Estimated Cost Savings of Case Management Services Provided by Guardian Nurses:

Schools Health Insurance Fund Case Study

At the request of Guardian Nurses Healthcare Advocates (GN), Open Health LLC conducted an independent study of the cost-effectiveness of case management and care coordination services provided to the Schools Health Insurance Fund (SHIF) members. Founded in 2016, the SHIF is a regional health insurance fund that offers public entities a source for providing coverage for employees and dependents.

SHIF began providing GN to its members in 2019 as part of a coordinated strategy to elevate the quality and responsiveness of member services and reduce medical costs. While GN services may be available broadly, the nurses are focused on supporting two primary types of members: (1) acute care episodes, usually requiring hospitalization and (2) complex, chronic conditions.

Some highlights from our study:

School Health Insurance Fund
As of January 2022

52,500

covered adults and children
(up 56% from Jan. 2020)

- **Avg. age:** 46 years old
- **Avg. family size:** 2.6 members
- **Avg. PMPM:** $547 (2021)
  6.5% lower than Artemis benchmark for moderately-managed health plans

Engaging Complex, Costly Cases.

Quantitative analysis of claims data shows that GN's approach has engaged and supported SHIF's high-cost, high-risk members. Substantial cost savings are only possible when case management programs serve the most complex cases.

Favorable Return on Investment.

The return is much higher than what it costs to deliver GN's case management model for SHIF's acute and complex/chronic members – a $1.0 M investment in 5.0 FTE nurses is associated with cost-savings of approximately $3.4 M per year.

And Even More Benefits.

In addition to healthcare system guidance, members receive social and emotional support during very difficult times. GN nurses provide improvements in chronic care management, which can enhance the quality of life and reduce future care costs – neither of which are accounted for in this short-term economic analysis.

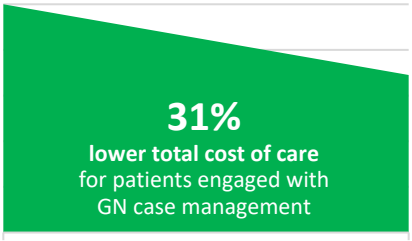
Our study aimed to address the questions described on the following pages. The cost analysis was based exclusively on adjudicated claims stored in Artemis. The monthly total cost of care for 57,018 members enrolled between January 1, 2019 and December 31, 2021 was calculated with Artemis tools. The classification of members eligible for or participating in case management was provided by GN (Acute Care Episode Support: 6,789 member records, Complex and Chronic Condition Support: 762 member records). We analyzed the two primary service lines as independent investments. Information about analysis methodologies is provided on page 4.

Service Line 1: Acute Care Episode Support

Highlights:

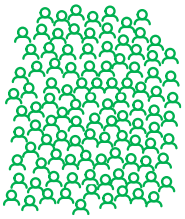
- GN engages high-cost, high-risk members in the Acute Care Episode Support program.
- GN is associated with a **31% reduction** in the total cost of care for members participating in Acute Care Episode Support.
- Additionally, **no readmissions** among participating members were observed, which is substantially lower than the expected number of 105 per a national study benchmark. The cost avoidance for readmission prevention alone is estimated to be $861,000 annually.
- Given the current operating costs and typical caseload (120 engaged members per nurse case manager per year), the return on investment (ROI) to SHIF is **3.0** (or $600,000) for each 1.0 FTE nurse case manager deployed, or **$1,800,000 total savings** per year.
- If GN alters its case-mix adjustment (i.e., more higher acuity members) and expands outreach by 33%, the ROI increases to 4.6.
- In addition to cost-savings associated with GN services, SHIF members and caregivers receive professional advice, problem-solving skill building, and healthcare system navigation which provides social and emotional support during very difficult and stress-filled times.

TOTAL CARE COST



31%
lower total cost of care
for patients engaged with
GN case management

READMISSIONS



105
Per
national
benchmark

0
Among
program
participants

ROI

3.0 to 4.6

for each dollar invested
in Acute Care Episode Support

Questions and Answers:

Is GN able to engage high-cost, high-risk members in the Acute Care Episode Support program?

+ Yes. GN is contacting and supporting SHIF members with higher costs and higher acuity. The average total cost of care for engaged participants was 30% higher (Acuity Level 2) and 55% higher (Acuity Level 3) versus members who declined or were unable to contact.

