Targeting Affordability in Healthcare

A Review of the Evidence

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KEY TAKEAWAYS

- Telehealth is associated with a reduction in expensive downstream healthcare utilization, but evidence is mixed on the cost savings for the healthcare system overall.
- Studies are needed to evaluate cost-effectiveness of telehealth in a hybrid model, where virtual care and in-person visits are integrated across the continuum of care.
- Selective network plans achieve cost savings, primarily by price reductions rather than reduced resource utilization, but employers have been reluctant to adopt them.
- Use of mail-order pharmacy is associated with lower out-of-pocket costs and improved adherence, which can reduce healthcare costs among beneficiaries with chronic conditions.
- Traditional worksite wellness programs have not delivered clinical or economic improvements, but programs that are customized to individual health and lifestyle risks may achieve cost savings.
- As genetic testing costs decline and pharmacogenomic-guided treatments continue to penetrate the market, preemptive genetic screening has potential for cost savings.

ABSTRACT

Evidence is emerging about how health insurance tools can help manage resource utilization and spending. We synthesized the evidence from the last 15 years in the United States on tools that reduce costs or have the potential to drive cost savings. Specifically, we included five interventions in this targeted review: telehealth, selective networks and value-based insurance designs, mail-order pharmacy, wellness programs and personalized medicine. Telehealth, which spans from real-time remote care to information exchange between providers, has been shown to reduce resource utilization. However, telehealth's ability to reduce costs is tied to reimbursement rates, which were brought in line with in-person rates during the COVID-19 public health emergency. But it is unclear whether private and public insurers will continue payment parity of telehealth services post-pandemic. Evidence shows that selective network plans offer affordability to the beneficiary through lower premiums and reduced overall healthcare expenditures; yet, employers have been reluctant to offer these plans. Beneficiaries incur savings from using mail-order pharmacy due to discounted prescriptions, while plans incur longer-term savings from reduced resource utilization attributed to improved adherence and clinical markers. Worksite wellness programs have not been shown to improve health outcomes or reduce resource utilization in the general population. But, a study of a telehealth-delivered wellness program in a population at risk for chronic conditions revealed trends for reduced healthcare spending. Additionally, as the cost of genetic screening falls, personalized medicine is emerging as an opportunity to improve care and reduce costs attributed to adverse events and ineffective care. Formal economic evaluations on the impact of these interventions from the healthcare system perspective are sparse. Overall, the evidence base to guide affordable plan offerings is growing, but more research is needed, particularly on identifying populations that will benefit most.

INTRODUCTION

Health plans have many tools to reduce spending and therefore reduce plan premiums, which can improve the affordability of health insurance. Historically, these have included:

- Coverage policies that do not cover certain treatments deemed too expensive without substantial gains in quality or health outcomes
- Utilization review to restrict use of certain treatments to particular settings or health conditions
- Benefit design that requires higher cost sharing for certain treatments or larger deductibles

Evidence is emerging about tools that can help further manage utilization and spending. Tools for plans to drive affordability include using remote care (for example, telehealth) or restricting networks of covered providers. Other tools manage utilization through improved patient outcomes, such as mail-order pharmacy, wellness programs and tailoring treatments according to a patient's underlying genetic makeup.

We synthesized the evidence from the last 15 years in the United States on health insurance tools that reduce costs or have the potential for cost savings, focusing on tools that impact care-delivery pathways. Specifically, five interventions were included in this targeted review: telehealth, selective networks and value-based insurance design, mail-order pharmacy, wellness programs and personalized medicine. We selected randomized controlled trials (RCT) and high-quality observational studies that evaluated the impact of the tool on efficacy, resource utilization or economic outcomes for review. For each tool evaluated, we discussed the barriers, utilization, evidence of cost savings, evidence of patient satisfaction or benefits, limitations of the studies evaluated and areas for future research.

TELEHEALTH

Telehealth refers broadly to using information and communication technologies to provide care and services from a distance. Several modalities exist, such as real-time care (e.g., videoconferencing and audio visits), remote patient monitoring, and store-and-forward care (e.g., transmission of medical data from one provider to another for offline assessment). In theory, video visits generate savings by diverting patients from more costly care settings, such as emergency department (ED) visits and specialists. Remote patient monitoring with internet-connected devices confers savings by reducing hospital admissions and readmissions. Store-and-forward care may generate savings as a result of improved efficiency of the healthcare system since the interaction between parties can occur at different times.

