The Program on Health Workforce Research and Policy Seminar
UNC Cecil G. Sheps Center for Health Services Research

Community-based, Multidisciplinary Care Teams: Optimizing the Return on Investment

Community Care
OF NORTH CAROLINA

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November 17, 2016

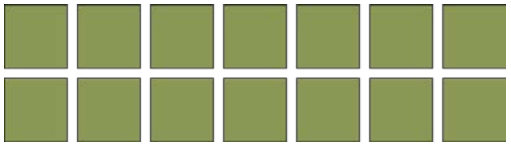
CCNC Footprint in North Carolina

- 5,000 primary care providers
- 1,800 Practices
- 90% of PCPs in NC

- 1.4 million Medicaid Patients
  - 300,000 Aged, Blind, Disabled
  - 150,000 Dually Eligible

All 100 NC Counties

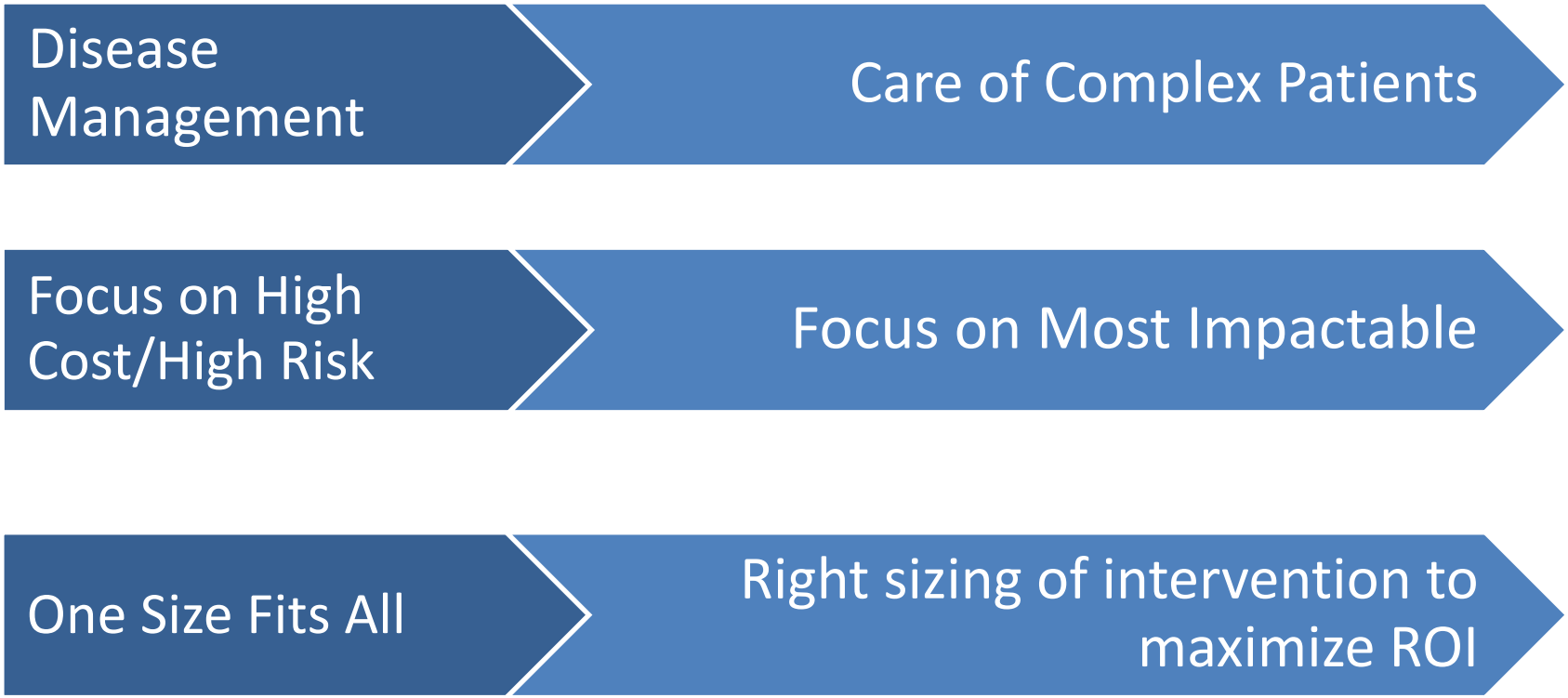
14 Networks

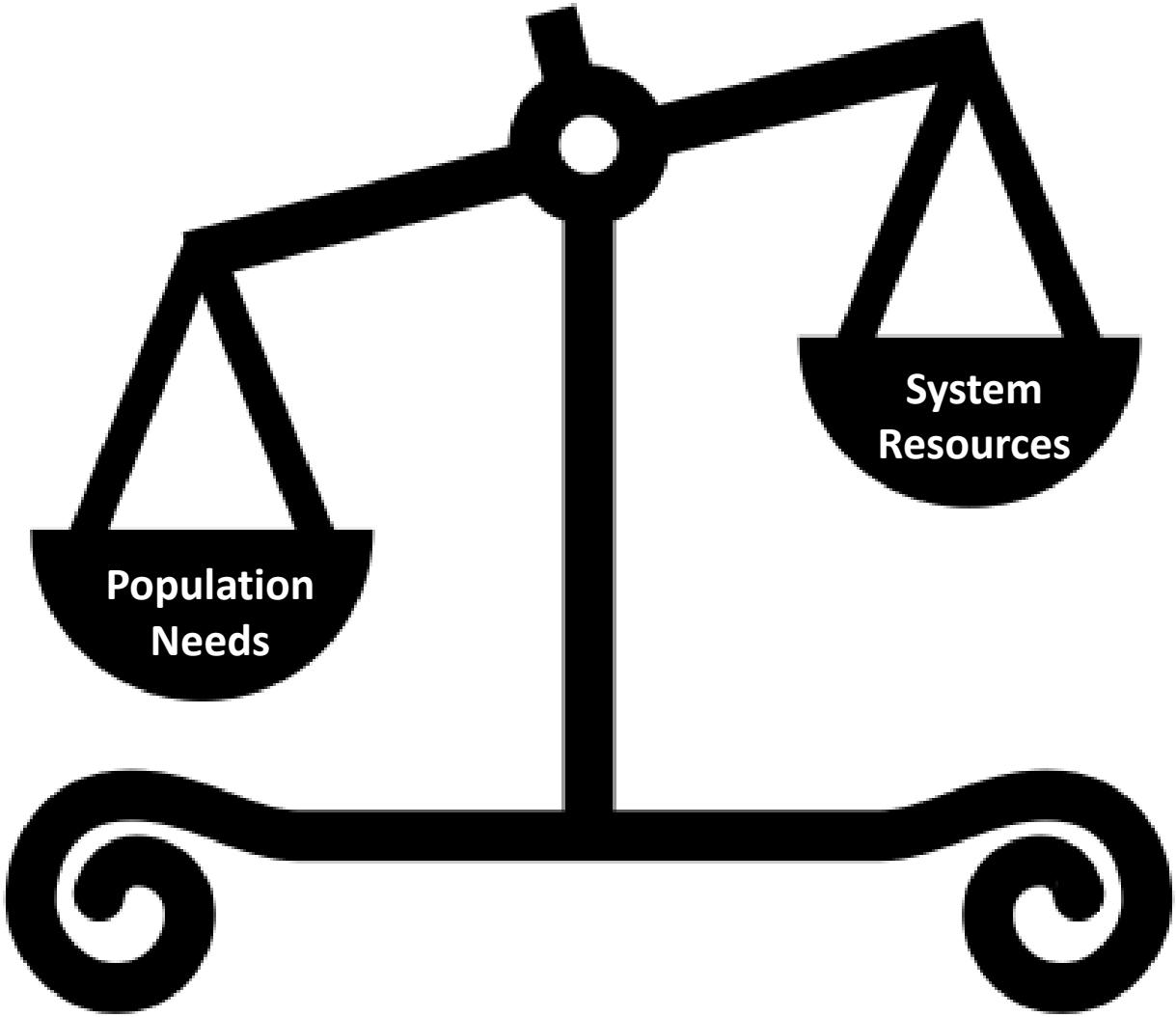


Each network averages:

- 1.4 Medical Directors, 1.0 Psychiatrist
- 42.8 Local Care Managers
- 1.8 Pharmacists
- Multiple disciplines: RN, LCSW, RD, …

CCNC Care Management Evolution




System
Resources
Population
Needs

Finding a Match: How Successful Complex Care Programs Identify Patients

Appendix A: List of Interviewees

PROGRAM	INTERVIEWEES
Aetna's Medicare Advantage Provider Collaboration Program	Dorothy D. Briggs, RN, CCM
AtlantiCare Special Care Center	Sandy Festa, LCSW
Veteran's Affairs Palo Alto Complex Care Program	Donna Zulman, MD, MS
West County Health Centers Complex Care Program	Jason Cunningham, DO

Of the 20 programs interviewed:

