

# Patients' Experiences with Refilling their HIV Medicines: Facilitators and Barriers to On-Time Refills

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## ABSTRACT

**Background:** Adherence to antiretroviral therapy (ART) is particularly important for patients with HIV. Prior research on ART adherence has focused primarily on behavioral interventions targeting patients and providers. No study has focused on the pharmacy refill experience as a potential target for improving adherence to HIV medicines. Informed by patients' experiences, this study aimed to assess patients' experiences with refilling their HIV medicines and to explore facilitators and barriers to refilling medicines on time.

**Methods:** We interviewed patients at three time points during their first year of care at an HIV clinic in Houston, TX. We analyzed interviews using directed and conventional content analysis.

**Results:** Analyses revealed individual, interpersonal, and system-level barriers that affect patients' ability to pick up their HIV medicines on time. Many patients perceived the refill process as being difficult. For some patients, picking up their HIV medicines each month triggered anxiety. Positive interactions with pharmacists and pharmacy staff, as well as clear and consistent messaging, played a key role in augmenting patients' refill experience. Self-efficacy, social support, and workarounds to resolve issues were also key facilitators. Many patients said changing ART-dispensing protocols from 30- to 90-day refills could mitigate the anxiety experienced with picking up HIV medicines and decrease opportunities for missing a refill.

**Conclusion:** Offering 90-day refills for HIV medicines may decrease anxiety concerning missed doses and improve medication adherence. Providing pharmacy staff with communication skills training is another strategy that may improve the patients' refill experience.

## INTRODUCTION

Adherence to antiretroviral therapy (ART) is critical to optimizing outcomes in HIV infection. Patients who take their ART as prescribed are more likely to achieve viral suppression, stay out of the hospital, and live longer.<sup>1-3</sup> Prior research on ART adherence has focused primarily on behavioral interventions targeting patients (eg, use of pill boxes and alarms) and providers (eg, communication skills training, adherence counseling).<sup>4</sup> Few studies have focused on the pharmacy refill experience as a potential target for improving adherence to HIV medicines.

Pharmacists and pharmacy staff have frequent contact with patients and are well positioned to play a key role in improving adherence to medicines.<sup>5,6</sup> Studies in other chronic

diseases show the important role of clinical pharmacists in educating patients about their medicines and working closely with health care providers to monitor and identify problems.<sup>4, 7-10</sup> Chrisholm et al showed that a pharmacy intervention to provide counseling and clear instructions to patients improved adherence to immunosuppressive medications in renal transplant patients.<sup>7</sup> Patients with HIV infection are a particularly vulnerable population, and, given their experiences with stigma, pharmacists and the pharmacy itself may play an even more important role in providing a safe place to refill medicines and ensuring a positive patient experience.

Beyond positive interactions with pharmacists and pharmacy staff, studies in other chronic conditions indicate that changing pharmacy dispensing protocols can affect adherence. These findings have proven true across a wide variety of medical conditions, including diabetes, hypertension, hyperlipidemia, and coronary artery diseases.<sup>11,12</sup> Specifically, they indicate that patients given a 90-day supply are significantly more likely to have a higher proportion of prescriptions filled than those given a 30-day supply.<sup>11,13</sup> With a 90-day supply, patients have fewer opportunities to miss a refill. This likely contributes to better adherence. Khandewal et al. showed that adherence rates in patients who filled 90-day prescriptions remained high, whether or not they filled their prescriptions through a retail pharmacy or via mail order.<sup>14</sup> Beyond pharmacy-dispensing outcomes, studies indicate that 90-day supplies can result in improved health outcomes. For example, a landmark study shows that women given a 90-day supply of oral contraceptives had significantly less unplanned pregnancies and abortions. In fact, the 2013 CDC guidelines on oral contraceptives recommend dispensing a 90-day supply to all women.<sup>15</sup>

In HIV care, medication adherence is particularly important because nonadherence has serious consequences.