A key barrier to telehealth adoption is the payment rate. Traditionally, payers have reimbursed telehealth visits at lower rates than in-person visits. The COVID-19 pandemic was the impetus to change payment rates for telehealth. During this public health emergency, telehealth payment parity policies were enacted by the Centers for Medicare and Medicaid Services (CMS),[1] followed by commercial insurers, to pay providers at the same rate as an in-person visit. In addition, some payers opted to waive cost sharing during the pandemic and 46% of employer-sponsored plans offered lower cost sharing for virtual visits.[2] It is unclear whether telehealth payment parity will remain in effect after the public health emergency expires. Extending payment parity could promote continued use of telehealth but could undercut the ability of virtual care to reduce spending.[3] In addition to some patients preferring in-person care, technological concerns raise other barriers from the patient perspective, including security/privacy concerns, gaps in technology access and implementation, and limited internet access in rural areas.[4]

Insurer coverage for telehealth has been widely adopted: CMS and 85% of employer-sponsored health plans cover telehealth services.[1, 2, 5] Since the initial surge in telehealth utilization in April 2020, utilization rates have stabilized to 13% to 15% of visits across all specialties, as of August 2021.[5, 6] Penetration of telehealth usage was the highest among psychiatry, where 50% of visits have been performed virtually.[5] Telehealth visits account for about one-third of visits for substance abuse treatment and 17% of endocrinology and rheumatology visits.[5]

Telehealth is designed to reduce unnecessary utilization, thereby reducing downstream care in more expensive settings such as ED visits or hospitalizations. Videoconferencing consultation has been associated with a reduction in hospitalizations. For example, a system in the Houston Emergency Medical Services requires a videoconference with a physician prior to transportation to the ED to evaluate appropriate care. A study evaluating this model found a 7% reduction in ED visits over one year.[7] Similarly, tele-triage has been shown to avoid unnecessary in-person visits to specialists, particularly dermatology and ophthalmology.[8]

Avoiding these more expensive care settings could also be achieved through better ongoing chronic disease management with telehealth. An economic evaluation of remote monitoring found that an intervention for patients with heart failure is considered highly cost-effective. The intervention, which uses a wireless sensor implanted in the pulmonary artery, was associated with a lower rate of heart-failure hospitalizations, resulting in an average cost reduction of $7,433 per patient over the next six months after implantation.[8] An economic analysis revealed that the estimated cost per quality-adjusted life year (QALY) compared to standard care was $44,832 over a five-year period.[9] In addition, there is evidence that noninvasive remote monitoring coupled with medication

management is associated with greater glycemic control in patients with type 2 diabetes.[10] The study randomized diabetic patients to a telemonitoring device that transmitted blood glucose, blood pressure and weight measurements to a nurse practitioner who adjusted medications according to established targets, or to a monthly care-coordination telephone call.[10] Significantly greater reductions in HbA1C were observed in the telemonitoring + medication-management group compared to the control group at three months (1.7% versus 0.7%, $p<0.001$), and the effect persisted after six months.[10]

In theory, asynchronous consultations using store-and-forward technologies increase the overall productivity of the healthcare system by maximizing the number of patients a provider can manage. Reviewing clinical information for a group of patients is often quicker than seeing each patient in the office. Furthermore, asynchronous consultations are likely to reduce the number of patients needed to be seen in person. These productivity gains do not necessarily equate to cost savings in fee-for-service or capitated reimbursement models, but offer opportunity for alternative contracting strategies that capture the reduced resource utilization.[8]

While there is evidence that telehealth is associated with a reduction in expensive downstream healthcare utilization, evidence is mixed on the cost savings for the healthcare system overall. A review that synthesized existing global research found that 50% of cost-effectiveness analyses and 32% of cost-utility analyses revealed that telehealth modalities improved outcomes and reduced costs.[8] In the remaining studies, telehealth increased costs but also resulted in improved care and gains in QALYs.[8]

Until additional economic evaluations surface, the promise of telehealth lies in the value to patients. Generally, patients and providers are satisfied with telehealth visits.[11-13] In fact, a consumer survey fielded in June 2021 revealed that 40% of patients believe they will continue to use telehealth in the future, up from 11% before the pandemic.[5] Findings from another pre-pandemic study implied that consumers consider video visits valuable to minimize out-of-pocket costs and inconvenience. For instance, Kaiser Permanente Northern California beneficiaries with high-deductible plans, cost sharing greater than a $10 co-payment, and over 30-minute driving time to their provider's office were more likely to schedule a video visit.[14]

