

# Measure What Matters

Applying Programmatic Insights  
to Bridge Healthcare's Gaps

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gainwell®

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## Executive Summary

Medicaid agencies are constantly striving to deliver more effective care at contained or lower costs. To reach these goals, agencies need comprehensive, overarching insights into the effectiveness and expense of each its programs. That includes evaluating how agencies' intermediaries, including managed care organizations (MCOs), hospitals, practices, providers, and other entities, are performing in implementing those programs across the bio-psycho-social spectrum of integrative care.

However, despite a great deal of hype about healthcare analytics, Medicaid agencies are too often left guessing about overall performance, using analytics that are designed and useful to measure some specific aspect of healthcare but yield at best an indirect or incomplete indication of big-picture results.

One common example: agencies often use measures that capture provider adherence to a standard of care with subsets of the population (like many CMS Core Sets or HEDIS® measures) in the hope that more adherent care for some is more effective care for the entire population. Without a doubt, provider adherence is a useful correlate of the effectiveness — or ineffectiveness — of care. Still, these correlates provide just a glimpse into the full story. Behavioral health scientists at Gainwell Technologies knew much more to be possible.

We set out to augment Medicaid agencies' analytics arsenals to provide new, comprehensive and big-picture insights. Through this work, we have now developed and deployed advanced programmatic analytics as an additional, qualitatively more comprehensive approach built around longitudinal programmatic estimators.

Working with multiple years of data, longitudinal programmatic estimators capture and explain key, overarching outcomes and changes in outcomes, including total cost of care and risk of all-causes mortality. This approach leverages a unique, Gainwell-developed psychiatric history grouper — PsychHx™ — that is essential to reveal the multiple, actionable bio-psych-social drivers of those outcomes over time. A small but comprehensive set of longitudinal programmatic estimators directly capture cost and quality, from the entire agency and its programs to intermediaries like MCOs and providers to individual members.

In a detailed case study, we demonstrate how Gainwell successfully used programmatic analytics to evaluate one state's health home targeted to those with severe and persistent mental illness (SPMI). Historically, this is a large, fragile, disproportionately costly and hard-to-manage population for Medicaid agencies. The health home is staffed by care coordinators with the behavioral health training required to have conversations about bio-psycho-social care that each member of this substantially impaired population needs. Gainwell's comprehensive analytics yield many noteworthy, actionable insights for this state's innovative program for those with SPMI.

Well beyond health homes and behavioral health, Gainwell's broad, programmatic approach can be used to evaluate Medicaid agencies' diverse programs and populations across the bio-psycho-social spectrum. As we detail, the self-same estimators that offer insights into these overall programs can provide understanding of the cost-effectiveness of agencies' contracted intermediaries, as well as methods for triaging, segmenting and stratifying individual member needs.

Gainwell can quickly implement this nimble, horizontally scalable analytics approach in any state using the state's medical, behavioral and pharmaceutical claims.

## Healthcare Analytics: The Comprehensiveness Gap

Every Medicaid agency is charged with delivering effective care to all segments of a complex population, including populations and individuals who experience:

- Chronic physical disorders or chronic comorbidities
- Complications of pregnancy or childbirth
- Severe and persistent mental illness
- Substance use disorder, including single- and poly-substance
- Severe emotional disturbance
- Declining or severely impaired physical health
- Homelessness
- Criminal justice system involvement

- Intellectual or developmental impairments
- Need for long-term care or home-based and community services
- Many with more than one of these listed challenges

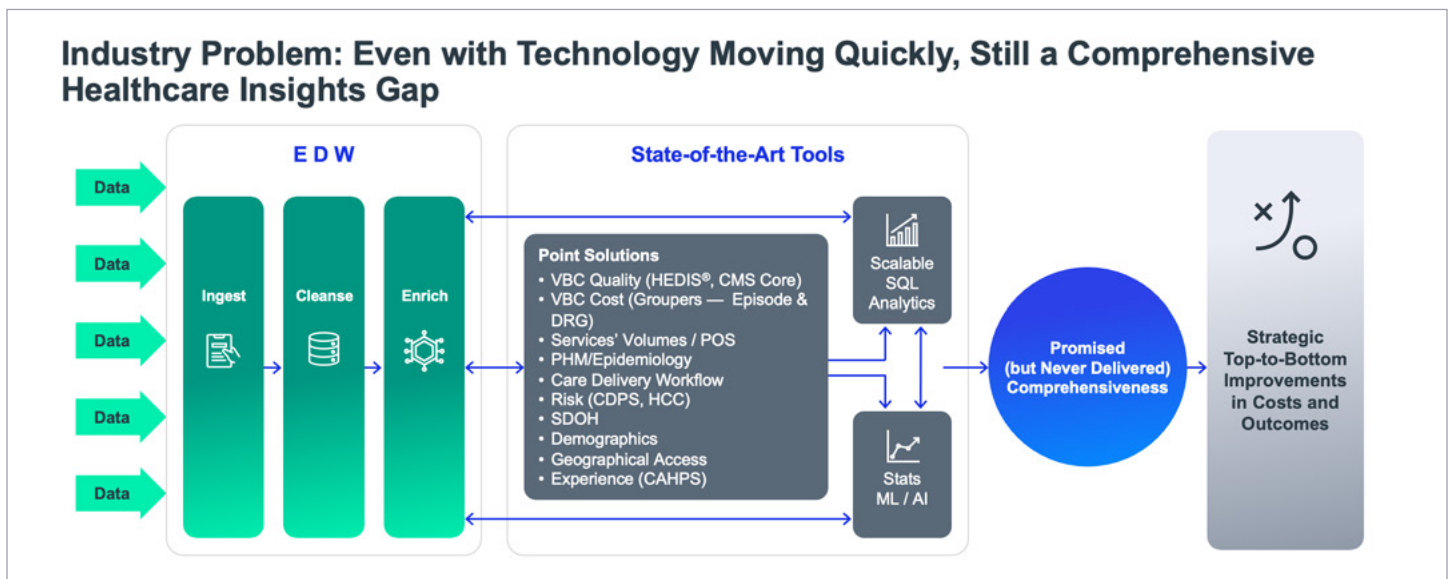
A key challenge in serving complex population segments is not only meeting their differing needs, but the dynamic nature of those needs over time. Appropriate interventions for each segment vary at different stages of their lives — and as members’ health improves or declines. Effective support and management of this dynamic complexity requires comprehensive solutions that provide value beyond the indirect glimpses that point solutions, designed and useful for other purposes, can deliver when used as proxy measures. The most complex and vulnerable populations need a better, direct approach to measure what matters: longitudinal programmatic analytics that speak comprehensively to members’ dynamic bio-psycho-social needs, the services being delivered to meet those needs across the continuum of care, the effectiveness of those services, the drivers making services more or less effective, and the total cost.

In the last decade, especially, analytics and the technology solutions supporting them have made great strides from the days of monotonous reports of limited use (see Figure 1).

- Sophisticated electronic data warehouses (EDWs) like Gainwell’s gather, cleanse, organize, enrich and catalog a Medicaid agency’s data assets to facilitate insights.
- A growing range of point solutions is revealing specific insights into more aspects of healthcare delivery.
- SQL has advanced over the decades from a rudimentary querying tool into a sophisticated analytics tool that delivers high-power performance within a server and horizontally across multiple servers.
- The advanced analytics tools of data science — biostatistics (Stats), machine learning (ML) and artificially intelligent (AI) neural networks — are growing dramatically.

However, for all the horsepower these tools embody, there is still a significant amount of hype. A substantial gap exists between the many things the industry’s healthcare analytics can do today and the level and diversity of programmatic insights needed. Instead of Medicaid agencies having to guess at the big picture from the indirect glimpses that point-solutions provide, analytics should speak to the big picture directly and comprehensively, informing agencies how to deliver impactful, cost-effective healthcare services across the bio-psycho-social continuum. The promise of healthcare analytics to deliver comprehensive, programmatic insights that tell an overarching, actionable story too often goes unfulfilled. It’s time to do better.