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In contrast to other chronic conditions, nonadherence in patients with HIV infection can result in resistance to an entire class of medication.<sup>16</sup> A large body of literature on barriers and facilitators of adherence to ART point to transportation, lack of knowledge, difficulty with motivation/self-efficacy, lack of social support, depression/anxiety, and stigma as barriers to on-time medication refills.<sup>4,17,18</sup> Beyond individual factors, studies show the importance of the health care team and positive patient care experiences in optimizing adherence.<sup>19-21</sup> Herein, we explore the pharmacy refill experience as a potential target for improving adherence to HIV medicines. Although much of the literature on pharmacy-based interventions in HIV has focused on pharmacist-directed patient education and adherence counseling, this study is unique in focusing on the patient's pharmacy refill experience.<sup>22,23</sup> Such data can contribute to the literature and provide a nuanced understanding on how patients' experiences refilling their medication can affect adherence. Informed by patients' experiences, this study assesses patients' experiences with refilling their HIV medicines and explores facilitators and barriers to refilling medicines on time. It also identifies what patients see as critical elements to a positive pharmacy refill experience.

## METHODS

This study was part of a larger study to understand how new patients experience and evaluate their overall HIV care.<sup>24</sup> We recruited new patients from August 2014 to November 2014 at Thomas Street Health Center (TSHC) in Houston, TX. We then followed participants over their first year of care at TSHC (Table 1).

### Study Population

Informed consent was obtained from all participants. Eligible patients were older than 18 years of age, had been diagnosed with HIV infection, and had not completed their first visit with the HIV clinic. Exclusion criteria included those who were mentally unable to complete interviews or give informed consent, non-English speaking, or incarcerated. A research coordinator approached consecutive patients new to the clinic and enrolled them prior to their first visit with the HIV provider.

### Setting

Harris Health System is a safety net health system that provides health care for poor and uninsured residents of Harris County, TX. It operates TSHC, an urban, community-based HIV clinic serving about 6000 patients with HIV infection yearly. The pharmacy is located on the first floor of the clinic. Five pharmacists and six technicians work in the clinic pharmacy. Each month, the pharmacy processes approximately 7000 to 8000 prescriptions. Approximately 30% of

**Table 1. Baseline characteristics of participants (N = 35) at Thomas Street Health Center in Houston, Texas**

Characteristics	Value
Age, y (mean SD)	39±12
Gender, n (%)	
Male	25 (71)
Female	10 (29)
Race ethnicity, n (%)	
Non-Hispanic black	23 (65)
Hispanic	10 (29)
Non-Hispanic white	2 (6)
Education, n (%)	
Some high school or less	9 (26)
High school graduate or equivalent	11 (31)
Some college or higher	15 (43)
Income, per year, n (%)	
≤ \$10,000	19 (54)
> \$10,000 and ≤ \$30,000	13 (37)
> \$30,000	3 (9)
HIV risk factor, n (%)	
Injection drug use	3 (9)
Male/male sex, no injection drug use	14 (40)
Heterosexual sex, no injection drug use	18 (51)
Time from HIV diagnosis, n (%)	
≤ 3 mo	8 (23)
3 mo-1 yr	4 (11)
1-5 yr	10 (29)
5-10 yr	6 (17)
> 10 yr	7 (20)
CD4 cell count > 200 cells/mm <sup>3</sup>	24 (69)
HIV RNA < 20 copies/mL – (%)	11 (31%)

patients use the Texas AIDS Drug Assistance Program (ADAP), funded by the Ryan White HIV/AIDS program, to receive their medications; 30% use Medicare/Medicaid; and 40% use private insurance. The pharmacy provides adherence counseling on all new prescriptions, and patients can request counseling on refills. When questions about dosing or drug-drug interactions arise, pharmacy staff are able to send messages or directly call providers in the clinic. At the time of the study, the pharmacy used Epic Willow software.

### Development and pre-testing of the interview guide

We developed an interview guide based on our prior work and a review of the literature. We pilot-tested the guide with 15 patients at TSHC to ensure that questions and prompts were easy to understand and elicited relevant data. We conducted cognitive interviews using the Think Aloud method.<sup>25</sup> Think Aloud is a cognitive interviewing method that asks the participant to tell the interviewer what goes through his or her mind when given an interview question

**Table 2. Key interview questions**

Now let's talk about all the other pieces of the HIV clinic visit you had today/on <date>, everything except the time spent with doctor. How do you feel about the pharmacy?
Tell me about the last time you refilled your HIV medicines. Walk me through the steps of refilling your HIV medicines.
How often do you refill your HIV medicines?
How do you feel about refilling your HIV medicines every ____ days?
Have you missed any HIV medicine because you had trouble refilling them on time?