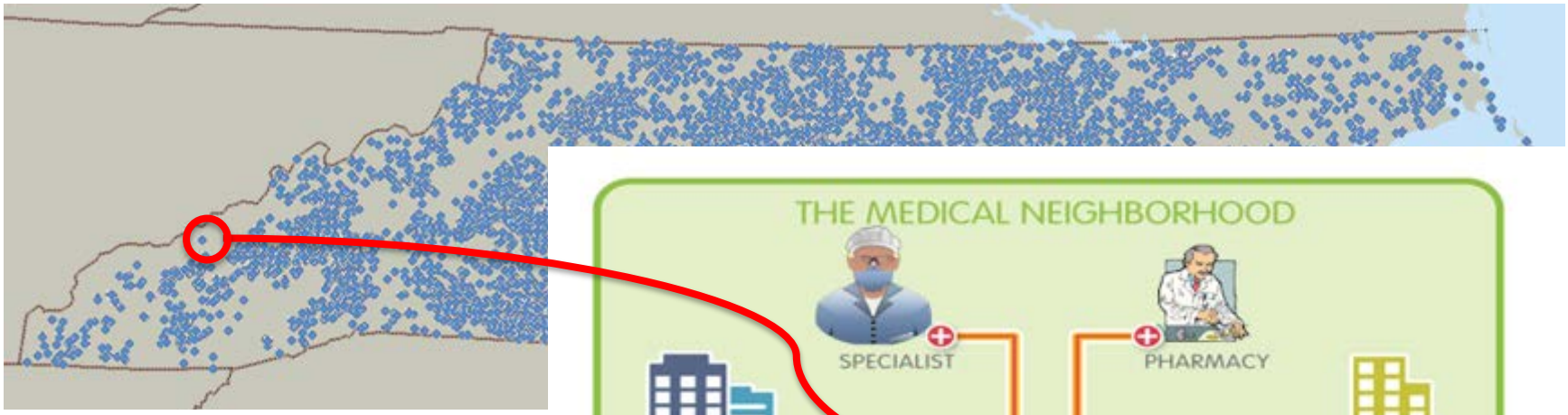
- **15 used some formal risk score** (Ex: HCC and LACE are most common; some use proprietary scores based on risk prediction models)
- **4 used a total cost criteria** (Ex: ">$50K annual spend)
- **4 used a condition criteria** (Ex: "High risk diagnoses")
- **8 used a utilization criteria** (Ex: "2+ admits in past 6 mos")
- **1 used an impactability score** where scores are a function of how much care management actually works.

Transitional Care Program

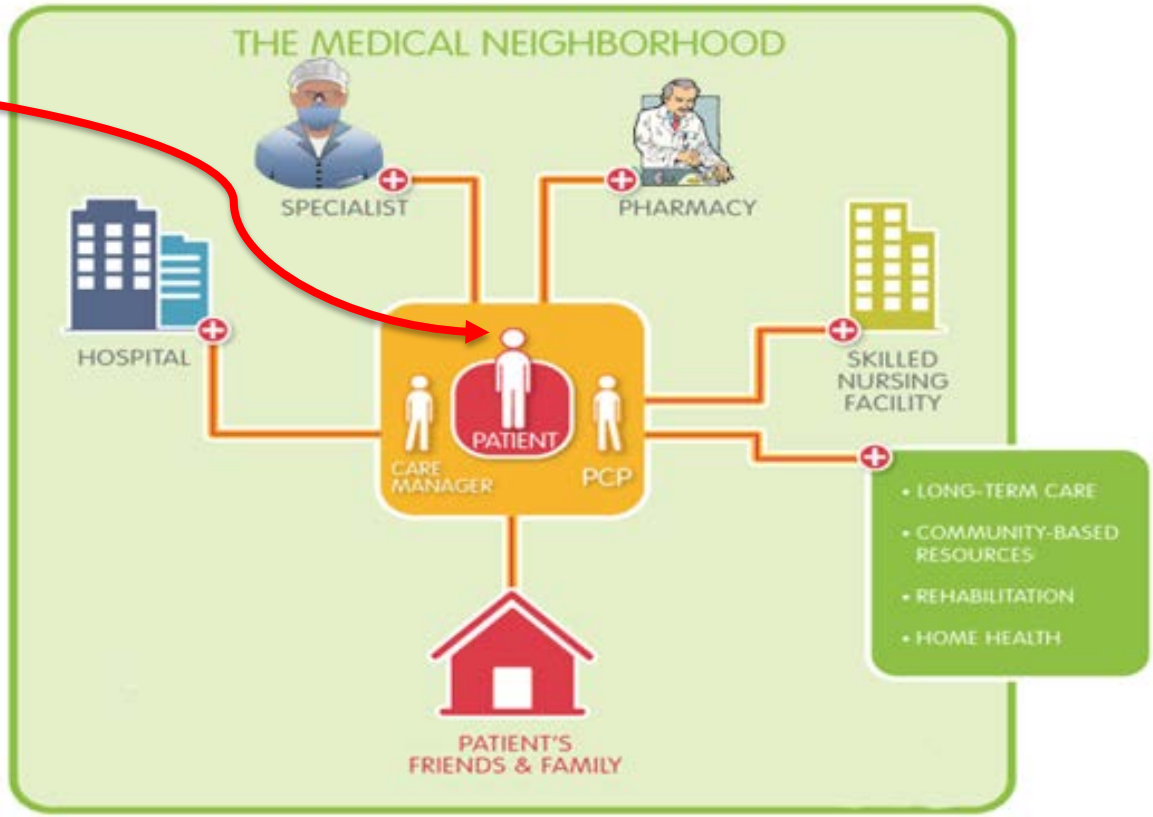
>32,000 Individuals received CCNC Transitional Care Support in 2015

Targeted from among 146,000 patients with 190,000 hospitalizations

Out of 1.4 million enrolled in Medicaid primary care medical home program



- ✓ Community-based multidisciplinary care team
- ✓ Connecting the dots with PCMH and other providers
- ✓ Comprehensive medication management
- ✓ Goal setting and care plan
- ✓ Education and self-management support
- ✓ Linkage to community resources



Typical patient identified as high priority for Transitional Care Management

58 year old man with severe diabetes, kidney disease and Hepatitis C

- Earlier in the year:
  - Two ED visits at Duke and Durham Regional;
  - Two UNC hospitalizations with uncontrolled DM and hyperosmolarity coma
- Recently hospitalized at Duke with hepatic encephalophathy and aspiration pneumonitis/ acute respiratory failure
- Re-hospitalized at UNC with c diff colitis and hepatic coma
- Primary care provider is in a Duke-affiliated practice

Medication Review

Consolidated Medication List | Meducation | North Carolina Drugs of Choice information

Prescription Fill History (•) Current Regimen ( ) Complete History

20 medicines in patient's possession based on prescription fill history. Additional 10 (unmatched) medicines listed on hospital discharge summary.

Fill Date	Drug Description	Qty	Days	Paid	Class	DO					
	ACCU-CHEK TES AVIVA PL	100	25	$59	DIAGNOSTICS						
	LOSARTAN POT TAB 50MG	30	30	$7	HYPOTENSIVES ...						
	BUPROPION TAB 75MG	60	30	$36	PSYCHOSTIMUL ...	✓					
	TRAMADOL HCL TAB 50MG	180	30	$10	ANALGESICS, ...	✓					
	KETOCONAZOLE SHA 2%	120	30	$20	FUNGICIDES	✓					
	OXCARBAZEPIN TAB 150MG	120	30	$19	ANTICONVULSA ...	✓					
	OXYCOD/APAP TAB 5-325MG	20	4	$3	ANALGESICS, ...	✓					
	CARVEDILOL TAB 12.5MG	180	30	$7	CARDIOVASCUL ...	✓		1.27		GURLEYS PHAR ...	MNC
	AMLODIPINE TAB 10MG	30	30	$0	CARDIOVASCUL ...	✓		1.05		GURLEYS PHAR ...	MNC
	OMEPRAZOLE CAP 20MG	30	30	$3	ANTI-ULCER/O ...	✓				GURLEYS PHAR ...	MNC
	LISINOPRIL TAB 5MG	30	30	$0	HYPOTENSIVES ...	✓		1.14		GURLEYS PHAR ...	MNC
	GABAPENTIN CAP 300MG	60	30	$3	ANTICONVULSA ...	✓	DC?	1.38		GURLEYS PHAR ...	MNC (1)
	SIMVASTATIN TAB 10MG	30	30	$0	LIPOTROPICS	✓				GURLEYS PHAR ...	MNC
	NOVOLOG MIX INJ FLEXPEN	15	30	$250	DIABETIC THE ...					GURLEYS PHAR ...	MNC
	FUROSEMIDE TAB 20MG	30	30	$0	DIURETICS	✓		1.22		GURLEYS PHAR ...	MNC
	UNIFINE PNTP MIS 6MM	200	30	$28	MEDICAL SUPP ...					GURLEYS PHAR ...	MNC
	ONDANSETRON TAB 4MG ODT	120	30	$39	ANTINAUSEANT ...					GURLEYS PHAR ...	MNC
	LANTUS INJ SOLOSTAR	15	21	$221	DIABETIC THE ...					GURLEYS PHAR ...	MNC
	INSULIN SYRG MIS 0.3/31G	100	25	$29	MEDICAL SUPP ...					GURLEYS PHAR ...	MNC
	CARVEDILOL TAB 25MG	90	30	$7	CARDIOVASCUL ...	✓	DC?	1.27		GURLEYS PHAR ...	MNC
	FUROSEMIDE TAB 40MG	30	30	$2	DIURETICS	✓	DC?	1.22		GURLEYS PHAR ...	MNC
	METRONIDAZOL TAB 250MG	36	12	$3	ANTIPARASITI ...	✓				GURLEYS PHAR ...	MNC (1)

