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The Program Cost-Effectiveness of a Safety-Net Hospital Program Expanding Social Needs Activities in Atlanta

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Abstract

The Grady Heart Failure Program (GHFP), based in a safety-net hospital, is an outpatient program that follows heart failure hospitalization. The 2018 GHFP added a community health worker, patient liaison, and mobile integrated health home visits to reduce socioeconomic barriers to treatment. Important outcomes for the GHFP included the program cost and patient follow-up visits within seven days of hospital discharge. We calculated the difference in 30-day related readmission between 2017 and 2018 to assess pre-post program effectiveness. Patient follow-up visits within seven days increased from 63.7% in 2017 to 65.6% in 2018. Related 30-day readmissions declined from 15.5% in 2017 to 13.1% in 2018. Compared with 2017, the incremental program cost per related 30-day hospital readmission averted was \$7,955 in 2018. The expanded GHFP is potentially cost-saving from the perspective of the hospital-provider based on the inpatient cost saved from a heart failure readmission averted.

Keywords

Community health workers; costs and cost analysis; heart failure; safety-net providers; social determinants of health

Social determinants of health (SDOH) are social and economic factors that influence health; they can influence the development of both cardiovascular disease (CVD) and CVD mortality.¹ Social determinants of health are shaped by policies and/or environments that support or inhibit health promotion for communities and populations.² For example, communities and populations can differ in access to social services, economic opportunities, public transportation, grocery stores, and health care.² Social needs occur at the individual level (e.g., not being able to afford medical care, not having reliable transportation to medical appointments).² Health care organizations are increasingly intervening on patients' social needs to address underlying SDOH disparities. Their aim is to improve health outcomes and control costs over the long term.^{3–7} For example, accountable care organizations often address transportation, food, housing, and financial strain and may work with community organizations to address social needs.⁷ With respect to the social determinants of CVD health and outcomes, a recent review made recommendations about future directions for clinicians, which included incorporating and monitoring SDOH measures, identifying and engaging patients placed at an increased risk for poorer CVD health and outcomes, and expanding clinical teams with staff dedicated to addressing social needs.¹

One way to expand clinical teams for social needs activities is to incorporate community health workers (CHWs). Community health workers can address social needs through counseling, social support, and navigation of services.⁸ While there is robust evidence on the cost-effectiveness of including CHW-nurse practitioner teams for behavioral interventions to improve lifestyle and treatment adherence,⁹ the evidence is limited for heart failure patients. Simulation modeling suggests that offsetting payor health costs through CHWs varies by health condition.¹⁰ Not knowing the costs and benefits can be a barrier to CHW implementation in health care settings.¹⁰

The present study evaluated the before-after program effectiveness and program cost-effectiveness of a heart failure clinical program that expanded SDOH activities, specifically by including a CHW and other services to address social needs and improve treatment plan adherence. The specific program is the Grady Heart Failure Program (GHFP), based in a safety-net hospital that primarily serves a patient population experiencing socioeconomic disadvantage.

The Centers for Disease Control and Prevention (CDC) used a systematic screening and evaluability assessment that identified GHFP as a CVD management program that addressed health equity and was ready for evaluation. The CDC initiated program evaluation in September 2017. Economic evaluation was included as part of the overall evaluation to estimate program costs and assess program cost-effectiveness and to provide feedback to the GHFP on costs and benefits of their expanded activities and resources used. As health care providers consider addressing social needs, evidence about the program's cost-effectiveness

can inform decision-making. This study also adds to the small body of evidence related to economic evaluations of CHW social needs interventions for heart failure patients.^{11–13} Our case study also demonstrates a feasible approach to evaluation using hospital-provider dashboards.

Methods

Expansion of the Grady Heart Failure Program (GHFP).

