Identifying High-Risk Medicare Beneficiaries with Predictive Analytics

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Until recently, with the passage of the Affordable Care Act (ACA), Medicare Fee-for-Service (FFS) providers had little incentive to coordinate or manage care for high-cost beneficiaries, much less understand the individual characteristics that likely drive high health care spending. Over the next decade, Medicare Advantage (MA) enrollment is expected to grow, Medicare FFS payments will increasingly be tied to value and quality, and providers will inevitably take on more risk to serve an older and likely more complex member population.

Little research exists to identify the full range of bio-psycho-social factors that lead to high health care utilization. Research tends to focus narrowly on the medical conditions associated with health care utilization because payers have easy access to health information on the administrative claims providers submit for payment. As a result, most MA plans and provider strategies to identify high-risk members rely almost exclusively on administrative claims data, which overlook characteristics critical to care coordination such as lifestyle factors, behavioral health, and functional and cognitive impairment. To help understand the opportunities and challenges of managing high-risk Medicare beneficiaries, Avalere Health analyzed the person-level characteristics associated with high Medicare spending with a focus on identifying predictive non-medical characteristics, such as functional and cognitive impairments and social support.

When predicting and managing high-risk beneficiaries, health plans and providers need to take into account a member's lifestyle, behavioral health, and functional and cognitive needs.

KEY FINDINGS: As expected, several characteristics that increase the probability of being high-cost are related to a beneficiary's medical condition.

BENEFICIARY'S MEDICAL CONDITION OR MEDICAL UTILIZATION	INCREASE IN PROBABILITY OF BEING HIGH-COST *
High Medicare spending in the prior year (PMPM)	
Being in the top 10 percent of spending in the prior year	**11.3%**
Being in the top 20 percent of spending in the prior year	**8.8%**
Diabetes with complications	**8.8%**
Neurological or mental health conditions	
Neurological conditions	**8.8%**
Psychological conditions	**6.4%**
Cardiovascular conditions	
Acute Myocardial Infarction	**8.6%**
Vascular conditions without complications	**7.5%**
Kidney disease	**6.8%**

However, and potentially more importantly, some non-medical characteristics increase the probability of being high-risk but cannot be definitively identified using administrative claims.

BENEFICIARY'S NON-MEDICAL CHARACTERISTICS:	INCREASE IN PROBABILITY OF BEING HIGH-COST *
Self-reported fair or poor health status	**8.1%**
Having moderate functional impairment	**6.9%**
Age 85 and older	**6.6%**
Living in a residential setting in the prior year	**4.5%**
Living in a nursing home in the prior year	**1.8%**

*For the purposes of this analysis, high-cost is defined as being in the top 20% of Medicare spenders in the data year.

HIGH-RISK BENEFICIARIES MAY NEED LONG-TERM SERVICES & SUPPORTS: Heavy use of home health care (under the Medicare FFS benefit) in the prior year, having moderate functional impairment, advanced age, and living in settings that provide LTSS have a significant impact on the likelihood of being in the top 20 percent of Medicare spending. These results point strongly to a key set of beneficiary characteristics that predict risk of high Medicare spending: those that are associated with difficulties related to activities of daily living – in other words, needing long-term services and support (LTSS).

Beyond administrative claims, the following data sources may help health plans and other providers collect more robust patient information that could be combined with claims to better understand a person's potential to become high-cost:

- Electronic health records
- Health risk assessments
- Patient registries
- Home monitoring devices
- Clinician input (from day-to-day interactions with patients)

Recommendations

Plans should:

- Leverage other clinical data sources to collect more robust patient information.

- Collaborate with in– and out-of-network providers to establish consistent and efficient data collection strategies.

- Invest in, or improve, the plan's current risk prediction tools using a combination of clinical (electronic health records), health risk assessment, and administrative claims data to identify high-risk patients.

IN SUMMARY: Assessing medical conditions alone will not improve risk identification and population health management. Instead, to manage high-risk populations, health plans and at-risk organizations should account for a member's non-medical characteristics like functional and cognitive impairments, behavioral health conditions, lifestyle and living situation (i.e., nursing home residence), and their social support network. By doing so, these organizations will be able to develop a more sophisticated understanding of the predictors of risk. This analysis supports the opportunity for MA plans and other risk bearers to reduce their costs and increase quality of care by collecting the right information to better target high-risk members for care coordination services. While avoiding hospitalizations is important, there is an opportunity to improve care continuity as this particularly frail subset of the Medicare population transfers across settings of care; often, from hospital to post-acute and long-term care services.

