

# Identifying Highest Yield Transitional Care Opportunities



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## KEY POINTS FROM THIS BRIEF:

- When targeted appropriately, transitional care for patients discharged from the hospital yields substantial return-on-investment and has long-lasting benefits.
- CCNC's vast care management experience has allowed for an evidence-based approach to identifying patients most likely to benefit from transitional care, to optimize overall efficiencies and effectiveness.
- A targeting strategy that uses CCNC's Transitional Care Impactability Scores™ can be expected to yield nearly twice the savings of common risk-based or diagnosis-based strategies.

## Background

Transitional care support for patients after hospital discharge has become an important strategy of payers, employers, government agencies, and provider groups who strive to reduce readmissions, improve outcomes and lower costs of care. It is well established that many readmissions can be prevented through coordinated care team support of patients and families following hospital discharge. However, entities struggle with uncertainty related to how much to invest in transitional care management programs, and how to identify which patients are most likely to benefit. Common strategies include using clinical criteria (such as certain diagnoses or number of comorbidities), or using more sophisticated predictive modeling tools to identify those at highest risk for readmission. There are pitfalls to both

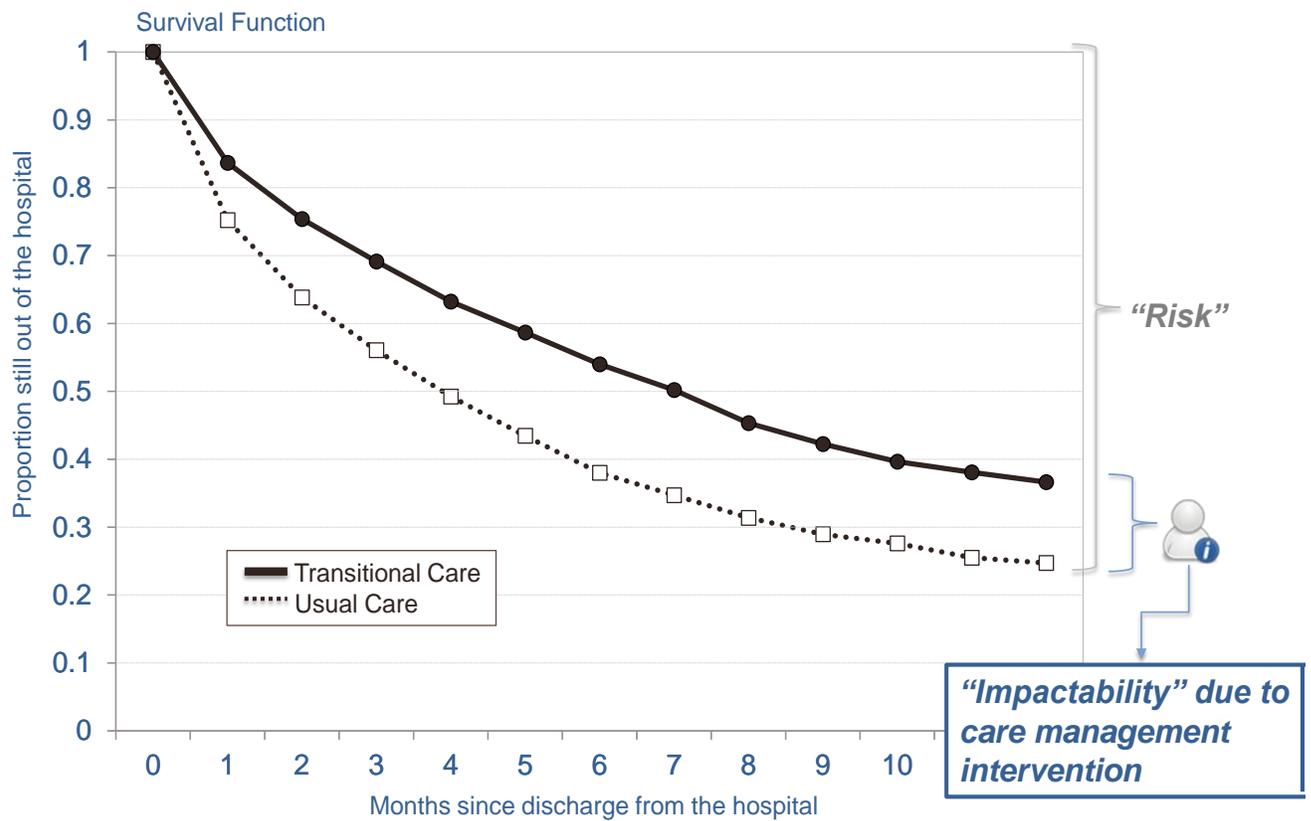
approaches: a diagnosis-based approach may blunt the impact of the program by including patients who were unlikely to be readmitted regardless of intervention, while a strictly risk-based strategy may be misdirected because not all risk responds to care management. As such, better tools are needed to help care management programs target their limited resources to optimize benefit.