Other Entries (•) Active ( ) All

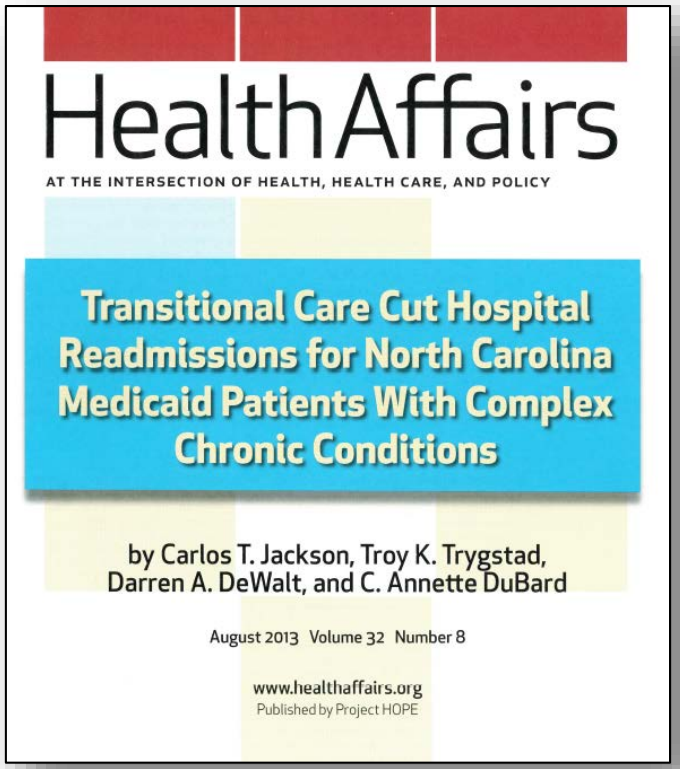
Added On	Drug Description	Frequency	Class	DOC	List Type	Site	Added By	Source
	AMLODIPINE TAB 5MG		CARDIOVASCUL ...	✓	Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	COREG TAB 25MG		CARDIOVASCUL ...		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	ADULT LOW DOSE ASA EC 81		ANALGESICS, ...		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	VITAMIN D3 400 UNIT TABLE		VITAMINS, FA ...		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	GABAPENTIN CAP 300MG		ANTICONVULSA ...	✓	Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	NOVOLIN N INJ U-100		DIABETIC THE ...		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	METRONIDAZOL TAB 250MG		ANTIPARASITI ...	✓	Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	LIPITOR 40 MG TABLET		LIPOTROPICS		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	TRAMADOL HCL 50 MG TABLET		ANALGESICS, ...		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)
	LIPITOR TAB 40MG		LIPOTROPICS		Discha ...	UNC Hospitals	Automated Feed	UNCH (1)

Transitional Care Team in Action

- RN care manager and health educator visited patient's home 2 days after discharge
  - Noted chaotic household; patient was "completely confused" about hospital events; unaware blood sugar had been >1000 at admission; "absent-minded"
  - CM worked with patient & family to develop a person-centered plan of care
- Follow-up PCP visit
  - CM accompanied patient to medical home
- Team-based care
  - Follow-up home visit by health educator and registered dietician
  - Patient/family education on "red flags" and use of glucometer
  - Nutritional assessment – baseline habits and knowledge
  - Provided bus pass to endocrinology appointment
- Network pharmacist consultation
  - Clarified active med list
  - Corresponded with patient's endocrinologist to simplify insulin regimen for better manageability, and switch to pen due to visual impairment

Early Findings from the CCNC Transitional Care Program

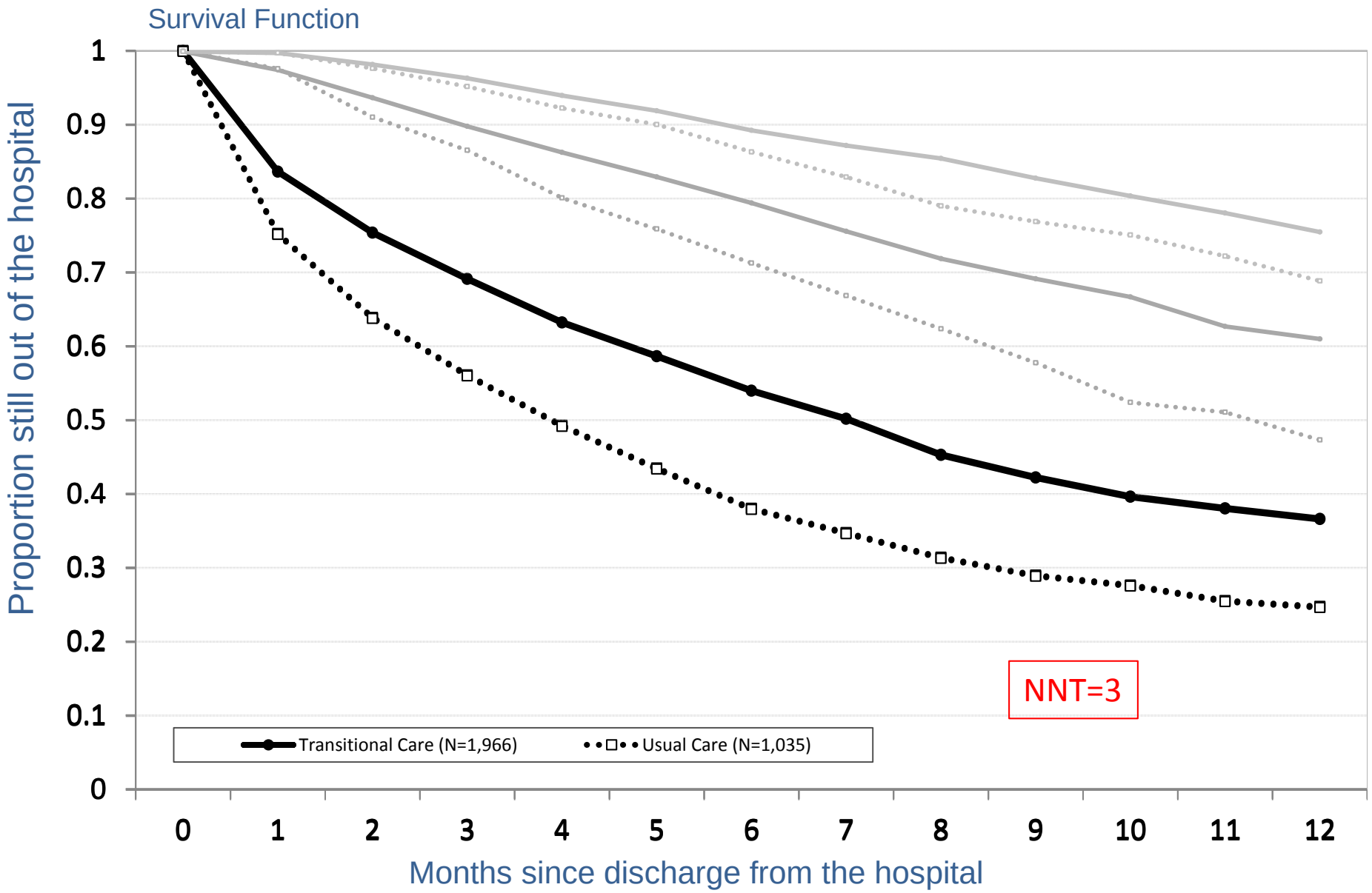
- 20% reduction in readmissions for patients with multiple chronic conditions in the transitional care program
- Benefit persists far beyond the first 30 days
- For every six interventions, one hospital readmission avoided – strong ROI



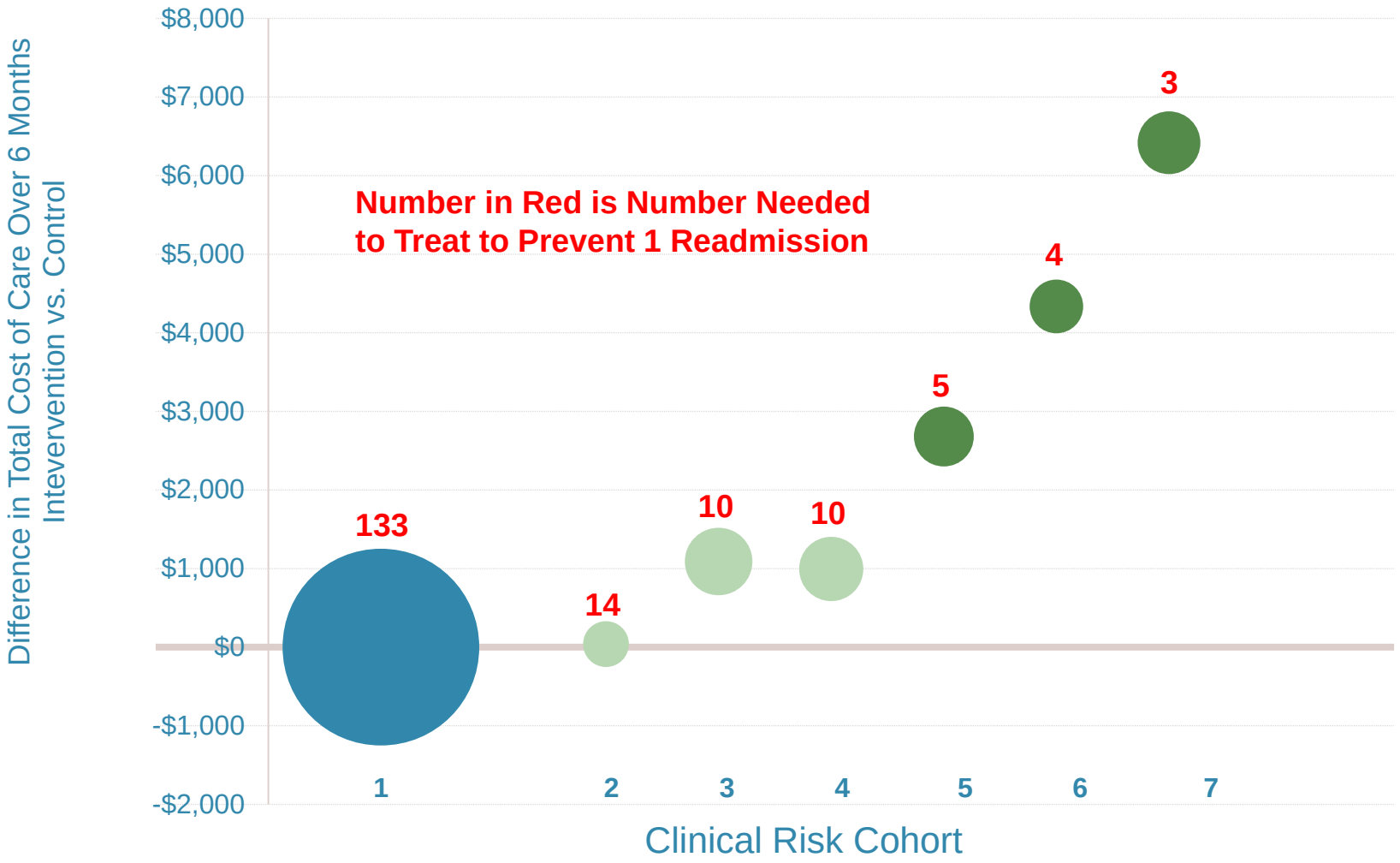
Time to First Readmission for Patients Receiving Transitional Care Vs. Usual Care

Lighter shaded lines represent time from initial discharge to second and third readmissions

(Significant Chronic Disease in Multiple Organ Systems, Levels 5 & 6; ACRG3 = 65-66)



Incremental Savings Achieved From Transitional Care, by Clinical Risk Strata



Size of circle represents number of Medicaid discharges, excluding newborn/delivery.

