

Pyx Health expands Banner University Health Plans' 24/7 care team to decrease medical spend among high-utilizing members

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The challenge

Banner University Health Plans (BUHP) covers over 200,000 Medicaid, Dual Eligible Medicare, and Long-Term Care lives in Arizona. In 2018 Arizona integrated behavioral health care into their traditional Medicaid program. This prompted BUHP to search for new approaches to address the whole-person needs of our members with a focus on key drivers of avoidable utilization—behavioral health conditions and social barriers to care. Analysis of our utilization patterns and medical expense clearly demonstrated the independent impacts of

both general mental health conditions, such as anxiety and depression, and serious mental illness on increased medical expenditures, including general hospital admissions and emergency department use. Furthermore, two characteristics of our high utilizers were consistent with published reports: they accounted for a disproportionately high percentage of our medical spend, a trend that was even more extreme for members with behavioral health co-morbid conditions; and they were a dynamic population with intense but short-term needs.¹

BUHP has a long experience of successfully managing the care of Medicaid members. Our experienced nurse case managers have reported three key barriers to successfully addressing the needs of our members. First, engagement rates are low, in part because when contacted about their specific condition, such as uncontrolled diabetes, members often report higher priority more basic needs, such as transportation, food security or family stressors. Second, traditional methods of outreach, such as letters and telephone, do not provide 24/7 capability to engage members when they are available and motivated for change. Third, nursing expertise is best used in a targeted manner to support non-nurse support staff in order for programs to be cost-effective and achieve long term sustainable results.

Characteristics of successful care coordination programs gleaned from the literature and consistent with our experience are: a strong transitional care component; targeting of moderate to severe patients; ability to address diverse conditions, including mental health issues and multiple co-morbid

chronic conditions; and ability to on-board members quickly and engage them over months to meet needs of the dynamically changing group of high utilizing members.^{2,3,4} Anecdotally, our care team had identified loneliness and/or social isolation as common issues present among members with high avoidable utilization patterns.

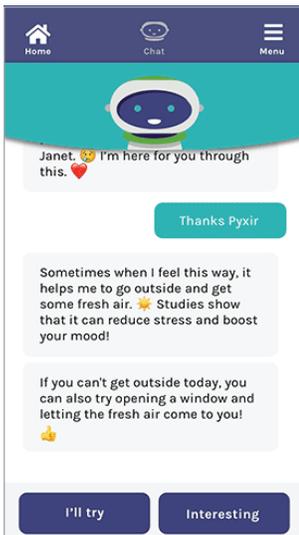
At a glance

The Banner Health Network consists of both health plan and accountable care covered lives enrolled with Medicaid, Medicare and commercial plans. Banner University Health Plans cover over 200,000 Medicaid lives and partnered with Pyx Health to engage members and coordinate their care during care transitions. The Pyx Health program, which consists of technology connected to support staff, generated a **net cost savings of \$847 per member per month (P<0.001)** for six months following initiation by successfully engaging high risk members, addressing their underlying needs and connecting them to community resources. The Pyx Health program uniquely addresses loneliness and social isolation to positively impact avoidable hospital and emergency department utilization among members with a wide range of clinical conditions, including multiple chronic conditions, to efficiently and cost-effectively improve service utilization patterns.

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Pyx Health provided an innovative approach when compared to those offered by vendors that proposed traditional nurse case management programs, care transition programs, or disease-specific programs that used technology to varying degrees to support their legacy programs. In contrast, Pyx Health utilizes a chatbot — engaging technology designed specifically for the more basic needs of loneliness and social isolation, along with highly prevalent behavioral health conditions. Loneliness and social isolation are pervasive and more requisite needs that provide a more effective target for member engagement in order to gain the trust necessary to address the diverse needs of high need and high cost members who drive substantial health care avoidable expenditures.^{5,6} Connecting this 24/7 technology to human supports provides a robust program that we believed could meet the diverse needs of our high needs and high cost utilizing members.

