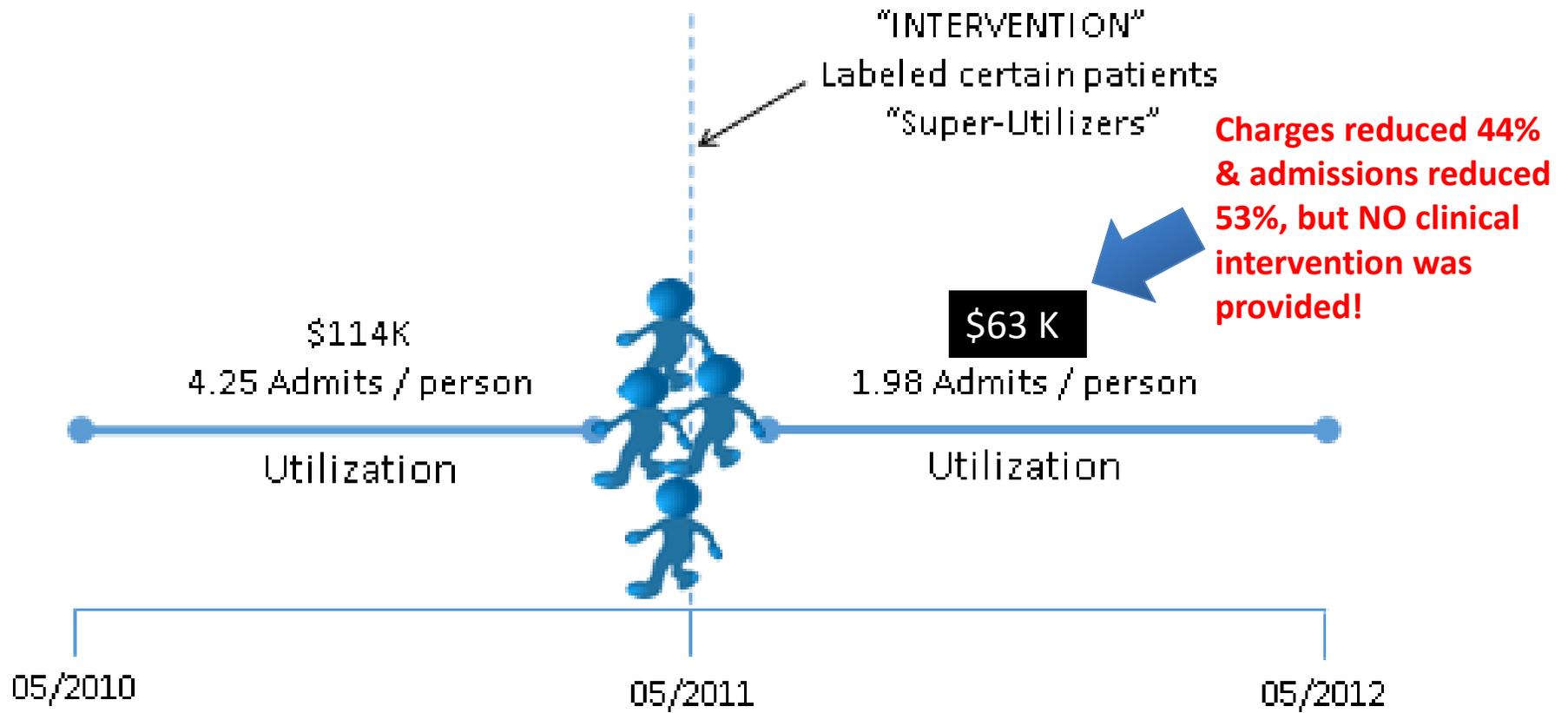
## **Preliminary Summary of Findings**

- Most of the clients interviewed liked the IOC
- Felt respected (known to providers, not judged, not rushed, caring staff)
- Better access (regular/same day appts, can call IOC and talk to someone)
- IOC helped with medication management and connected them to other needed services
- Most don't want to “graduate” to regular primary care

