

Yale University

EliScholar – A Digital Platform for Scholarly Publishing at Yale

Public Health Theses

School of Public Health

1-1-2019

“throwing Drops Of Water At A Wildfire”: Patient And Provider Strategies For Navigating Housing Instability And Type 2 Diabetes

Marlene Edelstein
mkedelstein@gmail.com

Follow this and additional works at: <https://elischolar.library.yale.edu/ysphtdl>



Part of the [Public Health Commons](#)

Recommended Citation

Edelstein, Marlene, “throwing Drops Of Water At A Wildfire”: Patient And Provider Strategies For Navigating Housing Instability And Type 2 Diabetes” (2019). *Public Health Theses*. 1870.
<https://elischolar.library.yale.edu/ysphtdl/1870>

This Open Access Thesis is brought to you for free and open access by the School of Public Health at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Public Health Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

“Throwing drops of water at a wildfire”: Patient and provider strategies for navigating housing instability and type 2 diabetes

Marlene Edelstein

Year Completed: 2019

Degree Awarded: Master of Public Health (pending)

Department: School of Public Health

Advisor: Danya Keene, PhD

Committee Member: Ronica Mukerjee, MSN, DNP, FNP-BC, LAc

Abstract

Type 2 diabetes and housing access are growing independent and intersecting crises in the United States, and unstable housing is associated with poor health outcomes for people with type 2 diabetes. A growing body of evidence points to the challenges of adhering to diabetes management without access to stable housing, and that provider behavior is impacted when their patients face housing instability. In this qualitative study, we investigate the ways that primary care providers and people with type 2 diabetes strategically navigate the challenges posed by homelessness and unstable housing. Semi-structured interviews from two qualitative studies were analyzed. The first set of interviews was conducted with 40 residents of New Haven, Connecticut who qualified for, or resided in, subsidized housing. The second set of interviews was conducted with 18 primary care clinicians practicing in Connecticut. Coding analysis for both sets of interviews was conducted independently before they were analyzed together. We found that providers addressed the challenges of managing type 2 diabetes in the context of unstable housing by individualizing care, reducing the risk of acute complications, and by going above and beyond for patients. Patients addressed these challenges by building strategic alliances and by creating structure. Our results suggest that individual solutions involve tradeoffs, are tenuous, and are insufficient at addressing these poor health outcomes. Systemic interventions are warranted.

Acknowledgements

I am grateful to the participants who made this thesis possible by sharing their time and wisdom.

I would like to thank Dr. Danya Keene, Dr. Ronica Mukerjee, and Sascha Murillo for their guidance and insight. Finally, I would like to thank David Weinreb, Jenny Ajl, and Lauren Waski for their support throughout this process.

Table of Contents

Abstract.....	2
Acknowledgements.....	3
Table of Contents.....	4
List of Tables.....	5
Introduction.....	6
Methods.....	8
Findings.....	10
Discussion.....	22
References.....	27
Appendix	
Table 1.....	30
Table 2.....	31

List of Tables

1) Descriptive Statistics for Patient Participants.....	30
2) Descriptive Statistics for Provider Participants.....	31

Introduction

According to the Center for Disease Control's (CDC) 2017 National Diabetes Statistics Report, 9.4% of the U.S. population (roughly 30.3 million people) have diabetes. However, this chronic disease does not affect the entire population evenly; there are stark disparities in diabetes prevalence and outcomes by race and socioeconomic status (SES) (CDC, 2017). The prevalence of diabetes among American Indian/Alaska Natives (15.1%), non-Hispanic blacks (12.7%), and Hispanics (12.1%), are higher than the prevalence among non-Hispanic whites (7.4%). The prevalence is also higher among those with less than a high school diploma (12.6%) than those with a high school education (9.5%) and those with more than a high school diploma (7.2%; CDC, 2017).

Housing status has a particularly significant effect on diabetes outcomes; unstable housing is associated with higher rates of diabetes-related hospital visits, poor glycemic control, and life-threatening complications such as diabetic ketoacidosis (Randall et al., 2011; Axon et al., 2016; Berkowitz et al., 2018). This is particularly concerning given the pervasive and growing housing and homelessness crisis in the United States. According to the U.S. Department of Housing and Urban Development's 2017 Annual Homeless Assessment Report to Congress, 553,742 people experienced homelessness in a given night. Many more are at risk of homelessness; approximately 6.7 million renters pay more than 50% of their income towards housing, and roughly 4.4 million people in poor households live "doubled up" with friends and family (National Alliance to End Homelessness, n.d.). Therefore, the fraught intersection of housing instability and type 2 diabetes deserves attention.

An emerging body of evidence points to the challenges of adhering to the resource and labor-intensive demands of diabetes management without access to stable housing (Wilson, 2015;

Paudyal, MacLure, Buchanan, Wilson, Macleod & Stewart, 2017). For example, Keene, Guo, and Murillo (2017) found that homelessness impaired people with type 2 diabetes' ability to, "1) prioritize their diabetes care, 2) establish and maintain diabetes routines, and 3) afford diabetes-related expenses." Other studies have found that the stress of homelessness, as well as the lack of access to healthcare and healthy food, also impact diabetes self-management (White, Logan & Magwood, 2016; Elder & Tubb, 2014).