Banner University Health Plans' adoption and implementation of Pyx Health



Pyx Health provides 24/7 companionship and support for patients via a mobile platform and compassionate support center after they have been discharged from the emergency room or inpatient care. At these times members are at a higher risk for poor health outcomes in part due to loneliness and social isolation. Once the member has been on-boarded by Pyx Health they receive companionship to help treat loneliness through a non-clinical, whole-person care approach. Pyxir, an endearing chatbot personality, walks alongside members in their health care journey, checking in each day to encourage self-management to help with pain, loneliness, sleep, anxiety and healthy habits. He also identifies social determinants of health needs, provides companionship and helps patients navigate their health plan and available community resources. When urgent needs are identified on the platform, the compassionate support center intervenes with a direct call to the member to offer support or helpful resources.

Prior to and during implementation Pyx Health provided trainings to key health plan departments, such as Care Management, Behavioral Health, and Member Services, along with key high volume contracted providers and facilities. BUHP provided daily target lists of members to Pyx Health. Pyx Health then initiated their engagement strategies to on-board members and track their outcomes. Regular touch point meetings allowed Pyx Health to customize the program to optimally coordinate with BUHP care management in order to provide cost-effective and member-centric care support to members.

From Dr. Ball

*Early in my career as a CMO of a Medicaid health plan I surveyed our nurses making diabetes case management calls to members. They told me that uncontrolled diabetes was usually the least of the challenges facing these members. Multiple chronic conditions, social stresses in their lives and, whether primary or secondary, related emotional issues were their primary concerns. Over my career this one conversation included three key issues that now have been formalized into well-recognized drivers of health care use: multiple chronic conditions, social determinants of health and behavioral health co-morbidities. These challenges remain today and continue to create barriers to successfully addressing unnecessary avoidable health care utilization. Chronic conditions are associated with increased medical expenditure, but **it is the associated co-morbidities, stressors and social barriers to care that drive avoidable unnecessary utilization.** These facts prompted Banner University Health Plans to search for a more universal lever by which we would be able to successfully engage our diverse subgroup of high utilizing members in order to partner with our team over time to meet their needs and improve their pattern of health care service use.*

Successful outcomes achieved by Pyx Health for Banner University Health Plan members

Cost savings

BUHP targeted our Medicaid and Medicare Dual Eligible Special Needs Plan (D-SNP) members who were experiencing a transition of care. The cohort of members included in this analysis ranged from 18-104 years of age, were 74% female and used the Pyx Health application for a median length of 68 days. The primary outcome we analyzed was medical spend savings to determine if the program would be cost-effective and financially sustainable. Of the 1,800 members utilizing the Pyx Health program, 1,170 members had sufficient length of health plan enrollment before and after Pyx Health use to include in the analysis of medical expense. A comparison group was selected from a 10% random sample of 61,027 BUHP members who were enrolled during the same time period as the Pyx Health intervention group. The control group was generated using a machine learning model matched on their Global Cost Risk Score* using propensity score matching.

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When members were surveyed a large proportion reported avoiding going to the emergency department after contacting the Pyx Health support team.

Unlike the control group, the intervention group of members who utilized Pyx Health had a savings of \$5,083 in the 6 months following Pyx Health use compared to six months prior to engagement with Pyx Health ($P < 0.001$) resulting in an average savings of medical expenditure of \$847 per member per month, which generated a positive return on investment when the cost of the Pyx Health program was factored into the analysis. As expected, the savings were primarily from decreased inpatient costs (51%) and emergency department use (41%), both of which were statistically significant ($P < 0.001$). Since BUHP had implemented multiple interventions focused on emergency department utilization in the past with negligible impact we were pleasantly surprised by the degree of cost savings from decreased emergency department visits. We believe the long length of engagement with Pyx Health by members (median=68 days) along with access to on-going supports as needed explains these results. Indeed, when members were surveyed a large proportion reported avoiding going to the emergency department after contacting the Pyx Health support team.

Member engagement

To better understand the factors associated with the success of this program we completed further analyses. Successful member engagement is foundational to impacting health care behaviors. Numerous approaches have been used to measure the value proposition of digital tools such as adoption, conversion and engagement rates. Varying specifications for each of these metrics makes it challenging to objectively compare outcomes and set reasonable benchmarks. Nevertheless, it is well known that the use of digital tools by consumers vary by industry, such as health care compared to banking, and that health care digital adoption lags behind other sectors.⁷ Furthermore, among health care digital users Medicaid enrollees lag behind commercially insured members.⁸ Of note, Blue Cross Blue Shield of Tennessee cited

* The Global Cost Risk Score controls from chronic diseases, hospitalization Stays, inpatient Stays, and expected Future Cost. The matching also controlled for race, county, age, sex, plan (Medicaid vs D-SNP), tenure, claims utilization, and pharmacy utilization.