Limitations of the literature include the absence of formal economic evaluations from the healthcare system perspective that incorporate front-end costs of technology infrastructure and data integration. Additionally, the possibility of significant downstream changes—such as reduced need for some of the brick-and-mortar healthcare capital that exists today—have not been fully considered in terms of their impact on costs and healthcare delivery. Further research is needed to understand which types of visits are most cost-effective to conduct remotely to optimize a hybrid care model, where telehealth and in-person visits are integrated across the continuum of care.

SELECTIVE NETWORKS AND VALUE-BASED INSURANCE DESIGN

Selective network, or narrow network, health plans create smaller pools of in-network providers based on cost and quality data. Financial incentives, such as lower cost sharing, steer beneficiaries to preferred providers and in some cases, plans may not cover nonemergency care outside of the network. The cost of using high-cost or low-quality providers is shifted to the beneficiary. In theory, selective network health plans reduce the cost of care by contracting with providers that offer the largest discounts and/or perform cost-conscious care delivery, such as limited referrals to specialists.[15]

Value-based insurance designs (V-BID), like selective network health plans, use out of pocket costs to influence patient behavior. The V-BID approach aligns patients' out-of-pocket costs with the clinical value of the service. Healthcare services that positively impact health outcomes are incentivized through low or no cost sharing. As with selective networks, consumers who choose to use low-value services bear a higher proportion of the cost. V-BID provider payment models tie payment to provider performance on the delivery of preventive services.[16]

While adoption of selective network plans is high in the individual market—over 70% of marketplace plans are considered selective networks[17]—employers have been more reluctant. In a focus group of benefit managers, the largest barrier to offering a selective network plan was concern about employee disruption/backlash, especially among companies with fewer than 200 employees.[18] Consumers are hesitant also: A 2016 focus group of employer-sponsored beneficiaries found that just 23% had a positive attitude toward selective networks.[19] While exploring themes of consumer resistance to selective networks, researchers have identified that consumers have a difficult time separating the patient-provider relationship from the quality of care received. When educated on quality measures as the basis for selective networks, consumers did not trust the source of the metrics (i.e., insurers).[19] In addition, consumers rank coverage of a personal provider and a broad network very high on the priorities of healthcare attributes.[20,21]

A national snapshot of network breadth in 2019 revealed that self-insured, large-group, employer-sponsored plans had broader networks than small-group, marketplace, Medicare Advantage, and Medicaid managed-care plans.[22] The metric used to classify coverage breadth was the percentage of physicians or hospitals within a 60-minute drive that were in network. Networks were considered large if coverage breadth

was over 40%. Among large-group employer plans, the mean primary care provider (PCP) breadth was 57% compared with 46% among small-group employer plans and 47% among Medicare Advantage plans.[22] Mean PCP breadth was the lowest among marketplace (36%) and Medicaid plans (32%).[22] Breadth of hospital coverage was higher for all insurance types, while large-group employer plans covered 63% of the hospitals within a 60-minute drive of the zip code on average and marketplace plans covered 51%.[22]

Selective network plans offer affordability to the beneficiary through lower premiums and reduced overall healthcare expenditures. A study found that plans with selective physician and hospital networks were 16% cheaper than plans with broad networks, and 6% to 9% cheaper when only one type of network (i.e., physician or hospital) was selective.[23] In addition, a model that utilizes data from the Medical Expenditure Panel Survey indicates that enrollees in selective network plans had significantly lower total expenditures than enrollees in open network plans ($761 savings per year, $p<0.01$).[15] The likelihood of any outpatient or inpatient visit was not associated with selective network plans.[15] While the study did observe significantly fewer outpatient visits among enrollees of selective networks plans compared to enrollees of open network plans, the effect size was minimal (0.14 fewer visits; $p<0.01$).[15] These findings reconcile with a previous study that indicated that the volume of outpatient visits was not affected by breadth of the network.[24] Taken together, cost savings in selective networks appear to be primarily driven by price reductions rather than reduced resource utilization.