(eg, "Tell me what you think when you hear this sentence"). This ensures comprehension of the question as intended by the researcher. Participants in the pre-testing phase received \$20. Revisions to content and wording were made prior to the main study (Table 2).

### Main Study

We interviewed patients three times over their first year of HIV care. The first interview occurred prior to the patient's initial visit with the HIV provider (T1). We aimed to understand expectations about the pharmacy. We anticipated longitudinal dropout by increasing the number of interviews by 25% at the first time point. The second interview occurred 2 weeks after the initial visit with the HIV provider (T2). We aimed to see what their early experiences with the pharmacy were like. The third interview occurred 6 to 12 months after the initial visit with the HIV provider (T3). We aimed to see how their experiences evolved and if they were able to solve any barriers they encountered. Interviews took place in private rooms at TSHC. Interviews were audio-recorded and professionally transcribed verbatim. Participants received \$10 for completion of the first interview, \$15 for the second interview, and \$25 for the third interview. Recruitment and interviewing continued until we reached data saturation (ie, no new themes emerged).

The Institutional Review Board at Baylor College of Medicine approved this study. All participants gave written informed consent. All names in the text are pseudonyms to protect patient confidentiality.

### Data Analysis

The research team consisted of two HIV primary care physicians and health services researchers (BND and TPG), a PhD-level behavioral scientist with expertise in behavioral health promotion and intervention mapping (CM), and two Masters-level public health professionals (SNM and SRJ). BND, CM, SNM, and SRJ have formal training in qualitative methods.

The principal investigator (BND) developed a list of themes patients identified as important to their care

experience based on her prior work, a literature review, and notes taken during and shortly after each interview.<sup>24,26</sup> ATLAS.ti software was used to evaluate interview data via conventional and directed content analysis.<sup>27</sup> BND and SN listened to each interview and identified quotes related to themes, including those related to the pharmacy, refills, anxiety, and treatment factors. BND and SN wrote memos regarding emerging themes related to patients' experiences refilling their HIV medicines and noted memorable quotes.

SRJ then consolidated all quotes into a query report. SRJ summarized the data using 2 methods. She first created a matrix grouping quotes from each patient according to the different time points (ie, T1, T2, and T3) to understand the overall pharmacy experience for all patients at each time point. She then created another matrix displaying the quotes in chronologic order for each patient to understand how each patient's story changed over time.<sup>28</sup> SRJ reviewed these structured matrices and, through an iterative process, identified emergent themes of different things patients said they experienced at the pharmacy and facilitators and barriers to refilling medicines on time. SRJ and BND met frequently to discuss the emergent themes and to develop the conceptual model within the context of the patient's overall HIV care experience.

### RESULTS

Thirty-five patients from TSHC participated in this study. The mean age was 39 years, and most patients were male (71%). More than half of the participants were non-Hispanic black (n = 23), 29% were Hispanic (n = 10), and 6% were non-Hispanic white (n = 2). A total of 23% were diagnosed with HIV within the last 3 months, and 26% had a CD4 cell count less than 200. Less than a quarter (20%) were diagnosed with HIV infection for greater than 10 years. Less than half (31%) had an undetectable HIV viral load (< 20 copies) at entry to the clinic. All completed the first interview, 28 (80%) completed the second interview, and 17 (49%) completed the third interview. Interviews averaged 60 minutes each.

#### Individual Barriers to Refilling HIV Medicines on Time

Our analyses of the patients' pharmacy refill experiences revealed individual factors that influence their ability to refill medication on time. Individual factors affecting patients' experience when refilling their medication include transportation, conflicts with work schedule, travel time, and cognitive barriers.