With over seven years of experience in transitional care management provided to over 100,000 patients to date, Community Care of North Carolina (CCNC) has actively evaluated and evolved its strategic approach to transitional care management over time, from a focus on "high risk" to a focus on "highly impactable." Unlike risk scores which aim to predict

who is most likely to have an event, CCNC’s Impactability Scores aim to predict which patients are most likely to benefit from an intervention. With the advantage of real-world care management experience across a diversity of patients and settings captured in a statewide care management information system, and a longitudinal view of cost and utilization outcomes, CCNC is uniquely advantaged to examine

“impactability” empirically: what works and what doesn’t, when, for whom? The Transitional Care Impactability Score™ applies those learnings in order to efficiently deploy transitional care team support to patients who are most likely to benefit, supporting those patients with an individualized care plan, and optimizing return on investment in the face of limited care management resources.

**Figure 1. Risk vs. Impactability: Time to First Readmission for Transitional Care Compared to Usual Care**



In the figure above, complex patients who received transitional care stayed out of the hospital longer than similar patients who did not get the intervention. This difference between what would have happened with and without the intervention is what CCNC calls “impactability.”

## Transitional Care Works

When targeted appropriately, transitional care yields substantial return on investment and has long-lasting benefits. CCNC's transitional care management program has been previously described<sup>1</sup>, and has been found to reduce the likelihood of hospital readmission by 20% overall among patients with multiple chronic conditions.<sup>2</sup> The benefits observed are long-lasting – as much as a year later – with reductions in likelihood of a second and third admission over the course of the following year. The impact of transitional care tends to be higher among the most complex patients, including those with severe mental illness.<sup>3,4</sup>

In addition, CCNC has been able to evaluate the impact of different interventions. For example, our prior

work has demonstrated that home visits significantly reduce the odds of hospital readmissions – by approximately half – compared to less intensive forms of transitional care support, but certain patients are much more likely to benefit than others. Among the most complex patients, the incremental benefit of the home visit amounts to 37 additional admissions averted over 6 months for every 100 patients, compared to less intensive forms of transitional care support.<sup>4</sup> Similarly, a majority of patients discharged from the hospital do not benefit meaningfully from early outpatient follow-up, but securing early follow-up appointments for certain patients will decrease readmission rates by up to 20%.<sup>5</sup>