The GHFP is a hospital-funded outpatient program for heart failure patients following a hospitalization at Grady Memorial Hospital, a public, safety-net hospital in Atlanta, GA. Most GHFP patients are African American (92%) with an average age of about 60 years. Most patients are covered by Medicaid or Medicare (77%) and some patients do not have health insurance (17%). A third of the patients have no high school diploma or equivalent.¹⁴

The GHFP is an advanced practice provider-led heart failure clinic.¹⁵ Nurse practitioners work with patients during the inpatient visit, during the transition to outpatient, and in outpatient settings following hospital discharge. During the initial patient intake session, the GHFP provides patient education, assesses clinical treatment barriers, provides recommendations and referrals, and plans the transition to outpatient care.^{16,17}

The GHFP includes activities to address socioeconomic barriers to treatment plan adherence, and these activities have expanded over time (Figure 1). Since 2011, the GHFP provided financial counseling and 30-day medication supply at no cost to the patient.^{18,19,20} In 2016, the GHFP received grant funding to provide transportation. Grady Heart Failure Program worked with CommonCourtesy (CommonCourtesy, Inc., Atlanta, GA) to provide Uber (Uber Technologies, Inc., San Francisco, CA) or Lyft (Lyft, Inc., San Francisco, CA) rides to outpatient appointments; this activity was added for patients with transportation barriers.^{21,22} In 2018, the GHFP hired a full-time CHW as a permanent member of the clinical team and also added a patient liaison. In addition, the GHFP worked with Grady Mobile Integrated Health to provide home health visits for patients who were most in need of these services.²³ In mid-2018, the GHFP also began tracking social needs through Epic's *Healthy Planet* (Epic, Verona, WI), an electronic health record system module used for accountable care and population health management.

The GHFP CHW conducts needs assessments and provides counseling and health education. In general, a GHFP CHW time allocation for addressing patients' social needs is: 5% towards financial counseling, 15% towards transportation needs (e.g., assistance in arranging rides, navigating public transportation), 10% towards mobile home visits, and 40% towards linkages to other services. The patient liaison assists with follow-up calls, scheduling appointments, and addressing other socioeconomic barriers. For example, the patient liaison spends approximately 10% of their time arranging transportation for health care appointments. It is important to note that other key clinical staff also address patients' social needs.¹⁴

Economic evaluation methods.

This evaluation estimated both program costs and program effectiveness to calculate the short-term program cost-effectiveness of the expanded 2018 GHFP, compared with the previous year without the expanded activities, from the perspective of the hospital-provider's budget.

GHFP costs.

Program costs were modeled and estimated using the best available information from the GHFP, health system, and hospital records using an activity-based micro-costing approach described in detail in a cost study published in 2021.¹⁴ The cost inputs, values, and data sources are presented in Table 1. The cost analysis is presented in Table 2. Cost included both labor and non-labor components. A majority of the GHFP total cost is for labor.¹⁴ Labor included personnel time of senior managers to operate the program (e.g., medical director, population health director) as well as other important program staff (clinical staff, CHW, patient liaison) and additional part-time staff (e.g., phlebotomy, front desk support). Non-labor costs included facilities, equipment, supplies, program-related materials, transportation ride service, and mobile integrated health home visits.¹⁴

Unit costs for the labor and non-labor components are from the original cost study that used cost data collected during 2018 and 2019.¹⁴ The unit cost for labor is the sum of salary, benefits (if applicable), and cost of training for full-time staff. Key staff were reported for each year by the GHFP program manager in 2020. In both 2017 and 2018, key staff included 4.5 full time equivalent (FTE) nurse practitioners, one FTE registered nurse, and one FTE medical assistant. In 2018 a CHW and patient liaison were added and unit costs for each staff were inputs. Labor costs were estimated using the number or proportion of full-time staff multiplied by the unit costs. Non-labor costs included facilities and 144 mobile integrated health home visits based on hospital records, available from the previous cost analysis.¹⁴ Other non-labor costs included equipment based on an inventory, supplies based on invoices, and program-specific costs reported by GHFP staff.¹⁴ Total cost for the transportation ride service for each year is based on invoices. We summed all labor and non-labor cost components by calendar year to derive the total program cost for 2017 and 2018 assuming the number of GHFP patients in 2018 for both years (Table 2).