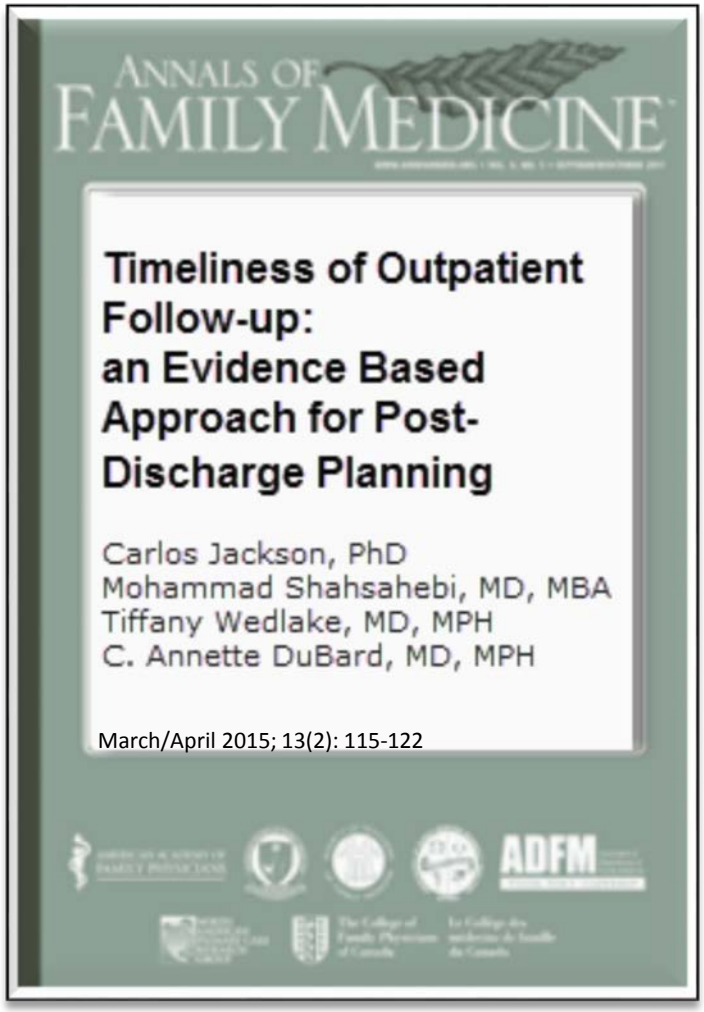
Digging Deeper

Are there specific components of transitional care that are associated with greater reduction in readmissions; for which patients, and under what circumstances?

Digging Deeper

How important is early outpatient follow-up after hospital discharge?

- A majority of patients do not meaningfully benefit from early follow-up
- Efforts should focus on assuring that highest risk patients receive follow-up within 7 days



Key Insight: Current Outpatient Visit Resources are Mis-matched

Opportunity Analysis for Patients Receiving 7-day Follow-up					
		Recommended Follow-up Period	Did the patient receive follow-up within 7 days of discharge?		
			NO	YES	Total
Risk Strata Grouping	0	**30 days**	16,082	10,242	26,324
	1	**21 days**	9,834	4,237	14,071
	2	**14 days**	9,099	4,151	13,250
	3	**7 days**	11,515	5,510	17,025
Total			46,530	24,140	70,670

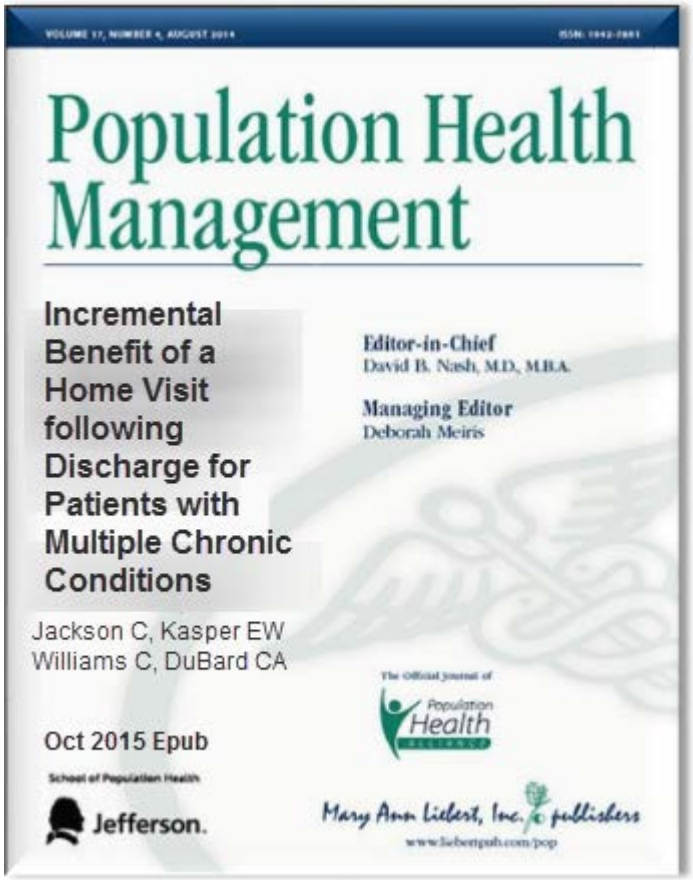
For every patient getting a 7-day follow-up who doesn't need it, there is a patient who would have benefitted from 7-day follow-up who did not get it.

Digging Deeper

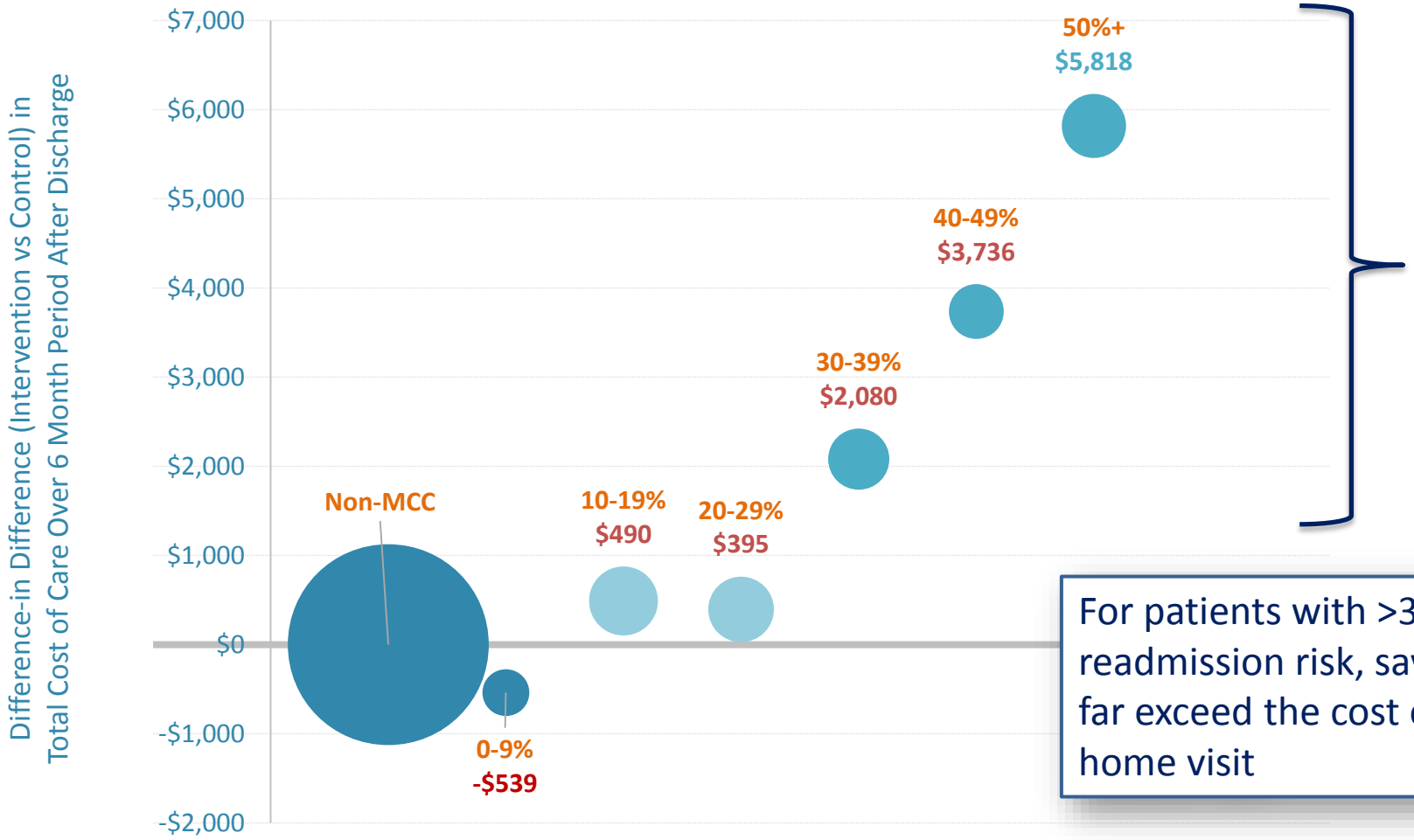
Is the Home Visit Really Necessary?