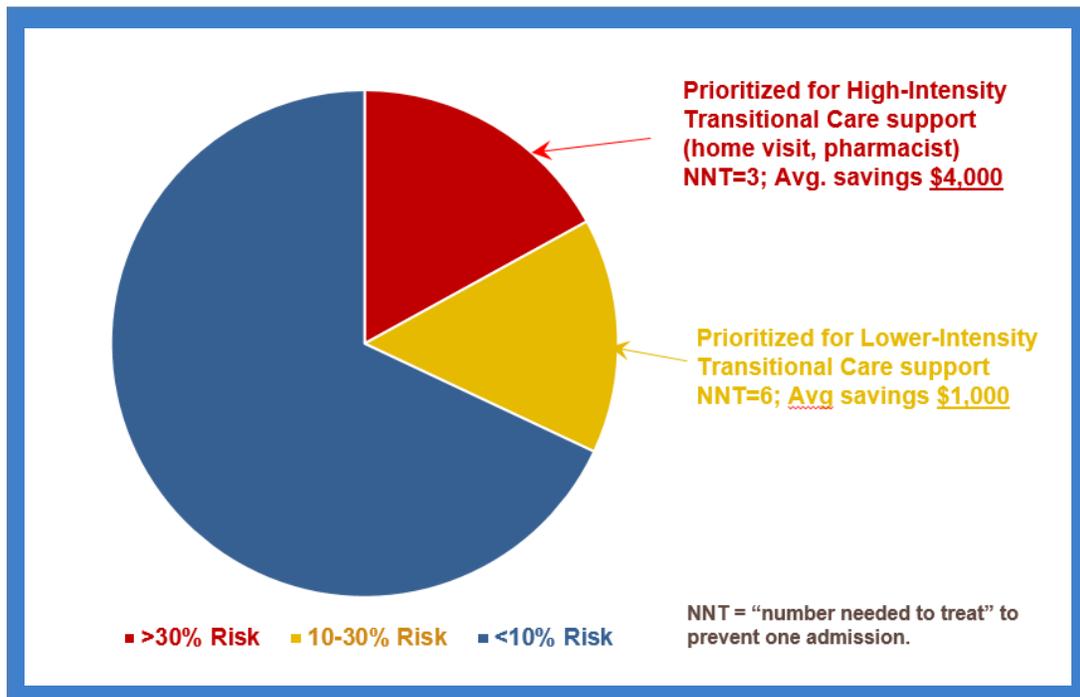
***Savings associated with the “impactability” approach are nearly twice that of other risk-based strategies***

Figure 2 on the following page summarizes the learnings from CCNC's experience with transitional care management for the North Carolina Medicaid population. The majority of Medicaid patients discharged from the hospital to home have low readmission risk, and rates of readmission are not meaningfully impacted by transitional care management (blue slice). Approximately 17% of patients (yellow slice) will benefit substantially from low-to-moderate intensity transitional care support (including components such as comprehensive assessment and individualized care plan, care coordination, and telephonic or face to face contact

with a nurse care manager in the hospital or physician office). We can expect to avert one

readmission for every six patients who receive transitional care in this group, with an average gross savings of \$1,000 per intervention patient over 6 months. The remaining 17% (red slice) are very complex patients, including patients with mental illness and physical comorbidity, who will benefit substantially from more intensive transitional care support, including a home visit by a nurse care manager, comprehensive medication review, early outpatient follow-up, and attention to end-of-life care as appropriate. For this group, providing care management for as few as three patients will prevent one hospital admission in the coming year, with an average gross savings of \$4,000 per patient managed.

**Figure 2. Volume of Medicaid Hospital Discharges, by Patient Risk of 90-day Readmission**



## Development of the Transitional Care Impactability Score™

In 2014, CCNC began consolidating all of this knowledge into the creation of a single score to help prioritize patients for transitional care management and provide guidance around the recommended intensity of that intervention. One of the key ingredients are Clinical Risk Groups developed by 3M Health Information Systems.<sup>6</sup> Clinical Risk Groups, or CRG's, evaluate each individual's historical claims data and assigns each patient to one of over 1,000 mutually exclusive peer groups based on diagnoses and combinations of diagnoses. Patients with multiple chronic conditions are additionally assigned a severity indicator. Further stratification by age and gender results in > 15,000 distinct groups for analysis. This is in contrast to other tools for targeting care management which are often less granular. For example, the Charlson Comorbidity Index<sup>7</sup> is a common tool used in risk assessment, but the index typically ranges from 0 to less than 20. Patients with a

score of 8 (for example) could arrive at that number many different ways, thus making the number '8' useful for crude expression of degree of complexity, but not clinically specific.

