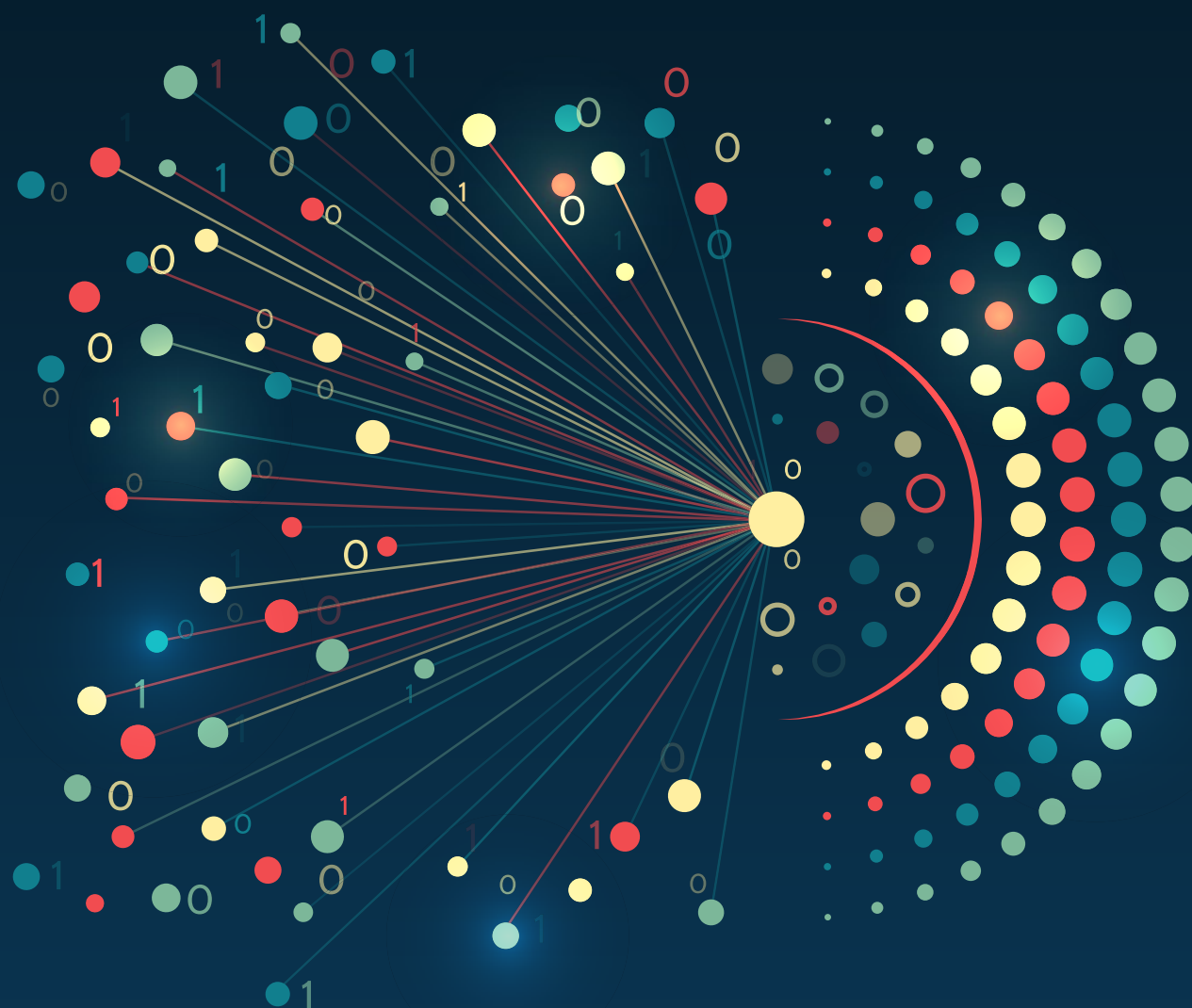


A Vision for Modernizing Medicare Risk Adjustment: Building the Evidence for Reform

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Disclosures

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About the Duke-Margolis Institute for Health Policy

The Robert J. Margolis, MD, Institute for Health Policy at Duke University is directed by Mark McClellan, and brings together expertise from the Washington, DC, policy community, Duke University, and Duke Health to address the most pressing issues in health policy. The mission of Duke-Margolis is to improve health, health equity, and the value of health care through practical, innovative, and evidence-based policy solutions. Duke-Margolis catalyzes Duke University's leading capabilities, including interdisciplinary academic research and capacity for education and engagement, to inform policymaking and implementation for better health and health care. For more information, visit healthpolicy.duke.edu.