GHFP outputs and outcomes.

A primary outcome for the GHFP is heart failure-related hospital readmission. To lower the risk of readmission, the GWTG® (Get With the Guidelines) program for heart failure recommends that patients have a follow-up visit within seven days of hospital discharge.²⁴ Therefore, a program output is a GHFP follow-up visit within seven days of heart failure hospital discharge and a short-term program outcome is related hospital readmission within 30 days. The percentage of follow-up visits conducted within seven days and 30-day hospital readmissions were obtained from Grady Memorial Hospital from their electronic medical record data dashboard in 2020 (Table 1).

To estimate the expected number of follow-up visits within seven days of a hospital discharge and 30-day heart failure hospital readmissions, we multiplied the rates each year

(2017, 2018) by the number of unique GHFP patients in 2018 based on program intake conducted during the inpatient encounter. We estimated what would have occurred among 2018 GHFP patients in the expanded (program) year (2018) compared with the baseline year (2017). The expected number of visits and readmissions in the program/baseline year estimates the number of visits and readmissions that would have occurred in the program/baseline year with the same number of unique patients across both years (Tables 1 and 3).

Program cost-effectiveness.

We compared the expanded 2018 GHFP with the previous year without a CHW, patient liaison, and mobile integrated health home visits to evaluate how program costs, follow-up, and related hospital readmission changed. For program output and outcome evaluation, we calculated the difference in expected number of follow-up visits within seven days of hospital discharge, and in heart failure-related hospital readmissions within 30 days of hospital discharge, in the expanded program year (2018) compared with the baseline year (2017). This calculation was based on 2018 GHFP patients to assess pre-post program effectiveness.²⁴ The difference in total program costs between the two years is estimated as the incremental program costs in 2018 compared with 2017 if the number of unique heart failure patients in 2017 were the same as in 2018.

The program cost-effectiveness metric is the incremental program cost per 30-day hospital readmission averted. The program cost-effectiveness metric was calculated by dividing incremental program cost by program effectiveness, which was reported as incremental program cost per heart failure-related hospital readmission in 2018 compared with 2017 (Table 3).

All program costs are reported in 2019 U.S. dollars as part of the original data collection. For a discussion of the costs, all non-labor costs, including heart failure inpatient costs from the literature, were standardized to 2024 U.S. dollars using the personal consumer expenditures health care price indices.^{25,26} Program labor costs were standardized to 2024 U.S. dollars by using the Employment Cost Index for wage and salaries for private industry hospital workers.²⁷ The CDC, Morehouse School of Medicine Institutional Review Board, and Grady Research Oversight Committee reviewed and approved this activity as program evaluation. This activity was reviewed by CDC and was conducted consistently with applicable federal law and CDC policy.

Results

The estimated total program costs were \$1,230,421 (2017) and \$1,403,019 (2018) for 2017 and 2018, respectively (Table 2). The largest component of the estimated program costs for both years was for labor (92% for 2017 and 91% for 2018). Both labor and non-labor costs increased in 2018. A key output of the GHFP is a follow-up visit within seven days of heart failure hospital discharge, and this increased from 576 patients in 2017 to 593 patients in 2018. A short-term program outcome is related hospital readmission within 30 days, which declined from 140 readmissions in 2017 to 118 readmissions in 2018.

To assess the pre-post program effectiveness, Table 3 shows the estimated differences in key program outputs and outcomes in 2018 compared with 2017. The estimated total program cost increased by \$172,598 in 2018 compared with 2017 with the addition of a full-time CHW and patient liaison and additional variable costs. The estimated number of patients meeting the GWTG[®] recommended follow-up within seven days of hospital discharge increased by 17.121 and the 30-day heart failure related hospital readmissions decreased by 21.696 in 2018 compared with 2017.