#### Transportation

Many patients expressed that lack of transportation was a major barrier to refilling HIV medication on time. Lee

described the hassle of having to navigate getting to the clinic without his own transportation:

*And like I was telling you before, the place that used to pick me up and bring me here doesn't do that anymore. And I'm taking a big risk using my job's car to come here and then I have to come here two times [to drop off prescription and pick up the medicine] instead of just the one.*

#### Conflicts with Work Schedule

Some patients do not have flexible work schedules that allow them to pick their medication up during pharmacy operating hours (ie, Monday through Friday). Navigating a demanding work schedule and finding time to refill medication is difficult, but, ultimately, patients would do their best to pick up their medication on time. Jean shared:

*I just take that day off but my job uh put points against you when you don't come to work. So if I get over 10 points or something they'll write me up you know. Then if I get over 12 points then they then they suspend me for 2 days. But I don't miss work so for a miss for a point against me to come to see about my health; I don't mind.*

#### Travel Time

Patients shared that travel time could deter them from frequently visiting the pharmacy to pick medication up. Sam said:

*It's too far out to come for doctor visits or to pick up medicine. Umhm well now it's an hour because we have so much construction. Usually it's like maybe 30 to 45 minutes but since it's so much construction it takes about an hour, hour and 15 minutes to get here.*

#### Cognitive

*Having to call in a refill (as opposed to automatic refills) also posed a threat to on-time medication refills. Patients reported their struggles with monitoring when it was time to refill their HIV medications. Casey said: Well it's kind of a hassle because if you don't pay attention to how many pills are left you get screwed. You know you either have to skip a couple of days without medication because they will not provide you with any medication.*

#### Anxiety and Stigma

*For some patients, picking up their HIV medicines each month triggers anxiety. Rob described his first time visiting the pharmacy: When I said uh shook up; I was scared. I didn't know what was going to happen. I didn't know what was going on within the pharmacy and once- once I uh- once I talked to the- just like I said earlier; once I talked to the lady downstairs and she explained to me what was going on then I felt at ease. But when you first walk through that door you don't know what's going on; you're shook up.*

Patients also talked about the fear of being recognized at the clinic pharmacy and dealing with the stigma associated with HIV. Both dispositions exemplify the deeply

rooted anxiety experienced with picking up their HIV medicines.

### Systems-level Barriers to Refilling Medication on Time

#### Refill Process

*Our analyses revealed system-level barriers that make it hard to refill HIV medicines. Many patients perceive the refill process as being difficult or frustrating. These difficulties generate negative emotions and increase the risk of not refilling HIV medicines on time, which can lead to missed doses. Blake said: So that's frustrating too. Because then to get my meds, my HIV meds filled I have to come in at least twice; one to tell them I need it filled and then to get it filled. And then half the time they don't have it filled or I'll come in and they'll tell me, "We sent it back; you need to come in another day." So usually it takes about 3 or 4 [days].*

While sharing her opinion on medication refills, Jordan shared how increasing the dispensing interval to 90-day supply would alleviate some of her frustration.

*I might actually ask my doctor if I can have him do it like every 90 days or something instead ..... I just- I'm so sick of coming in here three times to get it filled.*

### Interpersonal Barriers to Refilling Medication on Time

#### Lack of Helpfulness of the Pharmacy Staff

*The clinic pharmacy plays an integral role in helping patients navigate the refill process and addressing their frustrations. Lack of information or unclear directions from the pharmacy staff can lead to missed doses of medication. Taylor said: I missed a day one time... So they told me my meds the one time that I came in early and then they didn't have them on time and I had to- I would've gone a week without them. And they were like, "Okay you can come back in Tuesday." And they didn't listen to like the time of day that I take them; I told them I needed six [pills] not five because I take it at night and I needed one for that day still. And so they still only gave me five. Like, they just don't listen... Like most of them just like they're very frustrating.*

### Facilitators of Refilling Medication on Time

#### Ways Patients Coped with Negative Experiences

Patients had different ways of coping with negative experiences regarding refilling their ART medications. Patients who were able to overcome barriers in refilling their medications reported positive experiences at subsequent interviews. Our analyses of longitudinal data revealed several patient-level factors that affect their refill experience.

Key factors include 1) self-efficacy, 2) social support, and 3) workarounds. Each factor is detailed below.

**Self-Efficacy** During the first interview, Chris talked about his indifference toward following up with the clinic about his eligibility for subsidized care.

*Yeah, I didn't hear back. You know as soon as my mama, my mother said that she heard back, and she said they approved them right then and there, I was like well, I have things to do, so I'm not going to sit and wait.*

A year later, after talking with his mother, he decided to take his health more seriously and reapply for eligibility so he could begin receiving HIV treatment. He now felt empowered to take responsibility for his health and knew it was something he was capable of.