## **Areas for improvement**

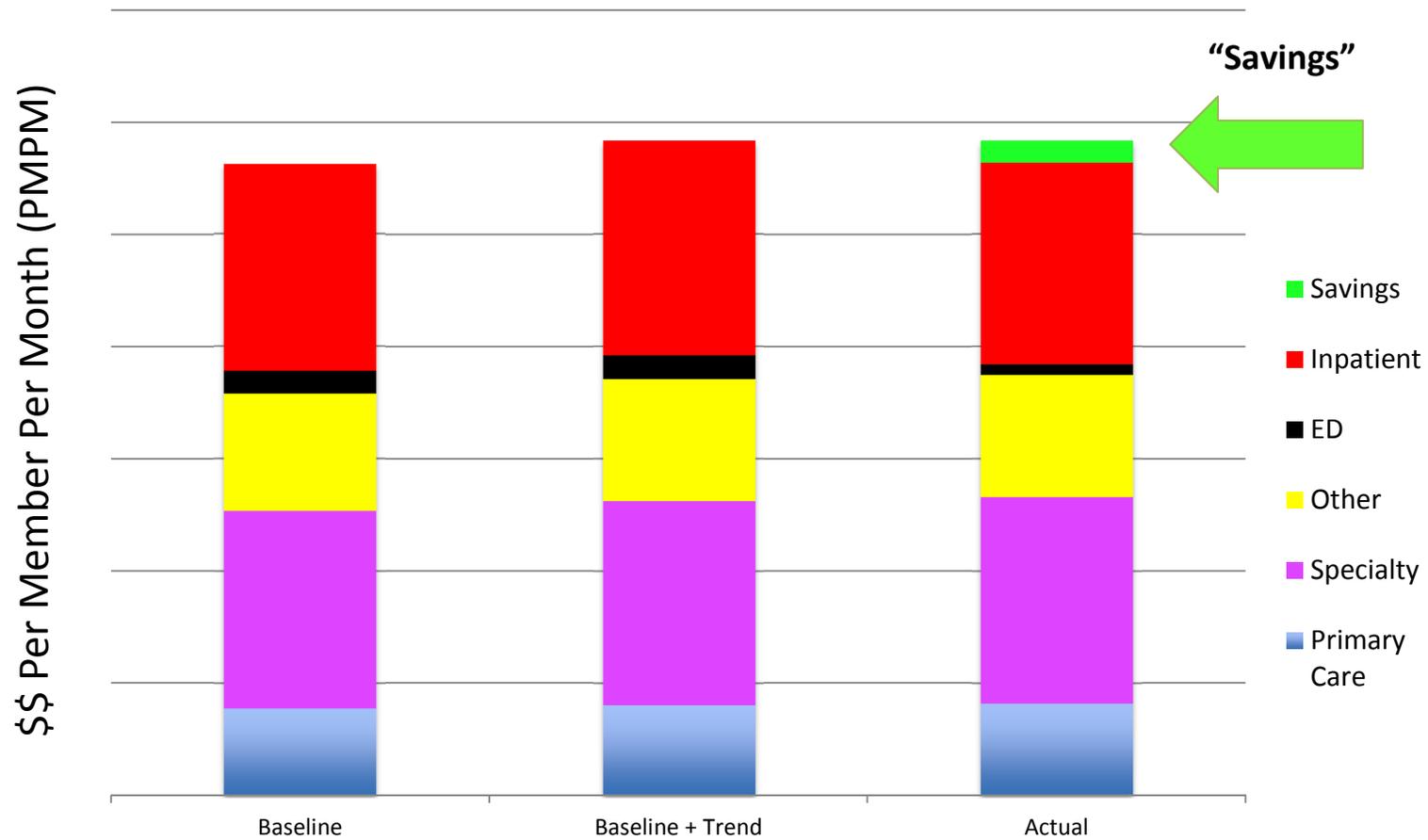
- Expand current clinic and establish more locations or “step-down” clinics
- Nurse advice line dedicated to IOC patients (currently 2 day call back)
- Home visits and social support outside the clinic
- Better parking options and help with transportation

# Cost Savings Analysis: Why can't we simply compare utilization/costs of before and after program enrollment?



**This natural tendency for high-utilizing patients to become less high-utilizing over time is known as "regression to the mean".**

# Evaluation: Total Cost of Care Analysis Sample (“Mocked-Up”) Data



# Evaluation: Total Cost of Care



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## Preliminary Actuarial Findings of 21CC

- Population: 21CC Managed Care populations
- Baseline period (11/1/11 – 10/31/12)
- Program implementation (11/1/12 – 9/30/13)
- “Cost Avoidance” = Dollar value of utilization reductions
  - Expected spending – Observed spending or
  - (Baseline spending \* trend) – Program spending
- Findings:
  - Medicaid cost avoidance equivalent to -2.7% (relative to expected)
  - Reductions in Adult Tier 4 Medicaid utilizers was the single largest driver of overall cost avoidance (-6.1% relative to expected)