METHODOLOGY: Avalere began by conducting a comprehensive literature review of the medical and non-medical person-level characteristics associated with having high-cost Medicare utilization. The analysis focused on identifying predictive non-medical characteristics, such as functional and cognitive impairments and social support needs, among others. Once a group of characteristics was selected, Avalere conducted a quantitative analysis of Medicare FFS beneficiaries in the Medicare Current Beneficiary Survey (MCBS)[1] for years 2007 through 2010. Using a risk prediction model, Avalere tested the relative power of person-level characteristics to predict whether a beneficiary will be in the top 20 percent of Medicare FFS spending. These models helped determine which person-level characteristics were associated with the largest increases in the probability of being a high-cost Medicare beneficiary in 2010.

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[1] The MCBS combines patient-level claims data with the results of a panel survey that includes non-claims based items such as the patient's self-reported health status, functional and cognitive impairments, social support needs, and other socio-demographic information.

A perfect storm of events is driving payers and providers to better manage the cost of their high-risk Medicare beneficiary population—dramatic changes in Medicare payment policy, growth in Medicare Advantage (MA) plan enrollment, and the aging population will make it impossible to avoid increasing financial risk. To succeed in this era of health system transformation, plans and providers bearing risk – in an accountable care organization (ACO) for example – will need strategies for managing a broad array of care needs for high-risk beneficiaries across multiple settings of care. One data collection tool that offers a particularly strong opportunity to improve identification of high-risk members is the health risk assessment (HRA).

HRAs are able to identify health behaviors and risk factors that would not be picked up in claims data, generating a more complete picture of the member.

To evaluate the state of HRAs used by payers, Avalere Health reviewed government regulations and relevant literature, and conducted interviews with HRA experts to understand common HRA practices, potential shortcomings, and recommendations for improvements.

BACKGROUND: HRAs are health-related questionnaires conducted telephonically, in-person, online, or through the mail. Essentially, HRAs ask members to assess their health status across a variety of dimensions, such as functional impairment (e.g., activities of daily living [ADL] and instrumental activities of daily living [IADL] needs), family history, lifestyle, nutrition, behavior, and social support.

The Centers for Medicare & Medicaid Services (CMS) requires MA plans to administer HRAs as part of the annual wellness visit, which is now required for all MA plan members. CMS does not require that MA plans utilize a specific HRA form, however. Instead, it requested that the Centers for Disease Control and Prevention (CDC) develop guidance on HRA questionnaires and administration. The CDC released recommendations in December 2011, but they were not comprehensive.

MA plans have limited guidance from CMS, and therefore significant flexibility in how they administer and what data they collect via HRAs.

MA plans and vendors often build upon existing HRA questionnaires to create updated or customized versions. Plans can further customize existing HRAs to target specific high priority populations, such as specializing in end-stage renal disease and diabetes prevention and management.

KEY FINDINGS: HRAs can strengthen risk stratification and care management activities by capturing key information about members' health that are not stored in claims data. Specifically, enhanced HRAs can benefit plans and providers by:

- Effectively uncovering risk factors within high-risk Medicare populations.
- Identifying long-term services and supports (LTSS) needs.
- Improving patient satisfaction scores, member retention rates, and members' quality of life.
- Supporting care coordination and care management for identified high-risk beneficiaries.
- Providing a potential positive return on investment through evidence-based care coordination programs. implemented for beneficiaries identified as high-risk through HRAs.

USING HRAS TO ASSESS LTSS NEEDS: HRAs can assess LTSS needs by evaluating the following domains:

- Ability to complete ADLs and/or IADLs
- Behavioral/mental health
- Cognitive function
- Family and caregiver support

- Frailty and fall risk
- Having a regular primary care physician
- Living situation (e.g., lives alone)
- Skin issues (e.g., wounds, ulcers)

- Home safety/accessibility and modifications
- Nutrition and/or access to proper meals
- Transportation

BEST PRACTICE: LifePlans, an HRA vendor interviewed for this study, advises its health plan clients to collect certain data to identify LTSS needs such as whether a member had: (1) difficulty with more than two ADLs and no paid caregivers, (2) three hospitalizations in the last six months, (3) three or more falls, in the last six months, (4) balance problems in the past week, and/or (5) difficulty chewing and/or swallowing.

USING HRAS TO SUPPORT CARE COORDINATION: Currently, MA plans can use enhanced HRA data to refer a member to care management and/or assist in the development of a care plan; however, not all MA plans do this. A key reason why many plans do not use enhanced HRAs that identify non-medical or LTSS needs is because plans typically are not reimbursed for the services that could address those needs. However, MA plans can provide certain supplemental benefits to their members, if the item or service is primarily health related.

