Linking Health and Housing Data to Create a Sustainable Cross-Sector Partnership

In response to the growing regional (and national) focus on health and housing intersections, two public housing authorities (PHAs) in Washington—the King County Housing Authority and the Seattle Housing Authority—joined with Public Health–Seattle & King County to form the Housing and Health (H&H) partnership in 2016. H&H linked Medicaid health claims with PHA administrative data to create a sustainable public-facing dashboard that informs health and housing stakeholders such as an Accountable Community of Health (a governing body that oversees local Medicaid transformation projects), managed care organizations, and PHAs, allowing insights into the low-income communities they serve. (*Am J Public Health.* 2020; 110:S222–S224. doi:10.2105/AJPH.2020.305693)

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See also Dasgupta, p. S174.

Housing is recognized as a significant social determinant of health, yet data siloes limit comprehensive insights into the relationships between housing and health outcomes.

INTERVENTION

In 2016, Washington State's King County Housing Authority and Seattle Housing Authority collaborated with Public Health–Seattle & King County (PHSKC) to form the Housing and Health (H&H) partnership, which aims to build system alignment between public health and housing. It does so through a sustainable, integrated data system[1] that supports exploration of existing health needs of public housing residents via an accessible, interactive platform; longitudinal analyses of interventions aimed at improving the health and well-being of public housing authority (PHA) residents; and shared governance and development of goals common to PHAs and PHSKC.

PLACE AND TIME

In 2016, PHSKC received an 18-month grant from the Robert Wood Johnson Foundation to initiate the project. PHSKC serves 2.2 million residents of the most populous county in the state. The King County Housing Authority provides affordable housing opportunities to low-income individuals and families residing in suburban King County, and the Seattle Housing Authority does the same in Seattle. The PHAs shared administrative data from 2004 onward, whereas PHSKC used Medicaid data from 2012 to 2018. Administrative housing data provided by PHAs were matched with Medicaid enrollment and claims data to create a longitudinal data set that illustrates use of housing and health care services from 2012 to 2018. This merged data set allowed exploration of population overlaps between the Medicaid and PHA service systems.

PERSON

PHAs shared administrative data from the US Department of Housing and Urban Development 50058 form, which contained demographic information on more than 70 000 housing residents in 2017. Medicaid data included information on almost 800 000 individuals between 2012 and 2018. More than 80% of PHA residents are also enrolled in Medicaid, representing 11% of King County's Medicaid population.

Relative to non-PHA Medicaid enrollees, PHA residents enrolled in Medicaid were more likely to be female, to self-identify as Black or African American, and to be dually enrolled in Medicaid and Medicare (Table 1).

PURPOSE

Although housing has long been recognized as a key social determinant of health,[2,3] research on health and housing has often focused on investigating links between specific housing conditions and singular health outcomes. PHAs and local health departments such as PHSKC had a desire to gain a broad, foundational understanding of the health and well-being of residents. To that end, they sought to develop an enduring resource that covers a wide range of health conditions and allows for longitudinal analyses and evaluations of future health interventions.

IMPLEMENTATION

An interval of nine months to two years was required to establish data sharing agreements

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TABLE 1—Demographic Characteristics of Participating Medicaid Recipients Enrolled in 2018: King County, WA

Characteristic	King County Housing Authority (n = 31 266)	Seattle Housing Authority (n = 21 879)	Non–Public Housing Authority (n = 485 669)
Gender, %			
Female	58.6	54.8	49.5
Male	41.4	45.1	50.5
Race/ethnicity, %			
American Indian/Alaska Native	1.2	1.9	1.6
Asian	4.2	9.5	10.5
Black/African American	46.4	58.4	12.5
Latino/Hispanic	13.9	7.1	16.8
Multiple race	8.5	1.4	1.2
Native Hawaiian or Pacific Islander	2.5	2.5	4.8
White	23.3	14.2	37.1
Other/unknown	7.0	5.1	15.5
Age, y, median	17.8	19.9	23.7
Age, y, mean	23.6	26.4	25.5
Age, y, %			
< 17	50.5	45.6	40.6
18–24	12.1	9.6	10.1
25–44	22.2	20.7	29.7
45–61	12.6	18.1	14.1
62–64	2.0	2.3	1.5
≥ 65	0.5	0.4	0.7
Unknown	2.4	3.3	3.4
Dual eligibility, %	17.0	23.0	8.2

Note. Participants were not dually eligible for Medicare.

between PHSKC and the Washington State Health Care Agency (which operates the Medicaid program), as well as the PHAs, after which data were transferred to PHSKC. R statistical software[4] was used to manipulate, clean, and link data. Stakeholders participated in routine meetings to address data issues, set priorities for the collaborative, and interpret and create meaning from the data. These meetings focused on shared governance, data caveats and strengths, data findings, and data-driven decision-making approaches. The linked data set was translated into a public-facing, interactive dashboard for use by the PHAs, PHSKC, managed care organizations, and other stakeholders.[5] The dashboard included events and conditions such as emergency department visits, hospitalizations, diabetes, cardiovascular diseases, depression, and well-child checks.