*I feel confident that I can call in and make an appointment. Very confident. I've always been that person. When there's a will, there's a way. If I can make a way, I'm going to make a way, and there are numerous ways.*

During his second interview, he reflected on how his mindset toward his health had changed.

*The first time I was supposed to come here for a screening [nurse intake], I did not come. Partially, I was nervous, scared, just wanted to act like I didn't know what I just found out... I knew I was supposed to go. I had time to go. It was at 11:00. I'm up at 6 am every morning. I could have easily gotten dressed, came here, did the screen, and everything. I just did not do it... like I said last time I'm coming back here to see you, if I make an appointment with somebody, I like to keep the appointment.*

This new sense of self efficacy carried over into him coping with the anxiety of visiting the pharmacy and picking up his medications.

*It's just that last step of going to the pharmacy and getting the medicine was just like okay, you know what, I can do this.*

During his third interview, his self-efficacy was more evident than ever.

*As far as involvement, it's you doing your part. It's you taking your meds. Can't nobody. You're grown. Everyone that's come into this clinic that I've seen so far is grown. They're all adults. You do what you're supposed to do. You can take it, or you cannot take it. You can decide if you want to live or not to live. Me personally, I want to live, so I'm going to do my part and take my medicine, keep my appointments, you know.*

Visiting the pharmacy to pick up his medication became a part of his routine, and he became more familiar with the system, making his medication pickups even easier.

*Like for the medicine at first I had to like come up here and sit and wait because I couldn't call it in. But now I call it in; I just learned how to call it in on the phone too; I didn't know how to do that. So I learned how to call it in on the phone; then it's a good thing because you ain't got to worry about, "Okay I wonder if my prescription ready."*

**Social Support** Visiting the pharmacy can trigger anxiety for patients with HIV. Patients discussed how intimidating their first visit to the pharmacy was and the realization that this would be part of their routine for the rest of their lives. Ashton talked about how meaningful it was to have her boyfriend with her during her first visit to the pharmacy.

*After I got out the doctor's, I still wasn't in a laughing mood, and I forgot what he did, but he, I think he started poking me on my side because you know I'm ticklish right there, and I was like stop it because I'm really not trying to laugh right now, but I started laughing anyway... So yeah, I find it's really important if you feel that you need someone to be there with you for moral support, ask that person to come there [to the pharmacy].*

**Workarounds** During the second interview, Reese discussed his difficulty with getting through to the pharmacy by phone and getting the answers he needed.

*Calling the pharmacy is a different subject um. If you like really need... because like I said, the first 3 months I actually had to talk to someone um [at the pharmacy] to see what was going on um and I know a lot of the times when I call. I don't know if it be a over-log of calls, the number just be shut down or busy.*

He also detailed his frustrations that stemmed from inconsistent messaging from the pharmacy staff.

*I almost went off on the- on the- on the pharmacist that was there because he was trying to tell me that I did not call to pick up medicine ever and I'm like, "Well that's not true and look in your computer again." I called my medicine in that day; it said it was ready. That's why I came here, otherwise I wouldn't've just showed up and when I got here you're telling me that it wasn't ready. But they had to reorder it and- and that- and that just frustrated me that day. It's frustrating me right now talking about it.*

After his experience with calling in his medication refill and it not being ready for pickup, he persisted. During his third interview, he shared that his experience with the pharmacy was much better due to his persistence and that he learned how to navigate the pharmacy system to ensure he did not miss any doses of medicine.

*I will call in like they say. They say call it in advance because it takes 5 to 10 days. Like I said, it'll just have to go down into my calendar to call in my medicine a week before I run out or 2 weeks before I run out.*

**Patient Identified Solutions** Several patients mentioned increasing the dispensing interval to 2 to 3 months would minimize a lot of the hassle by spreading it over a longer period of time. Sidney shared:

*Coming here from where I live and usually from where I'm primarily working is a hassle. And I've got to fight traffic on the way back if I come after 2 o'clock. That means I'm probably going to sit down there at the pharmacy till about 4. Uh-huh and now I've got to fight traffic. I wish it could be like a 2- or 3-month supply.*

## DISCUSSION

This qualitative study provides insight into the pharmacy refill experience for patients with HIV infection. It identifies facilitators and barriers to refilling medications on time and points to steps the pharmacy can take to address these barriers.