Building upon the granularity of 3M CRG's and our volume of observations over time, CCNC has been able to differentiate the impact of transitional care management interventions within very specific groupings of patients with similar clinical, demographic, and historical utilization characteristics. The Transitional Care Impactability Score™ is a number reflecting observed savings to Medicaid determined through real-world evaluations of patient spending trends attributable to care management, controlling for normal trends in patients not receiving an intervention. All patients in a population can be assigned a score that ranges from 0-1,000, reflecting the expected average gross cost savings in dollars per patient per month over the next six months for

hospitalized patients who receive transitional care management. For example, a patient with a score of 500 is

someone who will yield a monthly savings of \$500, or \$3,000 over the next 6 months with transitional care.

### How Does this Approach Compare to Other Targeting Strategies?

While CCNCs Transitional Care Impactability Score was developed to optimize the prediction of impactability, it does compare favorably to other models in the published literature for the more common aim of predicting hospital readmission, as shown in Figure 3. Among NC Medicaid medical and surgical discharges, we examined readmission rates among patients whose Transitional Care Impactability Scores were in the top 25%, compared to the top 25% based on an alternative validated model that predicts overall risk of admission, the top 25% based on Charlson comorbidity index, and a 25% random sample of all discharges.

In Figure 3, the c-statistic is a number summarizing the model’s predictive power compared to chance alone (higher is better).<sup>8</sup> The positive predictive value indicates what percent of patients were actually readmitted within the following year, out of the top quartile of patients for each targeting approach (higher reflects better predictive power).

While the Transitional Care Impactability Score performs well for predicting readmissions, we are much more interested in how well it predicts achievable savings attributable to care management intervention.

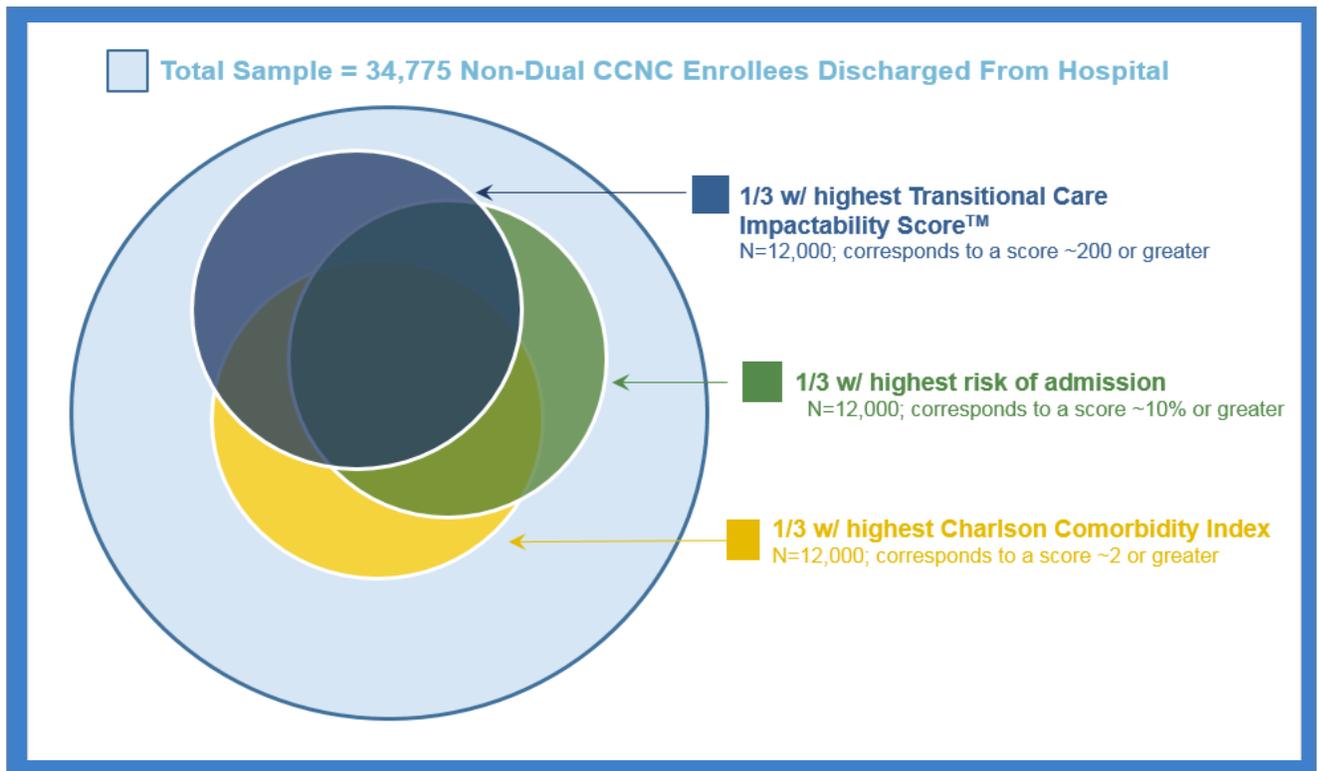
To validate the performance of the score for this intended use, we examined readmission rates in a