V-BID programs have been implemented across government and commercial insurance plans and initial studies have shown that, while short-term savings appear limited, there is potential for longer-term cost savings.[25-27] These programs have focused on populations with chronic conditions to improve health and reduce downstream costs of complications that occur when chronic conditions are poorly managed. The largest study of the economic impact of V-BID is among the Medicare Advantage program from 2017 to 2019, where the intervention focused on reduced cost sharing for high-value services (but not increased cost sharing for low-value services).[28] After three years, utilization rates increased among services that were targeted with V-BID interventions, such as certain types of specialist visits, primary care services, and prescription drugs expected to improve health and reduce longer-term utilization. Despite the increase in utilization of these high-value services as intended, there were no changes in costs to Medicare, nor in plans' own expenditures on beneficiaries. Cost savings for beneficiaries were achieved by a 3% to 4% reduction in prescription drug out-of-pocket expenditures through reduced co-payments and lower Part D (prescription drug) premiums. V-BID had no effect on adherence to diabetes, hypertension or cholesterol medications nor any health outcomes, such as self-reported health status, risk scores or mortality.[28]

While it is unclear whether satisfaction among consumers who chose selective network plans would translate to other consumers if involuntarily switched, it is worth noting that marketplace enrollees—where narrow networks are common—tend to be satisfied with their coverage. In 2016, 77% of adults with marketplace plans were "very" or "somewhat" satisfied with their plan.[29] The majority of respondents (66%) characterized the coverage of providers in their health plan as "good," "very good" or "excellent".[29]

Further research is needed to understand the breadth of coverage adequate to confer a premium reduction while also covering a significant proportion of PCPs within an area so that consumers can keep their personal provider. In addition, studies are needed to explore interventions that may increase consumer adoption of selective networks. For instance, transparency of quality metrics at the provider level[30] or stronger financial incentives may affect consumers' attitudes toward enrolling in a selective network plan and thus employers' willingness to offer them, either alone or alongside other options.

MAIL-ORDER PHARMACY

Mail-order pharmacy is a healthcare service that delivers medications through the mail. Health plans offer lower cost sharing for mail-order prescriptions, resulting in modest cost savings for the patient. Short-term savings for the health plan may be realized with cheaper administration through pharmacy benefit managers and bulk purchasing. Long-term savings for the health plan may be achieved through patient health improvements and avoidance of complications.

Barriers to using mail-order pharmacy were recently evaluated in a focus group of patients with diabetes.[31] Most issues fell into the category of opportunity barriers, in which concerns about mail security, unpredictability of delivery date and difficulty coordinating multiple prescriptions were prevalent.[31] This qualitative study suggested that patients would be motivated to utilize mail-order pharmacy if the pharmacy benefit plan offered an incentive of a free one-month supply of prescriptions.[31]

The utilization of mail-order prescriptions among adults in the U.S. has been stagnant at about 16% for the last 15 years, though there was a surge in mail-order prescriptions at the start of the pandemic.[32] However, there are substantial disparities across subgroups, such that racial minorities and low-income adults have historically had low prevalence of mail-order prescription use. The most commonly purchased medications indicate that mail-order pharmacies are utilized to manage chronic diseases. The top three therapeutic classes

in terms of share of prescriptions filled by mail order in 2018 were cardiovascular agents (58%), metabolic agents (52%) and central nervous system agents (30%).[32]

Mail-order prescription use is cost saving to beneficiaries and potentially payers.[33-35] An observational study of prescription medications dispensed in a Medicare Part D plan in 2010 indicates that patients receive savings from mail-order pharmacy, while plans paid more for prescriptions dispensed at mail-order pharmacies than at retail pharmacies.[35] Across the top 300 medications, the mean per-unit cost for beneficiaries was $0.24 for mail-order pharmacies and $0.31 for retail pharmacies.[35] In contrast, mean per-unit costs for Medicare plans were higher for mail-order pharmacies compared to retail pharmacies ($0.72 versus $0.64, respectively).[35] In addition, the cost estimates for the payer varied by generic and brand-name prescriptions. Brand-name products were more likely to be cheaper through mail-order pharmacy, while generic alternatives were more likely to be cheaper through retail pharmacies.[35]