**Figure 1. The Comprehensiveness Gap**



## How Do We Close the Comprehensive Healthcare Insights Gap?

Determined to meet this challenge, Gainwell Technologies has started closing the gap by looking beyond the valuable insights provided by current analytics point-solutions to deliver even more direct and comprehensive insights to Medicaid agencies. To accomplish this, we stepped outside the box of the typical approach to healthcare data engineering and data science, expanding our approach by repurposing and integrating tried-and-true methods from measurement science and software engineering. Combining these expanded technology underpinnings with Gainwell's clinical and business acumen, we are successfully transforming Medicaid agency healthcare data assets into new, much needed, comprehensive insights.

Gainwell is delivering programmatic healthcare analytics that transform data into measurements that make a real difference. The programmatic estimators that comprise these insights follow a few simple principles:

1. **Eyes on the prize: Measure what matters, and what drives what matters, to focus stakeholder effort on the most important outcome drivers across the entire bio-psycho-social continuum.** In healthcare, a programmatic view is the overarching, complete view. Because what gets measured gets managed, seeing the big picture helps keep focus on managing it. Deep dives to understand specific concerns occur in the context of insight into the overarching situation (following the general principle that local variability is usually better understood in the context of global variability). Agencies thereby obtain better outcomes in both broad and specific situations.
2. **Measure what matters as comprehensively as possible, with a few key metrics.** In the case study that follows outlining a program for a fragile, mentally ill population, programmatic estimators identify the drivers of outcomes. Here are three outcomes these estimators have uncovered that the program is accomplishing:
  - a. Improving members' overall health quality by decreasing inequity (in the example, by decreasing four-year all-causes mortality risk),
  - b. Decreasing member healthcare cost over time, and
  - c. Engaging in more efficient patterns of utilization (less inpatient and emergency, more outpatient and pharmaceutical).
3. **Measure what matters directly and understandably.** Use proxy, correlated measures — measures intended to measure something else — only when direct measurement is not feasible.
  - a. Consider, for example, the widespread practice of measuring providers' adherence in select subpopulations to a standard of care, in the hopes that more adherent care in the cohort-subpopulations translates to more effective care in the entire population. Without a doubt, provider adherence is one useful measure for contract compliance and is a correlate of the effectiveness — or ineffectiveness — of care. Still, these measures provide just a glimpse into the full story; whereas, direct measures of effectiveness like longevity and health stability can be feasibly achieved.
  - b. In the same vein, data science brings many powerful tools that find hidden relationships; but sometimes, the connections between outcomes and their underlying bio-psych-social mechanisms are opaque<sup>1</sup>. Not understanding those connections is not an issue when generating things like movie or consumer product recommendations. For those charged to "at least do no harm," it's necessary for analytics to yield understanding — not just of what makes an outcome more or less likely, but also the hows and the whys of what's driving the outcome that policymakers and providers can use as they craft their interventions.

4. **Measure what matters from reusable components.** Structure data into reusable component features,<sup>2</sup> such as kinds of disorders, kinds of pharmaceuticals, etc., so as to be reusable from estimator to estimator. For example, include the same list of diagnosis codes for psychoses or heart disease in estimators of both cost and mortality risk. Doing so increases comparability across results and facilitates interpreting different results together as part of a bigger picture. Over time, this approach to reuse grows a pool of estimator components that accelerates construction of programmatic estimators that quickly increase the agency's range of insights. This inherently efficient and expansive concept also allows for integration of additional information, beyond claims data, to understand how those drivers impact health outcomes.

These simple principles yield advanced insights that capture the multiple, interrelated drivers of success and of improvement opportunities in Medicaid agencies' healthcare policies, programs and administrative initiatives. Gainwell's tools ensure that the information is actionable and valuable across the healthcare ecosystem, fostering collaboration among healthcare stakeholders by identifying what matters most to improve outcomes. When Medicaid agencies are seeking either to (a) increase effectiveness without increasing cost or (b) decrease cost without decreasing effectiveness, direct, richly informative measures of cost and effectiveness are invaluable.

This approach identifies what drivers are important to achieving a desired outcome and allows Medicaid agencies to manage their programs more effectively and with much greater confidence. Measures of effectiveness performance must extend beyond traditional metrics, encompassing overall impacts on and drivers of cost, health equity and utilization patterns. To truly grasp the intricate factors influencing individuals within these complex populations, it is essential to harness all available data over extended periods. This becomes particularly vital when dealing with the most complex populations, where interrelated needs traverse the bio-psycho-social continuums, often with interconnected and interacting elements.

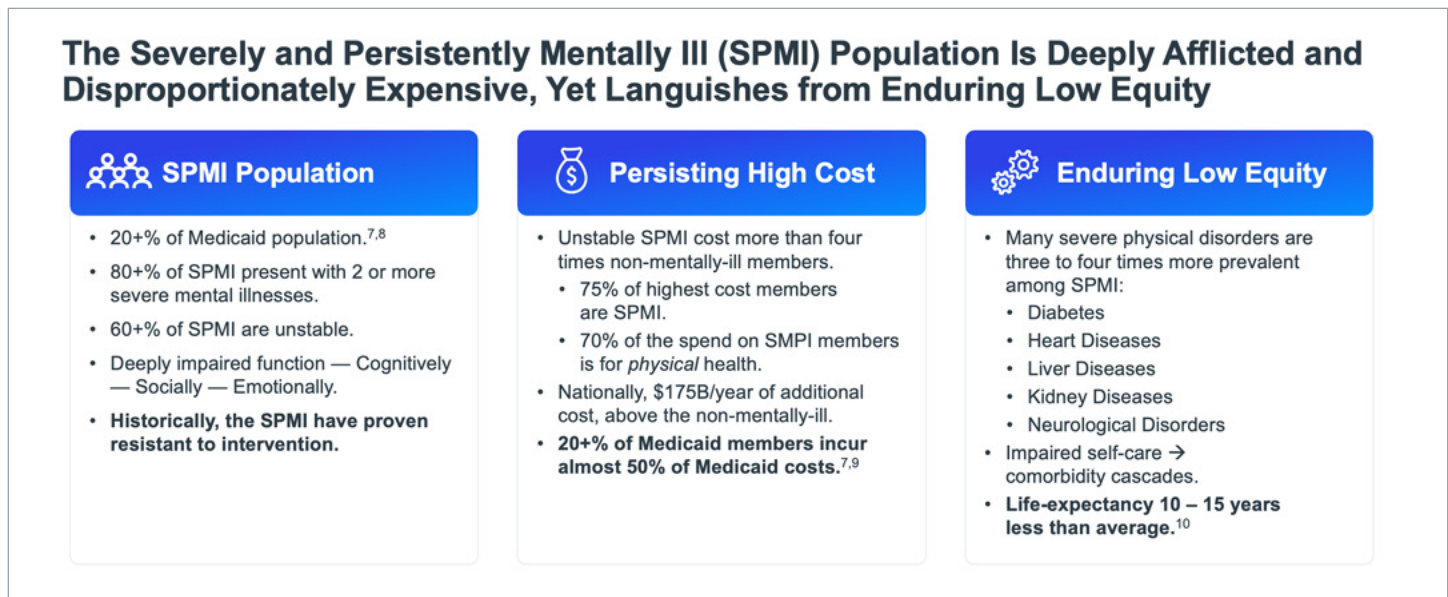
Navigating this complexity necessitates a programmatic approach, not only for comprehension but also to align with the mandates of key entities like the U.S. Department of Health and Human Services (HHS),<sup>3</sup> the Centers for Medicare and Medicaid Services (CMS)<sup>4,5</sup> and the Substance Abuse and Mental Health Services Administration (SAMHSA).<sup>5</sup> These entities are pushing for integration across complex systems. In response to the increasing demands from policymakers and public health officials for enhanced management of complex populations across the entire bio-psycho-social continuum of care, this kind of transformative approach is imperative.

## **A Real-World, At-Scale Example: Assessing Outcomes from a Health Home for the Severely and Persistently Mentally Ill**

Before continuing with the general capabilities of programmatic estimators, let's make this more concrete. We'll walk through three programmatic estimators Gainwell created with a client that developed an innovative health home staffed by care coordinators with behavioral health (BH) training. This intervention was intended to enable coordination across the continuum of bio-psycho-social care for the severely and persistently mentally ill population (SPMI).

Essentially, this was a BH health-home (BH-HH) for those experiencing SPMI. As we will see, patients experiencing SPMI comprise a large, disproportionately expensive population for whom less targeted interventions have not made a significant impact (See Figure 2).