What is the return on investment for the Acute Care Episode Support program?

+ The break-even point for GN Acute Care Episode Support **is just 40 engaged members** during a year. The current capacity of a single GN nurse case manager is 120 engaged members per year (which requires outreach to 300 members) yields an ROI of 3.0. Case-mix adjustments (e.g., more emphasis on Acuity Level 3 cases) will allow GN to increase ROI to 4.6. The ROI calculation is based on GN's attributable cost savings of $2,000 and $8,000, for Acuity Level 2 and Acuity Level 3, respectively.

+ Given SHIF's annual investment in 3.0 FTE nurse case managers[1] dedicated to Acute Care Episode Support, the estimated financial return is $1,800,000 in the form of lower medical claims. In addition, SHIF members and the health plan receive non-economic benefits, such as more compassionate and person-centered, responsive healthcare services.

[1] The investment cost per 1.0 FTE nurse case manager is $200,000.

To what extent does GN reduce the total cost of care for SHIF members participating in the Acute Care Episode Support program?

+ First, GN is associated with a **31% lower total cost of care** (during the acute episode month) for engaged members ($16,344) vs. disengaged ($23,955).

Mean cost savings by Acuity Level are:

- Acuity Level 1, 2.2 % of cases
- Acuity Level 2, 42.2% of cases
- Acuity Level 3, 50.1% of cases
- Acuity Level 4, 4.4% of cases

The analysis is based on a total sample of 990 cases, of which 760 were engaged. A sensitivity analysis that allowed each member to contribute multiple cases lowered the percentage difference from 31% to 25% for engaged members ($19,497) vs. disengaged ($25,881).

+ Second, no readmissions among participating members were observed, which is lower than the expected number of 105 during the two-year analysis period per an AHRQ study[1] that reported the average readmission rate for private health plans to be 8.7 per 100 hospital discharges. With an average cost of $16,400 per readmission, the cost savings for GN's readmission prevention is estimated to be $1,722,000, or an average of $861,000 per year.

Service Line 2: Complex and Chronic Condition Support

Highlights:

- GN engages high-cost, high-risk members in Complex and Chronic Condition Support, noting an average monthly cost **133%** higher than others.
- Approximately **77%** of members were supported by GN for at least 3 months which allows evidence-based case management strategies to address care quality, access primary care, schedule preventive services, and identify immediate cost-savings opportunities.
- In comparison to non-participants (i.e., declined/unable to contact), GN contributes to lowering the total cost of care by approximately **$4,000 per case** over 4 months after enrollment.
- Given the current operating costs and typical caseload of 200 members per nurse case manager per year, the ROI to SHIF is 4.0 (or $800,000 per nurse), or **$1,600,000 total savings** per year.
- In addition, known cost savings accrue past our window of analysis. For example, members with clinically significant improvements in glycemic control, blood pressure, and dyslipidemia can have lower medication costs (e.g., optimal use of generics) and lower risk of hospitalization many years later.

77%
of members were supported for at least 3 months

REDUCTION
in total cost of care per program participant
$4,000

ROI
4.0
for each dollar invested in Complex and Chronic Condition Support

Questions and Answers:

Is GN able to engage high-cost, high-risk members in the Chronic Complex Care program?

+ Yes. GN is connecting with and supporting high-cost, high-risk members who have chronic conditions. For example, engaged members were 133% more costly during the month of invitation to participate versus members who declined/were unable to contact.

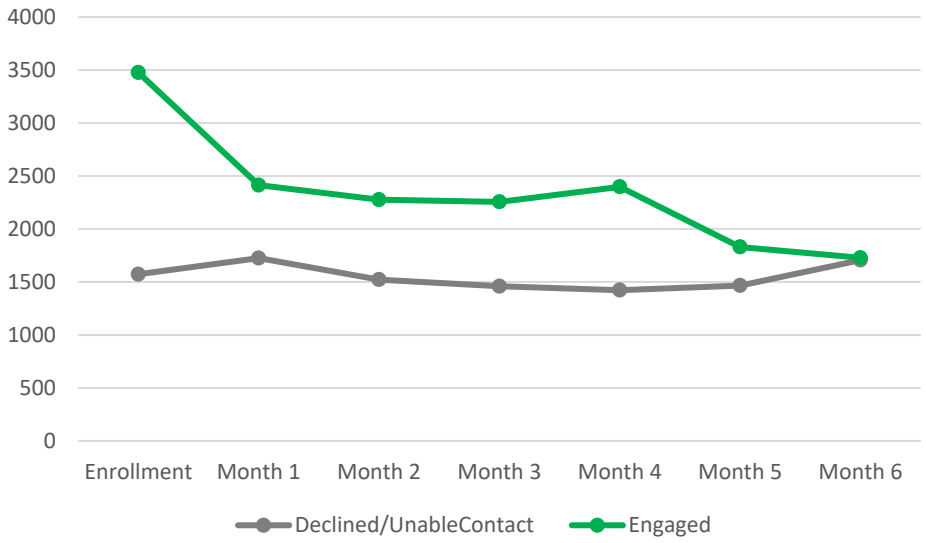
What percentage of Chronic Complex Care members does GN support for at least 3 months?