Health providers and their professional organizations are beginning to recognize the impact of housing challenges on people with type 2 diabetes, and the need to adjust care accordingly. In their 2018 Practice Guidelines, the American Diabetes Association (ADA) named homelessness as a barrier to diabetes self-management. They suggest that providers screen their patients for housing issues, and remind providers who work with the homeless "...to be familiar with resources or have access to social workers that can facilitate temporary housing for their patients as a way to improve diabetes care" (p. S10). Individual organizations, like Healthcare for the Homeless, have published their own guidelines for treating patients who are homeless and have type 2 diabetes, which include general suggestions about ways to modify their treatment plan (Kalinowski, Tinker, Wismer & Meinbresse, 2013). These are important steps because services that are tailored to homeless individuals result in better patient satisfaction and better outcomes for homeless patients compared to general primary care services (O'Toole et al., 2010; Kertesz et al., 2013).

Though not specific to housing, some prior research has also examined the ways that SES and housing instability shape provider behavior. In their seminal 2005 article, Lutfey and Freese argued that SES is a fundamental cause of poor health outcomes for people with diabetes. They identified diabetes treatment design and implementation as one mechanism linking SES and poor

health outcomes (Lutfey & Freese, 2005). More specifically, treatment design is affected when providers adapt their care to accommodate the challenges patients face due to economic and housing hardship (Henry, Lichtman, Hanlon & Keene, n.d; Bernheim, Ross, Krumholz & Bradley, 2008; Lutfey & Freese, 2005). Some providers make these changes based on biased assumptions of patients' motivation and abilities (Lutfey & Freese, 2005). Others make these changes in partnership with patients and still feel conflicted about devising treatment plans they would not consider for patients with more economic stability (Henry, Lichtman, Hanlon & Keene, n.d; Bernheim, Ross, Krumholz & Bradley, 2008). Even when providers conscientiously create a treatment plan that is patient-centered and responsive to a patient's housing challenges, goals for treatment outcomes are typically not as aggressive.

More research is needed to understand how both providers and patients navigate the well-established challenges to diabetes management that result from unstable housing. Responding to this gap, we draw on semi-structured interview data, collected from both patients and providers to understand the ways they strategically navigate the challenges posed by unstable housing.

Methods

Data for this analysis came from two qualitative studies, both approved by Yale University's Institutional Review Board. The first study (Study A) consisted of qualitative interviews with people who have type 2 diabetes and who resided in or qualified for subsidized housing. All participants lived in New Haven, Connecticut. Interviews were conducted to better understand how patients manage their diabetes in the context of housing instability. For the purposes of this paper, these study participants will be referred to as "patient participants."

The second study (Study B) consisted of qualitative interviews with primary care clinicians practicing in Connecticut. The purpose of the interviews was to investigate how these

clinicians understood and responded to housing challenges faced by their patients with type 2 diabetes. For the purposes of this paper, these study participants will be referred to as “provider participants.”

Data Collection

To be eligible for Study A, participants needed to be over 24 years old, diagnosed with type 2 diabetes, and meet the income criteria for subsidized housing. Patient participants were recruited through flyers posted at public libraries, the housing authority, bus stops, social service offices, and community-based organizations. A total of 40 participants were recruited. Semi-structured interviews using open-ended questions were conducted between July 2016 and January 2017, which focused on participants’ experiences with diabetes management, including challenges, resources, and strategies.

To be eligible for Study B, provider participants needed to be practicing primary care clinicians in Connecticut. Provider participants were recruited through emails to listservs of New Haven clinicians and medical residents. Seven participants were also recruited through snowball sampling, meaning they were referred by people who had already been interviewed. A total of 18 participants were recruited and interviewed between May and October 2017. Interviews were semi-structured and based on an interview guide which consisted of open-ended questions. Provider participants were asked about the ways that housing affects the care they provide for people with type 2 diabetes and how they attempted to navigate their patients’ housing needs.

Sample Characteristics

At the time of the interviews, half of the participants for Study A (see Table 1) lived in subsidized housing, 6 were homeless, and all participants took either oral or injectable medications for their diabetes.

Of the 18 participants in Study B (see Table 2), three were advanced practice registered nurses (APRNs), seven were attending physicians and six were internal medicine physician residents. Provider participants worked in a variety of primary care settings including the Veteran Affairs Connecticut Healthcare System, community health clinics, and academic practice.

Qualitative analysis

Coding and analysis for both sets of interviews were conducted independently, before they were analyzed together. The first author read through all of the interviews from both studies, taking notes and identifying themes. Using an open coding process, the first author identified subthemes related to navigating the challenge of managing type 2 diabetes with housing instability for Studies A and B. The list of open codes was reviewed and edited with the second and third author, who were involved with the collection of the original data from both studies. Once both codebooks were finalized, the first author coded all transcripts using Dedoose coding software. After coding was completed using distinct codebooks, results from patient and provider interviews were compared.