study of 34,775 CCNC-enrolled Medicaid beneficiaries discharged from the hospital to their home during a time period that preceded the introduction of the impactability score targeting strategy (July 2010 – March 2011).

From that group we selected the 12,000 patients who would have had the highest impactability score, 12,000 patients with the highest risk of an admission based on a validated prediction model, 12,000 with the highest Charlson Comorbidity Index, and a random sample of 12,000 patients (See Figure 4).

**Figure 3. Relative Effectiveness of Targeting Strategies for Predicting Readmissions**

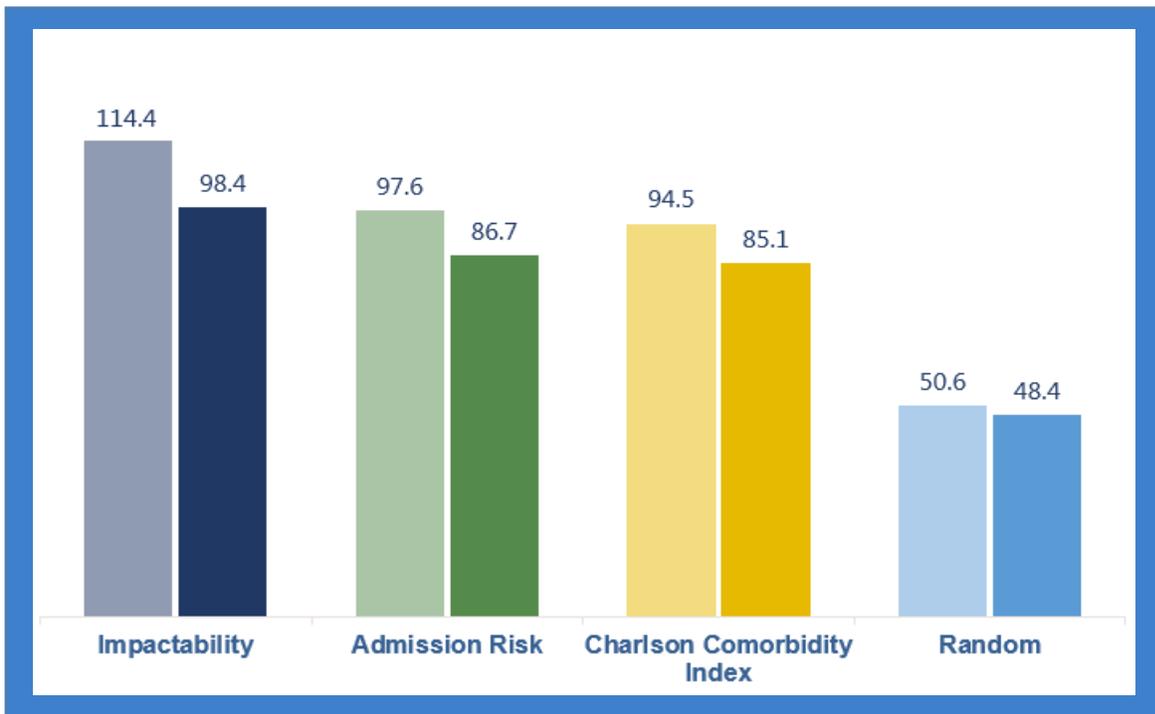
Upper Quartile of Discharges for Various Targeting Methods	C-statistic	Positive Predictive Value
Transitional Care Impactability Score <sup>TM</sup>	.77	60%
Admission Risk Score	.68	49%
Charlson Comorbidity Index	.66	48%
Random	.50	29%
Other Models in Published Literature <sup>8</sup>	.59 - .72	N/A