Figure 1 illustrates a conceptual model of the barriers and facilitators to on-time medication refills, developed from our analyses of the qualitative interviews. Analyses revealed individual, interpersonal, and system-level barriers that affect patients' ability to pick up their HIV medications on time. In addition to missed refills, based on our interviews, these barriers directly evoked negative emotional responses from patients. Self-efficacy, social support, and workarounds served as facilitators to on-time refills. Patients noted how vital these factors were in increasing their on-time medication refills.

At the time of these interviews, many of the patients in our study received HIV medications through ADAP. In Texas, the ART medications are mailed from Austin and delivered to contract pharmacies. Several steps need to align perfectly in the refill process so patients can receive their medication on time each month. Patients using the pharmacy at TSHC need to call the pharmacy refill line when they have 7 days of medication left.<sup>29</sup> This provides a buffer in case there is a delay in one of the steps. At the time of the study, the only two options to request a refill were via phone or in person. Several patients in our study reported difficulty calling the pharmacy and getting through. Since the interviews have taken place, Texas ADAP has moved to allowing patients to receive a 90-day supply,<sup>30</sup> and patients at TSHC can request refills through a patient portal in the electronic medical record or enroll in an automated refill

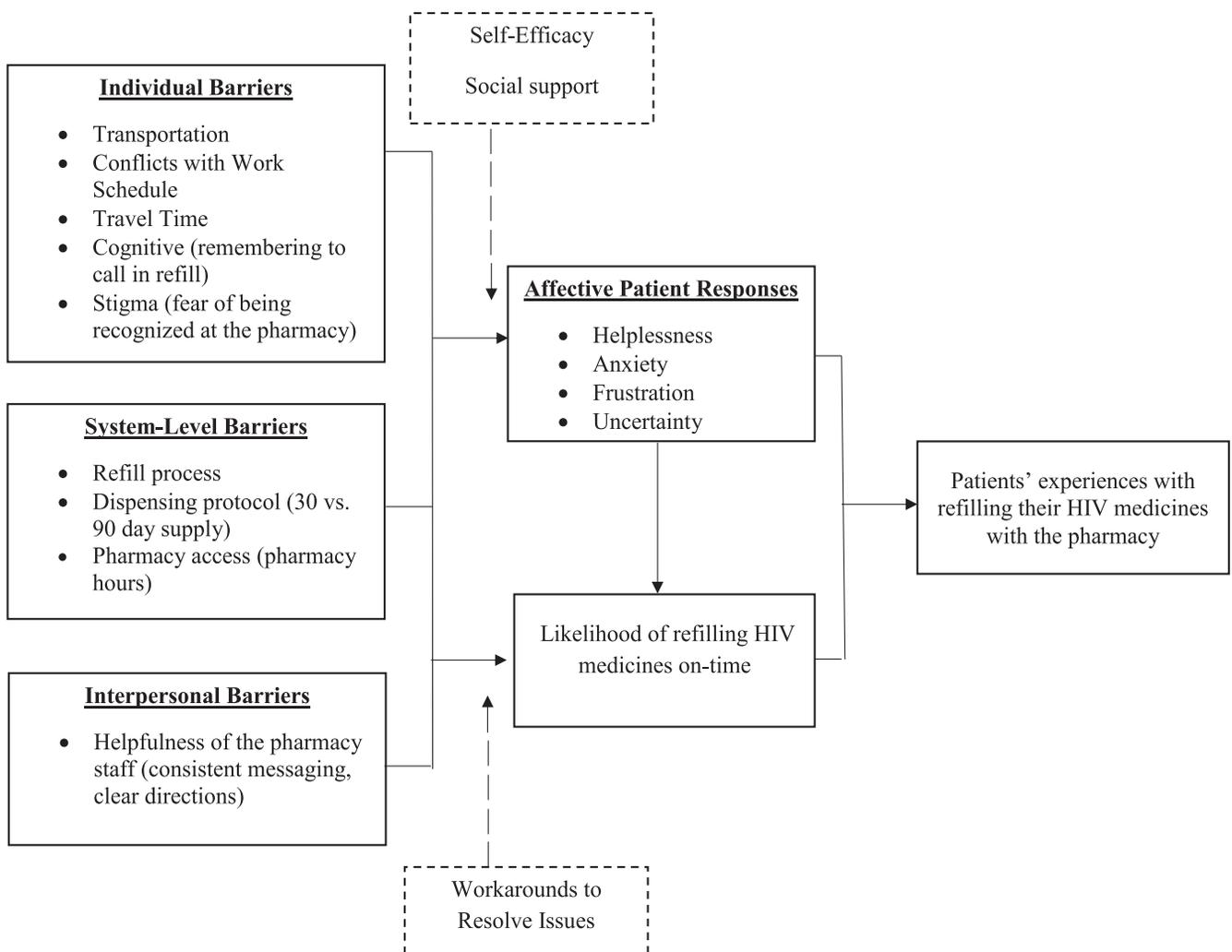


Figure 1. This figure details the barriers and facilitators experienced by patients in our study that affect their ability to pick up their medication on time. The dotted lines represent facilitators that can help patients overcome barriers.

program. This change in pharmacy dispensing protocol was mandated by the state and is not directly related to findings from this study.

Since the interviews of this study have been completed, another study has focused on the benefits of multi-monthly ART prescription schedules. In a study conducted among children and adolescents with HIV in six African countries, participants who began receiving multi-monthly ART prescription schedules had favorable health outcomes regarding immunologic status, ART adherence, viral suppression, retention, and mortality.<sup>45</sup>

In addition to the intervention being feasible, the analysis showed less frequent clinical visits and extending ART refills contributed to the favorable health outcomes.

Patients refilling their HIV medicines can experience negative emotions, such as heightened feelings of helplessness, anxiety, frustration, and uncertainty/confusion, especially because HIV is a life-altering condition. Physicians and pharmacists should be mindful of how getting refills can trigger anxiety for patients with HIV. A 30-day supply of ART medication requires more opportunities to feel those negative emotions, and a 90-day refill might therefore reduce anxiety.