Findings

The sections below describe the ways that providers and patients navigated the challenges of managing type 2 diabetes in the context of unstable housing. Providers addressed these challenges by individualizing care, reducing the risk of acute complications that can be particularly dangerous for this population, and going above and beyond for their patients. Patients addressed these challenges by building strategic alliances and by creating structure.

These strategies are illustrative of the ingenuity and effort that is required to manage type 2 diabetes in the context of housing instability, as well as the insurmountable challenges housing often poses.

Providers

Meeting Patients Where They Are: Providers addressed the challenges of managing type 2 diabetes in the context of homelessness and unstable housing by meeting patients where they were and individualizing care. The consequence of tailoring their treatment plans to better accommodate the lives of their patients was that providers sometimes lowered their expectations for the quality of care patients received. Due to the challenges posed by their patients' housing, providers opted for less ideal treatments and outcomes because they were more realistic for the patients. Ashley, a resident physician, described an encounter with a patient when she had to completely disregard a carefully thought-out treatment plan at the end of the visit because her patient said it wasn't "practical" for him: he was preoccupied with finding housing. This patient told Ashley that, "*...you can tell me to take my Metformin or my insulin but if I don't have a roof over my head, I'm not thinking about my insulin...*". In this example, Ashley had to feel comfortable disregarding her plan, accepting worse glycemic control for the patient, and shifting the priority to housing access.

Several providers spoke of individualizing the goals of treatment by increasing the target hemoglobin A1c for these patients, thereby accepting worse glycemic control and an increased risk of coronary artery disease, stroke, kidney disease, and much more. For example, Octavia, an attending physician, described changing the goal for a patient's Hemoglobin A1c to 9¹ while he

¹ According to the ADA, the target Hemoglobin A1c for most people who have type 2 diabetes should be 7.0, and according to the American Association of Clinical Endocrinologists/American

was unstably housed because of the inconsistent nature of his life and access to food. Octavia recounted that, “...*there were times where he’d run out of money and he would eat butter.*” Under these circumstances, she felt like it was impossible to appropriately and safely titrate the patient’s insulin, like she was “...*throwing drops of water at a wildfire...*”. She felt like she had no choice but to settle for lesser medications and a less ambitious Hemoglobin A1c goal for the patient.

Another way providers individualized their care was by foregoing insulin and other injectable medications. Ashley described the decision to stop prescribing insulin to a patient with uncontrolled diabetes and to start prescribing oral medications because the patient didn’t have a refrigerator for storing the insulin. She made this decision even though she believed,

...insulin is really the best option for high insulin resistance, it’s hard to control it with oral medications alone and when you can’t use insulin as a therapy, tool for therapy, it really limits the ability to keep the diabetes under control.

In these circumstances, Ashley felt that a less effective tool would have a more positive impact.

Abby, an attending physician, similarly decided not to prescribe insulin and other injectable medications to people experiencing housing instability, because these medications are not easily “portable.” She prescribed oral medications even when she thought insulin or injectable medications were more appropriate because they are, “...*even more tasking if someone doesn’t have a stable place and a stable ability to eat regularly so it influences that a lot.*” She also prescribed medicine that is administered less frequently, even if there were better options

College of Endocrinology, that number should be ≤ 6.5 for most people (ADA, 2018, p. S55; Garber, 2018).

available, to make the regimen more realistic for patients. In these situations, she said “*we’re actually like limited in your ability to really provide ‘em with the best care...*”. Abby acknowledged that the best care she could provide this patient would not be as good as the care for someone who wasn’t homeless.

Providers also discussed individualizing care when it came to therapeutic lifestyle management, which the ADA considers a “fundamental aspects of diabetes care” (ADA,p. S38). A.J., a resident physician, provided an example of a patient who was not able to cook for himself because he lived permanently in a hotel, limiting his ability to consume healthy foods. He explained,

he has no fridge. He has no stove. He has nothing, so he eats out. So, then we just say okay, we’re going to treat his diabetes with meds and insulin. We have to, because he’s not – we’re never going to bring this under control with diet.

Even though lifestyle interventions, such as modifying diet and exercise, are considered a cornerstone of managing type 2 diabetes, A.J. made the decision to disregard these interventions altogether. The natural consequence of disregarding these interventions is to prescribe more medications in order to achieve the same glycemic control. Additional medications may not provide the sustainable benefits of lifestyle interventions and expose patients to additional side effects.

However, there are providers who urged caution when changing the goals and plan of care for patients with type 2 diabetes who are unstably housed. For example, Kyle, an attending physician, was uncomfortable with the idea of accepting “*a lesser standard of care*” for people experiencing housing issues and insisted providers should seek to, “*...provide the best care possible for everyone in every situation.*” In addition, Kyle warned against assuming that a

patient can't handle certain treatment options because they are experiencing housing instability.

He remarked that he doesn't want

...to get into a trap of being like, "Oh, this person's marginally housed, I don't expect him to take his medications." You still want to be able to demand or sort of work together with your patients to try to find a situation that works best for them...