+ 77% of Chronic Complex Care participants were supported by GN for at least 3 months.

How does GN alter the cost curve for Chronic Complex Care members over a 6-month period of time?

+ The cost curve for Chronic Complex Care **participants decreases sharply one month after enrollment** and then tapers to the same level as members who declined or were unable to contact. Refer to Figure 1.

Figure 1. Mean PMPM costs for Chronic Complex Care members – engaged vs. declined/unable to contact. Monthly costs have been capped at $25,000.



What is the return on investment for the GN Chronic Complex Care program?

+ The break-even point for GN Chronic Complex Care is **50 engaged members** during a year, or a total outreach of 125 members per nurse. The current caseload and outreach capacity of a single nurse case manager is about 200 and 500 members per year, respectively. This capacity translates to an ROI **4.0**. The ROI calculation is based on GN's attributable cost-savings of **$4,579**, which is the cumulative cost reduction from baseline during the 4 months after program enrollment.

+ Given SHIF's annual investment in 2.0 FTE nurse case managers dedicated to Chronic Complex Care, the estimated financial return is **$1,600,000** in the form of lower paid medical claims within 4 months of enrollment. In addition, SHIF members and the health plan receive non-economic benefits, such as addressing gaps in care plans, linkages to primary care, more compassionate and person-centered, and healthcare system navigation.

Methodology

The analysis plan was built upon a month-by-month summary of paid claims for each SHIF member. Using the Artemis system, we extracted cost data between January 1, 2019 and January 31, 2022. At the time of the extraction (August 2022), the claims file was considered complete and reliable through December 31, 2021. The monthly costs were assembled into a matrix of 57,018 SHIF members (adults and children). Members who were eligible for and/or received GN services were marked in the matrix according to their service line, acuity, level of engagement, and month of enrollment/outreach. For members with multiple episodes of enrollment/outreach, we selected the one with the longest period of engagement. GN service data was provided by GN's case management records system. **6,789 cases** were associated with Acute Care Episode Support; and **762 cases** with Complex and Chronic Condition Support.

Acute Care Episode Support. The analysis was limited to 3,773 cases from members who had been enrolled for at least 6 months; each member was allowed to contribute only its most recent case. The cost of care was compared between four types of members: engaged vs. disengaged vs. declined to participate vs. unable to contact. All four groups had similar costs during the month before the acute care episode and the month afterward. To assess the potential cost-savings impact of GN services on the acute episode itself, we compared total costs for the engaged (e.g., people who accepted support from GN) vs. disengaged (e.g., people who opted out / disenrolled from GN's recommended support and services). This approach focused the analysis only on the one month during which the member received inpatient medical care, which was when GN case management services were deployed to assist members with in-hospital needs, discharge planning, readmission risk reduction, and outpatient follow-up (e.g., physician visits). The analysis was stratified by acuity level. A secondary analysis allowed each member to contribute multiple cases. For purposes of estimating ROI, we assumed the GN intervention cost $200,000 per nurse case manager and the current caseload was 120 members per year (with an even split between Acuity Level 2 and Acuity Level 3).