# Implementation Challenges



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- **Gaining clinician buy-in**
  - Transparency
  - Focus on avoidable hospitalizations
  - Clinical design control
- **Identifying target population**
  - Claims data useful for population analysis
  - Provide real-time (not claims) data for clinical action
  - Balance predictive analytics & clinical insight
  - Balance short-term & long-term goals
- **Payment model/perverse incentives**
  - Modified productivity standards

# State Medicaid Opportunities



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- **Regulatory approach**
  - Process vs. outcomes orientation
  - Flexibility vs. standardization
- **Data analytics**
  - Real-time data on high-risk patients
  - Clinical input to define what is a “high risk” patient
  - Access to raw data (for further analysis at clinical sites)
- **Payment model**
  - Advanced systems will want capitation/global payment
  - Managed FFS (PMPM care coordination payments) should focus on outcomes (less on qualified providers, workflow)

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# Contact Information



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## Thank you!

### **Contact information:**

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# Why Tier? Population-Matched Staffing



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## Enhanced Care Team Members

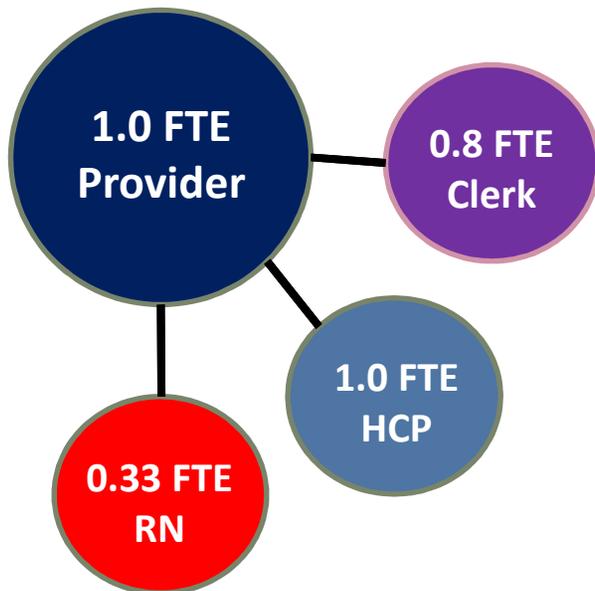


### Number of tier 3-4 patients per 1.0 staff FTE

Care Team Member	Traditional	Enhanced	IOC
Patient Navigator	none	570	189
Clinical Pharmacist	5,988	1,996	N/A
Nurse Care Coordinator*	none	3,992	377
Social Worker	2,994	1,330	377
Behavioral Health Consultants	none	798	1,257