Risk Reduction: To individualize care, providers had to consider the unique risks posed by housing instability. Specifically, providers strategically helped their patients navigate the challenges of having type 2 diabetes while unstably housed by focusing on reducing the risk of hypoglycemia and hyperglycemia. All medical care for people with type 2 diabetes must balance the need to lower blood glucose levels to prevent acute and chronic consequences of hyperglycemia with avoiding the dangers of acute hypoglycemia. However, provider participants described the increased stakes of devising a treatment plan for patients who may not have the resources to correct high or low blood sugars, which can easily lead to a medical emergency.

Preventing hypoglycemia, a potentially fatal complication of diabetes management, was on the forefront of many providers participants' minds. As Angie, an APRN, said: "*... I think probably like the more acute scenarios are the ones that concerned me the most and it was usually around – centered around – hypoglycemia.*" As previously mentioned, providers reduced this risk by accepting poorer glycemic control. At times, they also used medications that would have a less immediate impact on blood glucose because these patients wouldn't be able to easily treat a hypoglycemic episode due to lack of access to food. Abby described this decision when she explained that, "*it might impact what medications I give them if they're not able to reliably find their next meal, just because the risk of side effects...*"

Provider participants also reduced the risk of hypoglycemia by helping their patients navigate food access barriers. brainstorming with their patients about food access. Angie tried to consider how her patients' eating schedules would be affected when they relied on food banks or soup kitchens. In her experience, these patients had semi-reliable access to a substantial lunch provided by the soup kitchen, but breakfast and dinner were less consistently consumed. She tried to,

...work with them around arrangements for those other meals so you know because I really didn't want them to go and especially if they're on medications for their blood sugar..." She does this by, *"...trying to come up with snacks that it didn't really that they could either carry or just purchase at a one-time that also weren't expensive..."*

Based on her knowledge of local resources, like food banks, Angie strategized with patients to find a way to maintain safe blood sugar levels.

Providers had to strike a delicate balance by devising a care plan that minimized the risk of hypoglycemia without causing extreme hyperglycemia that can lead to deadly metabolic complications. James, an attending physician, summed up the process of contending with this dilemma:

So, we don't want him becoming hypoglycemic and passing out and we don't want him becoming super hyperglycemic that he develops either DKA or HHS.² But as long as he's like in the 2 to 400 range, he's not going to get super sick, hopefully... We can accept higher than what our target goal would be while he's getting stably housed. Once he's

² Diabetic Ketoacidosis (DKA) and hyperosmolar hyperglycemic state (HHS) are potentially fatal metabolic states caused by hyperglycemia.

housed, then it's on us to try to really wrap around and get those numbers better to prevent the long-term sequelae of diabetes.

James accepted this patient's hyperglycemia because he assumed that the housing instability would be temporary and that they could create a more aggressive treatment plan soon thereafter. However, James's plan does not account for a patient who is chronically homeless; his risk calculation changes when there is no foreseeable end to the housing instability.

Above and Beyond: The final way providers helped their patients navigate unstable housing and homelessness was by providing resources and care outside the bounds of typical practice. One way in which they go above and beyond is by using their networks to help patients access community resources. For example, Angie described cultivating a relationship with a local food bank so that when she called on behalf of a patient, they would give her patient a short-term emergency supply of food "no questions asked." Angie also described building a relationship with a soup kitchen in which, she can reach out to them, on behalf of a homeless patient, explaining that "*...They have no food, they're hypoglycemic, like, they're not eating, we need – they need – food and they would actually help, help that person, too, and give them a little extra stock of it.*" By cultivating a relationship with the soup kitchen, Angie was able to help patients access food that they would otherwise not be able to access.

Provider participants also helped patients address the social obstacles that can inhibit proper management of diabetes by giving them additional access to their time and office. Tyrell, an attending physician, described how he saw a patient more frequently than indicated in protocols because office visits gave the patient much needed structure and support. He asserted that, "*for that gentleman, we were that source of support structure. Like, knowing that he was going to have to come back and that we cared about him was something that kept him going.*"

Tyrell was not merely acting as the patient's medical provider, but also as a social support and network.

Some providers also described engaging in advocacy to help their patients obtain resources. For example, Rachel, a resident physician explained,

...of course our role is to kind of focus on the medical aspect of things, but the social aspect of things is so closely linked to it that it's our responsibility to kinda take part in that piece as well, to kinda make things better.

For Rachel, this kind of advocacy was part an obligation as a physician. She felt that her job was not limited to addressing patient's medical needs.

Patients

To manage type 2 diabetes while unstably housed, patients made strategic use of their resources by building alliances and creating structure in the midst of their chaotic lives.

Alliances: One way patients navigated their challenging circumstances was by identifying and drawing on relationships with people who could help them take better care of their diabetes. A few patients explained that building relationships with pharmacists in particular helped them access their medications more consistently. Garret described a time when he built a relationship with his local pharmacy, and they stored his insulin for him so that he could pick up one insulin pen at a time instead of the whole box. Without a refrigerator for the extra insulin, he would have wasted a large quantity every month.