Figure 2. Caring for Those with SPMI Is a Complex Challenge for Medicaid Agencies



Over several years, this state’s BH-HH had well over 300,000 referrals of members experiencing SPMI. These referrals were typically made when the member had an adverse health event and was noticed by the system. Of those members experiencing SPMI who were referred, about half engaged at least once to receive care coordination services from a behavioral-health-trained provider; the other half never engaged, despite outreach.

This BH-HH for the SPMI population provides an at-scale case study for programmatic estimators in the context of a disproportionately expensive population with complex care needs. The SPMI population is at the forefront of federal, state and local strategy and policy — from the White House, HHS and SAMHSA to most state governor’s offices and legislatures.

Beyond and apart from answering several of the client’s specific questions about the BH-HH program, this case study also includes examples where Gainwell’s programmatic analytics surfaced new knowledge about broad trends in the SPMI population that may be applicable in many states.

### Programmatic Estimators to Evaluate a Program’s Impact on the SPMI Population

Qualitatively, the descriptions in Figure 2 characterize the SPMI population as psychiatrically complex. Those experiencing SPMI are commonly unable to care for their own health reliably and adequately. As a result, those experiencing SPMI may suffer deeply and are especially vulnerable to comorbidity cascades. For example:

- Inadequate self-care leading to diabetes
- Inadequate self-care for diabetes leading to comorbid kidney disease
- Inadequate self-care for diabetes comorbid with kidney disease leading additionally to comorbid congestive heart failure

Each physical illness in the cascade is itself expensive and becomes more so as illnesses multiply and interact. As a result, this 20% of a Medicaid agency’s population comprising 75% of an agency’s highest-cost members incurs almost 50% of the healthcare spend — over four times per member, per month more than those without mental illness. Yet, for all that disproportionate Medicaid spending, the lives of those experiencing SPMI are shortened by 10 to 15 years relative to those not experiencing serious and persistent mental illness. Living shorter lives with unmet needs, the SPMI experience continuing low healthcare equity.

After this novel BH-HH had been in operation for some time, the state wanted to know how it was performing relative to aspirations for the program: Is the program really working? Using more than six years of data, the state wanted to explore overarching key performance indicators (KPIs) over time, like total cost of care (TCOC), in addition to and beyond what HEDIS® and the Centers for Medicare and Medicaid Services (CMS) Core Set analytics were already measuring for them. Moreover, the state's BH team recognized that simple direct comparison of year-to-year percent changes of KPIs like TCOC are often misleading. The state's clinical and analytical team wanted "error bars" (the range within which an estimated value's "true" value is likely to fall), along with other statistics that come with computing error bars. This would enable them to understand whether apparent differences were meaningful or shaky, and whether apparent trends were likely to continue in a stable manner over time.

**Overarching measures reported:** In addition to TCOC over time, we'll discuss two more overarching programmatic estimators:

- Distribution of utilization among inpatient, outpatient, emergency department and pharmaceutical services, which is a direct indicator of efficiency of utilization, over more than five years.
- From the more than six years' total data available, four-year all-causes mortality risk, a direct indicator of equity.

These KPIs are key measures that speak directly to the magnitude of program effectiveness. Using this approach also allows us to understand the multiple, heterogeneous drivers of that effectiveness, and to expand the catalog of drivers and programmatic estimators over time, to answer additional questions and to focus on other high-cost, complex and fragile populations.

**Event anchoring:** Different from measures of effectiveness used in this case study, many industry-standard point-solutions' metrics are designed to measure aspects of service delivery over a particular period of time — typically a calendar year and often called a "[contract-specified] performance period." For example, to what extent are services (not) being delivered as expected/contracted, within the performance period? *By design*, every member being evaluated is anchored to the start date of the performance period, and then is possibly excluded from the measure based on minimum amount of time since start of services before the end of the performance period. Programs clearly need such measures to track and manage intermediaries' contracted performance, but these measures can raise problems when they're repurposed to measure something other than delivery of contracted services, such as the effectiveness of those services for the member.

In addition, Medicaid agencies and their programs also need a direct view to overall effectiveness, which requires different, additional measures. Questions about effectiveness from the start of services are not well answered with standard measurements of service delivery. This is largely because agencies must work around the fact that, on average, in a one-year performance period, members will have about six months of data in the first performance year, while they were Medicaid members but before the start of services as program members. By contrast, for questions about overall effectiveness, programmatic estimators have the flexibility to anchor each individual member's "time zero" to the event most relevant for the insight being created. In the present case study, where the estimators are examining the impact of the BH-HH program on its members, the relevant anchor date is the date of each member's referral to the BH-HH, which is different for each member. In the estimator of four-year risk of all-causes mortality and the estimator of total cost of care, time zero for each member starts with the member being referred to the BH-HH for care coordination.

**Highlighting the analytics with robust underestimates:** Next, we'll touch on some of the robust trends we observed, where "robust" means the risk of a false positive is markedly less than 0.0001% (see Figure 3). However, the intent of this white paper is *not* to tout this innovative BH-HH program on behalf of the state that created and implemented it, so we are muting the observed trends by using numbers that understate the actual magnitudes markedly. Instead, the underestimates reported keep our focus on the *kinds* of powerful, directly actionable insights that can be surfaced by using a comprehensive set of just a few



programmatically estimators that measure overarching outcomes and their multiple drivers. The data might as easily have shown the program not to be working in some important way, and that, too, would have been actionable insight. No matter what they reveal, the *kinds* of overarching insights generated by longitudinal programmatic estimators can help focus the activities and resources of Medicaid agencies as they:

- Establish, track and improve policies and programs.
- Track, learn from and improve the performance of the many intermediaries associated with care delivery, such as MCOs, hospitals, outpatient practices and providers.
- Support those intermediaries in classifying, triaging and augmenting the personalization of services likely to be most impactful to individual members.

**Figure 3. Robust Insights into the SPMI Population and Interventions That Impact Them**



## Proof Points of Program Effectiveness

When Medicaid agencies establish and operate large, expensive programs that consolidate and coordinate delivery of services to fragile populations, it can be a major challenge to determine if these programs are working to a level that justifies their cost. For this BH-HH, the evidence from all three programmatic estimators speaks directly to the program's positive impact on this historically challenging population. While roughly half of those referred never interact with the program's services, this can be largely attributed to the challenging nature of engaging the SPMI population. The positive impact is clear for the half of the referred SPMI population who engaged at least once with the BH-HH's care coordination services.

- *Equity:* For members experiencing SPMI who engage with the BH-HH compared with those who never do, four-year all-causes mortality risk is well over 10% lower. (Unlike cardiology, where 10-year mortality risk is commonly measured, four years is sufficient to reveal clear program impact for the SPMI population, which has a 10-15-year shorter life expectancy<sup>10</sup> than the general population.)
- *TCOC:* For members experiencing SPMI who engage compared with those who never do, as their deferred/ignored healthcare maintenance gets caught up and their conditions are managed and become more stable, their TCOC falls by well over 5% per year.
- *Utilization:* For the members experiencing SPMI who engage compared with those who never do, their utilization of outpatient and pharmaceutical services is markedly higher, while their utilization of inpatient and emergency services is lower. This indicates their condition is responsive to ambulatory care that is more stable and lower-cost.

These results, taken together, provide a directly measured, comprehensive answer to the question, “Is this BH-HH working for the SPMI population?”

In this case, the results provide strong support that this agency’s BH-HH is working both to improve longevity, a key marker of equity, and to contain and reduce costs, in part with effective utilization of outpatient and pharmaceutical services that address ignored healthcare needs and stabilize health. Still, these results are particular to this agency and its BH-HH. However, no matter the results, longitudinal programmatic estimators give an agency vital insight into the current impact of programs and initiatives, along with pathways for how to move forward that are tailored to their specific circumstances and have calibrated confidence. That’s simply not possible with provider-quality point solutions or simple, percent-difference measures of cost.

## Intervention-shaping Insights

Within these three estimators, we are not only considering referred SPMI member engagement with the program as a driver of outcomes; we look at many other potential drivers *at the same time, within the same estimators*. For example, while evaluating the BH-HH program’s impact on longevity, another group of drivers that lowered four-year all-causes mortality risk by well over 10% were a collection of non-life-threatening physical disorders. At first glance, it may seem paradoxical that going to the doctor to be treated for anything non-life-threatening can sometimes lower mortality risk. Yet, for the SPMI population, presenting with ordinary disorders like headaches, arthritis, back pain or irritable bowel syndrome gives physicians a chance to consider, probe further and start treating commonly neglected health issues, including those additional disorders that are life-threatening.