Also shown in Table 3 are the program cost-effectiveness metrics. Compared with 2017, the 2018 estimated incremental program cost per related readmission averted was \$7,955 (2019 \$).

Discussion

The Grady Heart Failure Program (GHFP) is an outpatient program primarily serving African American patients who are experiencing socioeconomic disadvantage. We estimated the program cost-effectiveness of GHFP in 2018 compared with 2017, when the program did not have additional resources to address social needs. The GHFP expanded social needs activities over time to reduce socioeconomic barriers to treatment. The expansion included hiring a full-time CHW, hiring a patient liaison, and providing mobile integrated health home visits for patients, as needed, in 2018. For the 2018 program expansion, the incremental cost per readmission averted was estimated at \$9,639 (in present day 2024 \$; \$7,955 in 2019 \$).

Based on the Health Care and Utilization Project and National Readmissions Database, the average hospital costs per stay for heart readmissions for the same cause (heart failure) was \$15,663 (2024 \$) for self-pay, \$19,901 (2024 \$) for Medicaid, \$18,802 for Medicare, and \$31,548 (2024 \$) for privately insured.²⁸ The incremental program cost incurred per hospital readmission averted by GHFP in 2018 compared with 2017 is less than one half to more than one third of the inpatient expenditures that might have been incurred had the readmission not been averted. This implies that the program could potentially achieve health care cost-savings within the budget year, even based on a conservative estimate that only includes hospital readmission costs averted.

There are disparities in heart failure outcomes for underserved populations.¹³ Other evaluations of CHW social needs interventions that include heart failure patients show improvements in health care outcomes.^{12, 13} For example, in Chicago, CHWs provided in-home and telephone support and observed a 89% decrease in heart failure-related readmissions within the intervention cohort and no change within a matched comparison.¹³ A randomized control trial of a patient navigator care transition intervention demonstrated differences in health care costs among older adults with heart failure or chronic obstructive pulmonary disease. There was an average difference of approximately \$2,000 less in hospital payments during the 180 days post-discharge from the safety-net hospital between the intervention and the control.¹² Community health workers can help address social needs; however, there is limited evidence on the cost and cost-effectiveness of these efforts, especially for heart failure patients.

One recent randomized control trial of a CHW program that provided tailored social support for adult Medicaid or uninsured patients living in high-poverty neighborhoods with two or more chronic conditions (diabetes, obesity, tobacco dependence, or hypertension) estimated that for every \$1 invested, \$2.47 is returned to Medicaid within the fiscal year based on the difference in inpatient visits between intervention and control patients.⁸ Similarly, the present study suggests that for every \$1 invested to address social needs through a CHW and other efforts, approximately \$1.60 to over \$3 is potentially saved by Grady Memorial Hospital through readmissions averted. A nurse-CHW team addressing heart failure alone (9%), heart failure and diabetes (23%), or diabetes alone (68%) in the rural Midwest estimated a \$1.37 return on investment based on emergency department and inpatient visits.¹¹ The GHFP evaluation adds to the limited literature on real-world program cost and cost-effectiveness analysis of a clinical program that addresses social needs of heart failure patients with low incomes.

Our study has some limitations. First, our analysis only included health care costs saved from readmissions averted. This most likely is an underestimate as it does not measure other health care costs potentially saved due to improved health and lower utilization that would be realized in the longer term. Second, we did not include the benefits from addressing unmet social needs because data on beneficiaries and resolving unmet needs were not tracked in the earlier years of the GHFP. Therefore, our analysis might not fully capture the cost effectiveness of addressing social needs and improving health equity. Our analysis is conservative and likely undercounts some of the cost and benefits of social needs interventions. As health care organizations expand activities to address social needs there remains a need to account for cost and benefits. Third, the GHFP serves a specific patient population. Our findings are from a case study and may not be generalizable. Finally, changes observed may not be attributable to the GHFP alone. While the GHFP serves a patient population experiencing socioeconomic disadvantage and added social needs activities, it is possible that other factors not accounted for in our analysis influenced improvements in program outcomes.