As another example, Henry (age 71) who lived in subsidized housing, was on a fixed income and, on occasion, ran out of money by the end of the month. Since he had a good relationship with his pharmacist, a relationship that he worked to develop over 10 years, his pharmacist gave him the insulin ahead of time or lent him the funds to pay for it when he ran out

of money. Henry explained that he, “...*can go on the 29th and get my supply due to the fact that I have a good relationship with the pharmacy. Everybody don't have that same relationship. So that's how that is.*” He realized that his situation was unique; without this relationship, Henry wouldn't have reliable access to insulin.

Finding the right, sympathetic person was also helpful when it came to accessing diabetes friendly foods that were often costly and beyond participants' budgets. For example, when Viola (age 74) saw that a small grocery store was opening up in the neighborhood where she rents an apartment, she took the proactive step of introducing herself to the proprietors, “*even before they stocked the store...*”. Like Henry, she was on a fixed income and often ran out of money to buy food by the end of the month. After developing this relationship, she was able to buy food that helped her manage his diabetes at the store on credit and pay them back when she gets her monthly check.

At times, alliances offered access to resources in unexpected ways. Darnell (age 56) befriended a man volunteering at a homeless shelter where he lived and, for over 13 years, has traveled to his house every weekend to do odd jobs. Darnell was paid in cash and has identified this man as someone who would lend him money if he needed help paying for housing. Not only does this relationship provide Darnell with a modicum of financial security, but it also gave him a sense of social inclusion. Darnell asserted that, “*His whole family love me. His mother-in-law, his wife's mother and father, his sisters. The whole family, they love me. I'm just like a new child in the family.*” By developing a relationship with a shelter volunteer all those years ago, he has been able to weave a safety net for himself.

Alliances were not only made with strangers; patients also drew on relationships with family members so that they could better manage their diabetes. After Paul (age 39), who was

experiencing homelessness at the time of the interview, and his sister repaired their strained relationship, he was able to start storing his medications at his sister's house. Before he was able to keep his medication with her, he had to keep his medication at the shelter where he stayed, and was constantly worried about theft. Although Paul did not explicitly mention that he attempted to strategically rebuild his relationship with his sister because he needed a place to store his medication, he did say that the renewal of this relationship has allowed him to better manage his diabetes.

However, patients also described the inherent vulnerability of relying on the kindness of others for access to needed resources. Joe (age 60) who has been homeless and lived in supportive housing at the time of the interview, had a friend who promised to lend him money if he ever ran out of food. When he actually asked for help, though, his friend did not follow through. Joe recounted,

So I ain't got the money from this guy yet. It's been a week and a day. If I was waiting on him I'd starve to death already... So why front and tell me about how you're going to help me out...Man, you got a job. I don't like to ask people for money. But you told me to come to you and you would be dependable. And I come to you and this is what you tell me?

Structure: Another way in which patients strategically navigated these challenges was by creating structure amidst the chaos caused by unstable housing. Justice (age 47) who had experienced homelessness, described this chaotic state, and the challenge of not having structure, when he explained that,

...when you're homeless, you don't have structure. You basically, your structure is random. You gotta pick and choose your battles, pick and choose your associations with people. Sometimes you just neglect the medication.

One method identified by the patients was to create physical structure and security by figuring out how to store their belongings and their medication. Mike (age 60) who was living in a transitional shelter at the time of his interview, described the need for creativity when it came to finding storage while homeless. Mike kept his pills in his truck because he had issues storing it at homeless shelters. At first, Mike followed shelter protocol and gave the staff his medications to store while he was staying there. Mike tried to keep the medication at the shelter because if he left his medication in his truck, he risked losing his bed every time he left the shelter to take them. However, he decided that leaving the medication with shelter staff was untenable after they lost his medication and when he grew frustrated with asking for access to his medication every time he needed them. This was a problem for Mike because, “...*after I eat, I ain’t got my pills – I’ve got to go get them from him. It causes a little difficulty.*” As a result of these experiences, he decided to keep all the pills he needed for the day on him, in his sock, and went to his truck to restock every day.

Myron (age 47) also felt like he couldn’t keep his medication in a homeless shelter for fear that they would get stolen. Although Myron was living in subsidized housing at the time of the interview, he had previously been homeless for many years. He spent a good portion of his limited funds on a storage unit where he kept all of his belongings and medications. He kept a spare change of clothing in his car, but traveled to his storage unit daily to change and fill up his pill box. On a smaller scale, Myron also created structure for himself by devising a method for storing his medications. He explained:

I’ve got the two pill boxes. There’s one for day and one for night. I’ve got them in a plastic baggie. Once I fill those two up, if I take my morning meds, I leave the morning

one out of the bag. When I take it at night, I put it back in the bag. That way if it's out of the bag like it is now that means I took it.

This method helped him remember to take his medication in the context of a chaotic living situation, and ensured he took the proper dose.

The patients also sought to create structure in less concrete ways that provided emotional and psychological order. Samson (age 54) described intentionally creating a safe space while living in a San Francisco shelter. There, he woke up early and traveled to a neighborhood where he felt more comfortable taking medication. Getting out of the shelter to take his medication made Samson feel, “...*proactive. I made it happen, to be able to do that. I didn't depend on their clocks. I didn't depend on any of that.*” He chose the location, a park in the business district, because it was clean, it had fresh air, and, “*just being around people that are elevated in their positions in life, and being around people that are productive and prosperous and clean. Y'know, iron sharpens iron. And those are great motivating factors and encouraging factors.*” Building structure with a regimented schedule and by finding opportunities to curate his physical environment, gave Samson a sense of control and motivation to manage his type 2 diabetes.