- Home Visits significantly reduce odds of hospital readmissions, compared to less intensive forms transitional care support (OR 0.52; 95% CI 0.48-0.57)

- Benefit is greatest for higher risk patients
  - Among highest risk, the incremental benefit amounted to 37 additional admissions averted over 6 months for every 100 patients who received a home visit



Incremental Savings Achieved From TC Home Visits by Clinical Risk Strata



*Percentages reflect the relative clinical risk for patients in that strata with Multiple Chronic Conditions (MCC), based upon their expected risk of a 90-day readmission. 'Non-MCC' reflects the number of non-delivery/newborn discharges incurred by all other CCNC enrolled patients without MCC.

Where we took it from there…

Impactability Scores as opposed to Risk Scores

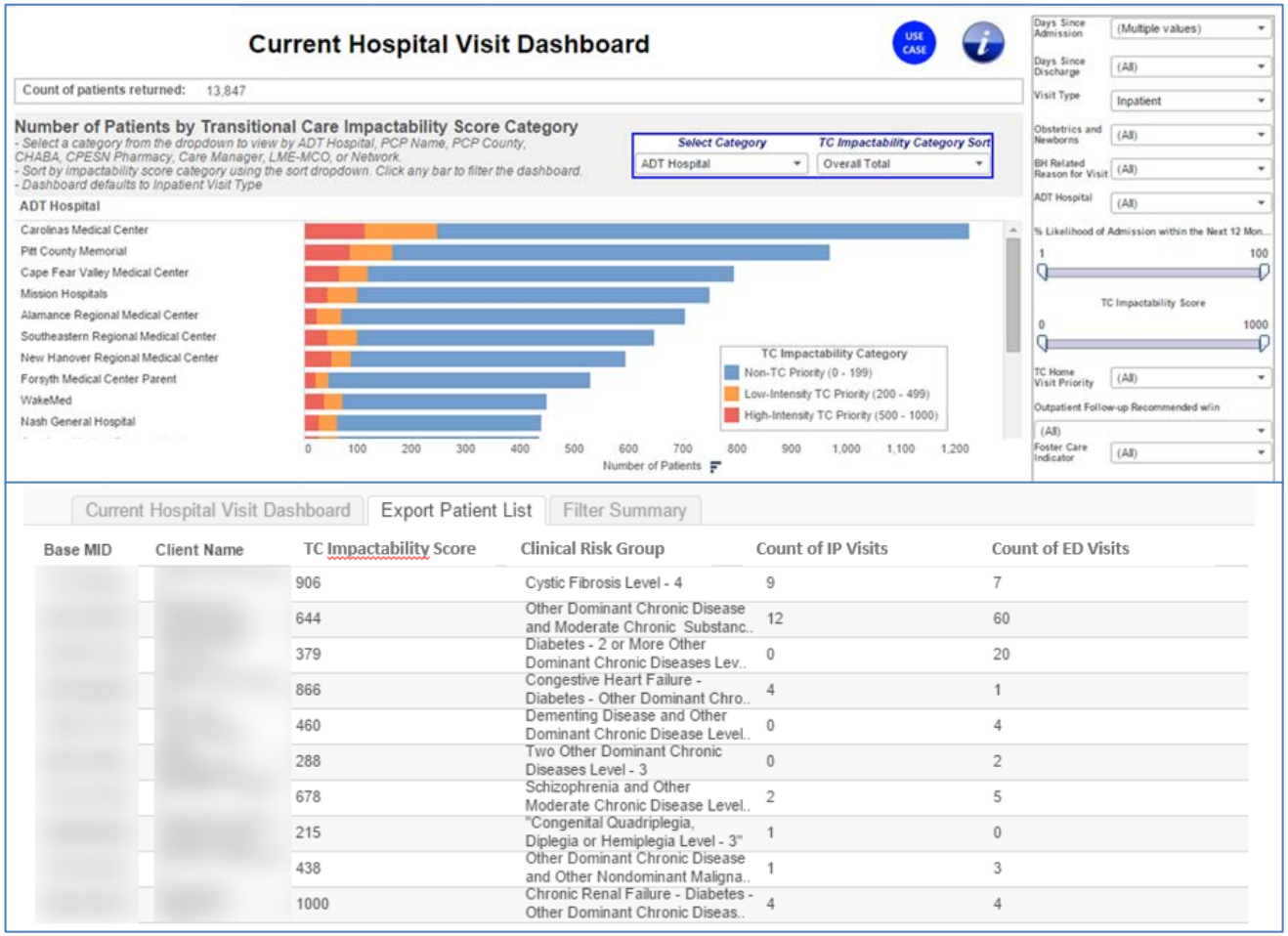
- **Risk Scores** are designed to predict events/outcomes in the absence of intervention. The dependent variable in the predictive models are typically events (e.g., hospital utilization) or costs.
- **Impactability Scores** are designed to identify members who will benefit the most from a given intervention. The dependent variable in the predictive models are the estimated savings from care management interventions, based on rigorous, controlled real-world evaluations.

Evidence-based Care Guidance

- What interventions make the most difference…. FOR which patients? BY whom? WHEN?

Putting It Into Action

- Real-time ADT notifications from 87 hospitals
- All members assigned a "TC Impactability Score"
- **Score reflects actual dollar savings expected pmpm x6 months**
- Specific indicators for:
  - ✓ Home visit priority
  - ✓ Timing of outpatient f/u
  - ✓ Risk of drug therapy problems (interaction, duplication, adherence)
  - ✓ End-of-life planning (mortality risk)
  - ✓ Chronic pain/opiate misuse
  - ✓ Behavioral health comorbidity



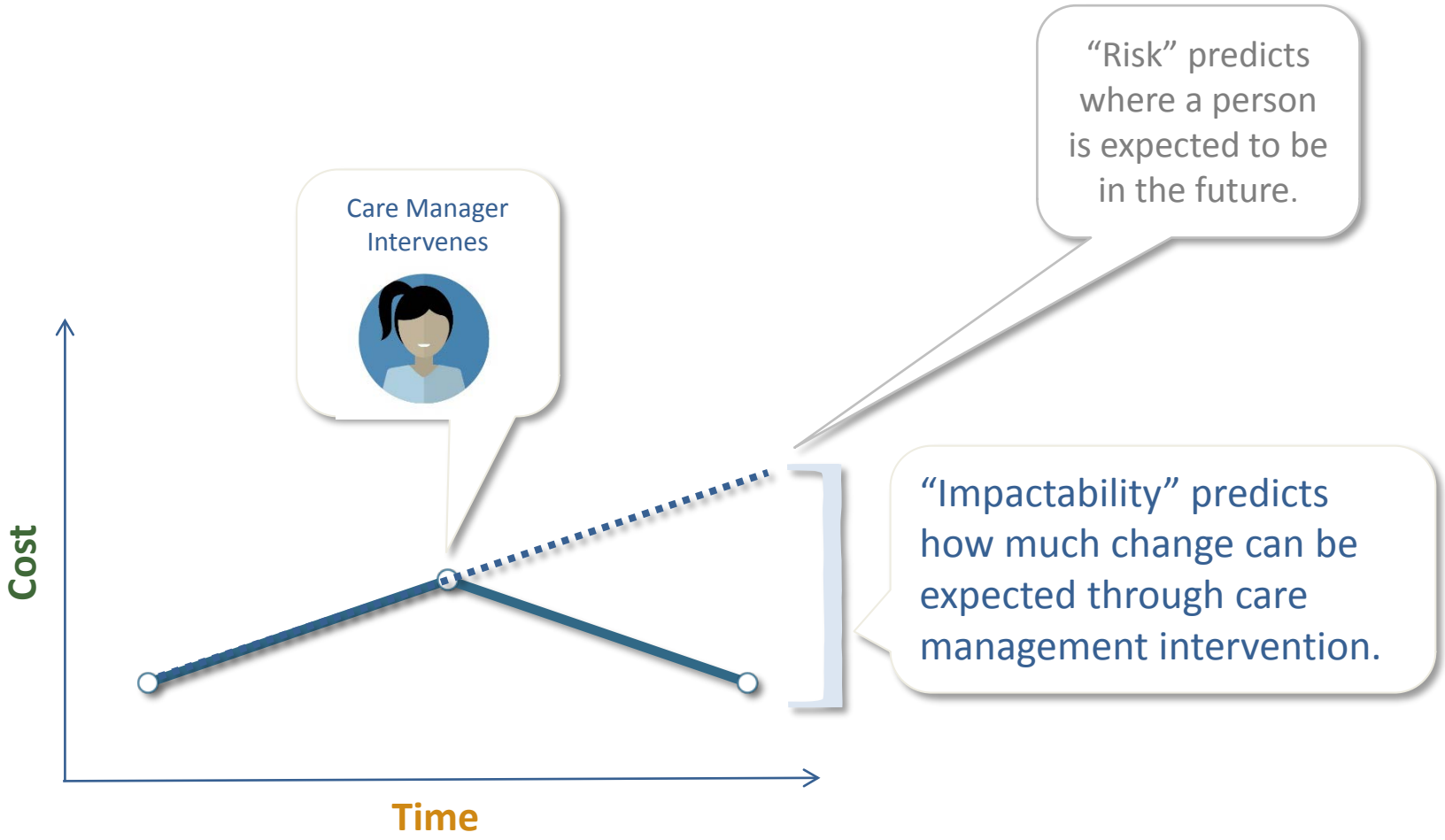
‘Right-sizing’ our Interventions to Maximize ROI