EVALUATION

Dashboard reviews provided insights into numerous health conditions of interest to the PHAs, PHSKC, and others. Relative to the non-PHA Medicaid population, PHA residents on Medicaid had higher rates of many of the chronic and mental health conditions analyzed (Table 2). For example, across age, gender, and race/ethnicity categories, PHA residents were two to three times more likely than non-PHA Medicaid enrollees to meet the definition for asthma. This finding could have been due to a greater prevalence of asthma among PHA residents or higher levels of care seeking.

The H&H project has implemented continuous process improvements when needed. With an early focus on developing data standardization and automation, the partnership allows for continued integrity, accuracy, and usability of the data system over time. The collaborative has been sustained for four years, including updates with more recent data and new conditions. Also, additional funding has expanded the linkage to include Medicare data.

Washington has a designated Medicaid transformation site to test new and innovative approaches to providing health coverage and care. Given that public housing residents account for 11% of the total Medicaid population, the Accountable Community of Health working on Medicaid transformation brought housing to the governance table and used the information to identify issues among a high-use population. By illuminating the health disparities present in the low-income housing population, the H&H partnership provided an opportunity for PHAs to collaborate with partners to develop programs and systems that address residents' health needs.

ADVERSE EFFECTS

The population studied did not experience any adverse effects. The linked data set is user access controlled in a PHSKC system that meets the data security and storage standards of both the Washington State Office of the Chief Information Officer and the Health Insurance Portability and Accountability Act.[6] The dashboard contains only aggregate information; small numbers are suppressed to prevent accidental disclosure or identification of an individual.

SUSTAINABILITY

The King County Housing Authority, the Seattle Housing Authority, and PHSKC have continued this partnership beyond the initial grant by leveraging funds available through the Department of Housing and Urban Development's Moving to Work program and other flexible funding sources. At a minimum, through use of the identified resources, the data set will continue to be updated with more recent Medicaid, Medicare, and PHA resident data on an annual basis. Linking other data sets or more frequent data refreshes will require additional dedicated funds. PHSKC's sharing of analytic codes through GitHub[7] allows for replicability in other localities among other PHAs, researchers, and local public health agencies.

PUBLIC HEALTH SIGNIFICANCE

This type of cross-sector data linkage with nontraditional health partners allows for a shared understanding of health care use and offers the opportunity to design policies, programs, and systems to address health inequities experienced by PHA populations. Whereas previously

TABLE 2—Selected Health Outcomes Among Participating PHA and Non-PHA Medicaid Enrollees: King County, WA, 2018

Condition Type	Non-PHA, Rate or Proportion (95% CI)	King County Housing Authority, Rate or Proportion (95% CI)	Seattle Housing Authority, Rate or Proportion (95% CI)
Acute (rate per 1000 person-years)			
Emergency department visits	578.9 (576.3, 581.6)	733.6 (722.8, 744.5)	699.4 (686.7, 712.3)
Hospitalizations	70.2 (69.3, 71.1)	54.9 (52.0, 57.9)	56.3 (52.7, 60.0)
Injuries	65.4 (64.5, 66.3)	66.8 (63.6, 70.2)	71.3 (67.3, 75.5)
Chronic (proportion per 1000 people)			
People with asthma	57.1 (56.2, 58.0)	97.2 (93.5, 101.1)	79.5 (75.4, 83.7)
People with cardiovascular disease (any type)	89.3 (88.1, 90.4)	114.2 (110.2, 118.4)	127.3 (122.3, 132.5)
People with depression	166.3 (164.8, 167.8)	189.5 (184.6, 194.6)	202.9 (196.9, 209.1)
People with diabetes	42.5 (41.7, 43.4)	63.1 (60.1, 66.3)	71.5 (67.7, 75.5)
People with kidney disease	42.8 (42.0, 43.6)	55.1 (52.2, 58.1)	67.2 (63.5, 71.1)
People with well-child checks	728.8 (724.5, 733)	680.9 (665.7, 695.8)	680 (661.7, 697.7)

Note. CI = confidence interval; PHA = public housing authority. Participants were not dually eligible for Medicare.

PHAs relied on anecdotal evidence of higher rates of disease in segments of their populations, they can now quantify disparities and develop data-driven interventions accordingly. In addition to a demographic picture, the linked data set allows for longitudinal analyses to examine the impact of longer-term housing on health. PHAs are using the information collected to share resident needs with providers and are beginning to develop pilot programs with health and social service agencies, as well as other partners, to address identified needs.

The continued development and expansion of the H&H data set and dashboard has served as a critical resource for strengthening cross-sector partnerships and understanding how housing plays a role in health, It has also led to a better understanding of the effects of policy and system changes and how linked data can be used to improve the health and well-being of vulnerable King County residents. AJPH

CONTRIBUTORS

A. A. Laurent supervised the project and led the writing of the article. A. Matheson worked on the project, contributed to the article, performed the analyses, and created the dashboard. K. Escudero and A. Lazaga facilitated data sharing, participated in the project, contributed to the article, and reviewed the dashboard.

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Note. The data product described here uses HCA data but has not yet been reviewed or approved by the HCA.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

The research described here was approved by the University of Washington Human Subjects Division.

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