Part 3 – Polypharmacy, Drug–Drug Interactions, and Avoidable Utilization – (Game changer – revenue stacking opportunity)

Executive Summary

U.S. Pharma Consulting (USPC), in collaboration with **Miracural AI (DeepDrug AI)**, has been operating at the leading edge of the mission critical data ecosystem shift, with our EHR - compendia and medication risk framework closely aligned to, and subsequently validated by - CMS's Health Tech Ecosystem direction articulated by Dr. Mehmet Oz at JPM 2026 [9], reinforcing the relevance of this approach across drug development, pharmacovigilance, and broader pharma revenue-stacking data gap opportunities.

Polypharmacy is the use of multiple concurrent medications that, in combination, increase clinical risk and downstream healthcare utilization beyond what is attributable to any single drug. This is a persistent driver of avoidable utilization and cost within Medicare and Medicaid populations, particularly among beneficiaries with multiple chronic conditions and fragmented care delivery. As medication burden increases, so does cumulative interaction risk, often in ways that are not visible through single-agent safety review or traditional rule-based clinical decision support.[1] Clinical evidence consistently demonstrates that it is the interaction of medications - rather than isolated toxicity - that drives a significant portion of preventable adverse events in older and medically complex populations.[2]

One of the most consequential manifestations of polypharmacy risk is falls. Medication-related falls are among the most expensive and disruptive adverse events in covered populations, frequently resulting in emergency department evaluation, diagnostic imaging, inpatient admission, surgical intervention, post-acute rehabilitation, and skilled nursing facility placement.[3] Among older adults, polypharmacy has been associated with materially higher fall risk, with studies reporting increases ranging from approximately 20 percent to well over 50 percent as medication count and interaction complexity rise.[4] These events disproportionately impact Medicare beneficiaries and contribute meaningfully to total cost of care, particularly in high-risk cohorts managed under Medicare Advantage, ACO, and value-based care arrangements.

From an economic perspective, fall-related utilization represents a compounding cost problem. A single fall event may trigger an emergency department visit that converts to an inpatient admission, followed by post-acute skilled nursing facility days and ongoing home health or long-term care services. The Centers for Disease Control and Prevention and peer-reviewed health economics literature estimate that fall-related injuries among older adults generate tens of billions of dollars in annual medical spending, with Medicare bearing the majority of this burden.[5] More recent analyses emphasize that a meaningful portion of this spend is potentially preventable, particularly when medication-related risk is identified earlier in the care continuum.[6]

Despite this economic impact, current medication management infrastructure remains limited in its ability to prospectively identify beneficiaries at elevated risk due to complex, multi-drug regimens. Existing compendia and EHR-embedded clinical decision support systems are largely retrospective and rule-based, focusing on known pairwise interactions and static thresholds.

These systems often generate alerts only after risk has already been embedded in the regimen, contributing to alert fatigue while failing to materially change prescribing patterns or downstream utilization. As a result, high-risk combinations persist, particularly during transitions of care, multi-specialty management, and high-acuity clinical settings.[7]

This limitation represents a structural data-translation gap rather than a lack of underlying clinical knowledge. What is missing is the ability to assess cumulative interaction risk across entire regimens and translate that risk into governed, deployable intelligence within the systems clinicians already use. DeepDrug addresses this gap by enabling upstream modeling of drug–drug interaction and polypharmacy risk at the regimen level, rather than relying solely on isolated interaction rules. By incorporating mechanistic, pharmacologic, and post-metabolic considerations across multiple agents, the platform supports earlier identification of high-risk profiles before adverse events occur.

When integrated into existing compendia and EHR workflows, this upstream approach has the potential to support more effective medication reviews, inform safer prescribing decisions, and enable targeted care management interventions without introducing new clinical or administrative burden. From a payer and CMS perspective, the value of this approach lies in its ability to reduce avoidable downstream utilization rather than generate additional alerts or documentation requirements. Earlier identification of polypharmacy-related risk creates the opportunity to offset high-cost services that disproportionately drive total cost of care, including fall-related emergency department visits, inpatient admissions following emergency evaluation, and post-acute skilled nursing facility utilization.[8]

These utilization offsets are precisely the categories CMS and payers focus on when evaluating new technology-enabled interventions. Emergency department visits, inpatient admissions, and skilled nursing facility days are among the most closely monitored and financially material drivers of medical spend within Medicare and Medicaid programs. Reductions in these areas translate into lower utilization intensity, improved performance on preventable event and quality metrics, and more predictable cost trajectories across high-risk beneficiary populations. Within Medicare Advantage, ACO, and other value-based arrangements, such reductions directly support shared-savings performance and sustainability of risk-bearing models.

Importantly, this framing aligns with the broader direction CMS has formally articulated through its Health Tech Ecosystem, interoperability initiatives, and emphasis on governed AI. CMS has made clear that its priority is not the proliferation of new clinical tools, but the deployment of technologies that integrate cleanly into existing infrastructure, preserve clinical governance, and demonstrably reduce avoidable utilization and cost. The EHR–compendia medication risk gap that USPC and DeepDrug have been addressing predates these formal CMS signals; recent policy direction effectively validates the thesis that earlier, better-translated medication risk intelligence is essential to improving quality while bending the cost curve.

Key takeaways

In this context, DeepDrug functions not as a diagnostic system or alerting overlay, but as a utilization management enabler that strengthens existing clinical and regulatory workflows. By supporting earlier identification of high-risk polypharmacy profiles, the platform aligns clinical safety objectives with payer and CMS economic priorities, creating a credible pathway to improved outcomes without increasing operational friction. This positioning is particularly relevant as CMS continues to prioritize interoperability, accountable care, and technologies that reduce preventable adverse events rather than add to clinical burden. We are your subject matter experts!

External References

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