IOC has reduced panel – 25% of traditional

\* - pediatric only except IOC



### Traditional Care Team

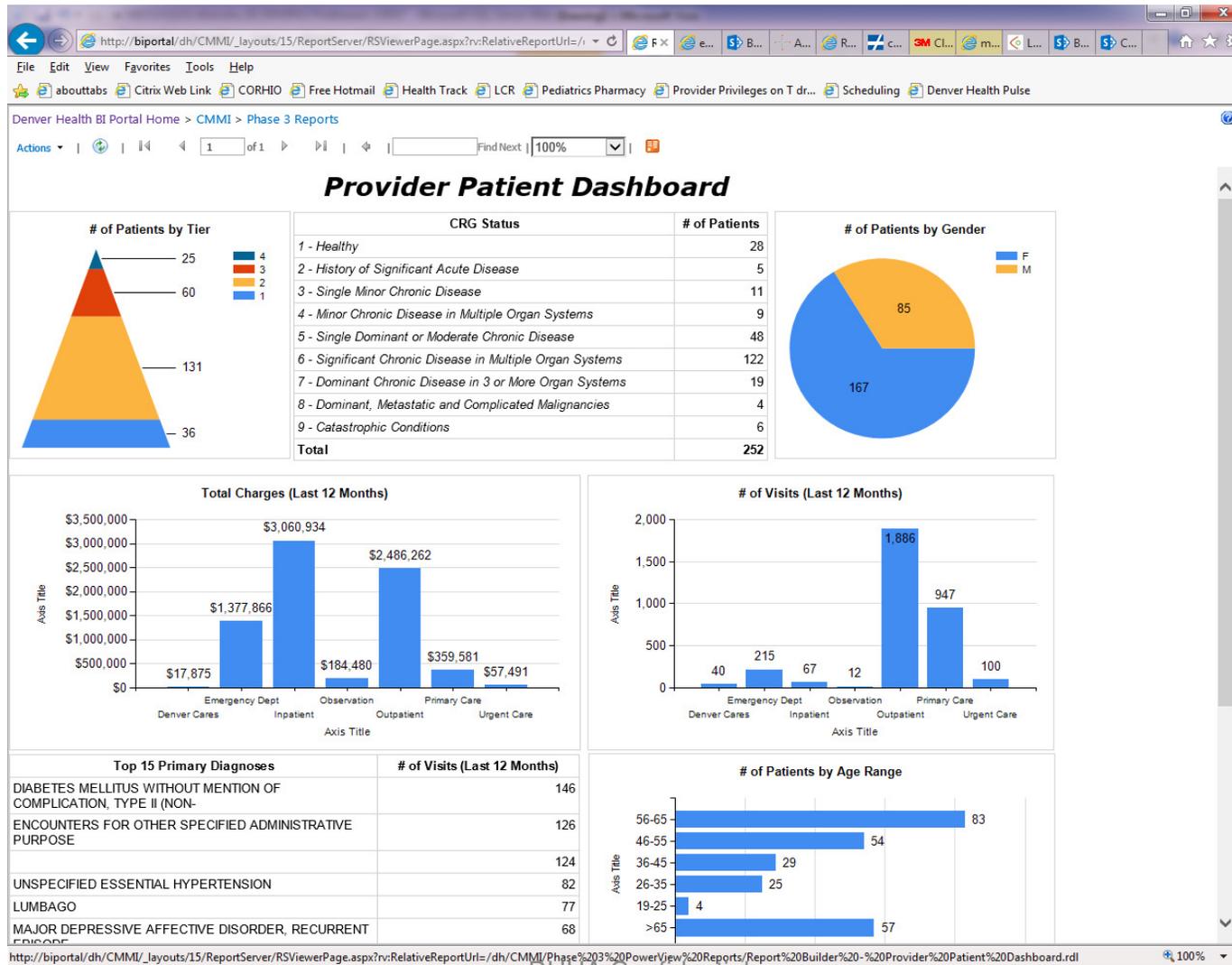
Panel of approximately 1400 patients

DHHA Confidential

# Why Tier? Provider Panel Analysis

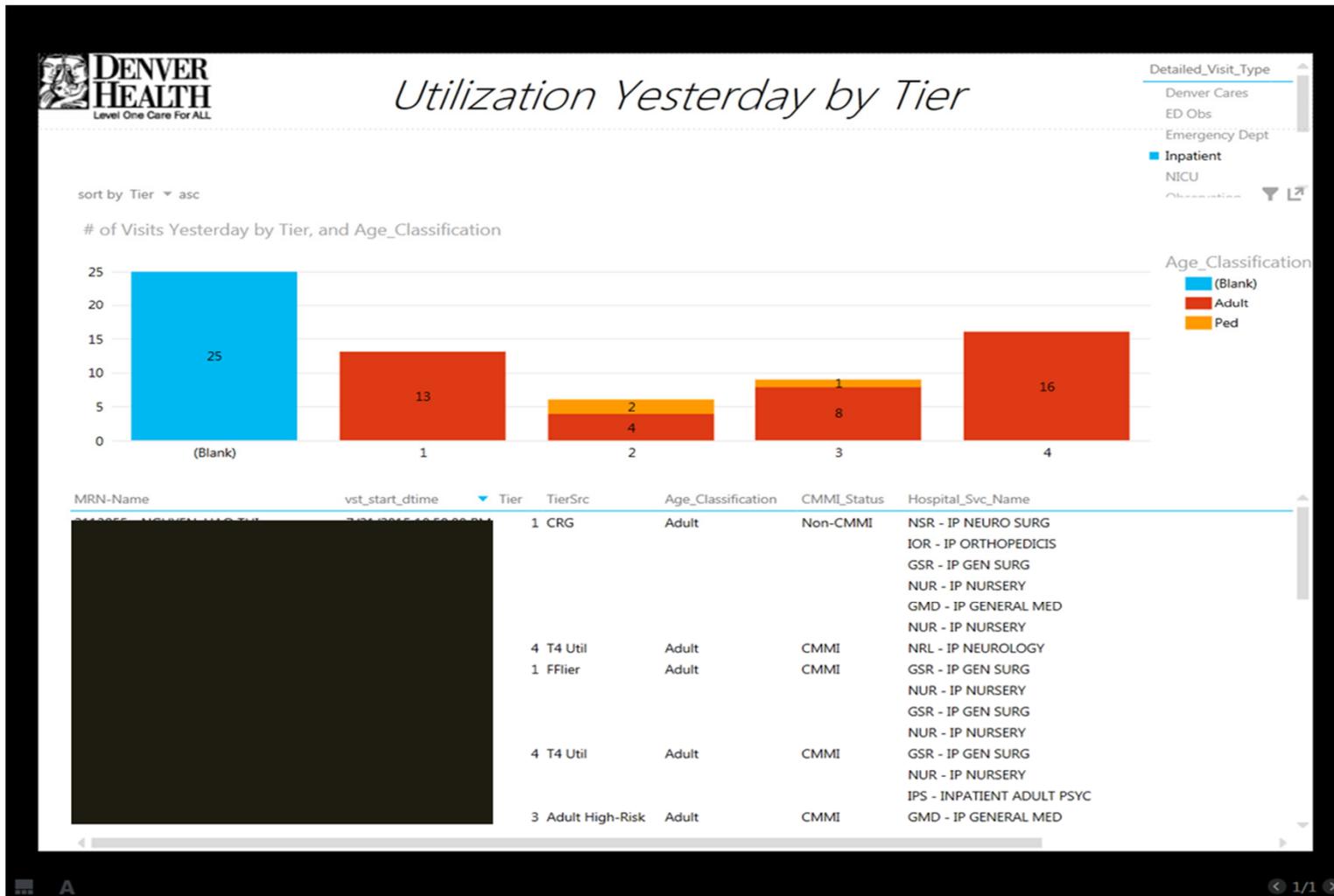


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Data Notes: Slide courtesy of Dan Brewer

# Why Tier?



# Why Tier?

## Patient Dashboard:





# Super-Utilizers are Heterogenous



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## Subgroups Of Super-Utilizers In Denver County, Colorado, And Associated Policies Or Interventions

Subgroup	Associated policy or intervention	Super-utilizers on May 1, 2011			Before and after identification as super-utilizers		
		Number	Percent	Percent in a Denver Health primary care panel	Average annual per person spending	Mean annual inpatient admissions	Risk score, concurrent and predictive
Recipients of emergency inpatient dialysis	Change in federal Medicaid policy to enable access to outpatient dialysis services under emergency Medicaid	30	1.8	43.3	\$397,089, \$408,567	33.9, 36.4	17.8, 15.7
Terminal cancer patients	Hospice, palliative care	11	0.7	36.4	\$230,513, \$682,176	5.8, 1.5	14.8, 9.0
Trauma patients	Highway safety/speed limits, violence prevention initiatives	195	11.6	45.1	\$136,050, \$79,366	4.4, 1.8	6.8, 4.7
Orthopedic surgery patients (not trauma related)	Shared decision making, infection prevention education, postdischarge follow-up	60	3.6	76.7	\$201,334, \$80,039	4.2, 1.4	10.0, 5.4
Individuals with serious mental health diagnoses	Integrated or collaborative behavioral health models	685	40.7	54.5	\$87,236, \$62,600	3.2, 1.1	5.4, 4.2
Patients with multiple chronic diseases/other	Redesigned primary care with enhanced social or mental health services	701	41.6	71.4	\$120,520, \$77,833	3.9, 1.5	7.4, 5.5