**Figure 4. Breakdown of Test Population**

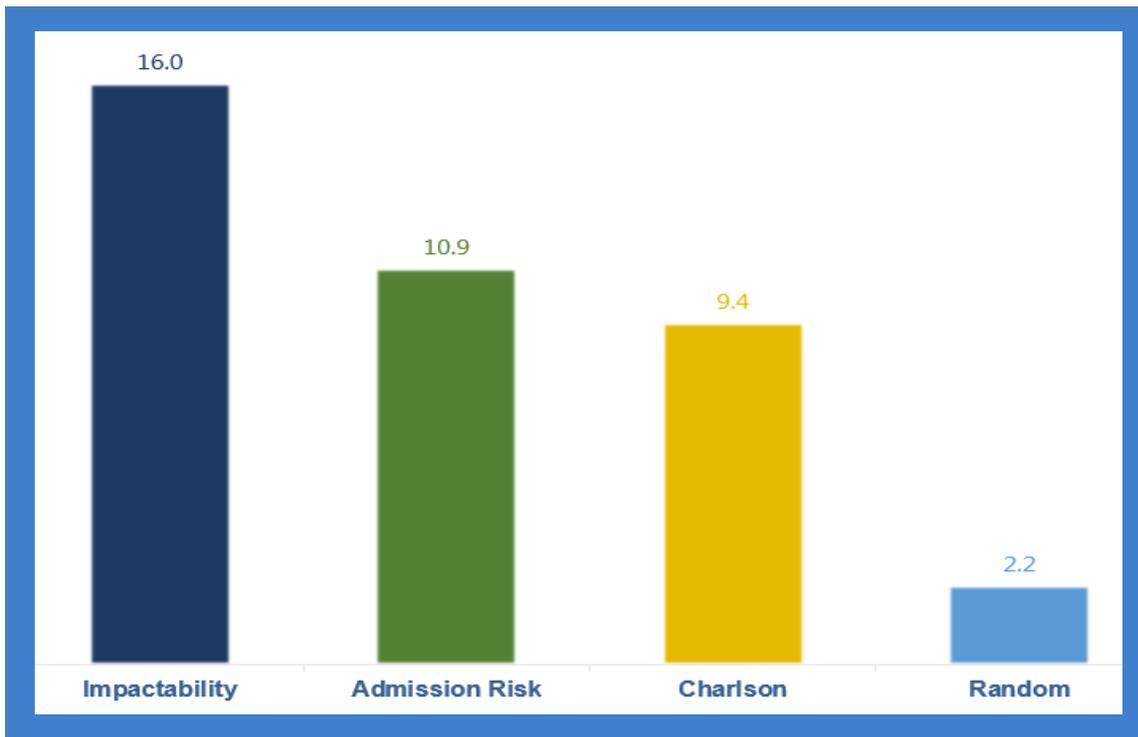
Within each group, we compared the difference in number of admissions during the 6 months following hospital discharge, among those who received care management vs. those who did not. In Figure 5 on the following page, the dark and light bars represent the number of admissions in the 6-month follow-up period for the intervention (those receiving transitional care management) and comparison groups, respectively. Patients can have more than one admission in the follow-up period, hence some numbers are higher than 100. In all 4 scenarios, patients who received transitional care management had fewer admissions in the follow-up period than what was observed in their respective comparison groups.