MA plans are allowed to provide these supplemental benefits to address functional needs:

- Enhanced disease management (EDM)
- In-home safety assessments
- Home meal delivery for a short duration
- Health and general nutritional education
- Smoking/tobacco cessation counseling
- Post discharge in-home medication reconciliation
- Readmission prevention support
- Telemonitoring
- Transportation support
- Bathroom safety devices
- Gym and fitness membership benefits

Recommendations

Plans should:
- Invest in the HRA process by incorporating key questions to identify LTSS needs and other risk factors not uncovered through claims.

- Use HRA responses to support risk stratification efforts by identifying future high-risk beneficiaries.

- Implement or enhance management efforts for beneficiaries identified as high-risk through HRAs and other data sources to help decrease future costs of these beneficiaries.

IN SUMMARY: To succeed in this era of health system transformation, plans and providers, especially those bearing risk, should invest in the use of enhanced HRAs. HRAs with well-targeted questions allow plans and providers to proactively identify the beneficiaries most at risk of high-cost health care utilization. This is a strategy of increasing importance as MA enrollment continues to grow, providers take on risk, and payments are increasingly tied to quality.

Uncovering non-medical factors through HRAs is crucial for population health management efforts as a significant portion of Medicare spending is attributable to characteristics and behaviors that occur outside of the health care delivery system. However, identifying high-risk members alone does not reduce utilization and spending. In order to reduce spending, plans need to implement effective care management and care transition programs that prevent and reduce high-cost utilization. Plans that use enhanced HRAs to support risk stratification and care management efforts will have a competitive edge in an evolving Medicare paradigm that rewards population management and spending efficiency.

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For years, healthcare analysts have pointed to poor care transitions as a major contributor to adverse health events and high Medicare spending. In particular, older people with chronic illnesses and functional limitations frequently do not receive adequate care during and after these transitions, which can span community, acute, post-acute, and long-term care (LTC) settings. As a result, this population accounts for a disproportionate share of Medicare expenditures. Policymakers and healthcare payers are exploring services and programs to identify and provide support to people who are most at risk of adverse events, with the goal of improving healthcare delivery, patient outcomes, and bending the cost trend. Several models for improving care transitions and coordination have been developed, but publically available research on the cost-effectiveness of these models is very limited. Avalere Health conducted a return on investment (ROI) analysis to identify the types of services that are cost-effective for Medicare beneficiaries whose Fee-for-Service (FFS) spending is in the top 20 percent of total Medicare spending. Six widely adopted care transition/care coordination models were selected for the ROI analysis: *Care Transitions Intervention; Care Transitions Intervention (Group Visit); Geriatric Resources for Assessment and Care of Elders (GRACE); Project RED (Re-Engineered Discharge); Project BOOST and Transitional Care Model.*[1]

ROI CALCULATOR: ROI is a standard measure used in both the public and private sector to gain a concise under-standing of an investment's net benefit. The simplicity of the equation below allows for versatile use across all types of investment.

$$ROI = \frac{\textbf{(Benefit from Investment – Cost of Investment)}}{\textbf{(Cost of Investment)}}$$

Based on 16 studies on the implementation of coordinated care models[2] and Medicare data for year 2012,[3] an ROI calculator was built to provide an estimate of the financial returns associated with implementing each of the selected care models. The algorithm for this calculator is shown below.