These non-lethal drivers of reduced mortality risk have clear import for how to think about intervention. Physical medicine providers understandably organize the cadence of their practice to move patients through the office at a pace that is geared to patients’ needs for physical care. The psychiatric complications presented by patients experiencing severe mental illness are often *very* time-consuming, to an extent that is challenging to manage. *Even so, providers may well use the opportunity to identify other significant medical problems that might not be declared, when patients with SPMI come in with mild or routine complaints.*

## Program-shaping Insights

Unsurprisingly, several life-threatening disorders are drivers of an adverse impact on longevity. Some of these disorders, like liver disease, heart disease and diabetes, drive upward of a 25% increase in four-year all-causes mortality risk for those experiencing SPMI. For some of these life-threatening disorders, the mortality risk for those impaired by SPMI is itself higher than for the non-mentally-ill — often because the diseases have advanced to later, more complicated stages as a consequence of neglected and disorganized self-care. Moreover, some of these life-threatening disorders are three to four times more prevalent among the SPMI population than Medicaid recipients who are not mentally ill. *That’s not only a useful insight to providers and care coordinators about where to focus diagnosis, treatment and follow-up; it’s also useful to agencies in shaping programs’ incentives to providers to meet or exceed accepted quality standards that are germane to treating those disorders.* Prevention and early treatment of some of these disorders can have dramatic impacts on longevity and quality of life, further emphasizing the program design implications of this insight.

## Financial Planning/Provisioning and Earlier Intervention

As mentioned previously, the programmatic estimator of TCOC showed that the referred-SPMI population who engage in the BH-HH become less expensive over time after care coordination starts. That self-same estimator also shows that the SPMI who engage and start catching up on neglected health needs are, on average, upward of 15% more expensive than those who don’t. That’s not surprising, given the frequency with which those experiencing SPMI are noticed and referred as a result of an adverse health event, which itself is the result of long-deferred health maintenance and self-care. Catching up on deferred services will drive more costs up front; as the health of members receiving care coordination stabilizes, costs will then go down.

For underserved, equity-challenged populations like those with SPMI, having an estimate of how much additional cost will be incurred can advance agencies' financial planning and provisioning in anticipation of the rate at which a program is successfully engaging new members with neglected health needs. An agency may also choose to evaluate the likely high cost that will come with the adverse events that get members noticed and referred to a program. This insight may be used to justify a change in policy or a waiver to start addressing neglected healthcare needs before the predictable adverse health events that result.

## Gainwell's PsychHx™ Psychiatric Grouper Provides New Insights into Those with SPMI

For over a decade, CMS has been advocating and providing funding to support initiatives directed at integrating care across the bio-psycho-social continuum. However, one of the barriers to understanding the effectiveness of this approach has been the lack of a tool — conventionally called a “grouper” and usually built to facilitate revenue cycle management (RCM) — to reconstruct members' psychiatric histories from their claims. While not advancing RCM, a grouper for psychiatric history is essential to understanding the SPMI population; and so, Gainwell built the PsychHx™ psychiatric history grouper to reconstruct each member's inpatient and outpatient psychiatric history from claims. Beyond enabling many of the above insights into the BH-HH, the Gainwell PsychHx™ psychiatric grouper has revealed new knowledge about the SPMI population, *apart from and in addition to* the impact of the specific BH-HH program in the case study. Those new insights are detailed below.

- **The SPMI population is not monolithic.** To date, the literature<sup>7,8,9</sup> has treated the SPMI as a monolithic 20+% of the Medicaid population. However, evaluating almost six continuous years of data for all of an agency's members, those SPMI who have been referred to the BH-HH for care coordination comprise only 60+% of the total SPMI population, based on examining all of the psychiatric diagnoses the Gainwell PsychHx™ psychiatric history grouper found on claims. The TCOC and overall utilization rates of the other 30+% who have never been referred for care coordination are quite distinctive and instructive. In many ways, the 30+% of members experiencing SPMI who are never referred to the BH-HH unexpectedly look much more like those Medicaid members who have no severe mental illness:
  - They incur a TCOC only about 1.5 times greater than those not having severe mental illness (not more than four times greater like those referred to the BH-HH).
  - They utilize outpatient and emergency services to the same extent as those not having severe mental illness.
  - They utilize inpatient services a bit more than those not having severe mental illness, but not nearly as much as those impaired with SPMI who get noticed by the system and referred to the BH-HH.

There is, however, one telling way that the segment of the SPMI population never referred to the BH-HH is similar to those with SPMI and different from those without: the extent of their pharmaceutical utilization. In this 30+%, pharmaceutical utilization is at the same high level as those who are referred to the BH-HH. Due in part to their adherence to suitable medication regimens, the physical health of this 30+% of the total SPMI population appears to be largely as stable, on average, as their counterparts without severe mental illness. *On the pathway to better physical health for those with SPMI, all kinds of providers, including physicians and care coordinators, can play a critical role in getting members with SPMI in to see psychiatric providers who can evaluate and then establish or adjust psychotropic medication regimens.*

- **Increased psychiatric impairment (more concurrent/comorbid psychiatric disorders) brings increased mortality risk and urgency to intervene early and effectively.** It's well established that more concurrent (comorbid) physical disorders drive increases in four-year all-causes mortality risk, by upward of 10% per disorder. For example, diabetes with comorbid heart disease brings greater risk than either diabetes or heart disease alone. In addition, leveraging the PsychHx™ psychiatric history grouper, Gainwell found that increased psychiatric comorbidity also brings its own, distinct, increased mortality risk. Suicidality, substance abuse, homelessness and many other concomitant features of psychiatric disorders drive increased four-year all-causes mortality risk — a more than 10% higher risk per psychiatric disorder among the 60+% experiencing SPMI who are not stabilized by their medication regimens. As they increase in complexity, the cognitive, emotional and social impairments afflicting those experiencing SPMI become an increasingly urgent matter of equity to intervene quickly and effectively.

- **Increased psychiatric impairment (more concurrent/comorbid psychiatric disorders) brings dramatically increased TCOC and urgency to intervene early and effectively.** More concurrent (comorbid) physical disorders drive increases in cost, because greater medical complexity brings with it more visits to more specialists. In addition, leveraging the PsychHx™ psychiatric history grouper, Gainwell found that, among the 60+% experiencing SPMI who are not stabilized by their medication regimens, additional concurrent (comorbid) psychiatric disorders drive well over twice the cost impact of multiple physical disorders. This speaks to the urgency of intervention for both physical and psychiatric stabilization.

## **A Few Overarching Programmatic Estimators Tell a Comprehensive Story**

As we've seen in this case study, just a few direct programmatic measures of program performance — in this case, equity/longevity, TCOC and types of service utilization — come together to tell a rich and compelling story of the effectiveness of one particular BH-HH program for the SPMI population. Built into the approach to assessing effectiveness, programmatic estimators also yield insights into the multiple drivers of outcomes, helping to identify opportunities for improving any program and its emphases, refining programs in a much more exact and confident way than conventional analytics. A few programmatic estimators transform a Medicaid agency's data assets so that an agency's programs can make a useful and meaningful difference to their members.