Risk Adjustment at a Crossroads

Medicare Advantage (MA) is the [largest source of Medicare coverage for seniors today and continues to grow](#). The most important payment policy underpinning MA is its risk adjustment system, now [version 28](#) (v28) of the Hierarchical Condition Category (HCC) model, based on diagnoses reported on Medicare fee-for-service (FFS) claims. The impacts of risk adjustment go far beyond payments, with the [Centers for Medicare & Medicaid Services](#) (CMS) noting its effect on competition—both between MA and Original Medicare (OM) and within MA—beneficiary engagement, benefit design, clinical care, and provider contracting. While discussions of risk adjustment reform often focus on technical issues such as coding intensity or model accuracy, these challenges are symptoms of a broader problem: the current system was designed around the data, technology, and policy environment of two decades ago. Modernization should therefore be guided not only by better prediction, but by a clear vision of what risk adjustment is intended to accomplish within a contemporary health care system and ideally prevent the need for falling behind again.

CMS adopted the HCC model for MA in 2004 (and fully implemented it in 2007 under the leadership of one of the co-authors), using the best broadly available source information on beneficiary health risk at the time: claims. Because the system has remained largely unchanged for more than 20 years, plans have become increasingly adept at optimizing risk adjustment, and considerable evidence has indicated consistent [overpayments](#); plans, especially [large plans](#), are encouraged to [invest in coding infrastructure](#), which drives higher risk scores and consolidation. Some of these higher payments are passed through to beneficiaries in the form of lower cost sharing and enhanced supplemental benefits, though the same fixed-payment structure also rewards selection—enrolling beneficiaries who are lower cost, conditional on their risk score. The same dynamics reappeared, in different form and severity, when CMS extended the HCC system to population-based Accountable Care Organization (ACO) models in OM to adjust payments for person-level risk, prompting caps on annual risk score growth of around 3% in MSSP and ACO REACH/LEAD. Recent updates under v28 excluded the diagnosis codes and HCC

categories most susceptible to aggressive coding but represented a fine tuning of the system rather than a foundational change: insurers appear to have already found workarounds based off [recently reported growth in risk scores](#), and selection, anti-competitive properties, administrative burden, and clinical care distortions remain unaddressed.

Temporary fixes such as v28 are increasingly insufficient, while more [fundamental changes](#) to risk adjustment are increasingly necessary. The clinician community has noted certain needed and overdue foundational changes, such as the need for more granular measures of clinical risk as well as the value of incorporating next-generation electronic medical record data to better align with data used in care delivery, which could also help reduce administrative burden. In its Risk Adjustment RFI in the [CY 2027 Medicare C&D Rule](#), CMS itself noted the growing need for foundational changes in the MA risk adjustment model — suggesting inferred risk as one option, and identifying opportunities around modernizing the set of data inputs feeding into risk adjustment, drawing on a broader set of inputs beyond just diagnoses, and modernizing the statistical methodologies underlying risk adjustment.

At the same time, the risk adjustment system has enormous consequences for the level and distribution of payments to Medicare health plans. Changes, especially unexpected changes or unintended consequences of conceptually thoughtful reforms, will result in disruptions in budgets and consequences for beneficiaries. Against this backdrop, we propose incremental, short-term actions that can achieve progress and advance toward medium and longer-term foundational reforms to risk adjustment. We concentrate on identifying specific opportunities around new data inputs and new statistical methodologies. We describe how private-public collaborations are both feasible and particularly well-suited to assess and provide confidence in implementing these reforms, and to allow future updates to keep risk adjustment both predictable and up to date.