Discussion

Our findings suggest that patients and providers strategically navigate the challenges that unstable housing poses for diabetes management in a number of distinct and similar ways. Providers navigated these challenges by individualizing the care they provided, reducing the risk of hyperglycemia and hypoglycemia, and by helping patients in ways that are outside the bounds of typical practice. Patients navigated these changes by building strategic alliances with people who have valuable resources and by creating structure in the midst of their chaotic lives.

The strategies that patients and providers use typically involve tradeoffs. Providers contended with a tradeoff between reducing the risk of acute hypoglycemic emergencies with the long-term consequences of hyperglycemia when developing a treatment plan or identifying goals of care. To create a treatment plan that was realistic and safe, they consistently selected second or third line medicine and lowered their expectations for glycemic control. Patients traded valuable time and resources to manage their diabetes, and often went to great lengths to control their blood sugars. There may be unknown costs associated with expending these resources on diabetes management.

The strategies were also tenuous and fragile. Provider solutions depended on individual clinicians spending time, energy and resources that they are not usually expected to give, nor separately compensated for. Since this assistance is not typically a part of any formalized process or procedure, it is dependent on a caring provider who is capable of consistently going above and beyond for patients. Without infrastructure, this assistance will not be given if an individual provider is out of work, switching jobs, or becomes unable to help. Patient plans were fragile as well because they were complex and relied on the help of friends, family and medical professionals. There is no safety net to catch patients if a phase of their plan goes awry, or if the person they are relying on is unable to, or chooses not to, help them. Patients may be unable to access the care they need if any part of their tenuous plan fails. Any solution that requires this amount of effort or luck is not sustainable.

These fragile and tenuous solutions mitigated, but did not resolve, the challenges posed by housing instability. In most cases, lack of housing was an insurmountable barrier to good diabetes management. Even when patients and providers partnered with each other to strategically navigate barriers and devise ingenious workarounds, only the rare exceptions were

able to find a solution that worked. Even the most industrious and resourceful patients were asked to take medications that they could not store, or to spend a large portion of each day obtaining those medications. Providers are not set up for success because their care is not equal to the challenges posed by homelessness. The rare solutions identified by patients or providers are specific to a patient's context, based on luck and individual relationships. To improve care, systematic interventions are warranted.

Implications:

Access to Housing: Given the tenuous and time-consuming nature of these solutions, health outcomes will not significantly improve by asking patients and providers to work harder. The most comprehensive way to improve the health outcomes of this population may be to increase access to housing. Our findings align with recent research which confirms that housing is a vital way to improve health, address disparities, and lower health care costs (Koh & Restuccia, 2018). Hospitals are innovating and creating successful housing programs specifically designed to target their most medically complex, homeless patients (Kuehn, 2019). Health systems should continue to invest in affordable housing so they can implement longer-term medical solutions instead of temporary fixes that are ineffective and costly (Sandel & Desmond, 2017).

Realistically these solutions will take years, if not decades, to achieve. In the interim, other options should be explored. In their 2018 guidelines, the ADA reaffirmed their recommendation that treatment plans and goals should be individualized based on a patient's unique medical and social contexts. In these guidelines, housing is briefly mentioned as a factor to be considered and providers are advised to familiarize themselves with community resources so that they or their social worker colleagues can, "...facilitate temporary housing for their patients as a way to improve diabetes care" (ADA, 2018, p. S10). However well intentioned, this

recommendation does not acknowledge the dearth of affordable housing units and transitional housing programs. Depending on the state, there are anywhere from 15 to 61 available and affordable homes for every 100 households at or below the Poverty Guideline (National Low Income Housing Coalition, 2017). While many states have increased the number of emergency shelter beds, almost every state has decreased the number of transitional beds available (National Alliance to End Homelessness, 2017). There are simply not enough housing resources for all the people who need them, which means that providers must figure out the best way to treat these patients in their current context.

Clinical Implications: Providers have a responsibility to attempt to improve diabetes-related health outcomes for homeless and unstably housed patients in the absence of stable housing. To ease the burden on the average clinician, providers should be given tools to address the unique needs of these patients.

To determine the best possible treatments, providers should consider the specific challenges posed by housing instability and homelessness. The National Health Care for the Homeless Council has already identified treatment plans and best practices; the Council has a guide designed to specifically help providers treating people experiencing homelessness who have type 2 diabetes (Kalinowski, Tinker, Wismer & Meinbresse, 2013). Furthermore, in their 2018 article, Brooks, Kalyanaraman & Male explored the utility of newer classes of diabetes medications for homeless populations and urged providers to think more creatively. More research and in-depth guidelines are needed to better support providers and to disseminate this wisdom more effectively.