Despite these limitations, our findings add to the literature on the cost-effectiveness of programs addressing social services within clinical programs using hospital-based evaluation data. This case study shows ways that clinical programs can reduce socioeconomic barriers to treatment within the budget of the hospital-provider. Our case study also demonstrates a feasible approach to evaluation using hospital-provider dashboards.

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References

1. Powell-Wiley TM, Baumer Y, Baah FO, et al. Circ Res. 2022 Mar 4;130(5):782–99. Epub 2022 Mar 3. 10.1161/CIRCRESAHA.121.319811 [PubMed: 35239404]

2. Hacker K, Houry D. Social needs and social determinants: The role of the Centers for Disease Control and Prevention and public health. *Public Health Rep.* 2022 Nov–Dec;137(6):1049–52. Epub 2022 Sep 9. 10.1177/00333549221120244 [PubMed: 36367214]
3. Gurewich D, Garg A, Kressin NR. Addressing social determinants of health within healthcare delivery systems: a framework to ground and inform health outcomes. *J Gen Intern Med.* 2020 May;35(5):1571–5. Epub 2020 Feb 19. 10.1007/s11606-020-05720-6 [PubMed: 32076989]
4. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Committee on Integrating Social Needs Care into the Delivery of Health Care to Improve the Nation's Health. Integrating social care into the delivery of health care: moving upstream to improve the nation's health. Washington, DC: National Academies Press, 2019.
5. Gottlieb LM, Garcia K, Wing H, et al. Clinical interventions addressing non-medical health determinants in Medicaid managed care. *Am J Manag Care.* 2016 May;22(5):370–6. [PubMed: 27266438]
6. Gottlieb LM, Wing H, Adler NE. A systematic review of interventions on patients' social and economic needs. *Am J Prev Med.* 2017 Nov;53(5):719–29. Epub 2017 Jul 5. 10.1016/j.amepre.2017.05.011 [PubMed: 28688725]
7. Murray GF, Rodriguez HP, Lewis VA. Upstream with a small paddle: how ACOs are working against the current to meet patients' social needs. *Health Aff (Millwood).* 2020 Feb;39(2):199–206. 10.1377/hlthaff.2019.01266 [PubMed: 32011930]
8. Kangovi S, Mitra N, Grande D, et al. Evidence-based community health worker program addresses unmet social needs and generates positive return on investment. *Health Aff (Millwood).* 2020 Feb;39(2):207–13. 10.1377/hlthaff.2019.00981 [PubMed: 32011942]
9. Allen JK, Dennison Himmelfarb CR, Szanton SL, et al. Cost-effectiveness of nurse practitioner/ community health worker care to reduce cardiovascular health disparities. *J Cardiovasc Nurs.* 2014 Jul;29(4):308–14. 10.1097/JCN.0b013e3182945243 [PubMed: 23635809]
10. Basu S, Jack HE, Arabadjis SD, et al. Benchmarks for reducing emergency department visits and hospitalizations through community health workers integrated into primary care: a cost-benefit analysis. *Med Care.* 2017 Feb;55(2):140–7. 10.1097/MLR.0000000000000618 [PubMed: 27547954]
11. Fawcett KJ Jr, Neff RK, Freese Decker CM, et al. Achieving IHI's triple aim by utilizing core health program with community health workers in rural communities. *Fam Community Health.* 2018 Oct/Dec;41(4):255–64. 10.1097/FCH.0000000000000196 [PubMed: 30134340]
12. Galbraith AA, Meyers DJ, Ross-Degnan D, et al. Long-term impact of a postdischarge community health worker intervention on health care costs in a safety-net system. *Health Serv Res.* 2017 Dec;52(6):2061–78. 10.1111/1475-6773.12790 [PubMed: 29130267]
13. Vohra AS, Chua RFM, Besser SA, et al. Community health workers reduce rehospitalizations and emergency department visits for low-socioeconomic urban patients with heart failure. *Crit Pathw Cardiol.* 2020 Sep;19(3):139–45. 10.1097/HPC.0000000000000220 [PubMed: 32209825]
14. MacLeod KE, Chapel JM, McCurdy M, et al. The implementation cost of a safety-net hospital program addressing social needs in Atlanta. *Health Serv Res.* 2021 Jun;56(3):474–85. Epub 2021 Feb 12. 10.1111/1475-6773.13629 [PubMed: 33580501]
15. Phillips CO, Singa RM, Rubin HR, et al. Complexity of program and clinical outcomes of heart failure disease management incorporating specialist nurse-led heart failure clinics. A meta-regression analysis. *Eur J Heart Fail.* 2005 Mar 16;7(3):333–41. 10.1016/j.ejheart.2005.01.011 [PubMed: 15718173]
16. Feltner C, Jones CD, Cené CW, et al. Transitional care interventions to prevent readmissions for persons with heart failure: a systematic review and meta-analysis. *Ann Intern Med.* 2014 Jun 3;160(11):774–84. 10.7326/M14-0083 [PubMed: 24862840]
17. Vedel I, Khanassov V. Transitional care for patients with congestive heart failure: a systematic review and meta-analysis. *Ann Fam Med.* 2015 Nov;13(6):562–71. 10.1370/afm.1844 [PubMed: 26553896]
18. Banegas MP, Dickerson JF, Friedman NL, et al. Evaluation of a novel financial navigator pilot to address patient concerns about medical care costs. *Perm J.* 2019;23:18–084. 10.7812/TPP/18-084