Despite the modest increase in costs for the medication, plans incur savings through reduced resource utilization among beneficiaries using mail-order prescriptions for chronic conditions. A retrospective cohort study of beneficiaries in Medicare Advantage plans from 2008 to 2016 revealed that patients who used mail-order pharmacy for antihyperglycemic agents were significantly less likely to have an ED visit (50% versus 54%, $p<0.01$) or hospitalization (36% versus 40%, $p<0.01$) than their propensity-score-matched counterparts in the community pharmacy group after 36 months.[36] There is further evidence of the association of reduced resource utilization among mail-order users of prescriptions for all cardiometabolic agents. Among Kaiser Permanente Northern California beneficiaries who initiated antihypertensive agents, lipid-lowering agents or antihyperglycemic agents, those using mail-order pharmacy had fewer preventable ED visits than their local pharmacy counterparts.[37] This association was observed among patients 65 and older, as well as patients under 65.[37] Among those 65 and older, mail-order pharmacy users were less likely to have a preventable ED visit than local pharmacy users (13.4% versus 16.3%, $p<0.01$).[37] In patients under 65, 7.7% of mail-order pharmacy users had a preventable ED visit compared to 9.6% of local pharmacy users ($p<0.01$).[37]

In addition to reduced resource utilization, there is evidence that target clinical markers are achieved more frequently with mail-order pharmacy. In an observational study of Kaiser Permanente Northern California beneficiaries who initiated treatment with statins between 2005 and 2007, 85% of those who ever used a mail-order pharmacy achieved target LDL-C levels within 15 months compared to 74% in those who only used the community pharmacy ($p<0.001$).[38] Improvement in glycemic control (HbA1C < 7.0) was also observed within 12 months among patients taking oral antihyperglycemic agents dispensed through mail-order pharmacy compared to their community pharmacy counterparts in the Medicare Advantage population.[36]

The benefits to patients of mail-order pharmacy are convenience of home delivery, longer supply and improved adherence measures.[36, 39, 40] These benefits are reflected in patient satisfaction. In the 2021 annual pharmacy survey from J.D. Power, the average satisfaction score for mail-order pharmacy was 877 on a scale of 1 to 1,000.[41]

The evidence suggests that mail-order pharmacy is more effective at achieving clinical targets among patients managing diabetes and hypertension. Since the studies were observational in design, RCTs are needed to inform whether the association between mail-order pharmacy and clinical marker targets is causal. Nonetheless, in the evidence to date mail-order pharmacy improved outcomes and reduced ED visits and hospitalizations. Further research is needed to quantify the net savings from mail-order pharmacy, where some of the savings from reduced resource utilization may be offset by the modest cost increase paid by the plan for mail-order pharmacy. Since savings are likely to accrue in the long term from avoided ED visits or hospitalizations, economic evaluations should be conducted with longer time horizons.

WELLNESS PROGRAMS

Wellness programs are intended to improve and promote health and wellness through different modalities, such as behavior modification modules, health screenings and fitness tracking. Program focuses include smoking cessation, diabetes management and weight loss. Typically, wellness programs are delivered at the workplace. Employer investments in wellness programs have been motivated by economic returns, such as savings from reduced healthcare expenditures, gains in productivity and reduced absenteeism. Insurers also sponsor wellness programs to achieve savings through reduced resource utilization as a function of prevention of chronic conditions and improved disease management.

Wellness programs are often voluntary and take-up can be low. Barriers to participation in wellness programs from the employee perspective include insufficient incentives, inconvenient locations and time limitations.[42] The literature suggests that incentives are effective for participation in health screenings and health coaching programs, but fail to influence achievement of weight loss goals. One workplace wellness program trial found that incentives ranging from $100 to $200 increased participation rates in health screenings by about 15%.[43] In a large survey study of employees, higher sustained participation rates were observed in groups with cash incentives over $250.[44] However, necessary incentives may

differ to promote enrollment relative to outcomes. For example, an RCT designed to evaluate premium-based incentives to achieve weight loss goals in obese employees showed that delayed or immediate premium adjustments valued at $550 were not effective in promoting weight loss.[45]

Health screenings and wellness program offerings were frequently reported by employers in 2020,[2] but participation rates were mediocre. Health screenings, such as biometric measurements or health risk assessments (HRA), are offered by 68% of employers with over 200 workers and about one-third provide incentives to complete the HRA.[2] Smaller employers are less likely to offer HRAs (42%).[2] Wellness program offerings have been widely adopted among large employers at 81%, but only 35% offer incentives.[2] Among small employers, 53% offer wellness programs. A systematic review of wellness programs offered from employers between 1992 and 2006 indicates that mean participation rates ranged from 30% to 43%.[46] Multi-component programs that include health screenings, behavior modifications and/or physical activity programs had the highest levels of participation.[46]