While all models showed a reduction in readmissions after intervention, care management of patients with the highest Transitional Care Impactability Scores™ resulted in a greater number of averted admissions relative to similar patients who did not receive care management. As detailed in Figure 6 on the following page, this impact was roughly twice as much as what was achieved through management of patients with high admission risk, either defined by the Charlson Comorbidity Index or a validated admission risk prediction model, and several times higher than what was averted through care management of the broader pool of patients coming out of the hospital.

**Figure 5. Readmissions in 6-Month Follow-up; Control vs. Intervention by Strategy**



**Figure 6. Readmissions per 100 Discharges Averted – by Strategy**



## Savings Estimations and Opportunities

Impactability Scores are built to predict total-cost-of-care savings, taking into account observed reductions in hospital costs as well as higher spending in desirable areas such as ambulatory care and medication use. This approach is particularly well suited for accountable care organizations or full-risk bearing entities. Alternatively, savings estimates can be provided based on averted inpatient admissions alone, adding utility for other scenarios.

Figure 7 below displays the expected rate of averted admissions and associated savings by payer population and targeting strategy. Here, the savings associated with the “impactability” approach is almost twice as much as observed in the other risk-based approaches, and several times higher than a “random” approach.

**Figure 7: Savings Per 100 Transitional Care Patients by Payer and Targeting Approach.**

Approach (Averted admissions per 100 transitional care patients)	Payer (avg. cost of admission) <sup>9</sup>			
	Medicare (\$12,200)	Medicaid (\$8,100)	Private (\$9,700)	Uninsured (\$8,800)
<b>Impactability</b> (16.0)	\$195,200	\$129,600	\$155,200	\$140,800
<b>Admission Risk</b> (10.9)	\$133,000	\$88,300	\$105,700	\$95,900
<b>Charlson</b> (9.4)	\$114,700	\$76,100	\$91,200	\$82,700
<b>Random</b> (2.2)	\$26,800	\$17,800	\$21,300	\$19,400

## Use cases and real-world examples

The expression of impactability as achievable savings adds additional utility to the Transitional Care Impactability Score,<sup>TM</sup> allowing program planners to judiciously determine the optimal allocation of care management resources, with much greater certainty around anticipated return on investment. The use cases detailed below demonstrate the utility of the Impactability Approach.

### Applications of the Transitional Care Impactability Score

#### **Aim: Avoid Medicare Readmission Penalties**

- Assume a hospital with an all-cause readmission rate of 18%, who aimed to bring that down to 14% to avoid Medicare penalties:
- That goal can be achieved by providing CCNC-model transitional care support to just 20 of the highest impactable patients per 100 discharges.
- This compares favorably to less efficient approaches where the same savings could be achieved by providing transitional care support to 29 per 100 based on admission risk score; 34 per 100 based on comorbidity index; or every discharged patient.