60% use by commercial members of their digital tool, but only 22% response rate by their Medicaid members following a gap in care text prompt.⁹ Considering published findings, discussions with peers, and Banner University Health Plans' past experience with traditional outreach efforts to our Medicaid and D-SNP enrollees we set a target of 20% conversion rate upon initiation of our partnership with Pyx Health. In addition, we aimed to better understand factors associated with longer term meaningful engagement by our high utilizing members of the tool beyond initial conversion.

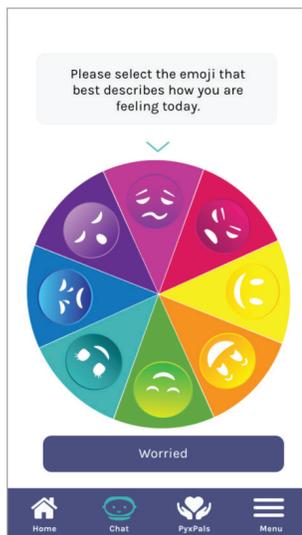
We found that members who scored as lonely on the UCLA-3 screen were more likely to engage with Pyxir between midnight and 5AM... it is clear that 24/7 accessibility is critical and most cost-effectively provided through the use of Pyxir chatbot.

Characteristics of member use of Pyx Health program

The initial adoption rate of the Pyx Health application exceeded our benchmark with members who were contacted following a crisis as 40% enrolled in the Pyx Health program, which was much greater than our health plans' previous experience with traditional methods. Conversion rates for Medicaid (31%) and D-SNP (25%) members were also higher than our prior experience. The on-going member engagement as measured by active use of the application for median of 68 days also exceeded the time frame we anticipated as necessary to address member needs during care transitions. The costs of traditional readmission programs are often a barrier to their sustainability, even when their focus is on reducing 30-day readmissions. The median Pyxir engagement of over 60 days appeared to be a key aspect of the success of the overall program.

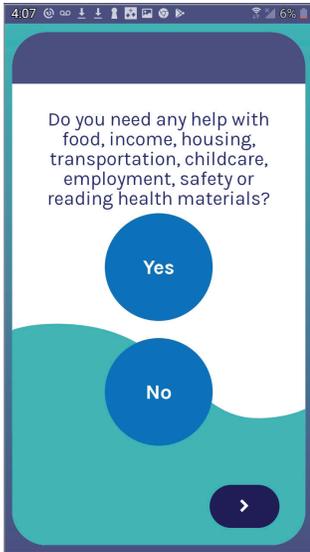
In exploring factors associated with this continued engagement in more depth we found that members who scored as lonely on the UCLA-3 screen were more likely to engage with Pyxir between midnight and 5 AM (37% of lonely users compared to only 4% of non-lonely users) whereas the most common time for those scoring as not lonely was from 5-7 PM (45% of non-lonely users compared to 17% of lonely users). This is consistent with the well-documented association between loneliness and sleep disturbance.¹⁰ Furthermore, members who scored as lonely most frequently reported moods of "worried," "in pain," or "sad," all of which would be expected to prompt avoidable emergency department use. Members who did not score as lonely most frequently reported moods of "hopeful," "content," or "happy."

While these relationships are complex, due to the high degree of interaction with Pyxir outside normal business hours it is clear that 24/7 accessibility is critical and most cost-effectively provided through the use of Pyxir chatbot. In consultation with specialists within the Banner University health care system we also believe that the success of this program may be partially explained by Pyxir's support of members suffering from combinations of loneliness, behavioral disorders, emotional distress and/or sleep disturbance.



Community referrals to address social barriers to care

It is challenging to parse out the relative value of distinct components of a comprehensive whole-person health program. However, we also believe community referrals made by the Pyx Health program is also a key success factor. Social determinants of health have been associated with persistently high health care costs.¹¹ Users reported multiple social



The Pyx Health program addressed the three key challenges faced by Banner University Health Plans' care management initiatives.

determinants of health (SDOH), most frequently being food and housing insecurity. These SDOH resulted in coordination with our health plan to address through available public programs. While these referrals were critical for the individual members served, they were not frequent enough to explain the overall findings of our analysis. In addition, consistent with published studies, our belief when choosing to partner with Pyx Health was that successful cost-effective programs must seamlessly partner technology with human support.