Complex and Chronic Condition Support. Drawing from the 762 cases available, the analysis was limited to 494 unique members who had been enrolled for at least 6 months. The monthly costs for each member were tracked for 6 months after their month of enrollment. The trendline of mean costs per month was compared between two types of members: engaged vs. declined/unable to contact. To minimize the potential impact of high-cost claimants distorting the results, monthly costs were capped at $25,000. The trendlines were used to estimate the cost difference between the two groups using enrollment month as the baseline comparator. In contrast to the flat trendline for declined/unable to contact members, a downward trendline was observed for the engaged members, ultimately reaching the same point six months after enrollment. While multiple factors can explain the trendline and groups were not matched for confounding factors, we attributed the cost reduction from baseline to GN services. Later, the analysis was stratified by acuity level, and we conducted a subgroup analysis for members with diabetes. The final analysis included 494 eligible members and 3,458 member-months, of which 203 (or 41%) were engaged members. For purposes of estimating ROI, we assumed the GN intervention cost $200,000 per nurse case manager and the current caseload was 120 members per year (with an even split between Acuity Level 2 and Acuity Level 3).

About Open Health

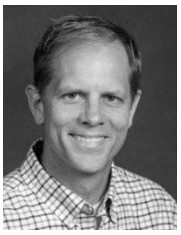
Established in 2005, Open Health LLC is a collaboration of management and research professionals committed to improving public health. Our experience and evidence-based approach assists clients and communities with the challenging goal of planning and evaluating health outcomes. We work in partnership with government agencies, non-profit organizations, foundations, health care corporations, and others vested in the health and well-being of communities as well as individuals. Customized services are offered in the areas of public health planning, program evaluation, and economic impact. Data analysis, database design, project management, survey development, and group facilitation are among the many skills that we bring to client engagements.

Open Health Mission Statement

Bring **creativity, responsiveness, and science** to partnerships that improve public health.

Eric Armbrecht,

MS, PhD, Principal and Partner



As a Principal of Open Health, Dr. Armbrecht leads small and large projects with bold public health improvement goals. Over the past two decades working with government agencies, non-profit organizations, and health plans, Dr. Armbrecht has developed expertise in evaluating public health approaches to health equity and disease prevention and management, including measurement of costs and return on investment. He has led economic impact projects for the Missouri Department of Social Services (Medicaid, MO HealthNet), Centene Corporation, Ascension Health, Missouri Department of Health and Senior Services, and Missouri Foundation for Health. As a professor at the Saint Louis University School of Medicine and College for Public Health and Social Justice, he has authored more than 75 peer-reviewed publications and 100 abstracts. He serves in leadership and volunteer advisory roles for many non-profit organizations and government agencies dedicated to education, public health, and healthcare. He is an advisory council voting member for the Institute for Clinical and Economic Review and a board member of the Midwest Health Initiative, a multi-payer commercial health plan claims database. Dr. Armbrecht holds a bachelor of science from the University of Notre Dame, a master of science degree from Johns Hopkins University, and a doctor of philosophy from the Saint Louis University School of Public Health.

Donna Zazworsky,

RN, MS, CCM, FAAN, Consultant

Donna Zazworsky is a nationally recognized expert and senior leader in case management, disease management, telehealth, and population health. Ms. Zazworsky has more than 35 years of experience in designing, implementing and evaluating programs that demonstrate clinical outcomes and financial return on investment. She served as Vice President of Community Heath and Continuum Care at Carondelet Health Network, where she led a diabetes disease management program. Her successful readmission reduction work was funded by the CMS Center for Innovation for Care Transitions. In her position as Chief Clinical Officer and Director of Care Management for a Centene Medicaid Health Plan and Regional Behavioral Health Authority in Arizona, Ms. Zazworsky established successful clinical, quality, and ROI systems for care management and disease management programs. Ms. Zazworsky graduated from Penn State University with a Bachelor of Science in Nursing and the University of Arizona with a Master of Science in Community Nursing with an emphasis on health planning. Ms. Zazworsky has authored numerous articles and chapters and has lectured on case management and disease management nationally and internationally. She served on the Mercy Care Board of Directors, an Aetna Medicaid Health Plan. She is a Fellow in the American Academy of Nursing and a Certified Case Manager.

END NOTES

[1] Weiss AJ (IBM Watson Health), Jiang HJ (AHRQ). Overview of Clinical Conditions with Frequent and Costly Hospital Readmissions by Payer, 2018. HCUP Statistical Brief #278. July 2021. Agency for Healthcare Research and Quality, Rockville, MD www.hcup-us.ahrq.gov/reports/statbriefs/sb278-Conditions-Frequent-Readmissions-By-Payer-2018.pdf.