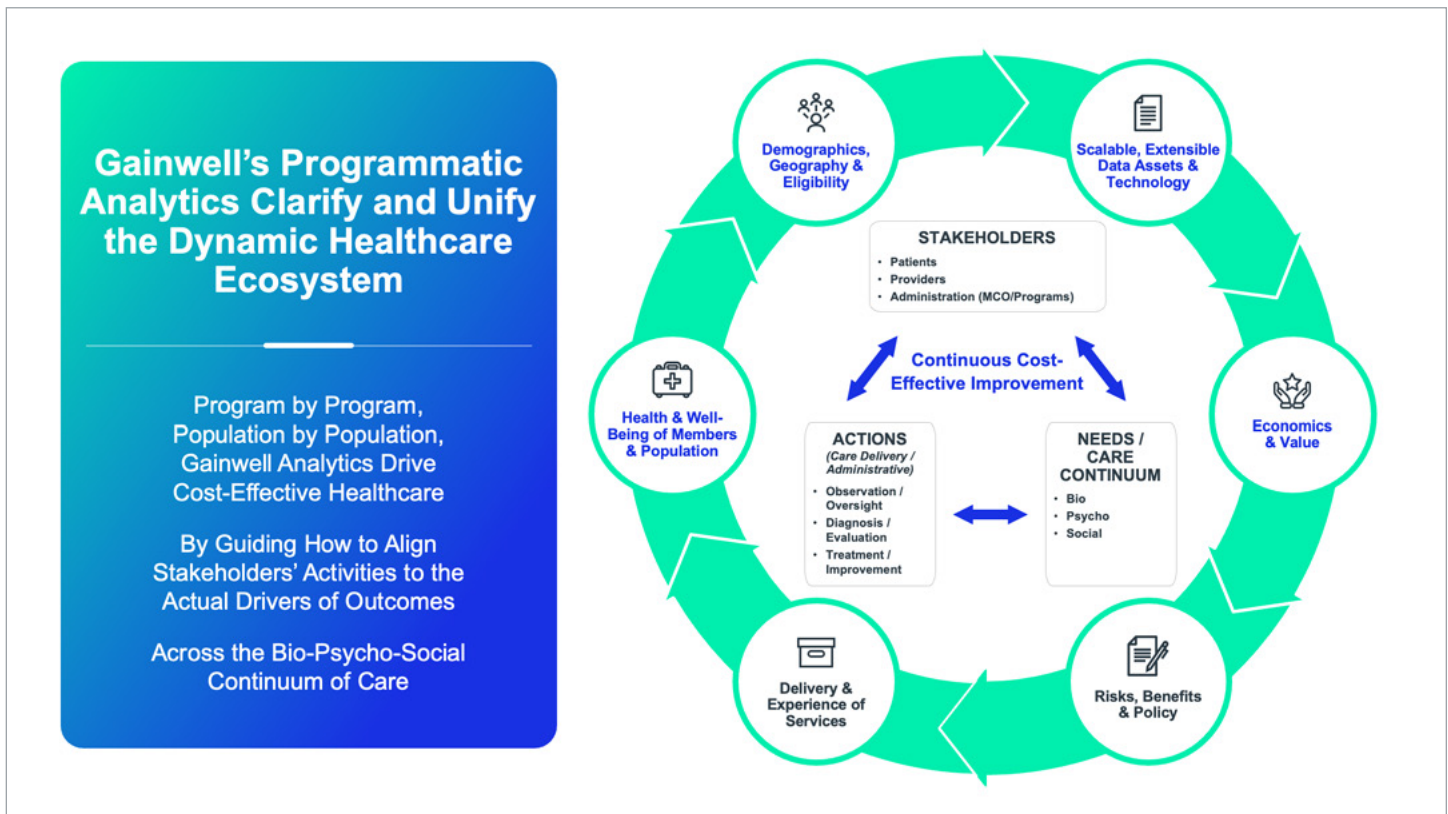
## **Actionable Insights Across Stakeholders, Populations, Programs and Pain Points**

At Gainwell, our Medicaid agency partners often speak about the need for programmatic insights that will help them effectively manage and serve vulnerable, high-cost populations within their available budgets. Experience has taught agencies, along with those of us privileged to support them, that actionable information is the key to providing value. We also understand the complexities that Medicaid agencies must align across managed care, healthcare delivery systems, providers of care, and county, state and federal government.

Gainwell developed this programmatic approach to ensure that all constituencies benefit through an understanding of the complex, interrelated circumstances that drive results. We provide that information in a way that allows a clear, objective and actionable view so that all constituencies can achieve the best outcomes for their program, their organization and the health and well-being of those in their care. We do this in a way that allows for continuous expansion of the outcomes and drivers being considered, which in turn drives continuous improvement for Medicaid agencies.

As we describe next, the uses of programmatic estimators to yield comprehensive insights go well beyond the features of the BH-HH example, beyond application to the SPMI population and beyond the set of health outcome drivers most commonly considered from the data at hand — i.e., member data, provider data, SDOH data and medical/behavioral/pharmaceutical claims. Gainwell's programmatic analytics align data assets and, consequently, stakeholders (see Figure 4).

Figure 4. Gainwell Refactored the Healthcare Ontology for Comprehensiveness and Robustness



Gainwell’s programmatic analytics work for and grow with Medicaid agencies, and here’s why: In developing this approach, we went all the way back to the most abstract basics from measurement science (ontology<sup>11</sup> and epistemology<sup>12</sup>) in order to unify the diversity of data collected to capture several aspects of healthcare for a variety of stakeholder purposes. Specifically, Gainwell refactored — again leveraging software engineering methodology<sup>2</sup> — to tease out the kinds of considerations that, in different combinations, make up the many kinds of measurables and observables that inform both the rendering of care and the administrative activities that facilitate it. In so doing, we’ve usefully aligned the key features to deliver much-needed comprehensive healthcare insights.

Our refactoring yielded three broad dimensions (the inner circle in Figure 4):

- Key stakeholders in facilitating successful, cost-effective delivery and outcomes:
  - The patients who receive care, and who often must be nudged, even pushed, to follow providers’ instructions with accuracy and diligence
  - The providers, practices, hospitals and other entities that deliver care
  - The administrative entities that oversee care delivery
- Needs that define the continuum of care:
  - Biological
  - Psychological
  - Social
- Activities in which stakeholders engage within their roles:
  - Taking in information — observation/oversight
  - Figuring out what it means — diagnosis/evaluation
  - Acting on it — treatment/improvement

While this refactoring is outside-the-box thinking for current healthcare data/feature engineering, we believe it's nonetheless robust and has legs, because it's well within the box of how scientists are starting to talk about adaptively competent information processing:<sup>13,14,15,16</sup>

- The bio-psycho-social dimension is driven by what it is to have a body and mind in a social context.
- The activities dimension captures what we do in our goal-directed commerce with the world, including:
  - Taking in data about our changing situation.
  - Parsing the data to determine its meaning (semantics) for us.
  - Acting within the pragmatics of the situation toward achieving — and sometimes changing — our current goals.
- Only the third dimension is specific to healthcare, as a taxonomy of actor/role types.

Gainwell's approach is powerful in addressing the big healthcare picture, because we have placed healthcare in the context of an even bigger picture — namely, how people go about successfully achieving their changing goals in changing circumstances. This framework gives us direct facility to traverse Medicaid agencies' healthcare data broadly, deeply and nimbly.

Horizontally, programmatic estimators yield a comprehensive view across programs, evaluating each program and population for which estimators are constructed, including for the growing number of integrative bio-psycho-social care-focused demonstration programs. (Demonstration programs often involve Section 1115 waivers<sup>15,16,17</sup> from CMS, allowing Medicaid agencies to work to improve costs and outcomes with new interventions and approaches that do not increase costs.) Because the estimators are built from reusable measures, results across programs and populations are comparable. This approach allows us to build an integrated view of the agency and continually expand and improve the effectiveness of Medicaid programs.

Vertically, each programmatic estimator supports drill-down to yield more granular views.