A Vision for Modernized Risk Adjustment

Many stakeholders agree that the current risk adjustment system relies on increasingly outdated data sources and analytical methods.¹ A modernized approach should leverage a broader set of data beyond medical claims, especially as provider systems rely less on billable encounters to manage patient care, including direct measures of clinical state, while incorporating more sophisticated analytical approaches such as machine learning and artificial intelligence. A modernized risk adjustment framework should:

- More accurately reflect expected beneficiary costs based on an individual's true health status and anticipated clinical needs.
- Reduce opportunities for coding intensity manipulation by relying less on plans' investments in documentation practices and more on objective measures of health status and longitudinal management of a patient's/population risk.
- Support prevention-oriented care and longitudinal population health management, rewarding investments in aspects such as better clinical risk management infrastructure, which help clinicians and beneficiaries maintain health and slow or prevent chronic conditions and health status complications over time.
- Promote competition based on value and outcomes, enabling plans and providers to succeed through better care delivery, patient experience, and affordability rather than differential coding performance.
- Minimize administrative burden on providers, beneficiaries, and health plans by reducing reliance on extensive documentation and chart review activities.
- Promote transparency and explainability, while continuing to encourage innovation and efficiency in care delivery and risk management.
- Avoid disadvantaging beneficiaries who have unmet health needs but low observed utilization because of nonmedical barriers to accessing care.
- Create incentives for timely, reliable exchange of clinical data, aligning risk adjustment modernization with broader health system goals around interoperability and data liquidity.

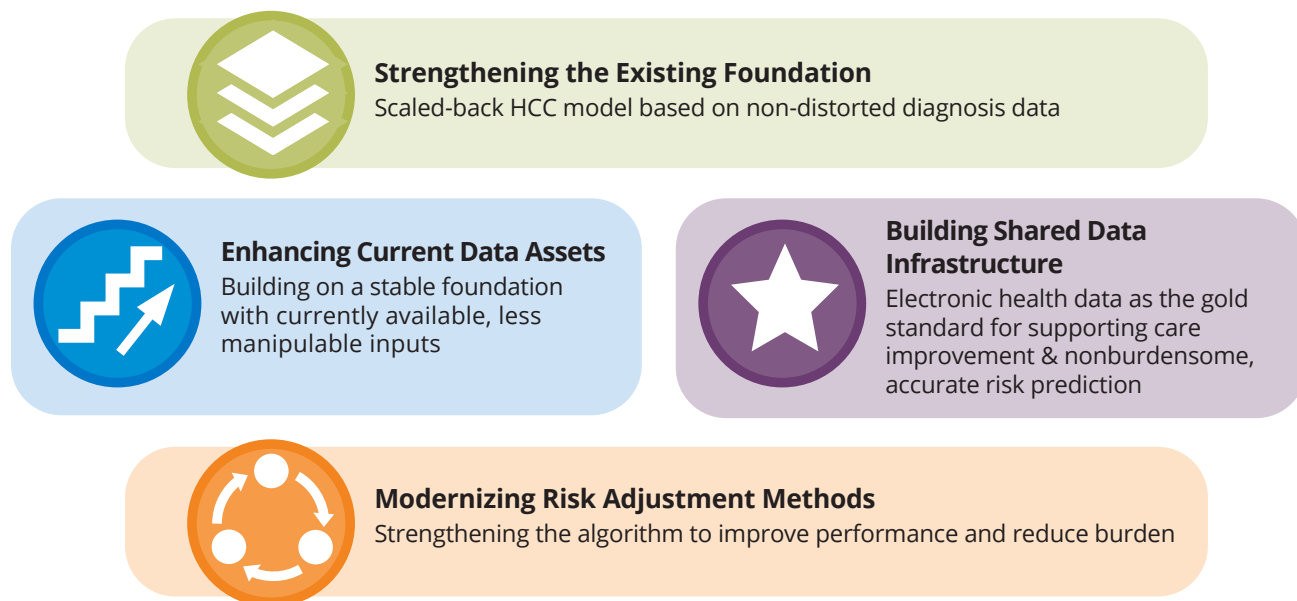
Viewed collectively, these principles suggest that risk adjustment reform should be designed not merely as a technical exercise in improving predictive accuracy, but as a strategic lever to support a more competitive, prevention-focused, data-driven, and patient-centered health care system.

¹ https://jamanetwork.com/journals/jama-health-forum/fullarticle/2840337#google_vignette
https://www.healthaffairs.org/doi/10.1377/hlthaff.2024.00369?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200pubmed
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Building Toward Next-Generation Risk Adjustment

Translating these principles into practice will require a combination of short-term policy changes and longer-term structural reforms. While comprehensive redesign of Medicare risk adjustment will take time, CMS can begin taking practical steps today that improve performance, reduce burden, and create the foundation for more transformative changes in the future.

