

RESEARCH LETTER

Improving Disparities in Access to Cardiovascular Care



Effects of Embedding a Clinic in an FQHC

Racial and socioeconomic disparities in access to cardiovascular care are significant contributors to adverse clinical outcomes.¹ Federally qualified health centers (FQHCs) provide a range of medical services for free or at highly discounted prices to economically disadvantaged Americans.² There are over 1,400 FQHCs in the United States that serve more than 30 million people. Most of these clinics lack the resources to provide specialty care on site, and FQHC patients face many barriers when referred for specialty care.

Piedmont Health Services (PHS) is a nonprofit FQHC that operates 12 community health centers in 7 counties in central North Carolina. PHS provides medical, dental, and behavioral health services to approximately 49,000 patients per year, of which 75% are a racial/ethnic minority, 86% have an income at or below the 100% federal poverty line, and 53% are uninsured.

A clinic staffed on a volunteer basis by the University of North Carolina (UNC) faculty cardiologists and medical students was embedded within PHS 12 years ago. The clinic operates from 5:00 PM to 9:00 PM once per month and provides cardiology consultation, on-site transthoracic echocardiography, and electrocardiography. To determine the impact of this novel clinic, a retrospective study of all patients seen at the PHS Cardiology Clinic from January 1, 2010, through December 31, 2020, was performed. A comparison between groups was done using Student's *t*-test, Mann-Whitney Rank Sum Test, analysis of variance, or Mantel-Haenszel chi-square test. This study was approved by the UNC Biomedical Institutional Review Board.

During the study period, 505 unique patients were seen at the PHS Cardiology Clinic. Compared to new patients seen at the UNC Cardiology Clinic in 2019, patients seen at the PHS Cardiology Clinic were younger (age 49 ± 15 years vs 64 ± 7 years; $P < 0.0001$) and more likely to be female (65% vs 47%;

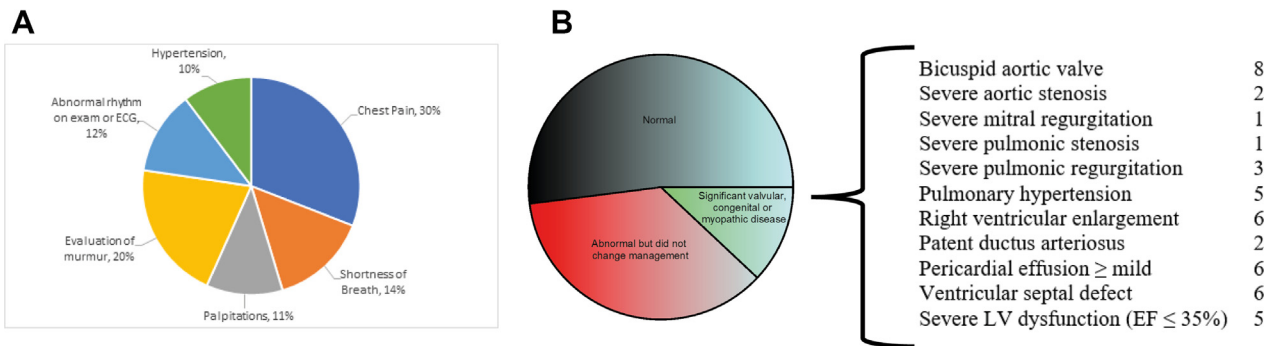
$P < 0.0001$), members of a racial/ethnic minority group (70% vs 24%; $P < 0.0001$), and uninsured (68% vs 6%; $P < 0.0001$) than patients seen at the UNC Cardiology Clinic. Comorbid diagnoses were present in 79% of patients, and the median number of comorbidities per patient was 2. The most common comorbidities were hypertension, obesity, and hyperlipidemia.