Although the majority of employers offer a wellness program,[2] two recent RCTs have found limited evidence of cost savings or improved health outcomes.[47-49] In a study of a large U.S. warehouse retail company, 20 work sites were randomly assigned an invitation to a wellness program defined by eight modules on nutrition, physical activity, stress reduction and related topics administered by dieticians on-site.[48] The study compared self-reported health behaviors, clinical markers, and medical and pharmacy spending between the intervention work sites and controls from 140 other work sites after 18 months[48] and 36 months.[47] Participation in the wellness program was not mandatory and approximately 30% participated. The researchers weighted participants to balance the intervention and control groups on hours worked, employment duration and demographics. No significant differences in health outcomes, clinical markers, spending or utilization were observed across the groups at 18 or 36 months. However, participants in at least one module of the wellness program had significantly better self-reported health behaviors at 18 months compared to the control group, such as engaging in regular exercise (70% versus 62%; p=0.03) and actively managing weight (69% versus 55%; p=0.01).[48] These health behaviors persisted at 36 months.[47]

Another RCT evaluated a multicomponent workplace wellness program, called iThrive, which consisted of annual biometric screenings, annual HRAs and ongoing behavior modification modules (e.g. physical activity, smoking cessation and disease management).[49] A subset of employees of the University of Illinois at Urbana-Champaign were invited to participate in iThrive and enrollees were randomized to the treatment or control group. The treatment group was invited and incentivized to complete the biometric screening and HRA and, among those who completed both, access to the ongoing modules was granted. The control group participated in annual biometric screenings only. After two years, no significant differences between treatment and control groups were observed for biometric measurements; rate of new diagnoses for diabetes, hypertension or hyperlipidemia; resource utilization; or absenteeism.[49] However, comparable with the results of the warehouse work-site study,[48] access to the wellness program was associated with improvements in self-reported beliefs about enrollees' health.

An observational study of employees who were at risk of developing metabolic syndrome suggests that a telehealth delivered wellness program with health coaches may be more effective for achieving weight loss. Employees who participated in a multidimensional wellness program, including a limited genetic test as part of a nutrition and activity plan, achieved an average weight loss of 4.5% of their baseline weight over 12 months.[50] Trends for improved clinical measures and healthcare savings were observed among those who participated in the program.[50]

Satisfaction with wellness programs was evaluated in a survey of 17,896 employees across eight industries from 2007 to 2010.[44] Wellness programs were delivered by health coaches on several topics, including smoking cessation, weight management and blood pressure management, using telephone, email and self-directed web portal modalities. Satisfaction was highest among those using telephone (89%), followed by email (83%) and self-directed modalities.[44] Other determinants of satisfaction included female sex, incentives over $250 or premium discounts, and longer duration in the program.[44]

The null findings from the RCTs cast doubt on the ability of wellness programs to significantly reduce spending, but it is premature to conclude that wellness programs are ineffective. Limitations across the trials may have affected the results. First, the trials were conducted over 18–36 months, and it is possible that clinical or economic outcomes that reflect improved health may take longer to achieve. For instance, the development of chronic conditions, such as those measured in the iThrive trial, may take a decade or more to accrue in the control group. Second, the intervention itself was not randomized, but rather the invitation to participate was randomized. Participation rates of about 30% were observed in both trials; these rates are similar to estimates seen in voluntary workplace wellness programs.[46, 48, 49] Designs that rely on voluntary participation after invitation as the intervention group reduce the power to determine whether outcomes are related to the programs or the characteristics of the people who choose to participate. The intervention and control groups were properly weighted in both analyses; however, residual confounding may exist due to unmeasured characteristics.

Additional research is needed to determine which populations or features of wellness programs are most likely to achieve cost savings. Specifically, RCTs of wellness programs should be conducted among those with chronic conditions or at-risk for chronic conditions. Targeted wellness programs in populations that need it the most may prove to be where cost savings are greatest. Given the evidence of weight loss achievement and satisfaction with telehealth-delivered programs,[44, 50] comparative effectiveness studies on different features of programs are warranted.