Patient Population	TC Impactability Score Criteria	Equivalent Savings Estimate Per Patient Discharged
High-Intensity Transitional Care	500-1,000	**$3,000 - $6,000**
Low-Intensity Transitional Care	200-499	**$1,200 - $2,999**

- **High-Intensity TC:**
  - Home visit
  - Comprehensive medication review
  - Outpatient follow-up within 7 days
  - End-of-life planning (if high predicted mortality risk)
  - Individualized care plan

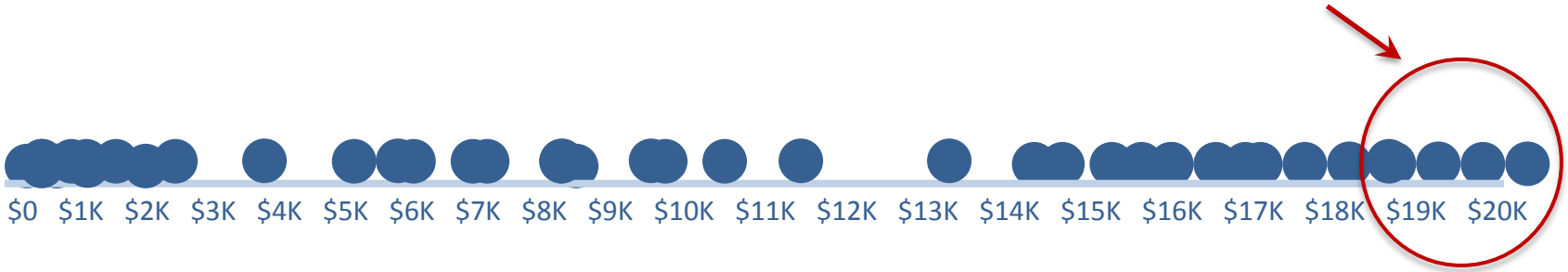
- **Low-Intensity TC:**
  - Telephone contact after discharge; face-to-face encounter (e.g. in PCP office) encouraged
  - Medication reconciliation
  - Outpatient follow-up within recommended time-frame for individual
  - Individualized care plan

The Sweet Spot: Optimizing ROI requires a focus on impactability



Impactability Concept

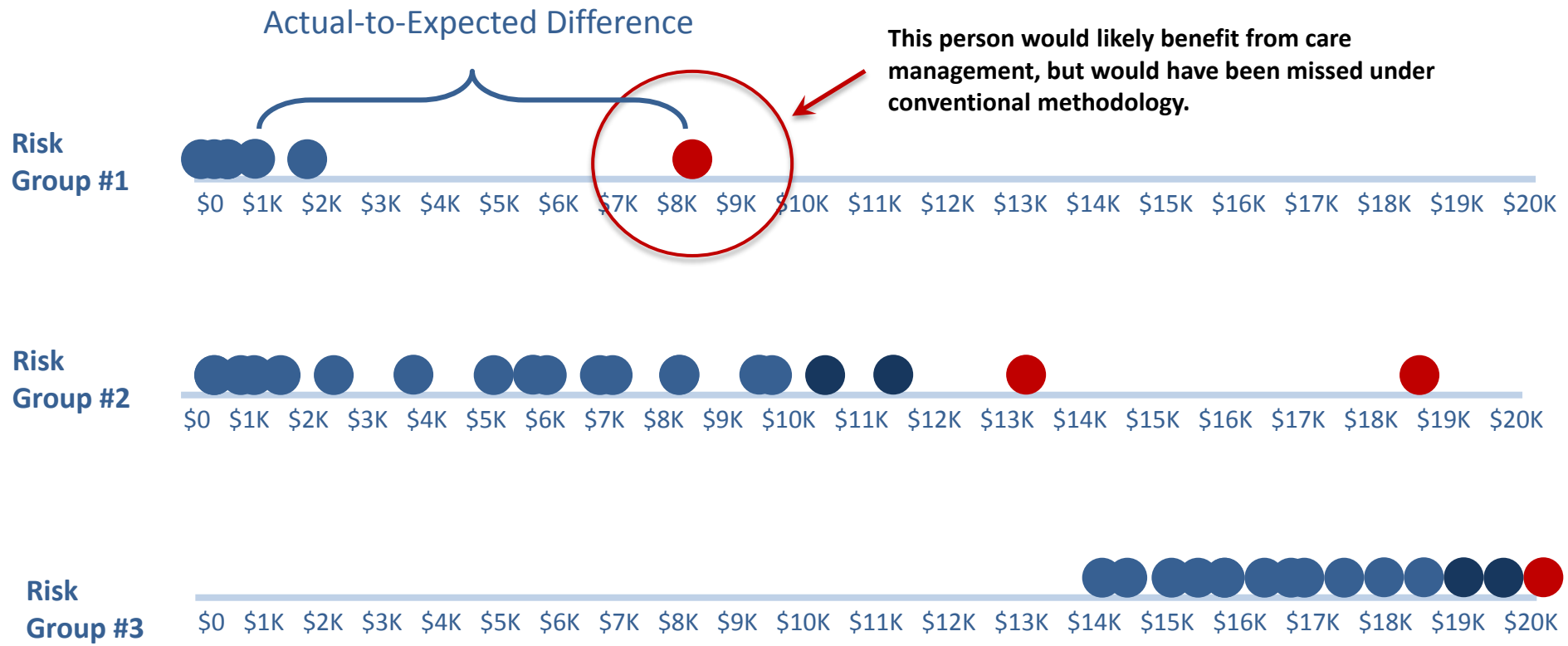
Historically, care management efforts have been targeted at the highest risk.



Total Enrolled Population

= Total costs for an individual

Impactability Concept



= Potentially preventable hospital costs for an individual

Care Management Impactability Score™

Score	How Defined?	What it means?	Key Drivers

Care Management Impactability Score™	A score from 0-1,000 reflecting likely cost saving, per month (over 6 months following care management);
	
	CCNC prioritizes patients with a CM Impactability Score above 200
		Clinical characteristics and utilization patterns indicate a high likelihood of benefitting from care management.	Claims-derived measures including:
			• Above-Expected Potentially Preventable Hospital Costs:
			  • 3M Clinical Risk Groups
			  • 3M Potentially Preventable Flags
			• Clinical Characteristics
			• Utilization Patterns
			• Medication Adherence
			• Demographics

Take-away points

Prioritizing patients with a score >200 flags less than 1% of the Medicaid population, but for these patients, we are confident that we can expect an average savings of $1,200 - $6,000 per patient receiving care management.

Social Determinants and the Need for the Community-Based Care Team

88% of Impactable patients have at least one of the following social risk factors in addition to their medical conditions:

- 77% have mental illness
- 30% lack adequate support system
- 29% lack adequate transportation
- 18% have unstable housing
- 17% have experienced trauma or abuse
- 17% have substance abuse problems
- 16% have unmet nutritional needs
- 14% are illiterate

➢ **58% have more than one of these**

➢ **21% have at least 4 or these**

Fragmented Care

The most impactable patients (score ≥ 500) visit an average of

- ❖ **14 different billing providers during any given year**
- ❖ **2.5 different hospitals for acute events in a 12 month period.**
  - o **70% use more than one hospital**
  - o **20% use 4 or more hospitals**

Conditions Themselves Don't Drive CM Impactability

Select CRG's (for illustrative purposes)	All Members	Members w/ a CM Impactability Score™ = 200+	
	N	N	%
Acute Lymphoid Leukemia Level - 2	135	6	4.4%
Asthma and Hypertension Level - 2	1,303	19	1.5%
COPD and Other Dominant Chronic Disease Level - 4	1,126	67	6.0%
Chronic Renal Failure - Diabetes - Other Dominant Chronic Disease Level - 2	101	2	2.0%
Congenital Quadriplegia, Diplegia or Hemiplegia Level - 2	1,086	10	0.9%
Congestive Heart Failure – COPD - Other Dominant Chronic Disease Level - 6	130	5	3.8%
Congestive Heart Failure - Diabetes – COPD Level - 6	251	13	5.2%
Diabetes and Asthma Level - 2	1,168	18	1.5%
Diabetes and Hypertension Level - 2	2,368	13	0.5%