Providing quality care to this population requires clinical expertise, but it also requires additional time with patients. Creating individualized treatment plans that are truly responsive to

a parent's situation is an in depth process that requires flexibility and attention (Holman, Beasley, Karsh, Stone, Smith, 2015). Primary care providers are currently required to see patients in short periods of time since primary care is typically reimbursed poorly by insurance; care coordination for socially complex patients is not reimbursable either (Young, Burge, Kymar & Wilson, 2017). A larger change to the health system that fairly compensates primary care providers and that allows them to dedicate more time to patients with complex needs will trickle down and improve care.

Clinical Education: Medical professional education is another place where an intervention can improve the care of people with type 2 diabetes who are experiencing housing instability. The National Health Care for the Homeless Council (2013) promotes the “Teaching Health Center” model, in which a health center that serves homeless patients partners with an academic institution. If implemented correctly with proper accreditation, this model relieves some of the clinic's staffing and financial needs, improving sustainability and expanding access to quality care. The health center also provides a learning opportunity for the university's clinical students. Furthermore, students develop specialized skills while learning at the clinic, creating a new generation of providers who are competent at caring for homeless people (National Health Center for the Homeless Council, 2013).

Health professional schools are also creating curricular initiatives aimed at preparing students to meet the needs of homeless patients. Asgary, Naderi, Gaughran & Skell (2016) described a curricular intervention at a medical school that included formal instruction as well as precepted clinical at a shelter or specialized clinic. De la Cruz, Brehm & Harris (2004) found that providing care at a homeless outreach clinic also improved nurse practitioner students' attitudes

towards homeless people. These interventions are effective and point to the importance of students rotating at clinics that serve people experiencing homelessness.

Clinical students are typically taught how to develop plans using first line treatments that may not be accessible to homeless patients. These programs matter because clinical students need to develop specific skills and creativity to provide quality care. Best practices for this population may not follow guidelines and often require creative solution that are imperfect. Therefore, these programs give students the opportunity to nuance their practice and gain understanding of the unique challenges posed by homelessness.

References

- American Diabetes Association. (2018). 1. Improving Care and Promoting Health in Populations: Standards of Medical Care in Diabetes-2018. *Diabetes Care*, 41(Suppl 1), S7.
- American Diabetes Association. (2018). 4. Lifestyle management: standards of medical care in diabetes—2018. *Diabetes Care*, 41(Supplement 1), S38-S50.
- Asgary, R., Naderi, R., Gaughran, M., & Sckell, B. (2016). A collaborative clinical and population-based curriculum for medical students to address primary care needs of the homeless in New York City shelters. *Perspectives on medical education*, 5(3), 154-162.
- Axon, R. N., Gebregziabher, M., Dismuke, C. E., Hunt, K. J., Yeager, D., Santa Ana, E. J., & Egede, L. E. (2016). Differential impact of homelessness on glycemic control in veterans with type 2 diabetes mellitus. *Journal of general internal medicine*, 31(11), 1331-1337.
- Berkowitz, S. A., Kalkhoran, S., Edwards, S. T., Essien, U. R., & Baggett, T. P. (2018). Unstable housing and diabetes-related emergency department visits and hospitalization: a nationally representative study of safety-net clinic patients. *Diabetes care*, dc171812.
- Bernheim, S. M., Ross, J. S., Krumholz, H. M., & Bradley, E. H. (2008). Influence of patients' socioeconomic status on clinical management decisions: a qualitative study. *The Annals of Family Medicine*, 6(1), 53-59.
- Brooks, L. K., Kalyanaraman, N., & Malek, R. (2018). Diabetes Care for Patients Experiencing Homelessness: Beyond Metformin and Sulfonylureas. *Am J Med*. doi:10.1016/j.amjmed.2018.10.033.
- Centers for Disease Control and Prevention. (2017). *National Diabetes Statistics Report*. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Dept of Health and Human Services.
- Cunningham, M., & Batko, S. (2018). *Rapid Re-housing's Role in Responding to Homelessness: What the Evidence Says*. Retrieved from https://www.urban.org/sites/default/files/publication/99153/rapid_re-housings_role_in_responding_to_homelessness_2.pdf.
- De la Cruz, F. A., Brehm, C., Harris, J. (2004). Transformation in family nurse practitioner students' attitudes toward homeless individuals after participation in a homeless outreach clinic. *Journal of the American Academy of Nurse Practitioners*, 16(12), 547-554.
- Elder, N. C., & Tubb, M. R. (2014). Diabetes in homeless persons: barriers and enablers to health as perceived by patients, medical, and social service providers. *Soc Work Public*

Health, 29(3), 220-231.