Of interest, when members were surveyed 55% of respondents reported that the program provided companionship over the prior month and the number one feature reported in providing companionship was Pyxir. As a health plan we were pleased that 67% of respondents reported that the program made them feel more connected to their health plan.

Next Steps

In summary, the Pyx Health program addressed the three key challenges faced by Banner University Health Plans' care management initiatives. Members were successfully and cost-effectively engaged with 24/7 access in order to meet their needs when they were available and motivated for change.

Due to the success of the Pyx Health program Banner Health Network has expanded its use beyond the Medicaid membership to its Medicare and Commercial lines of business. We expect Pyx Health to bring value to our accountable care programs and value-based contracts by improving their medical cost ratios. In addition, although the focus will remain on members experiencing care transitions we will also provide Pyx Health to other members identified by our analytics team as having high avoidable unnecessary utilization.

Other findings from this case study are being used to formulate future direction. The heavy use of the program between midnight and 5AM validates the need for a 24/7 solution accessible to members when they choose to engage in self-care. While 24/7 nurse lines are one method to meet this need, they are higher cost and have not been heavily used by our members after hours. We envision opportunity in better understanding how to expand Pyxir's reach to provide a continuum of services around the clock to our members in an engaging, cost-effective and customer-friendly manner.

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References

1. Johnson TL, Rinehart DJ, Durfee J, et al. For Many Patients Who Use Large Amounts Of Health Care Services, The Need Is Intense Yet Temporary. *Health Affairs* vol. 34, no. 8. <https://doi.org/10.1377/hlthaff.2014.1186>
2. Peikes D, Chen A, Schore J, Brown R. Effects of Care Coordination on Hospitalization, Quality of Care, and Care Expenditures Among Medicare Beneficiaries: 15 Randomized Trials. *JAMA*. 2009;301(6):603–618. doi:10.1001/jama.2009.126
3. Cancino RS, Culpepper L, Sadikova E, et al. Dose-response relationship between depressive symptoms and hospital readmission. *Journal of Hospital Medicine*. 06 March 2014. <https://doi.org/10.1002/jhm.2180>
4. Horenstein A, Heimberg RG. Anxiety disorders and health care utilization: A systematic review. *Clinical Psychology Review*. Volume 81, November 2020, 101894
5. Valtorta NK, Moore DC, Barron L, Stow D, Hanratty B (2018) Older adults' social relationships and health care utilization: a systematic review. *Am J Public Health* 108(4):e1–e10
6. Petite T, Mallow J, Barnes E, et al. A Systematic Review of Loneliness and Common Chronic Physical Conditions in Adults. *Open Psychol J*. 2015; 8(Suppl 2): 113–132. doi: 10.2174/1874350101508010113
7. Gandhi P, Khanna S, Ramaswamy S. Which Industries Are the Most Digital (and Why)? *Harvard Business Review*. <https://hbr.org/2016/04/a-chart-that-shows-which-industries-are-the-most-digital-and-why>
8. Majerol M, Carrol W. Medicaid and digital health: Findings from the Deloitte 2018 Survey of US Health Care Consumers The Deloitte Center for Government Insights and the Deloitte center for health solutions. <https://mail.google.com/mail/u/0/?tab=wm&ogbl#inbox?projector=1>
9. Medicaid Mobile Engagement Solution Wins Third Modern Health care Award for Relay. <https://www.relaynetwork.com/resources/medicaid-mobile-engagement>
10. Griffen SC, Williams AB, Ravyts, et al. Loneliness and sleep: A systematic review and meta-analysis. *Health Psychology Open*. April 4, 2020. <https://doi.org/10.1177/2055102920913235>
11. Sterling S, Chi F, Weisner C, et al. Association of behavioral health factors and social determinants of health with high and persistently high health care costs. *Preventive Medicine Reports*. Volume 11, September 2018. <https://doi.org/10.1016/j.pmedr.2018.06.017>