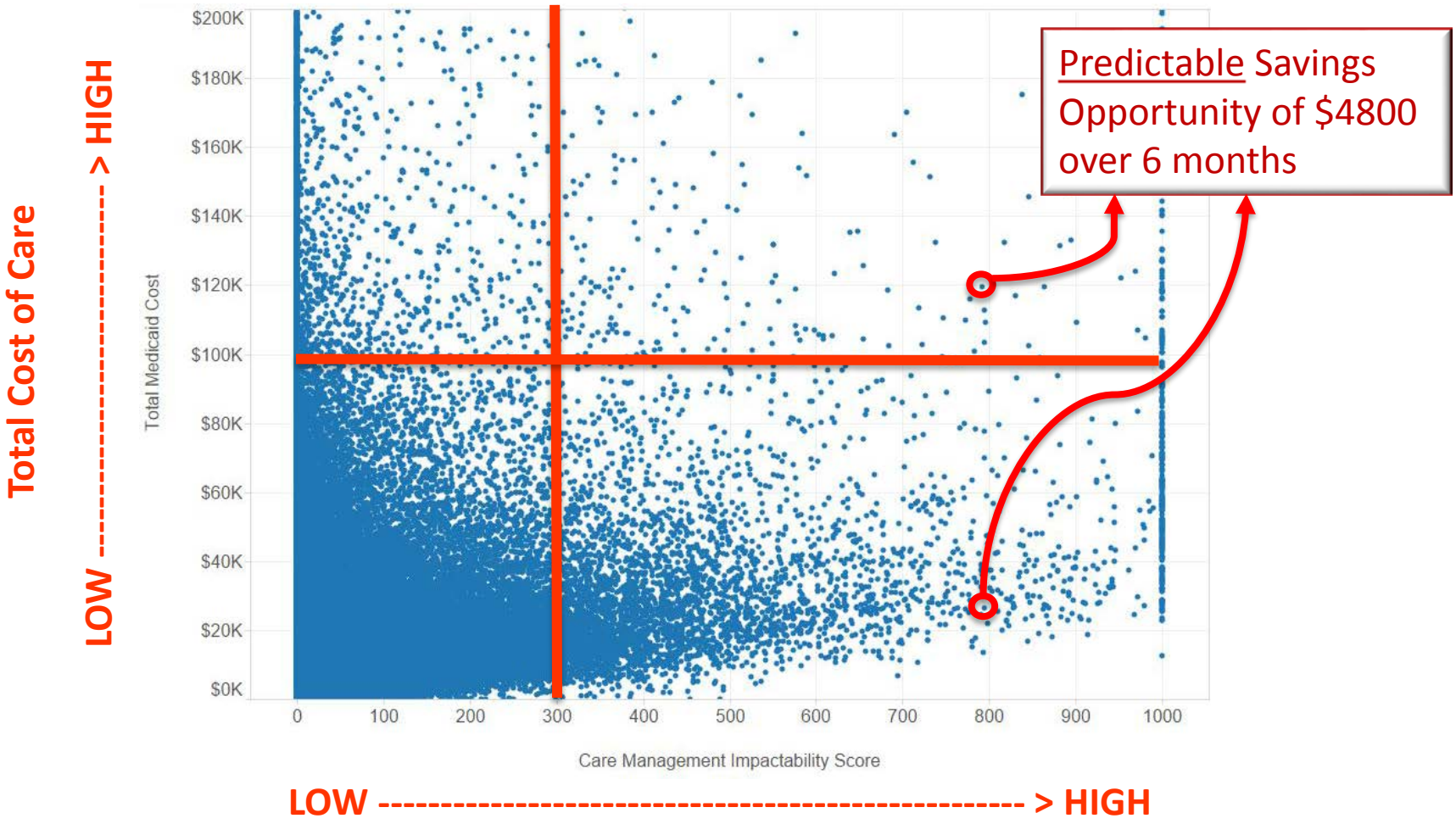
Only a small percentage within any clinical risk group is flagged as "impactable"

Example: *Two patients with advanced coronary artery disease and comorbidities, but very different impactability scores:*

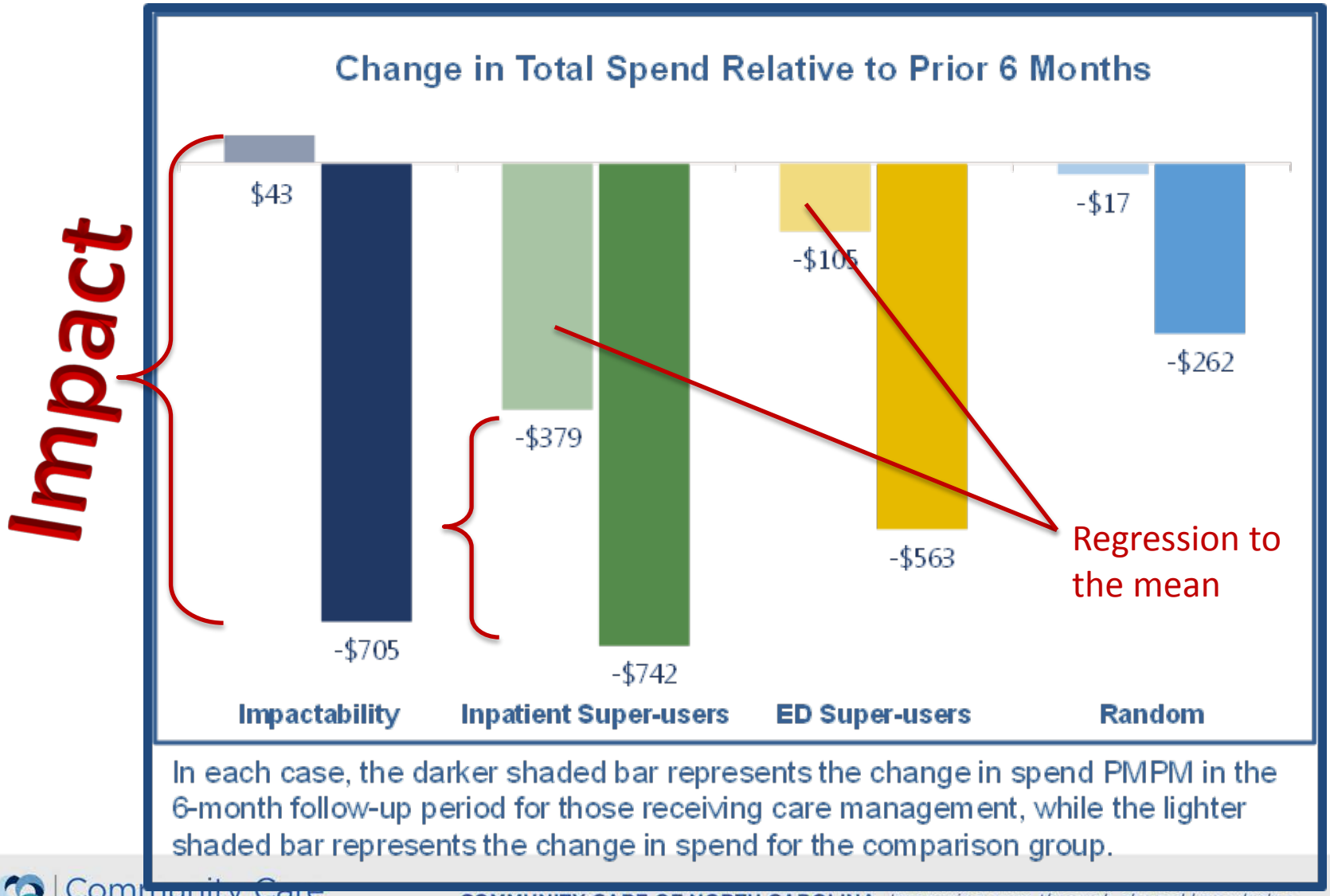
Age 39
IP visits: 2
ED visits: 2
Costs above-expected: $0
Impactability Score= 228

Age 53
IP visits: 2
ED visits: 47
Costs above-expected: $2,005
Impactability Score= 1,000

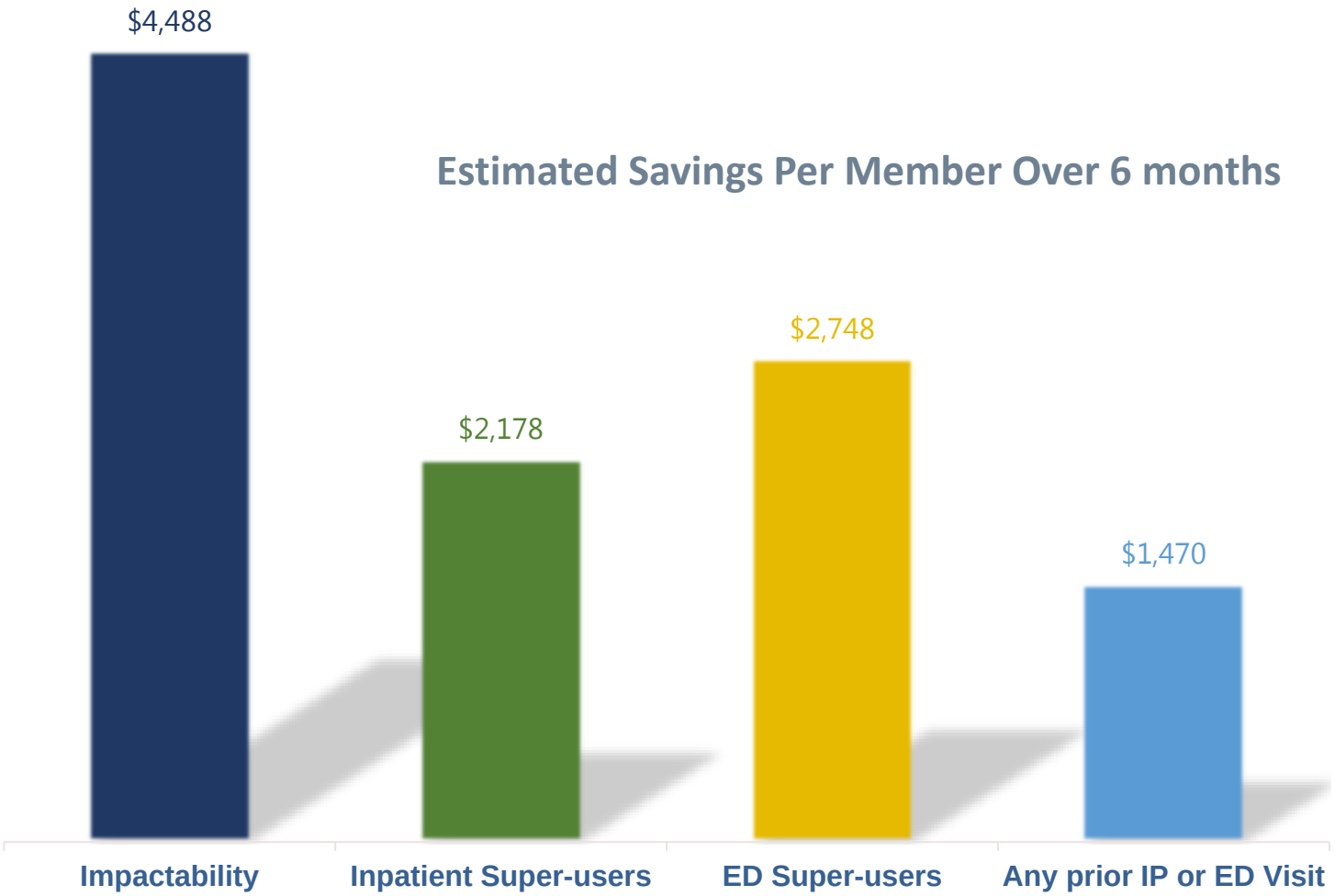
1.8 Million Medicaid Recipients
CCNC's Targeting Strategy Optimizes the Care Management ROI



Savings Impact by Targeting Strategy (Pre-post trend for comparison vs. intervention group)



Savings Attributable to Complex Care Management, by Targeting Strategy



Take-away point

The same investment in care managing 5,000 patients yields VERY different results depending on who you choose to manage.