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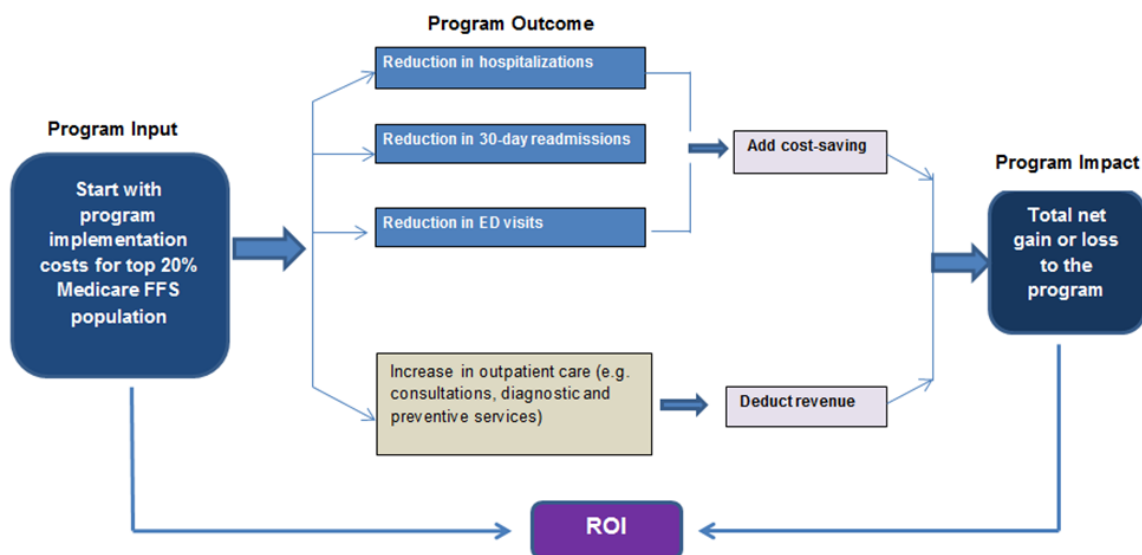
[1] *Project BOOST* was also reviewed as part of the ROI analysis, but results of the ROI analysis on the program were not included because of the limitations of the evidence.
[2] Average program cost and effect for implementing each care model were estimated based on the relevant information provided in the studies.
[3]Five percent Medicare Standard Analytical Files (SAFs) for year 2012 which contain detailed medical claims information about health care services rendered to Medicare FFS beneficiaries.

KEY FINDINGS: Five coordinated care models serving high-risk Medicare beneficiaries result in an ROI.

Program Model	Annual Cost Per Enrollee	Annual Savings Per Enrollee	ROI Per Year	PMPM Savings
Care Transition Intervention (Group Visit)	$678	$4,795	607.02%	$343.06
Transitional Care Model	$1,492	$5,334	257.48%	$320.14
Care Transition Intervention	$999	$2,311	131.3%	$109.34
GRACE	$2,201	$4,291	94.96%	$174.17
Project RED	$373	$493	32.37%	$10.05

Avalere found that effective models emphasize close coordination amongst care providers, such as nurses, physicians, social workers, and pharmacists, during care delivery and through the transition to the patient's next care setting (or home). The common components of these models include standard discharge protocols, discharge planning and implementation, patient education, and transition counselors performing regular follow-up. Further, a comprehensive approach that integrates key care transition processes with LTC management can be highly effective in reducing high-cost utilization. For example, the programs that adopted Care Transition Intervention (Group Visit) or GRACE model were implemented over two years and they not only engaged a wide variety of health care providers in the care transition process, but also provided appropriate care management through continuous patient education as well as health assessment, monitoring, and counseling. These efforts resulted in substantial reductions in emergency department (ED) visits and hospitalizations.

It is important to note that these models cannot be compared solely based on the ROI results due to limited data available. The results suggest that these care transition/coordination models are cost-effective and can reduce overall health care costs when deployed with the right population. To do so, plans need to implement the following two strategies first.

Identify the right risk factors—Avalere's modeling shows that non-medical factors are as powerful as medical factors in determining health care utilization. Plans must develop risk profiles using a variety of data sources beyond traditional claims or financial data. These can include health risk assessments (HRAs), medical records, and clinical input.

Improve data collection through existing tools—Through the HRA process, plans have an opportunity to collect member information that builds upon administrative data to strengthen risk stratification.

After plans understand the full range of individual factors that contribute to high health care utilization and identify members at highest risk through existing tools, they can select appropriate care coordination programs that address the needs of the target members. This research shows that implementing targeted care coordination program can not only improve the health outcomes for the target members, but also yield a positive ROI for the plans.

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Key Takeaways

♦ The ROI of implementing these five coordinated care models ranges from 32.37 % to 607.02% and the PMPM ranges from $10.05 to $343.06.

♦ Program models that integrate care transition and long-term care management are cost-effective in reducing high-cost utilizations.

♦ Evidence-based care transition and coordination programs can result in positive ROI for MA plans looking to better manage their high-risk members.

♦ Higher program investments are not necessarily associated with better results.

ABOUT THE SCAN FOUNDATION: The SCAN Foundation's mission is to advance a coordinated and easily navigated system of high-quality services for older adults that preserve dignity and independence. See more at: www.thescanfoundation.org.

ABOUT AVALERE: Avalere is dedicated to solving the challenges of the healthcare system and improving care delivery through better data, insights and strategies. See more at: www.avalere.com.