PERSONALIZED MEDICINE

Personalized medicine, where treatments are tailored to an individual's genetic profile, has been hailed as the next frontier of healthcare. Genetic testing is used to guide personalized medicine decisions to avoid adverse reactions from medications or inappropriate doses. Additionally, genetic testing can identify the prescription medication most likely to be effective based on the patient's underlying genetics for some therapies. The cost of genetic screening has been drastically reduced in recent years, reducing the cost of personalized medicine. As a result, personalized medicine has the potential to be cost saving for plans by reducing hospitalizations for serious adverse events and avoiding paying for treatments that are not effective.

Pharmacogenomic (PGx) studies, which evaluate the relationship between individual genetic variation and drug response, have demonstrated many relevant gene-drug associations with regards to safety and efficacy. Some PGx associations have translated into clinical practice to guide optimal drug and dose selection, but consumer awareness is poor and provider education is lacking.[51] The rate-limiting barrier to using PGx-guided treatments effectively is lack of coverage for genetic testing. Clinical and economic data to support reimbursement for testing has been underwhelming and, in some cases, it is not clear what evidence payers require to facilitate coverage.[51] A recent policy analysis of the top 41 private health insurance companies revealed that of the 34 drug-gene pairs published by the Clinical Pharmacogenetics Implementation Consortium, only 50% were unanimously mentioned.[52] Among those mentioned in their policy, genetic testing was covered for about 40% of the PGx-guided treatments.[52]

Several economic evaluations have been conducted on gene-drug pairs with varying study quality and out-of-date pricing for genetic testing.[53] A recent review of pharmacoeconomic studies of PGx-guided treatments assessed the impact of the cost of genetic information on the cost-effectiveness of treatment. The analysis indicated that if the cost of genetic information was negligible, 50% of treatments with PGx recommendations would be considered cost saving (dominant) and another 25% would be considered cost-effective.[53]

Beyond gene-drug pairs, PGx testing may be performed for several markers that are implicated in medication management for a particular indication. Evidence suggests that a panel genetic test for medication management in patients with depression and anxiety is cost saving.[54, 55] Treatment response data from an RCT evaluating the PGx panel test and cost-burden data were used to model cost savings associated with pharmacogenomic-guided treatment of depression and anxiety.[55] The model indicated that PGx testing was associated with cost savings of $3,962 per patient per year after deducting the $2,000 testing cost.[55]

In addition, real-world evidence of reduced resource utilization and medical costs provides support for the potential for cost savings attributed to PGx testing. For example, patients over 65 with polypharmacy who underwent PGx testing experienced a significant reduction in hospitalizations (9.8% versus 16.1%, p=0.03) and ED visits (4.4% versus 15.4%, $p < 0.001$) following the testing. Similarly, an analysis of beneficiaries with mood or anxiety disorders who underwent PGx testing showed significant reductions in rates of all-cause hospitalizations and ED visits.[56] Using a large commercial claims database, the researchers found that, on average, medical costs were $2,000 less in the testing group compared to their propensity-score-matched counterparts.[56]

With the precipitous decline in the cost of whole-genome sequencing, which now stands at $1,000 per genome,[57] preemptive screening is a promising strategy to reduce costs in the greater population. In a preemptive strategy, patients are screened for a multiplex of genetic markers that are implicated in several drugs, and data are linked to electronic medical records to inform clinical decision-making at the point of prescribing. Preemptive screening may be more cost-effective than reactive testing if the prevalence of genetic variation is common, a sufficient number of treatments are covered by one test and patients are likely to have future exposure to a PGx-guided treatment. There is growing evidence that these requirements are satisfied. First, the vast majority of the population carry genetic markers that are considered clinically actionable.[58-60] Second, preemptive multiplex screening in an academic medical center sample of 10,000 patients reduced testing burden by 50% compared to a hypothetical reactive scenario.[59] Last, a large claims analysis revealed that 30% to 42% of privately insured and 50% of Medicare beneficiaries were prescribed medications with PGx labeling.[61] The prevalence of PGx-guided treatment is likely to rise in the future given that the proportion of new drug approvals with PGx labeling has increased threefold over the last two decades to 28% in 2020.[62]

