Infection Control & Hospital Epidemiology (2025), 1–4
doi:10.1017/ice.2024.241

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Concise Communication

Facilitators of antibiotic decision-making in home-based primary care: a qualitative investigation

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Abstract

Interviews with 22 home-based primary care (HBPC) clinicians revealed that infectious disease physicians and clinical pharmacists facilitate infection management and antibiotic selection, respectively, and that local initiatives within programs support antibiotic prescribing decisions. Interventions that facilitate specialist engagement and tailored approaches that address the unique challenges of HBPC are needed.

(Received 11 October 2024; accepted 22 December 2024)

Background

Over 7 million older Americans are homebound.[1] Homebound persons have complex chronic conditions comparable to nursing home residents and are at high risk of hospitalization. Approximately 11% of homebound older Americans receive home-based primary care (HBPC).[1] HBPC provides longitudinal primary care in the home. The Department of Veterans Affairs (VA) HBPC program operates in 140 medical centers and cares for nearly 60,000 patients each year.[2,3] The most common HBPC model features a nurse practitioner as the primary care clinician, with teams supported by a median of 9 disciplines, designated physicians at 80% of sites, and variable access to specialists.[3] We observed a high prevalence of antibiotic prescription dispensing and antibiotic resistance in this program.[2,4] There are also unique challenges to the diagnosis and treatment of infection in HBPC.[5] Yet, to date, HBPC has fallen outside the scope of traditional antibiotic stewardship efforts.[6,7] To inform the development of antibiotic stewardship interventions in HBPC, we aimed to identify strategies that clinicians in HBPC have employed to help ensure they are making appropriate antibiotic prescribing decisions.

Methods

Methods and results are reported in accordance with the COnsolidated criteria for REporting Qualitative research (COREQ).[8] The study protocol was approved by the institutional review boards at the Veterans Affairs Connecticut Healthcare System and Yale University.

We recruited physicians and advanced practice providers who practiced in the VA HBPC Program and prescribed antibiotics using a national listserv of HBPC Medical Directors. There were no exclusion criteria. We conducted interviews until data saturation was achieved, and further interviews provided no new insights. This occurred after 22 interviews had been performed.[9] Participation was voluntary, uncompensated, and subsequent to verbal informed consent.

In-depth, one-on-one interviews were performed by a trained clinical research nurse between June 2022 and September 2022 using a discussion guide developed by the research team. The discussion guide contained open-ended questions about management of suspected infections, how antibiotics are prescribed, and how prescribing can be improved (Appendix). It was pilot-tested with 3 HBPC physicians and modified based on feedback. All interviews were video-recorded and transcribed in Microsoft Teams and independently verified for accuracy.

Transcripts were de-identified, analyzed using grounded theory, and coded through the constant comparative method. Two investigators independently reviewed and coded transcripts, resolving disagreements through discussion. This process was iteratively applied to five initial transcripts, and no major differences were identified. New transcripts were compared to previously coded ones. Once a coding structure was established, the remaining transcripts were coded. The research team then examined the relationship among codes and identified themes. Analyses used ATLAS.ti 7.1 (Berlin, Germany).

Results

We interviewed 22 clinicians from 19 HBPC programs across 18 states (Table 1). Mean age of participants was 48.5 years (standard deviation, 9.3 yr).

Interviews revealed 3 themes related to facilitators of appropriate antibiotic decision-making in HBPC: (1) Infectious disease specialists enhance the management of infection; (2) Clinical pharmacists aid the selection of antibiotics; and (3) Local initiatives within programs support antibiotic prescribing decisions.

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Cite this article: Datta R, Kiwak E, Fried T, *et al*. Facilitators of antibiotic decision-making in home-based primary care: a qualitative investigation. *Infect Control Hosp Epidemiol* 2025. doi: 10.1017/ice.2024.241

Table 1. Characteristics of study participants (n = 22)

Characteristic	N (%)
Sex	
Male	2 (9.1)
Female	20 (90.9)
Race	
White	20 (90.9)
Non-White	2 (9.1)
Ethnicity	
Hispanic	2 (9.1)
Non-Hispanic	20 (90.9)
Region	
Northeast	9 (40.9)
Mid-Atlantic	2 (9.1)
South	2 (9.1)
Midwest	7 (31.8)
West	1 (0.1)
Current Position	
Physician	7 (31.8)
Physician Assistant	2 (9.1)
Advance Practice Registered Nurse	13 (59.1)
Years of Clinical Experience	
<5	0 (0.0)
5 to 10	4 (18.2)
11 or more	18 (81.8)
Years Practicing in Department of Veterans Affairs	
<5	10 (45.5)
6 or more	12 (54.5)
Years Practicing in Home-Based Primary Care	
<5	9 (40.9)
6 or more	13 (59.1)

Theme 1. Infectious disease specialists enhance the management of infection

Participants reported that infectious disease specialists assisted clinicians in HBPC by offering clinical guidance through remote consultations in the electronic health record, coordinating intravenous antibiotic therapy at home, and providing recommendations regarding the management of multidrug-resistant organisms (Table 2). Contributions from infectious diseases specialists also included formal education tailored to clinicians in HBPC. According to one participant, "[infectious disease conducts] grand rounds on a regular basis, probably quarterly, [that] deal with multiple multidrug-resistant infections at our medical center and associated programs . . . they're constantly updating us."