Same Lesson Learned:
Savings to Medicare for Targeted Transitional Care of Dual Eligibles

Average Medicare Spend PMPM During 6 Months After Discharge

Risk Strata	TC with Home Visit Group (Unadjusted)	TC with Home Visit Group (HCC Risk-Adjusted)	No Transitional Care Group	Risk-adjusted Difference
Low	$3,588	$2,782	$1,908	$874
Medium	$3,986	$3,370	$3,603	-$233
High	$6,015	$6,727	$7,753	-$1,018

All patients in above analyses had multiple chronic conditions, with a predicted 30d readmission risk at least 10%. TC generated savings, however, only for medium and highest risk patients.

TC of highest risk patients reduced readmissions from 38% to 27%, and spend by $6,108 per patient over 6 months. This opportunity represents 18% of discharges for Medicare/Medicaid duals.

TC of medium-risk patients reduced readmissions from 19% to 13%, and spend by $1,398 per patient over 6 months. This opportunity represents 37% of discharges for Medicare/Medicaid duals.

Palliative Care Experience

- Palliative Care interventions work.
- However, most of the impact from CCNC's palliative care interventions are only realized *at the end of life* (often the last month of life).
- People that are incorrectly flagged for palliative care management experience *no significant change* in costs or admissions.
- **Positive ROI depends upon accurate prediction of mortality risk to finely target outreach and intervention**

CCNC Palliative Care interventions have been proven to reduce end-of-life spending

Fewer Inpatient Admits
Less Spend:

$1,661 PMPM (MCaid)
$5,000 per patient in last month (MCare)

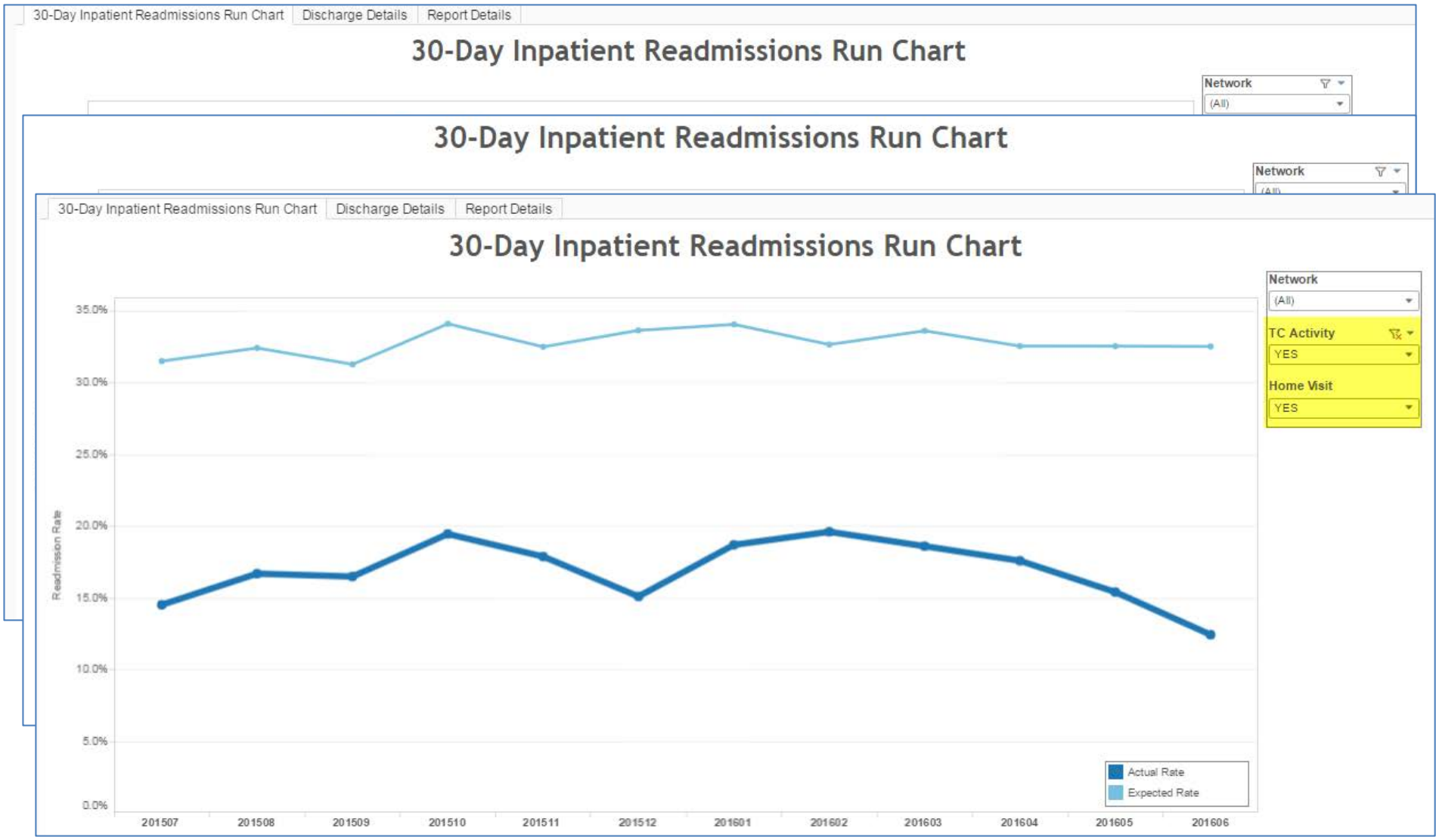
Evaluation of Call Center F/U after non-emergent ED visit (NNT to prevent one subsequent ED visit)

PRE-PERIOD UTILIZATION	N	POST (EXPECTED)	Upper CI Limit	Lower CI Limit	POST (ACTUAL)	ABSOLUTE REDUCTION	NNT
0	2682	1140	1258	1025	1597	457	N/A
1	1509	1704	1788	1619	1400	-304	5.0
2	667	1223	1268	1177	926	-297	2.2
3	275	698	720	675	513	-185	1.5
4	158	512	527	497	554	42	N/A
5+	227	1449	1482	1414	1445	-4	N/A
TOTAL	5518	6725	7042	6407	6435	-291	

RED = Above Expected YELLOW = Marginal or No Difference GREEN = Below Expected

"Sweet spot" for lower cost intervention

Practical applications: Rapid-cycle PDSA



Practical applications:
Predictable savings from targeted care management

(Example from Lower Cape Fear 6-county region)

Total Non-dual Medicaid Eligibles	99,253
Percent Enrolled in a CCNC Practice	85%
Impactability-Guided Care Management	
Number of Patients with CCM Impactability Score of 200+ (CCNC Priority)	555
Expected Savings from CCNC's Complex Care Management	**$1,185,000**
Number of Inpatient Discharges with TC Impactability Score of 200+ (TC Priority)	2,794
Expected Savings from CCNC's Transitional Care Management	**$8,868,000**

Practical applications:
Impactability Scores and Resource Planning

- Impactability Score values represent expected average savings from defined intervention. For example, a patient with a **CM Impactability Score** of '300' is a patient for whom, if care managed, one could expect to achieve savings of $300 PMPM over the next 6 months, or $1,800 total
- Helpful for resource planning to optimize return on investment

Example ROI Calculator

Inputs			
Outputs			
Task category	Minutes	hourly salary/rate	Cost
Home Visit	**90**	**$35**	$73.56
Other Face to Face Encounters	**65**	**$35**	$16.77
Pharmacist	**45**	**$60**	$53.65
Non Face to Face Encounter BY a Care Manager	**35**	**$35**	$210.79
Non Face to Face Encounter BY Non Clinician	**30**	**$25**	$44.61
Travel (in miles one-way)	**50**	**$0.50**	$50
Total			$449

How much savings can you expect?					
	High TC	Low TC	ED-Supers	PPL	TOTAL
Patients	678	550	220	150	**1,598**
Cost per patient	$449	$146	$449	$399	
Savings per patient	$4,000	$1,500	$1,800	$1,400	
ROI per patient	$3,551	$1,354	$1,351	$1,001	
ROI per Quarter	$2,407,323	$744,599	$297,137	$150,094	**$3,599,153**

Take-Aways

- Indiscriminate deployment of care team interventions will "wash out" your measured effect/ ROI
- If the sustainability of your program relies on demonstrating near-term return on investment, targeting is everything!
- High Cost/High Risk ≠ Highly Impactable
- "Learning Health Systems" are critical to figuring this stuff out!

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