However, current studies of preemptive strategies for PGx testing showed limited cost-effectiveness. Screening patients with a broad panel covering all top PGx-guided treatments resulted in an incremental cost-effectiveness ratio (ICER) of $139,615/QALY, assuming that the genetic data were used at a high rate by providers and reduction of adverse events were moderate in efficacy.[63] Another model found that preemptive testing was cost-effective compared with usual care in a hypothetical cohort of patients under cardiovascular disease management over 20 years.[64] The ICER for preemptive testing and reactive testing was $86,227/QALY and $148,726/QALY, respectively.[64] These values are only slightly under the upper bounds of the standard willingness to pay threshold of $150,000/QALY. Sensitivity analyses revealed that the preemptive strategy in a systemwide manner was most beneficial for individuals ages 45–65. This is not surprising given that younger age groups have greater probabilities of future exposure to PGx-guided treatment and, in turn, gain utility from preemptive screening. Thus, current evaluations of preemptive PGx testing are cost-effective with potential for cost savings as genetic testing costs decrease or within specific populations, such as those ages 45–65.

In a small study evaluating patient satisfaction after taking a PGx test in the clinic or using a direct-to-consumer product, the majority were satisfied with their decision to take the test (88%) and the testing experience (84%).[65] Perhaps even more important is that 57% of participants indicated that they were more likely to take medications prescribed by their doctor as a result of testing.[65] PGx testing was a source of confidence in receiving benefit from treatment, in which nearly three-quarters of participants reported that they felt more confident that the medications prescribed would not cause side effects and/or would help their condition compared with past prescriptions received without PGx testing.[65]

While the evidence of reduced resource utilization and lower medical costs in real-world settings is encouraging for the ability of PGx panel testing to be a cost-saving healthcare tool, complete economic evaluations that incorporate the cost of genetic testing are needed to support reimbursement for testing. Updated cost-effectiveness models for preemptive genetic screening of PGx markers are also needed to identify the threshold for the cost of whole-genome sequencing that infers cost savings.

CONCLUSION

A targeted review of the literature on health plan solutions to improve affordability revealed that the body of evidence to guide plan offerings is growing, but more research is needed. Decisions regarding future payment policy for telehealth will affect its ability to reduce spending, but evidence suggests that remote monitoring is cost-effective and videoconferencing consultation is associated with a reduction in resource utilization. Selective network plans have lower premiums and reduce overall healthcare expenditures, with limited impact on outpatient visit volume. While selective network plans offer affordability to the beneficiary, employers are reluctant to adopt them because their employees are wary of changing providers. Use of mail-order pharmacy reduced out-of-pocket costs for the beneficiary and plans incur long-term savings from improved health outcomes and reduced resource utilization. Tools that support preventive care, such as wellness programs and PGx testing to avoid inappropriate treatments, have potential for cost savings. For instance, a wellness program that targets populations at risk for the development of chronic conditions is more likely to produce savings from health improvements than a one-size-fits-all program for the general population. Since more PGx-guided treatments are coming to market and the cost of genetic testing is falling, baseline testing for genetic markers implicated in any future treatment may be cost-effective and potentially provide savings.

The strongest evidence for cost savings is for selective networks. Studies indicated that both premiums and medical expenditures were reduced among those in selective network plans compared to broad network plans. The evidence is convincing that these savings were achieved without a reduction in utilization. The RCTs on general work-site wellness programs did not find cost-savings. The ability of wellness programs to confer cost savings likely rests in special populations that have the potential to avoid developing chronic diseases that burden the healthcare system.

Affordability is the goal of health plan attributes, but savings are complex. Some tools that lower out-of-pocket spending for beneficiaries may also improve health outcomes, such as waiving cost sharing for some medications or supplies to encourage enrollees with chronic conditions to adhere to treatment.[2] However, other benefits that are viewed as mechanisms to decrease spending may supplement rather than offset spending. For example, 79% of employer-sponsored plans cover retail clinics[2] as an alternative to more costly ED or physician office visits, but studies have found that retail clinic use is associated with a modest *increase* in spending per-person per-year.[66] Similarly, studies have shown that urgent care, while reducing low-acuity emergency visits, is associated with an *increase* in overall net spending.[67] These examples highlight the complexity that undergirds the design of affordable and convenient health insurance products. Interventions that reduce the unit price of healthcare services may not necessarily reduce overall spending if they are more convenient and, therefore, increase the quantity of services consumed.

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