Figure 1: Practical Steps



Strengthening the Existing Foundation

Connect Risk Capture to Care Management

CMS excluded unlinked chart reviews from risk adjustment, under the 2027 Finalized MA Rate Notice, to ensure that invalid and clinically irrelevant records did not get counted towards risk adjustment. However, additional steps can be taken to ensure the validity of chart reviews as well as health risk assessments (HRAs), to incentivize accurate characterization of past conditions, as well as drive closer integration with future care. For example, CMS could make a record's eligibility for risk adjustment contingent on

additional factors, such as the concurrent transmission of that record to a primary care provider, or to the adoption of a care plan for a given diagnosis. Any such policy action would be intended to align with the goal of counting only clinically meaningful diagnoses towards risk adjustment, and to provide financial support for using risk assessments to improve treatment and not just documentation.



Enhancing Current Data Assets

Unlock Additional Value from Existing CMS Data and Data Sharing Initiatives

Existing CMS data contain substantial information that is not currently incorporated into risk adjustment. Many HCC-reported diagnoses with significant explanatory power appear to be captured consistently across beneficiaries in fee-for-service coverage in OM as well as in MA coverage with encounter data reporting. However, substantial additional, unused information exists that is currently collected by Medicare—generally, utilization information that is accurate because it pertains to payment—that could have much predictive value for risk adjustment and could also help to mitigate some of the existing issues with the risk adjustment system such as vulnerability to coding manipulation. For example, based on [domestic](#) and [international](#) evidence, pharmacy data offers a tremendous opportunity to improve risk adjustment methodologies.

Additional analysis is needed to identify which variables would provide the greatest predictive value, as well as how these inputs can be best derived in a way that improves predictive accuracy while also mitigating selection and coding intensity, maintaining cost control incentives, and instituting productive clinical incentives. Often, tradeoffs are involved, wherein a given input cannot satisfy all of these requirements and some requirements are met at the expense of others. These additions should be based on reproducible and transparent evidence that the additional data improves explanatory power and credibly without substantially rewarding avoidable or low-value utilization.

Similarly, some existing inputs to the risk adjustment system could warrant elimination, for example certain diagnosis and HCC codes that are more readily manipulable while also delivering lower incremental predictive benefit. CMS moved in this direction for v28 by dropping some HCCs, but concentration remains. For example, [Kronick and colleagues'](#) recent work has emphasized that 10 conditions, including chronic obstructive pulmonary disease, heart failure, diabetes, morbid obesity, stage 3 chronic kidney disease, major depression, and others, account for nearly all of the measured risk-score difference between MA and OM. Excluding these groups would reduce measured MA relative risk by approximately 10%, though it may also increase incentives for risk selection and reduce incentives to provide high-quality care to beneficiaries with those diagnoses.

One major spillover benefit of requiring clinical data as an input to risk adjustment is its potential to serve as a catalyst for greater interoperability across the health care system. CMS's ongoing efforts around prior authorization and the Health Technology Ecosystem could present similar opportunities for alignment and cross-pollination. Specifically, this effort could enable gathering of important clinical elements, in an automated, digital, and scalable manner. Under this new structure and collections process, prior auth-related data would be more accessible and more readily usable across different program areas, including risk adjustment. Clinical data collected and exchanged for risk adjustment purposes could also be reused for care management, quality improvement, population health management, and clinical decision support. In this way, modernization of risk adjustment can generate benefits that extend beyond payment policy, strengthening the broader health data infrastructure while enabling more effective and proactive care delivery.

Use Stars Modernization to Accelerate Risk Adjustment Reform

CMS already collects substantial clinical and quality-related data through the Medicare Advantage Quality Bonus Program ("Stars"), but much of that information is gathered for a limited subset of beneficiaries, through resource-intensive processes, and used primarily for quality measurement rather than broader program purposes. However, data gathering is currently undertaken for only a small subset of the population, for example only a subsample of 411 enrollees per contract is required based on standard National Committee for Quality Assurance (NCQA) guidelines. Similarly, much of this data gathering is undertaken through highly manual paper-based processes, rather than automated digital ones. Finally, the data that's gathered as part of Stars ends up being siloed and used exclusively for quality, rather than being used broadly for additional applications such as risk adjustment. CMS could address these limitations by moving Stars data collection to a digital, full-population basis and permitting the resulting data to be reused for risk adjustment, reducing the burden of manual abstraction for plans while expanding the set of clinically validated inputs available to the risk adjustment model.