19. Chung GC, Marottoli RA, Cooney LM Jr, et al. Cost-related medication nonadherence among older adults: findings from a nationally representative sample. *J Am Geriatr Soc*. 2019 Dec;67(12):2463–73. Epub 2019 Aug 22. 10.1111/jgs.16141 [PubMed: 31437309]
20. Khera R, Valero-Elizondo J, Das SR, et al. Cost-related medication nonadherence in adults with atherosclerotic cardiovascular disease in the United States, 2013 to 2017. *Circulation*. 2019 Dec 17;140(25):2067–75. Epub 2019 Nov 25. 10.1161/CIRCULATIONAHA.119.041974 [PubMed: 31760784]
21. Syed S, Gerber B, Sharp L. Traveling towards disease: transportation barriers to health care access. *J Community Health*. 2013 Oct;38(5):976–93. 10.1007/s10900-013-9681-1 [PubMed: 23543372]
22. Wolfe MK, McDonald NC, Holmes GM. Transportation barriers to health care in the United States: findings from the National Health Interview Survey, 1997–2017. *Am J Public Health*. 2020 Jun;110(6):815–22. Epub 2020 Apr 16. 10.2105/AJPH.2020.305579 [PubMed: 32298170]
23. Ruiz S, Snyder LP, Rotondo C, et al. Innovative home visit models associated with reductions in costs, hospitalizations and emergency department use. *Health Aff* 2017 Mar 1;36(3):425–32. 10.1377/hlthaff.2016.1305
24. American Heart Association. Get With The Guidelines®—Heart Failure. Dallas, TX: American Heart Association, 2016. Available at: https://www.heart.org/-/media/Files/Professional/Quality-Improvement/Get-With-the-Guidelines/Get-With-The-Guidelines-HF/Educational-Materials/HF-Fact-Sheet_Updated-011119_V2.pdf.
25. Dunn A, Grosse SD, Zuvekas SH. Adjusting health expenditures for inflation: a review of measures for health services research in the United States. *Health Serv Res*. 2018 Feb;53(1):175–96. Epub 2016 Nov 21. 10.1111/1475-6773.12612 [PubMed: 27873305]
26. US Bureau of Economic Analysis. Price Indexes for Personal Consumer Expenditures by Major Type of Project. Suitland, MD: US Bureau of Economic Analysis, 2023. Available at: <http://www.bea.gov/iTable/>.
27. US Bureau of Labor Statistics. Employment cost index seasonal dataset. Washington, DC: U.S. Bureau of Labor Statistics, 2024. Available at: <https://www.bls.gov/eci/data.htm>.
28. Agency for Healthcare Research and Quality. Healthcare Cost and Utilization Project (HCUPnet). Rockville, MD: Agency for Healthcare Research and Quality, 2024. Available at: <https://datatools.ahrq.gov/hcupnet/>.



