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Primary care and survival among American Indian patients with diabetes in the Southwest United States: Evaluation of a cohort study at Gallup Indian Medical Center, 2009–2016

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ABSTRACT

Objectives: To evaluate the role of primary care healthcare delivery on survival for American Indian patients with diabetes in the southwest United States.

Methods: Data from patients with diabetes admitted to Gallup Indian Medical Center between 2009 and 2016 were analyzed using a log-rank test and Cox Proportional Hazards analyses. **Results:** Of the 2661 patients included in analysis, 286 patients died during the study period. Having visited a primary care provider in the year prior to first admission of the study period was protective against all-cause mortality in unadjusted analysis (HR (95% CI) = 0.47 (0.31, 0.73)), and after adjustment. The log-rank test indicated there is a significant difference in overall survival by primary care engagement history prior to admission ($p < 0.001$). The median survival time for patients who had seen a primary care provider was 2322 days versus 2158 days for those who had not seen a primary care provider.

Conclusions: Compared with those who did not see a primary care provider in the year prior to admission, having seen a primary care provider was associated with improved survival after admission.

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1. Introduction

The Indian Health Service (IHS) provides healthcare to approximately 2.2 million American Indians and Alaska Natives across the United States [1]. Part of care delivery by IHS includes primary care services, such as family medicine and internal medicine clinic visits, for eligible American Indian patients. Within the United States and abroad, primary care delivery has been shown to help reduce healthcare expenditures and improve patient-centered healthcare outcomes, including mortality [2–9].

In spite of this, a combination of funding and recruitment challenges contribute to a 25% vacancy rate for physicians and nurse practitioners within IHS, with an estimated annual rate of 47% of physicians planning to leave their IHS job in the next three years [10,11]. The healthcare provider shortage makes seeking a primary care provider (PCP) appointment difficult for patients, who in some IHS regions experience wait times of several months to see a PCP. In 2016, the Government Accountability Office published a report indicating that IHS should work to address long wait times for PCP appointments and provide standards of acceptability for wait times across the agency [12]. Though potentially helpful, challenges for IHS primary care delivery are not purely logistic; in 2015, the allotted expenditure per person by the United States Congress for patients treated by IHS was \$3688 versus \$9523 per person on average for other federally funded health programs [1]. Both funding and logistic challenges contribute to IHS's reduced capacity to provide adequate and timely primary care services.

In the face of these challenges, American Indian communities across the United States experience significant health disparities that may be improved with timely and comprehensive primary care delivery. One of twelve geographic regions served by IHS, Navajo Area Indian Health Services is located in the Four Corners region of the southwest (primarily New Mexico, Arizona, and Utah). The Navajo Nation comprises the majority of the population served by the IHS region, with a population of 332,000 people, though not all registered tribal members live on the reservation or seek care from IHS [13]. The Navajo Nation experiences a high prevalence of Type 2 Diabetes Mellitus (DM) with 25,000 tribal members living with diabetes and 75,000 who are prediabetic [14]. Despite these challenges, there is evidence that health disparities can be reduced and health outcomes improved through primary care access [15,16]. The objective of this paper was to evaluate the role of primary care healthcare delivery on survival for American Indian patients with diabetes in the southwest.

2. Methods

2.1. Study site

This analysis was completed by the research team at the Community Outreach and Patient Empowerment (COPE) Program in Gallup, New Mexico. COPE is a 501c3 non-profit organization and a sister organization of Partners in Health, a global healthcare organization that works primarily with community health workers to improve care delivery [17]. COPE began for-

mally collaborating with the Navajo Nation in 2009. In 2013, Brigham and Women's Hospital received a Patient Centered Outcomes Research Institute (PCORI) contract to evaluate a project on a — Community Health Representative lead intervention with patients with chronic health conditions. The data for this project was abstracted for analysis for the PCORI study in six of the eight major health facilities comprising the Navajo Area IHS network.

COPE has two community advisory panels that guide the organization's mission and research plans. The Community Health Advisory Panel (CHAP) is comprised of patients with diabetes, their family members, and Community Health Representatives. The COPE Advisory Group (CAG) is comprised of Community Health Representative supervisors, physicians, nurses, hospital educators, IT personnel, and other healthcare workers who contribute to healthcare systems on the Navajo Nation. Both CHAP and CAG provide input on all research including study design, data interpretation, and generation of additional research ideas and recommendations based on research findings.

2.2. Study design and setting

This retrospective cohort study includes patients with diabetes admitted for any reason to Gallup Indian Medical Center (GIMC), an Indian Health Service facility in Gallup, New Mexico, between January 1st, 2009 and May 31st, 2016. GIMC is a health facility run by the IHS that primarily serves American Indian patients. GIMC has 99 inpatient beds and facilitates 250,000 outpatient and 5800 inpatient visits per year [18].

2.3. Data source

The RPMS system is an Electronic Health Record system that allows for the abstraction of clinical data at IHS facilities. Data for this project data was abstracted from the Resource and Patient Management System (RPMS) at Gallup Indian Medical Center, Northern Navajo Medical Center, Tsehootsooi Medical Center, Chinle Comprehensive Health Care Facility, Crownpoint Health Care Facility, and Kayenta Health Center during the summer of 2016. Patient data from Gallup Indian Medical Center was merged with other sites to include mortality events of the GIMC cohort that may have occurred elsewhere. All data were de-identified and the resulting database was used for study analysis.

2.4. Study participants

Participants had a diabetes mellitus diagnosis via ICD 9 coding (code 250) between 2009 and 2016 and were admitted at least once to GIMC during the same period. The first admission event after a diabetes diagnosis was used to evaluate covariates relevant to the study question. There were no age restrictions on cohort participation.

2.5. Variables

Covariates were originally selected based on literature review and input from co-authors. A list of covariates considered for inclusion was presented to COPE's CHAP and CAG members at

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