Expand Beyond Claims and Encounter Data

While CMS relies almost exclusively on medical-based encounter data for risk adjustment, there is broad-based recognition of the limitations of this data, and of the value that additional data sources can bring to risk adjustment. However, successfully integrating additional data sources requires that CMS first overcome multiple challenges, including successful identification of valuable new data sources, successful procurement of these sources at the necessary scale and across diverse providers and plans, and effective derivation of key analytic inputs from this data.

Promising additions to a future risk adjustment framework could include:

- **Electronic health record data that increases the reliability of risk assessment without adding significant administrative burden.** These data include clinically meaningful information that's not contained in current claims and encounter data sources, such as more granular diagnosis information (through SNOMED rather than ICD codes, as well as unstructured notes), and more granular clinical and symptomatic information (through lab test results and unstructured notes). Advances in health care interoperability, and ongoing CMS efforts to facilitate and incentivize clinical data exchange, represent a key enabler to the future use of this data for risk adjustment. Furthermore, these ongoing CMS efforts ensure that the exchange and processing of this data can be effectuated in a manner that is not administratively burdensome by aligning efforts with broader CMS interoperability efforts in digital quality measurement and the Health Technology Ecosystem.
- **Validated and predictive patient survey data:** Key measures of functional status (e.g. [PROMIS](#)) have been [validated](#) as strong predictors of spending, which are not otherwise captured by diagnosis information in claims. A functional measure is already incorporated in [Medicare's post-acute care payment system](#) and validated functional measures are expected in some of Medicare's ACCESS model's outcome-aligned payment models. Feasibility assessments could identify which functional measures (and for

which subpopulations) could be most valuable for improving risk adjustment, and the best mechanisms or technologies to collect and exchange such measures. As with clinical outcome data, this effort could focus on measures that are already under consideration or in use for MA Stars, and that already are being collected or are soon to be.

- **Geographic or neighborhood-level proxies for access barriers:** CMS has used measures of rurality, social risk, and the extent to which a neighborhood is underserved in some of its [payment models](#). Assessments of incorporating this data more routinely could advance the goal of a more accurate, less burdensome risk adjustment system.

Incorporate Longitudinal Measures of Risk

Current risk adjustment methods continue to be based on payment-year reported diagnoses calibrated by HCC weights using prior-year data. However, many key predictors of beneficiary costs are not acute conditions but chronic conditions that were present over many prior years. These common chronic diseases and risk factors that require effort to diagnose and manage are often missed or can be over-reported. CMS could start exploring methods to longitudinally capture these persistent conditions that could ultimately serve as aligned and less burdensome performance measures over time, enabling production of one-year or longer-term outcome measures, leading to potential financial rewards for taking action now to prevent long-term complications. As CMS conducts shadow testing of inferred risk for its LEAD model and the pipeline of data between CMS and providers thickens through the work under the Health Technology Ecosystem, it should explore a longitudinal risk adjustment framework that distinguishes between transient clinical events and chronic, persistent conditions. A longitudinal record of chronic disease burden could support development of multi-year performance measures focused on disease progression, complication avoidance, functional status, and preventable utilization. For example, organizations could be rewarded not merely for documenting diabetes, but for reducing the incidence of diabetic complications over time; they could be rewarded not simply for coding chronic kidney disease, but for slowing disease progression and delaying dialysis initiation.



Modernizing Risk Adjustment Methods

Strengthen the Underlying Algorithms

Potential options include the analysis and testing of reinsurance models for high-cost outliers, building on prior research and policy proposals (see [JAMA commentary](#) and [CY 2027 MA Advance Notice](#)); these can increase the precision of risk adjustment model, reducing opportunity for selection, and also eliminating incentives for plans to avoid high-cost beneficiaries. AI and machine learning approaches can improve predictive accuracy, particularly to account for disease interactions in the presence of multiple comorbidities, while also addressing other aforementioned objectives (like those proposed in the new [LEAD model RFA](#)). Constrained regression could be applied to address undesirable coding or utilization behavior by reducing the weight on data elements most likely to induce such behavior while increasing the weight (leading to higher payments) for certain risks that are expected to be inadequately captured in an unconstrained regression.