- Fenelon, A., Mayne, P., Simon, A. E., Rossen, L. M., Helms, V., Lloyd, P., ... & Steffen, B. L. . (2017). Housing assistance programs and adult health in the United States. *American journal of public health*, 107(4), 571-578.
- Garber, A. J., Abrahamson, M. J., Barzilay, J. I., Blonde, L., Bloomgarden, Z. T., Bush, M. A., ... & Garber, J. R. (2018). Consensus statement by the American Association of Clinical Endocrinologists and American College of Endocrinology on the comprehensive type 2 diabetes management algorithm—2018 executive summary. *Endocrine practice*, 24(1), 91-120.
- Holman, G. T., Beasley, J. W., Karsh, B. T., Stone, J. A., Smith, P. D., & Wetterneck, T. B. (2015). The myth of standardized workflow in primary care. *Journal of the American Medical Informatics Association*, 23(1), 29-37.
- Kalinowski, A., Tinker, T., Wismer, B., & Meinbresse, M. (2013). Adapting your practice: Treatment and recommendations for homeless people with diabetes mellitus. *Nashville: Health Care for the Homeless Clinicians' Network*.
- Keene, D. E., Guo, M., & Murillo, S. (2018). “That wasn't really a place to worry about diabetes”: Housing access and diabetes self-management among low-income adults. *Social Science & Medicine*, 197, 71-77.
- Kertesz, S. G., Holt, C. L., Steward, J. L., Jones, R. N., Roth, D. L., Stringfellow, E., . . . Henry, S. R. (2013). Comparing homeless persons' care experiences in tailored versus nontailored primary care programs. *American Journal of Public Health*, 103(S2), S331-S339.
- Kuehn, B. M. (2019). Hospitals Turn to Housing to Help Homeless Patients. *Jama*, 321(9), 822-824.
- Koh, H. K., & Restuccia, R. (2018). Housing as health. *Jama*, 319(1), 12-13.
- Lutfey, K., & Freese, J. (2005). Toward some fundamentals of fundamental causality: Socioeconomic status and health in the routine clinic visit for diabetes. *American Journal of Sociology*, 110(5), 1326-1372.
- National Alliance to End Homelessness. (n.d.). *State of Homelessness*. Retrieved from <https://endhomelessness.org/homelessness-in-america/homelessness-statistics/state-of-homelessness-report-legacy/>
- National Alliance to End Homelessness. (2018). *Racial Disparities in Homelessness in the United States*. Retrieved from <https://endhomelessness.org/resource/racial-disparities-homelessness-united-states/>

- National Health Care for the Homeless Council. (2013). *Teaching Health Centers: A Case Study*. Retrieved from <https://www.nhchc.org/wp-content/uploads/2011/09/NHCHC-Teaching-Health-Center-Case-Study-2013.pdf>
- National Low Income Housing Coalition. (2019). *The Gap: A Shortage of Affordable Homes*. Washington D.C: National Low Income Housing Coalition.
- O'toole, T. P., Buckel, L., Bourgault, C., Blumen, J., Redihan, S. G., Jiang, L., & Friedmann, P. (2010). Applying the chronic care model to homeless veterans: effect of a population approach to primary care on utilization and clinical outcomes. *American journal of public health, 100*(12), 2493-2499.
- Paudyal, V., MacLure, K., Buchanan, C., Wilson, L., Macleod, J., & Stewart, D. (2017). 'When you are homeless, you are not thinking about your medication, but your food, shelter or heat for the night': behavioural determinants of homeless patients' adherence to prescribed medicines. *Public health, 148*, 1-8.
- Randall, L., Begovic, J., Hudson, M., Smiley, D., Peng, L., Pitre, N., . . . Umpierrez, G. (2011). Recurrent diabetic ketoacidosis in inner-city minority patients: behavioral, socioeconomic, and psychosocial factors. *Diabetes care*, DC_110701.
- Sandel, M., & Desmond, M. (2017). Investing in housing for health improves both mission and margin. *Jama, 318*(23), 2291-2292.
- The U.S. Department of Housing and Urban Development. (2017). *The 2017 Annual Homelessness Assessment Report (AHAR) to Congress*. Retrieved from <https://www.hudexchange.info/resources/documents/2017-AHAR-Part-1.pdf>
- White, B. M., Logan, A., & Magwood, G. S. (2016). Access to diabetes care for populations experiencing homelessness: an integrated review. *Current diabetes reports, 16*(11), 112.
- Wilson, M. (2005). Health-promoting behaviors of sheltered homeless women. *Family & Community Health, 28*(1), 51-63.
- Young, R. A., Burge, S., Kumar, K. A., & Wilson, J. (2017). The Full Scope of Family Physicians' Work Is Not Reflected by Current Procedural Terminology Codes. *The Journal of the American Board of Family Medicine, 30*(6), 724-732.

Table 1. Characteristics of interview sample from Study A

Characteristic	Interview Sample (N=40)
Race/ethnicity	
Black and/or African American	25
White and/or Caucasian	7
Hispanic and/or Latino(a)	3
Multiracial and/or Other	5
Age (years)	51.0 (mean)
Gender	
Male	21
Female	19
Receiving Rental Subsidy	
Yes	20
No	20
Currently Homeless	
Yes	6
No	34
Primary Language	
English	38
Spanish	2
Taking Insulin	
Yes	26
No	14
Insurance Type	
Medicaid	26
Medicare	5
Dual Medicaid/Medicare	5
No insurance	2
Private insurance	2
Primary Income Sources	
Employment	6
Spouse or family member	3
Disability benefits	19
Other state benefits	12

Table 2. Characteristics of interview sample from Study B

Characteristic	Interview Sample (N=18)
Gender	
Male	8
Female	10
Profession	
Attending physician	9
Resident physician	6
Advanced practice registered nurse (APRN)	3