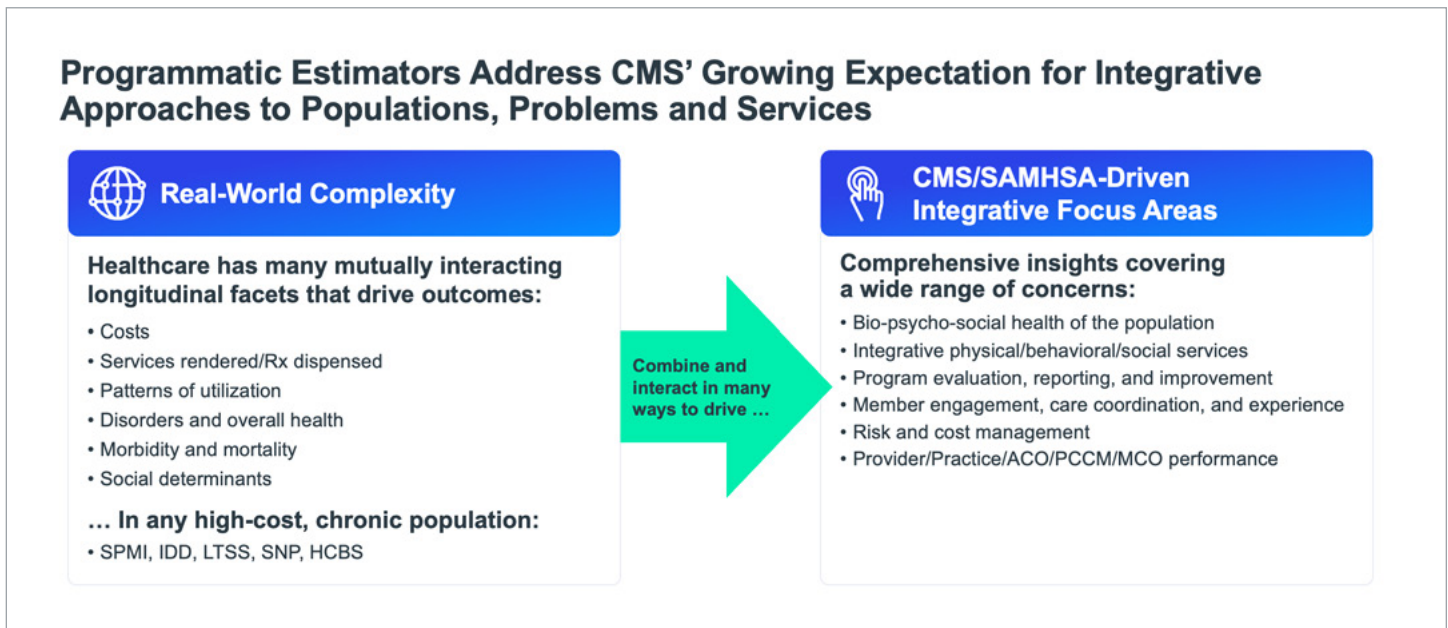
- Programmatic estimators yield insights for managing and improving the performance of all the agency's contracted intermediaries, including MCOs, hospitals, practices and providers.
- Programmatic estimators drill through the intermediaries to the level of the individual member, placing members in context with other members for purposes of triage, segmentation, personalization and proactive care. This tailored and granular view of the individual opens the possibility to make every encounter an opportunity to improve health outcomes and drive the most impactful services.

Programmatic estimators transform all manner of relevant data into measurements that make a difference across the many dimensions and scopes of interest. Moreover and powerfully, it's not only that both overarching outcomes and their drivers are estimated; in addition, the influence of those drivers is estimated in context with the influence of other drivers. Creating and leveraging such programmatic insights will contribute substantially to the successful and continuously improving healthcare operations of Medicaid agencies.

## **Horizontal Scope to Look Across the Drivers, Populations and Approaches to Healthcare**

Our example of the SPMI population and a BH-HH program generalizes broadly. Starting from relatively simple, reusable constituent measurements of healthcare drivers and outcomes, Medicaid agencies can build programmatic estimators that give a rich, nuanced, integrative view of how the agency is performing across the population segments they serve (see Figure 5).

Figure 5. Programmatic Estimators are Built from Reusable Features to Yield Insight for Any Group



**Reusable measurements/features/observations.** The many facets of healthcare, including those that drive the outcomes that make a difference, can usually be structured in reusable form:

- Costs, with further subgroupings (breakdowns/drilldowns), for example:
  - Inpatient
  - Outpatient
  - Skilled nursing facilities
  - Long-term acute care hospitals
  - Emergency department
  - Pharmaceutical
  - Laboratory
  - Transportation
  - Dental
  - Community-based services
  - In-home care
- Volumes of service types rendered
- Types of service location
- Volumes of pharmaceutical types dispensed (with normalized dosages, e.g., morphine-equivalent dose for opioids, where established)
- Types of disorders, and for chronic types, disorder stability/volatility
- Lengths of stay and discharge reasons
- Traumatic events
- Morbidity and mortality
- Social determinants of health
- Emotional well-being
- Bio, psycho and social risks and risk stratification
- Member experience of the health care system
- Providers' adherence to established standards of care (as is found in HEDIS® or CMS Core Set measures)

- Transitions of care (age-related, as well as other transitions for at-risk populations)
- Events drawn from other public agencies' data as that becomes available (like criminal justice agencies and housing agencies)

These reusable features comprise a growing catalog of observable drivers of bio-psych-social need, of care delivered across the continuum and of cost-effectiveness in the Medicaid agency's ecosystem.

**Any grouping of members of interest.** Once in reusable form, features' values can be extracted for those members in any grouping.

- Beyond those with SPMI from the earlier BH-HH example, being a member of any vulnerable or fragile population for which the Medicaid agency is providing distinctive services, including:
  - Intellectually/developmentally disabled (IDD)
  - Long-term services and supports (LTSS)
  - Special needs plans (SNP)
  - Home and Community Based Services (HCBS)
  - Children in early and periodic screening, diagnostic and treatment (EPSDT)
  - Foster care
  - Children with serious emotional disturbance
  - Members with a substance use disorder (single- or poly-substance)
- Having a particular disorder or complex of disorders
- Having received particular types of services
- Having been dispensed particular kinds of pharmaceuticals (including but hardly limited to opioids)
- Being in a particular age group
- Living in a particular geography or in the context of some degree of rurality, or other area where access to services and social needs are limited
- Being Medicaid-Medicare dual-eligible

Whenever it's possible to state a business rule based on available data for who is and who isn't in a grouping, that grouping can be constructed and elaborated into programmatic estimators. (Some kinds of estimators can even be used to construct ad hoc, data-driven groupings and segmentations.)

Finally, and very usefully with respect to the flexibility of horizontal (and vertical) scopes for programmatic estimators: for members in particular programs, it's usually possible to extract a substantial, randomly selected, demographically matched sample (a "stratified random sample") from outside the group of interest. Such samples serve as "control" groups, points of comparison of cost-performance effectiveness for members in a grouping of interest versus other members served by the Medicaid agency, helping to distinguish the impacts of an agency's overall policies from the impacts distinct to any specific program.

## Programmatic Insight into the Broad Areas of Focus for Medicaid Agencies

For over a decade, CMS has been intensifying its focus, initiatives and funding to increase the comprehensiveness of bio-psycho-social care offered to Medicaid recipients and to improve the whole-person health of Medicaid populations, especially those most vulnerable. As the integration of bio, psycho and social delivery systems increases, so does the challenge of creating a comprehensive understanding of what is and is not working in these programs. Showing the effectiveness of 1115-waivered demonstration programs that are providing integrative care is one increasingly common use for programmatic analytics, and there's a growing range of others, as shown on the right side of Figure 5. To name a few:



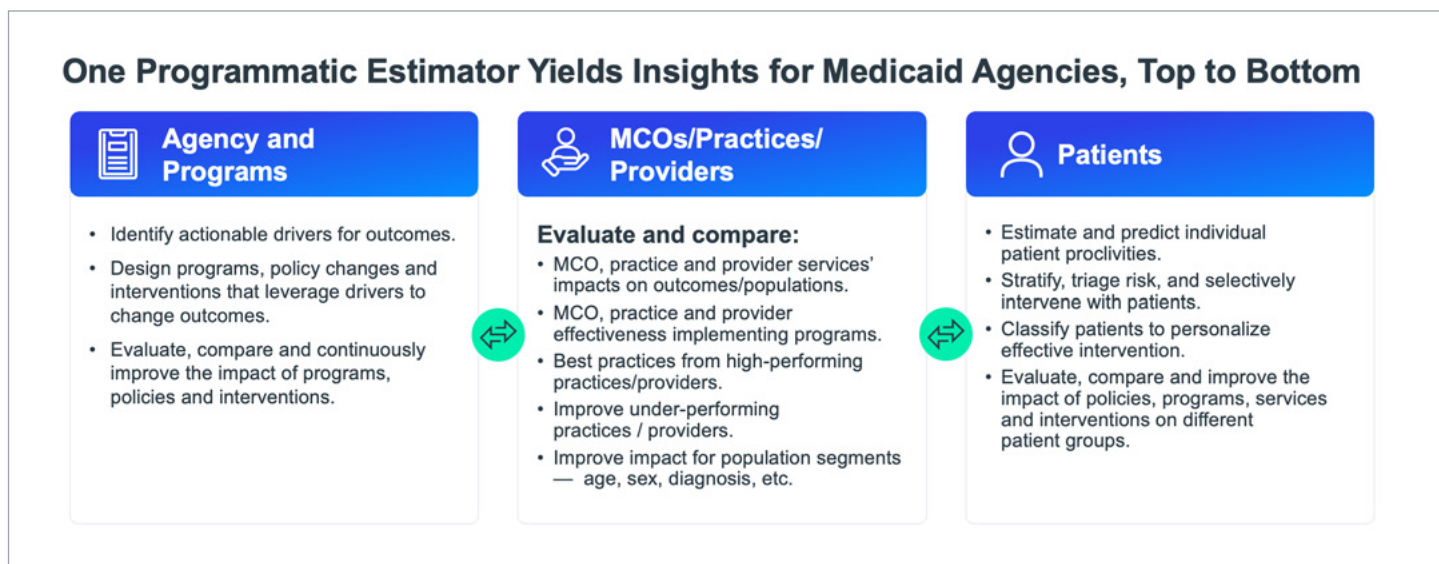
- The amount, types and drivers of members’ engagement with services can be tracked. The same is true for the extent to which members’ kinds and levels of engagement are effective, in preventing/reducing morbidity and mortality and in stabilizing members’ health and ongoing costs.
- For vulnerable and complex populations that are offered care coordination and related services, the level, cost and effectiveness of engagement with those services can be similarly tracked.
- Like cost, health status stability and morbidity, risk is also both a driver of outcomes and an outcome to be assessed and managed in its own right. Initial risk assessment may be informed by both conditions and patterns of utilization, and future risk can be predicted based on that assessment. Over time, the interventions that impact risk become clearer and more specific to individuals. As that happens, the estimator itself improves to become better both at evaluating initial risk and predicting needed interventions that result in the desired health outcomes. This approach extends to providers across the bio-psycho-social continuum, to the MCOs that contract with them and to programs themselves, ensuring that resources are driven toward value-producing providers and MCOs. This programmatic methodology helps constantly improve population health management across the entire ecosystem of a Medicaid agency’s programs.

As long as the necessary data assets are available at hand, and are cleaned and engineered to be reusable and performantly structured, Medicaid agencies can systematically and quickly grow their catalog of reusable features and comprehensive programmatic insights. Over time, this approach will continuously improve the cost-performance of initiatives and programs in ways that demonstrably drive members’ bio-psycho-social health and well-being.

## Vertical Scope to Drill Down, Both to Care Delivery Intermediaries and to Individual Recipients

In addition to programmatic estimators’ horizontal scope, these measures can yield insights vertically (see Figure 6).

**Figure 6. Each Programmatic Estimators Addresses Multiple Levels of Agencies’ Concerns**



Vertical drill-down starts at the top, considering the agency as a whole, and it does not stop at the next level of finer granularity, with the agency’s many policies, programs and initiatives.

The same programmatic estimators that evaluate cost-performance for agencies and, more granularly, for programs, can be elaborated even more granularly to evaluate the cost-performance of the intermediaries through which Medicaid agencies’ programs accomplish their mission. This comprehensive evaluation covers both the overall cost-performance of intermediaries and their specific implementations of agency policies, programs and initiatives.

This granular analysis offers a dual advantage. Firstly, it allows for the identification of high-performing intermediaries, enabling

the agency to pinpoint improvements in best practices that can be shared across its intermediary network. Secondly, when underperformance is observed, the agency can actively collaborate with intermediaries to understand and address the root causes, fostering remediation and continuous improvement.

Adding an integrative bio-psycho-social perspective across the continuum of care enhances coordination and synergy among intermediaries, each of which plays a distinctive role.

In the same way that members can be grouped by program, age, sex, diagnosis and other factors, grouping members by the intermediaries that are involved in serving them provides a comprehensive view to the cost-performance of those intermediaries, compared to each other and relative to agencies' needs and expectations. The value of our groundbreaking methodology transcends program design and evaluation, extending to managed care and care providers.

Our method provides a clear lens for assessing the performance and value of MCOs, ensuring a comprehensive understanding and appropriate incentivization of providers across the entire bio-psycho-social systems of care while taking the partnership between Medicaid agencies and care providers to a new level. The specificity and clarity of information eliminate guesswork, enabling providers to grasp the true impact of interventions and form effective care teams.

Crucially, our comprehensive, longitudinal view of all claims — physical, pharmaceutical and behavioral — facilitates partnerships between providers, Medicaid agencies and each other, and provides a fuller understanding beyond the insights provided by point-solutions.

At the lowest, still more granular level, programmatic estimators, which are constructed empirically from large samples of members or even an entire membership, can be applied to individual members to understand their likely needs, costs and engagement relative to those of other, similar members.

Programmatic estimators reflect the degree of different drivers' influence on an outcome — for example, the estimated influence of each of the drivers of cost, mortality risk or likelihood of emergency department utilization in that population — and can be applied computationally to estimate the expected likelihood each member in that population will experience the given outcome. These estimates at the individual level can then be used to stratify and/or triage members relative to each other, as well as to facilitate the selection of interventions for members.

Data-driven observations allow for the classification of members, enabling personalized outreach to enhance engagement and increase the likelihood that the member will receive the most appropriate intervention feasible. Recognizing every touchpoint with a member as an opportunity for more effective engagement, our approach emphasizes the significance of each interaction in driving better outcomes. Whether through phone calls, in-person encounters or on the operating table, the employee interacting with a member is the most important person on the team to drive a better outcome.

Everyone, and all the analytics, should work together toward supporting each and every such interaction. The insights from programmatic estimators, if surfaced to each person working with a member, can drive increased cost-performance at each touchpoint across the care continuum. For example, if call center employees see an alert when they bring up a member's records, they can proactively offer access to specially trained individuals with critical knowledge, looping them in to align the interaction with larger treatment objectives.

Gainwell's programmatic methodology reflects our commitment to unlocking real value for the individuals we support. By evaluating patients across the entirety of their conditions and monitoring their stability, agencies and care teams can tailor interventions to patients' individual risk profiles. We can reveal patterns of instability that indicate future, high-cost events to enable interventions that prevent them. Increasing the stable management of complex, chronic, high-cost populations can both reduce costs and improve the quality and longevity of people's lives.

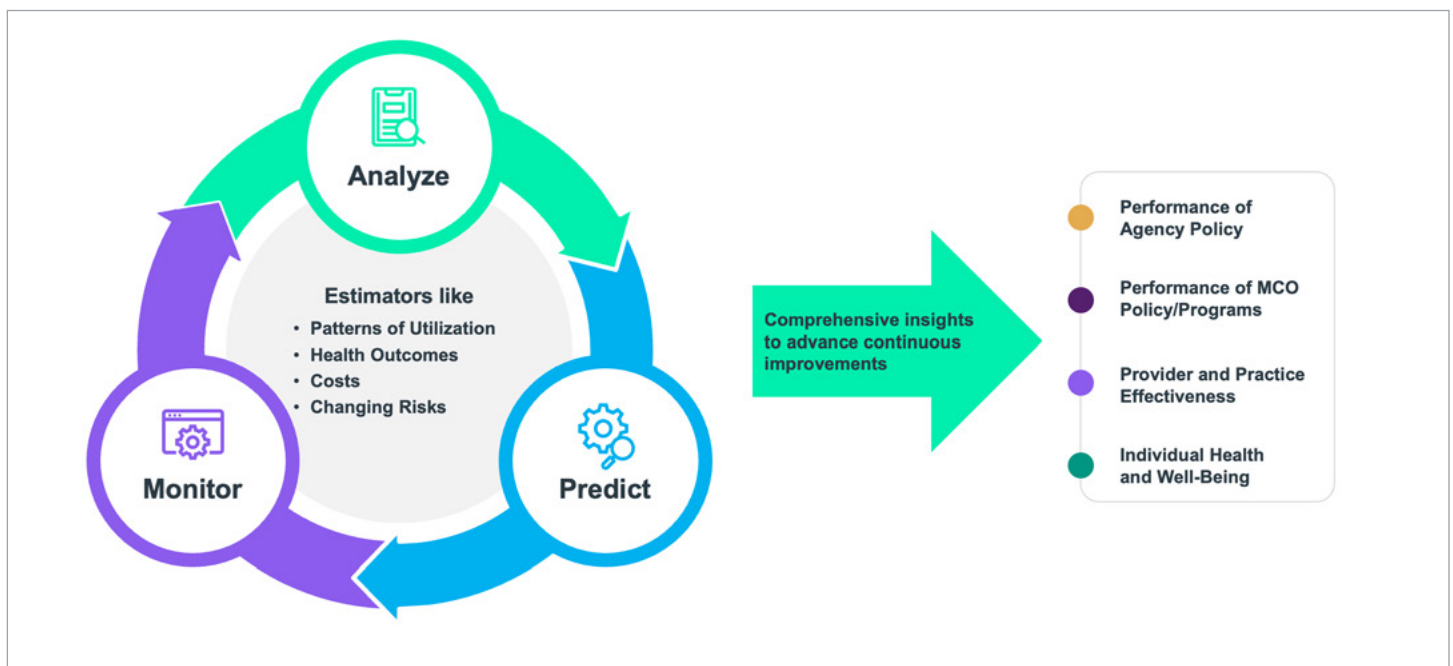
Gainwell's ethos aligns seamlessly with the industry's overarching goal of helping individuals achieve their best health and live to their highest potential. Acknowledging the multifaceted nature of health, we address the whole person by aligning and leveraging the entire claims history over time. This enables us to understand an individual's bio-psycho-social profile, identify impactful interventions, prevent morbidity and mortality, and ultimately contribute to people living healthier, more fulfilling lives.