Figure 1.

Expansion of social needs activities, the Grady Heart Failure Program, 2011–2018.

Note:

CHW = community health worker; MIH = mobile integrated health.

Transportation rides and MIH visits are for patients most in need.

(a) Staffing of temporary CHW, funded through a different program, ended in November 2016.

Table 1.

INPUTS AND SOURCES FOR ANALYSES

Input Description	Input value for reference—Baseline Year (Jan 1, 2017–Dec 31, 2017)	Input value for expanded program—Year 1 (Jan 1, 2018–Dec 31, 2018)	Source
Number of unique GHFP patients	N/A	904	Data Dashboard Program Intake
Program costs			
Labor	See Table 2	See Table 2	GHS records ^{1,4}
Non-labor			
Facilities	\$20,770	\$20,770	GHS records ^{1,4}
Equipment (e.g., work stations, computers)	See Table 2	See Table 2	Inventory ^{1,4}
Medical supplies	See Table 2	See Table 2	Invoices ^{1,4}
Program specific (e.g., guidebooks, workshop)	See Table 2	See Table 2	Reported by GHFP staff ^{1,4}
Transportation rides total cost	\$1,281	\$1,129	Invoices
Mobile integrated health home visits total cost	N/A	\$36,000	GHS records ^{1,4}
Rates			
% Follow-up visit within 7 days of hospital discharge	63.69	65.58	EMR dashboard
% 30-day HF-related hospital readmission ^a	15.50	13.10	EMR dashboard

Notes

CHW= Community health worker; EMR= electronic medical record; GHFP= Grady Heart Failure Program; GHS= Grady Hospital System; GWTG[®]= Get With The Guidelines; HF= heart failure; PT = part-time.

N/A indicates not applicable; for the number of patients this reflects the scenario what if the number of unique patients were the same in 2017 as in 2018.

Number of GHFP patients is based on program intake during the inpatient encounter.

Labor costs include salary, benefits (if applicable), and training for full-time staff.

All costs are reported in 2019 \$

^aThe denominator includes all inpatient encounters for all patients discharged with an International Classification of Diseases, 10th clinical modification code: I11.0, I13.0, I13.2, I50.1, I50.20–I50.23, I50.30–I50.33, I50.40–I50.43, I50.810–I50.814, I50.82–I50.84, I50.89, or I50.9. Exclusions included an ICD-10-PCS code within 12 months prior, any procedure position: 02HA00Z, 02HA0R1, 02HA0R5, 02HA0RZ, 02HA3QZ, 02HA3RJ, 02HA3RZ, 02HA4QZ, 02HA4RJ, 02HA4RS, 02HA4RZ, 02YA0Z0, 02YA0Z1, or 02YA0Z2. The numerator includes patients who returned within 30 days and had a heart failure diagnosis-related group indicated on their readmission (291–293).

Table 2.