The primary reasons for referral to the PHS Cardiology Clinic are shown in **Figure 1A**. At the time of first consultation, an electrocardiograph was obtained in 49% of patients, with 49% of these being abnormal, and echocardiography was performed in 51% of patients, of which 48% were abnormal (**Figure 1B**). Patients who received echocardiograms at the PHS clinic were younger (50 [IQR: 39-60] years vs 61 [IQR: 49-71] years; $P < 0.001$), more likely to be female (69.4% vs 50.3%; $P < 0.01$), and more likely to be referred for evaluation of a murmur (35% vs 5%; $P < 0.001$) than patients receiving echocardiograms at the UNC medical center. Important congenital, myopathic, and/or valvular diseases were identified in 31 (12.1%) patients.

This analysis shows that this novel collaborative effort between an academic medical center and an FQHC was effective at reaching underserved patients in need of cardiovascular care, with 70% of patients being an ethnic/racial minority, 68% being uninsured, 79% having comorbidities, and approximately one-third having a pre-existing cardiovascular disease. Patients seen at the PHS Cardiology Clinic were younger, more often female, and much more likely to be members of a racial/ethnic minority group and uninsured than those seen at an academic cardiology clinic.

Uninsured patients are a high-risk group who often lack access to specialty care because of financial and logistical challenges, which the PHS Cardiology Clinic worked to eliminate. These barriers are not without consequences as patients without insurance are less likely to be aware of hypertension and hyperlipidemia, more likely to have poor blood pressure control, and had an increased risk of stroke and all-cause mortality compared to those who were insured.³ The nonpartisan Congressional Budget Office estimates 30 million Americans remain uninsured including the most vulnerable of patients.

Echocardiographic abnormalities were identified in 48% of patients, with important findings that would

FIGURE 1 Reasons for Referral to the Clinic and Findings of Patients Who Underwent Echocardiography

Reasons for referral (A) and echocardiographic findings (B) of patients seen at the PHS Cardiology Clinic. The number of patients with specific echocardiographic diagnoses is given (some patients had more than 1 diagnosis). ECG = electrocardiography; EF = ejection fraction; LV = left ventricle; PHS = Piedmont Health Services.

potentially change management identified in 12% of patients. The current study adds to existing evidence that rates of undiagnosed echocardiographic abnormalities are high in underserved populations.⁴

The PHS Cardiology clinic is staffed by medical students who change on a yearly basis and who receive a real-world clinical experience at an early stage in their medical education. Medical student participation in clinics that serve vulnerable populations has been shown to reduce the significant decline in empathy seen during medical school⁵ and may also stimulate long-term interest in caring for underserved patient populations.

This is the first study to our knowledge to describe an adult cardiology clinic embedded within an FQHC and provides some insight into the patient population that can be reached. Because community health centers and other safety net clinics serve a large number of disadvantaged patients, a focus on increasing access for these patients can help address disparities in cardiovascular care.

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Sterling A. Wheaten, MD
Clark Williamson, BSPH
Charles M. Piehl, BA
Paula F. Miller, MD
Thelsa P. Weickert, MD

Alan L. Hinderliter, MD

*George A. Stouffer, MD

*Division of Cardiology

University of North Carolina

Chapel Hill, North Carolina 27599-7075, USA

E-mail: rstouff@med.unc.edu

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

REFERENCES

- Mensah GA, Cooper RS, Siega-Riz AM, et al. Reducing cardiovascular disparities through community-engaged implementation research: a National Heart, Lung, and Blood Institute workshop report. *Circ Res*. 2018;122:213-230.
- Rosenbaum S, Hawkins DR Jr. The good doctor—Jack Geiger, social justice, and US health policy. *N Engl J Med*. 2021;384:983-985.
- Fowler-Brown A, Corbie-Smith G, Garrett J, Lurie N. Risk of cardiovascular events and death—does insurance matter? *J Gen Intern Med*. 2007;22:502-507.
- Kirkpatrick JN, Davis A, DeCara JM, et al. Hand-carried cardiac ultrasound as a tool to screen for important cardiovascular disease in an underserved minority health care clinic. *J Am Soc Echocardiogr*. 2004;17:399-403.
- Modi A, Fascelli M, Daitch Z, Hojat M. Evaluating the relationship between participation in student-run free clinics and changes in empathy in medical students. *J Prim Care Community Health*. 2017;8:122-126.