Although the patients in our study had favorable responses to a 90-day supply, there may be unintended consequences. For some patients, frequent visits to the pharmacy every 30 days could be a positive thing, particularly if they find the pharmacy safe, inviting, and a source of social support. Frequent visits could also provide greater opportunities for pharmacy staff to remind patients of ADAP renewal deadlines and things they need to do to maintain eligibility. In other conditions, interventions resulting in more frequent contact with the pharmacy yielded favorable patient experiences.<sup>31,32</sup> When pharmacy staff are well trained and have the time to interact with patients, they are part of a health intervention. Stigma is also a prevalent issue, particularly for patients new to HIV and likely still grappling with stigma associated with HIV. People with HIV have stated that fears related to stigma, including fears of being judged and fears of being seen picking up HIV medicines, can provoke anxiety. In our study, positive interactions at the pharmacy and feelings of support were important to patients feeling accepted.

Our qualitative findings show that the pharmacy staff plays a key role in shaping the patients' refill experience. Patients depend on the pharmacy for the information regarding medication refills. Our patients share that inconsistent messaging from the pharmacy causes frustration and anxiety that deters them from refilling their ART medications on time. Staff have opportunities to make the refilling process smoother by explaining how refills work and involving the

patient in managing these steps. Kamei et al found that, among other things, good information management, which is how information regarding the medications is given to patients, is vital for a pharmacy.<sup>5</sup> Themes that emerged from patient interviews align with the findings of Kamei's study, which reinforces the importance of communication. Our patients said communication is important not only in imparting knowledge and education but also with dealing with anxiety related to medication refills.

A strategy to improve lines of communication in the pharmacy is to train pharmacy staff to increase their awareness of patient barriers and improve customer service. A study showed that patients care more about how pharmacy services are delivered (eg, fast, friendly, functional) than what they receive (eg, counseling on how to take medication, medication brochures).<sup>6</sup> A qualitative study exploring pharmacy staff's perception of service quality indicates that pharmacy staff want specific and more frequent feedback from upper management and more clarity in their roles as it relates to service quality.<sup>33</sup> No rigorous studies testing the impact of different feedback interventions for pharmacy staff exist.