Vertical drill-down extends the reach of programmatic estimators by elaborating them to apply at each level of granularity where additional insight will be useful.

## Continuously Improving in the Changing Healthcare Landscape

Taking an iterative approach to the development of advanced programmatic analytics solutions, Gainwell helps each Medicaid agency to iteratively monitor, analyze and predict a comprehensive suite of key outcomes that matter to the agency (see Figure 7).

**Figure 7. Gainwell's Best-In-Class Programmatic Analytics Iteratively Strengthen Medicaid Agencies**



Because the healthcare landscape is not static, neither are programmatic estimators, which are developed over time, as programs and priorities change and as knowledge of effective interventions and risk improve. Programmatic estimators allow a flexibility in population health and quality programs because they are responsive to the changing composition and impacts of the drivers of healthcare outcomes they measure, and because the approach allows for additional data to be brought in beyond claims. Here are just a few examples of circumstances under which a nimbly iterative approach brings benefits well beyond any initially developed set of programmatic estimators.

- The circumstances of healthcare delivery can change in dramatic ways, like the recent COVID-19 public health emergency that changed the landscape of members' physical health needs and resulted in lingering mental health needs.
- Far from passive bystanders, Medicaid agencies have many opportunities to change the programmatic circumstances that are giving rise to drivers' observed values — for example, to incentivize providers to improve the care for the disorders that are disproportionately driving costs, or to engage more eligible members in programs known to have a useful impact.

Agencies can improve outcomes and collaborate with providers by giving them actionable insights and data to help them in their work.

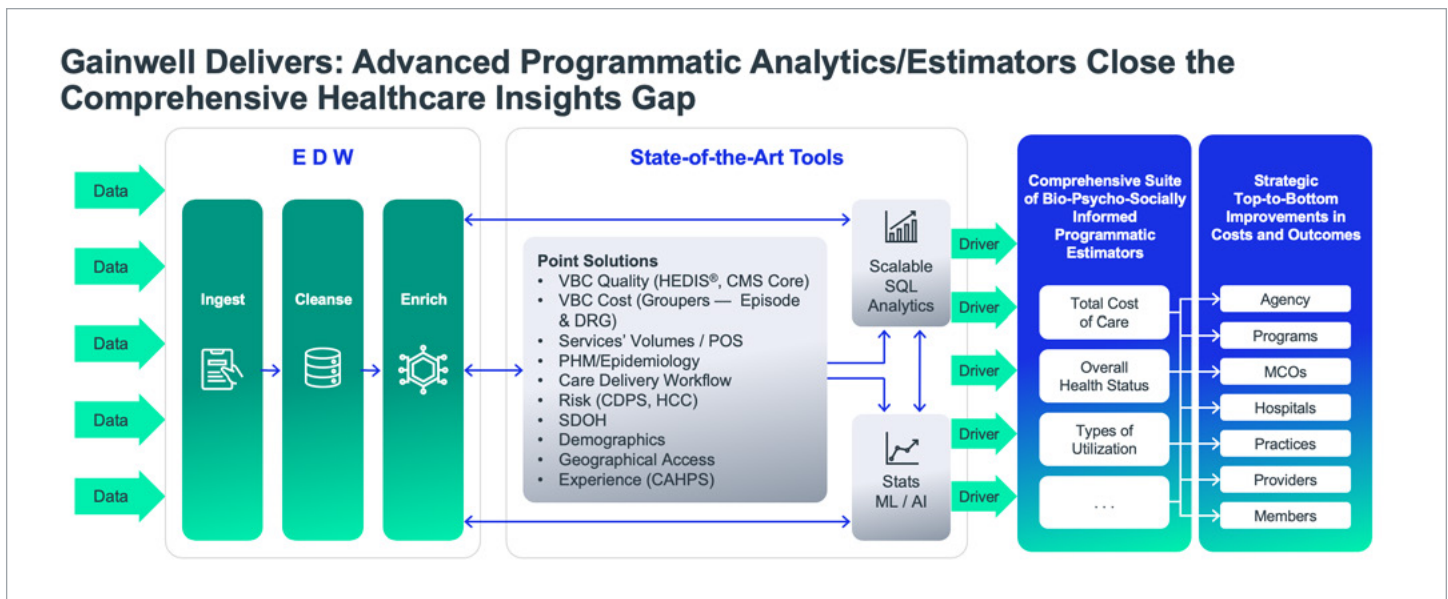
- Many states recognize the need for more integrated care. For example, physical and behavioral care integration is a long-standing priority. Increasingly, states recognize the impact of social care on health outcomes and are implementing waivers that support Health-Related Social Needs (HRSN). By adding these drivers to the programmatic model, states can collaborate across agencies or departments (depending on how they are structured) to understand the impact of interventions that have not traditionally been managed by Medicaid, but are critical to health outcomes.

From the outset and throughout their useful lives, programmatic estimators are developed and maintained iteratively, improving agency performance and outcomes. This iterative and flexible construct ensures that focus remains on the highest priorities of the agency and that value is created across the entire ecosystem. Because the information provided is so specific and the impact of drivers on outcomes is quantified and clear, all stakeholders are better able to collaborate to achieve desired outcomes, and the agency can devote resources across the continuum where value is best created. Solution after solution, the underlying core of reusable real-world features keeps growing, and with it the portfolio of impactful real-world solutions for Medicaid agencies.

## Gainwell’s Advanced Programmatic Analytics Close the Comprehensive Healthcare Insights Gap

It has often been said that if you can’t measure something, you can’t change it. Medicaid agencies can have both the specific, detailed glimpses into aspects of their ecosystem afforded by today’s point-solutions as well as the advanced programmatic analytics that provide a fuller grasp of the bigger picture. Building on the solid foundation of EDW and analytics tools that are available today (see Figure 8) and leveraging concepts from software engineering and measurement science, Gainwell has shown how a small set of overarching programmatic estimators can provide actionable insights that Medicaid agencies can leverage significantly to improve outcomes, reduce costs and improve access to care.

Figure 8. Gainwell’s Advanced Programmatic Analytics Go the Distance



Take a moment to consider what it would be like to satisfy your tangible need for comprehensive insight, beyond what conventional wisdom says is possible:

- Imagine the strategic advantage of pinpointing specific population segments and geographic areas that respond best to interventions.
- Think about how the quality and effectiveness of your interventions improves, as your data assets increase in both breadth of content and longitudinal depth.
- Picture the power of assessing the real value of interventions on crucial factors such as cost, longevity and utilization.

This kind and level of clarity unlocks a world where it is much easier to unite healthcare's many stakeholders across the bio-psycho-social continuum to make and keep people healthy, benefiting individuals and society alike. By delivering estimates that reliably quantify both key overarching outcomes and the multiple actionable drivers of those outcomes, Gainwell continuously and strategically supports our Medicaid partners with the insights they need to improve how Medicaid agencies advance their mission to serve the nation's most vulnerable while maintaining effective financial stewardship.

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