ESTIMATED PROGRAM COSTS, GRADY HEART FAILURE PROGRAM, 2017–2018

Type	Quantity (Qty)	Unit Cost (2019 \$)	Cost (2019 \$) Baseline Year (Jan 1, 2017–Dec 31, 2017)	Cost (2019 \$) Year 1 (Jan 1, 2018–Dec 31, 2018)
Labor	FTE			
Population health director	.05	180,000.00	9,000.00	9,000.00
Medical director	.05	300,000.00	15,000.00	15,000.00
Manager	1.00	175,000.00	175,000.00	175,000.00
Data dashboard support	1.20	67,204.00	80,644.80	80,644.80
Program check-in and front desk support	.50	35,000.00	17,500.00	17,500.00
Financial counselor	.20	43,750.00	8,750.00	8,750.00
Nurse practitioners	4.50	140,000.00	630,000.00	630,000.00
Clinical registered nurse	1.00	93,750.00	75,000.00	75,000.00
Contract nurse	1.00	55,000.00	55,000.00	55,000.00
Medical assistant	.80	43,750.00	35,000.00	35,000.00
Phlebotomist	.80	31,250.00	25,000.00	25,000.00
Community health worker	1.00	70,000.00	N/A	70,000.00
Patient liaison / Licensed practical nurse	1.00	63,750.00	N/A	63,750.00
Annual training for full-time staff	5.00	1,500.00	7,500.00	7,500.00
Annual training for additional full-time staff	2.00	1,500.00	N/A	3,000.00
Labor Subtotal			1,133,394.80	1,270,144.80
		Qty	Qty × unit or invoiced	
Non-labor				
Facilities (square feet)	765.00	27.15	20,770.00	20,770.00
Medical and home supplies			10,836.04	10,836.04
Medication	650.00	78.10	50,765.00	50,765.00
Guidebook	1,200.00	5.00	6,000.00	6,000.00
Caregiving workshop	1.00	2,000.00	2,000.00	2,000.00
Transportation rides			1,281.00	1,129.00
MIH home visits total cost			N/A	36,000.00
Non-labor annuitized				

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Program-specific 2-year certification	1.00	4,000.00	2,000.00	2,000.00
Work stations	4.00	3,200.00	1,110.15	1,110.15
Laptops	4.00	800.00	423.67	423.67
Computers	16.00	580.00	1,228.65	1,228.65
Printers	2.00	300.00	79.44	79.44
Phone	10.00	75.00	65.05	65.05
Blood pressure monitor	1.00	3,000.00	467.59	467.59
TOTAL			1,230,421.39	1,403,019.39

Notes

Unit cost for labor includes benefits, if applicable.

FTE = full-time equivalent; MIH = mobile integrated health.

Table 3.
GRADY HEART FAILURE PROGRAM OUTPUTS, OUTCOMES, AND ESTIMATED PROGRAM COST-EFFECTIVENESS, 2017–2018

	Reference—Baseline Year (Jan 1, 2017–Dec 31, 2017)	Expanded program—Year 1 (Jan 1, 2018–Dec 31, 2018)
Estimated output and outcomes ^a		
Number of follow-ups within 7 days of hospital discharge	576	593
Number of 30-day related readmissions	140	118
Costs—total program cost, 2019 \$ ^b	\$1,230,421	\$1,403,019
Program effectiveness (2018 compared with 2017) for 2018 GHFP patients		
Estimated additional follow-ups within 7 days of first discharge	N/A	17.121
Estimated number of 30-day related readmissions averted of first discharge	N/A	21.696
Program cost (2018 compared to 2017) for 2018 GHFP patients		
Total additional program cost, 2019 \$	N/A	\$172,598
Program cost-effectiveness (2018 compared with 2017)		
Incremental program cost per related readmission averted, 2019 \$	N/A	\$7,955

Notes

^aThe 2017 and 2018 rates in Table 1 were applied for the respective program years using the same number of patients for both years (n= 904).

^bCost estimates are from Table 2. Both years have similar clinical staffing. The expanded program includes the addition of a full-time community health worker and patient liaison, and mobile integrated health home visits for those most in need of these services.

N/A = not applicable.