**NOTES** The numbers and percentages for the subgroups are based on the original cohort of 1,682 super-utilizers. Each pair of numbers represents before and after identification as super-utilizers.

Tracy L. Johnson, Deborah J. Rinehart, Josh Durfee, Daniel Brewer, Holly Batal, Joshua Blum, Carlos I. Oronce, Paul Melinkovich, and Patricia Gabow. For Many Patients Who Use Large Amounts Of Health Care Services, The Need Is Intense Yet Temporary. *Health Affairs*. August 2015; 34(8):1312-1319; doi:10.1377/hlthaff.2014.1186

# 21CC Enhanced Care Team



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- **Patient Navigators:** address barriers to care (transportation, financial/insurance, language, fear), assist with access to care, provide patient support, support panel management and population health, link to community resources
  - Post-discharge phone calls for all empaneled patients; diabetes pre and post visit care; proactive outreach for preventive care; high-risk care coordination; asthma home visits
- **Clinical Pharmacists:** pharmacotherapy management, ongoing monitoring for patients with specified comorbidities
  - Post-discharge calls for patients on high-risk medications; assess labs, vitals and medication adherence; titrate medications; encourage lifestyle modifications
- **Behavioral Health Consultants:** licensed psychologist or licensed clinical social worker practicing integrated care in primary or specialty clinics
  - Diagnostic clarification; health behavior change; brief course of therapy; linkage to psychiatrist and to outside resources/specialty mental health services; crisis management
- **RN Care Coordinators:** provide extra support and services for children with special needs that are tier 4 or complex tier 3
  - Care coordination intake; schedule specialty appointments; coordinate with school RN and home services; follow up on hospital or DECC discharge