Modernize Model Calibration Using Medicare Advantage Data

CMS's MA HCC model is currently calibrated off OM data and then subsequently applied (scored) using MA encounter data. In practice, this means that the costs of certain factors, such as the presence of a specific disease, are quantified based off their impact within an Original Medicare population. However, because beneficiary populations differ substantially between OM and MA, cost relationships observed in OM may not generalize well to MA, with [research showing](#) that MA beneficiaries tend to have lower Medicare spending, even before they enroll in MA, than those that remain in OM. As a result, conditions like diabetes in the OM context may have very different cost implications than in MA, because MA attracts diabetics of a very different level of acuity. As a consequence, the current calibration of the HCC model from OM-specific data impairs the overall accuracy of the HCC model.

For these reasons, in previous rate notices as well as in the [recent risk adjustment RFI](#), CMS has brought up the possibility of calibrating the risk adjustment model off MA rather than OM-specific data. Duke-Margolis

[submitted comments](#) in response to this RFI, detailing both the challenges and the opportunities this could entail. Specifically, the encounter data currently suffers from various data quality issues, which could hinder its use for training purposes. Additional work needs to be done by CMS in collaboration with plans and providers to improve and validate the encounter data, particularly when it comes to specific data elements, before it can be reliably used for risk adjustment. Indeed, a learning collaborative of the kind described below will need to assess a number of data related baselines, including:

- Baseline coding completeness and accuracy for priority HCC diagnoses in claims/encounter data, with particular attention to differences in coding between OM, MA, and MSSP/ACO beneficiaries
- Differences in resource use among FFS, MA, and MSSP/ACO beneficiaries to determine if costs differ across populations for diagnoses of interest, based on claims/encounter data for Medicare-reimbursed services and data on services not reimbursed in OM
- Potential differential impact across providers, plans, and for Medicare at large, including how changes result in HCC reweighting/risk score

Modernizing Risk Adjustment Through Collaborative Learning Efforts

Achieving this vision will require an iterative, evidence-driven, and collaborative approach. Evaluating new data sources, testing emerging analytic methods, and understanding operational implications cannot be accomplished through model development alone. Success will require close collaboration among CMS, health plans, providers, technology partners, researchers, and patients to assess how alternative approaches perform in real-world environments.

A practical path forward would be a phased public-private collaboration designed to generate the evidence and implementation guidance needed to support modernization. CMS could convene or support a structured learning collaborative, facilitated by a neutral organization such as Duke-Margolis, that brings together interested health plans, accountable providers, researchers, and technology partners. The collaborative could evaluate alternatives to encounter-based diagnosis reporting, identify clinically valid and reliable longitudinal indicators of chronic disease burden, and test innovative approaches for incorporating clinical, claims, and other data sources

into future risk adjustment models. Participating organizations could contribute real-world evidence on feasibility, predictive accuracy, documentation burden, and unintended consequences, allowing CMS to assess potential reforms before broad implementation.

Over time, findings from the collaborative could inform the design of a formal CMS demonstration or pilot that tests longitudinal approaches to risk adjustment and outcome measurement. Such a pilot could evaluate whether persistent chronic conditions can be identified and maintained through multi-year clinical evidence rather than annual recapture, while also examining how longitudinal risk adjustment could support longer-term measures of disease progression, complication avoidance, and preventive care. By creating a structured pathway from research and learning to demonstration and scale, CMS could modernize the risk adjustment system in a manner that is evidence-based, operationally feasible, and aligned with the agency's broader goals of improving quality, reducing burden, and supporting better long-term beneficiary outcomes.

CONCLUSION

Modernizing Medicare risk adjustment is increasingly central to the future of Medicare payment policy. The current system was developed using the best available data and analytical methods of its time, but it now faces growing challenges related to coding intensity, selection incentives, administrative burden, and the limited ability of diagnosis-based models to fully capture beneficiary health status.

Addressing these challenges will require a fundamentally modernized approach to risk adjustment. A next-generation system should draw upon richer clinical information, more advanced analytical methods, and a broader set of incentives that reward prevention, care management, and better outcomes rather than documentation alone. While comprehensive reform will require substantial technical work, CMS can begin laying the foundation today through targeted improvements to data inputs, model calibration, clinical interoperability, and risk adjustment methodologies. Getting there will require evidence that does not yet exist today. The phased public-private collaboration described above offers a practical way to generate evidence, test reforms against real-world operations, and give CMS confidence to act before changes are applied at scale.