#### **Aim: Reduce Uncompensated Care Costs**

- In a typical population of uninsured patients requiring hospitalization, 32 per 100 will be flagged for Transitional Care Priority (TC Impactability Score >200).
- Transitional care support for those 32 patients will prevent 5.3 future admissions, averting approximately \$46,600 of uncompensated care
- If Transitional Care were provided to 32 patients based on alternative targeting strategies, expected savings would be lower (\$31,700, \$27,400 or \$6,000 based on admission risk score, comorbidity index, or all discharged patients, respectively)

#### **Aim: Reduce Inpatient Costs for Commercial Population**

- Assume a self-insured population or a full-risk accountable care contract for a privately insured adult population, with a typical readmission rate of 10% and average cost of an inpatient stay \$9,700
- Setting a threshold impactability score to flag the top 10% of discharges will require that 10 per 100 patients receive transitional care, yielding \$16,000 in gross savings through 1.6 averted admissions for every 10 patients managed.

## Data Sources and Methodology

Data on total Medicaid spending, utilization, diagnoses, enrollment and eligibility came from NC Medicaid paid claims and administrative files. Information about whether patients received care management came from CCNC's Care Management Information System. Data on average hospital costs for inpatient admissions came from the AHRQ Healthcare Cost and Utilization Project for hospitalizations during the year 2012.<sup>9</sup>

For the validation study, subjects were selected from a pool of 34,775 Non-dual CCNC-enrolled Medicaid beneficiaries who were discharged from the hospital to their home during the period July 2010 through March 2011, and followed for up to 6 months post-discharge. Only discharges from in-state general hospitals were included, and hospitalizations for deliveries/newborns, cancer, burns and traumas, were excluded. Patients in this sample were divided into one of two groups – an intervention and a comparison group. Patients who received a transitional care intervention at any point from the time they were admitted to the hospital through 30 days post-discharge were included in the intervention group (N=14,668). Patients who did not receive any transitional care intervention were included in the comparison group (N=20,107). Patients in both groups had to be Medicaid eligible for at least 6 months following the index discharge to be included in the analysis. Readmissions were defined as any inpatient admission regardless of the reason for the admission, up through 6

months following the index discharge date. We also included second and third readmissions following discharge as long as they occurred within the 6-months following the initial index discharge.

To mitigate against selection bias, we evaluated the impact of care management during a period when the transitional care program was mature but not fully to scale.

Additionally, we adopted the most conservative approach for examining effectiveness by including everyone in the intervention group who received the most minimal level of intervention, including those patients who may have refused further intervention.<sup>10</sup> While this helps to further mitigate selection bias, it may also result in an underestimation of the full effect of the intervention.

Utilization during the year prior to hospital discharge determined assignment into the four study groups (12,000 highest impactability score; 12,000 highest admission risk; 12,000 highest Charlson Comorbidity Index; and 12,000 randomly selected). The number '12,000' was selected because it roughly equated to 1/3 of the hospital discharges, which corresponds to the approximately 1/3 of discharges benefitting from transitional care (see Figure 2).

In the absence of a randomized controlled trial, the possibility of selection bias remains, but any remaining biases should be similar across the four study groups, preserving our ability to draw conclusions about relative effects.

## Conclusions

With increasingly aligned incentives to improve patient experience and outcomes while lowering costs of care, providers and payers need tools to help them identify which patients are likely to benefit from care management support. Transitional care is one very effective way to achieve this goal, but the return on investment is highly dependent on the targeting strategy. Approaches that target patients based on certain diagnoses, high historical costs or utilization, or high risk of future hospitalization have merit, and are likely to

yield greater benefit than less discriminant use of care management. Optimizing return on investment, however, requires more intelligent deployment of resources toward those who are most likely to benefit. CCNC's analytic methods effectively use administrative data for an efficient and informed first pass at identifying "highly impactable" patients, allowing for more productive use of the care team's time, for the greatest benefit across the population.

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## Suggested Citation

Jackson CT, DuBard CA (October 2015). *Identifying Highest Yield Transitional Care Opportunities*. CCNC Data Brief, No. 5, Community Care of North Carolina, Inc.: Raleigh NC.

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