Patients in our study say some of the greatest barriers of refilling medication involve travel and time. Commercial pharmacies have implemented several technology-based interventions to decrease the number of trips to the pharmacy and to increase on-time medication refills. One pharmacy in Iowa revamped its process to synchronize patients' medication refills so that patients have 1 medication pick up instead of multiple pickups.<sup>34</sup> TSHC now gives patients the option to synchronize their medications as well. In another study, patients preferred to refill their medications online because it was faster than calling in a refill.<sup>35</sup> The pharmacy in this study has subsequently added an online portal for refills.

Allowing prescriptions to be filled online is favorable for many patients and can improve medication adherence.<sup>35</sup> In a qualitative study conducted at a pharmacy in Pittsburgh, patients preferred e-prescribing and liked the convenience of not having to drop off a prescription and then return to pick up the medication. These patients also said this convenience made it more likely for them to pick up their medications.<sup>36</sup> Another study of patients picking up their asthma, high blood pressure, diabetes, or high cholesterol medication for the first time also showed that patients with e-prescriptions had higher first-fill rates.<sup>37</sup> Refills at TSHC pharmacy can be requested online via MyHealth, and refill prescriptions are e-prescribed unless a patient requests a hard copy prescription.

Dispensing literature on other common chronic medical conditions provides a lens to understand the potential value of 90-day vs 30-day prescriptions as it relates to medication

adherence and clinical outcomes.<sup>38-41</sup> In a study conducted with among patients high cholesterol, hypertension, or diabetes, patients with a 90-day supply of medication had more improved adherence than patients with a 30-day supply.<sup>12</sup> Adherence was measured by medication possession ratio. Beyond medication possession ratio, several studies have looked at clinical outcomes. A study conducted among patients with acute myocardial infarctions demonstrated favorable patient health outcomes among patients surviving 1 year; when looking at 1-year survivors, compared with patients who did not survive, a higher percentage had a 90-day prescription of statins.<sup>42</sup> The most compelling data come from the women's health literature with oral contraceptives.<sup>15</sup> Patients with 90-day oral contraceptive prescriptions had fewer missed doses and unintended pregnancies.<sup>43</sup> Given this, the Department of Human Health Services national guidelines now recommend 90-day refills for oral contraception. As noted above, Texas ADAP now allows a 90-day supply to be dispensed.

Although some privately insured patients can access 90-day supplies of ART, HIV medicines are expensive, and many insurance plans limit supplies to 30 days at a time.<sup>44</sup> Our data support shifting stable patients to 90-day supplies when feasible and suggest policies supporting 90-day supplies should be considered. We expect patients with HIV filling 90-day supplies to have improved adherence and pharmacy refill experiences. We hope our study points to potential benefits of increasing dispensing protocols to 90 days, including the potential for mitigating structural and psychosocial barriers (ie, by decreasing the number of pharmacy trips needed).

### limitations

This study took place at one clinic. Our study participants represent an underserved population, and results may not generalize to other populations. This is a qualitative study, and the findings are exploratory; the levels of anxiety and measures of medication adherence could not be quantified or correlated with missed doses. However, qualitative findings are necessary to provide context and to understand the patient's perspectives. As anticipated, we had longitudinal dropout. Still, we retained a reasonable number of patients at T2/T3 and were able to see how their experiences changed over time.

### CONCLUSION

This study identified several individual, intrapersonal, and system-level barriers affecting patients' ability to refill their ART medication on time. Analyses revealed patient-centered solutions to address these barriers: 1) providers and pharmacy staff should be mindful how getting refills can trigger anxiety for patients, 2) proactive communication and consistent messaging from pharmacy staff is vital, and 3) dispensing protocols should

be increased from 30 days to 90 days. Patients in our study said they would prefer to receive 90-day prescription refills of their ART medications. Changing dispensing protocols of ART medication from 30-day prescription refills to 90-day prescription refills is a patient-centered solution that, based on our interviews, may decrease anxiety concerning missed doses and improve medication adherence.

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### Ethics Approval

All procedures performed in studies involving human participants were in accordance with the Baylor College of Medicine Institutional Review Board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. ❖

### Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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### Authors' Contributions

All authors contributed to the study conception and design. Material preparation and data collection were performed by Sarah Njue-Marendes, MPH, and Bich N Dang, MD. Analysis was performed by Bich N Dang, MD, and Syundai R Johnson, MPH. The first draft of the manuscript was written by Syundai R Johnson, MPH, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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