Theme 2. Clinical pharmacists aid the selection of antibiotics

Participants acknowledged that clinical pharmacists were helpful resources when selecting the class or dose of antibiotics. Most often, clinical pharmacists provided insight regarding drug–drug interactions and the potential for adverse drug events with antibiotics. Clinical pharmacists also provided comprehensive medication reviews (Table 2). Not all participants had clinical pharmacists on their interdisciplinary teams, and those without access to them expressed difficulty with antibiotic selection.

Theme 3: Local initiatives within programs support antibiotic prescribing decisions

Several initiatives within HBPC programs supported antibiotic prescribing decisions. Participants described a range of interventions in the electronic health record that informed the selection of antibiotics. Some of these interventions were generated specifically by members of the HBPC program, such as order sets related to the treatment of infectious diseases, whereas others were available through participation in national initiatives. Participants also described local antibiotic stewardship champions. According to one participant, "[I]in one of our outlying programs, the provider got the whole team involved and gave a little antibiotic stewardship mini education. [S]he expressed . . . the process of how she wanted to proceed in kind of establishing that culture of stewardship and then maintaining it through constant re-education. I think that's a major thing." Other initiatives included peer review and feedback between physicians and advanced practice providers (Table 2).

Discussion

Antibiotic stewardship interventions have largely focused on institutional and office-based settings with limited focus on HBPC.[7] In the absence of interventions specific to HBPC, we sought to explore what clinicians in HBPC deemed helpful in making appropriate antibiotic prescribing decisions. We found that infectious disease physicians and clinical pharmacists facilitate the management of infection and selection of antibiotics, respectively, and that local initiatives within programs support antibiotic prescribing decisions.

The Core Elements of Outpatient Antibiotic Stewardship include commitment, action for policy and practice, tracking and reporting, and education and expertise.[10] Our work suggests that these elements may be generalizable to HBPC. Through remote consultations with infectious disease specialists, access to expertise can be expanded to HBPC programs when needed. Active participation of pharmacists on interdisciplinary HBPC teams can improve how antibiotics are prescribed. This may be impactful among the 10% of HBPC programs that reported a lack of assistance from clinical pharmacists with medication management.[3] Approaches that are tailored to the distinct needs and resources of programs, such as interventions in the electronic health record, peer review and discussion, and education, may further promote antibiotic stewardship in HBPC.

There are unique challenges to antibiotic prescribing in HBPC. Prior work has highlighted limited access to diagnostic testing and the challenges of collecting and transporting microbiological specimens in the field.[5] Notably, facilitators that may address these challenges were not discussed by study participants. Future studies should consider developing and testing clinical decision support systems or enhanced diagnostic tools, such as point-of-care ultrasounds, which are specifically tailored to improve the management of commonly encountered infections in HBPC such as urinary tract infections, pneumonia, and skin and soft tissue infections.[2]

Because our study focused on the VA HBPC program, the results may have limited generalizability outside the VA and to patients who are homebound but not receiving HBPC. Findings also reflect

https://doi.org/10.1017/ice.2024.241 Published online by Cambridge University Press

Table 2. Factors that assist clinicians with challenges related to antibiotic decision-making

Theme #1: Infectious disease specialists enhance the management of infection
• **Clinical guidance through e-consultation** We do get caught up on [challenges related to] antibiotic resistance or medications they're already on . . . we have the availability to do an e-consult to infectious disease and say, 'hey, this is what I got, this is what's going on, I'm stuck.' And they can usually find us something. That's happened a couple times actually. (ID 26, Nurse practitioner, Midwest)
• **Coordinating intravenous antimicrobial therapy in the home** I had one patient a while ago who had a catheter and multidrug-resistant *Pseudomonas*. I actually talked to the [infectious disease] people about [whether] I could order home [intravenous] antibiotics for him. That necessitated him coming into the emergency room to be seen by the [infectious disease] people before they could order home [intravenous] antibiotics . . . So it was good to find that out, that there's a way to do it. (ID 9, Physician, Northeast)
• **Management of multidrug-resistant organisms** We get a fair number of people who are colonized with many resistant organisms, so that can be a challenge in trying to decide how we're going to go about treating an infection. Involving infectious disease [is helpful]. (ID 19, Nurse Practitioner, West)
Theme #2: Clinical pharmacists aid the selection of antimicrobial therapy
• **Conducting patient-centered medication reviews** Our program has five full time pharmacists, and I think they are a great resource . . . Another set of professional eyes looking through the scenario, looking through the allergies, looking through the drug-drug interactions . . . they can help . . . support our clinical decision making. (ID 3, Physician, Northeast)
• **Optimizing antibiotic dosing** They are good resources, not only for appropriate use and drug interaction, but proper dosing based on kidney function . . . . (ID 11, Nurse Practitioner, Northeast)
• **Evaluation for adverse drug events** Our clinical pharmacists [are] very helpful.I think each provider uses them a little bit differently, but I know for myself, especially on the challenging patients, they will do a very thorough review [and] make sure that there's no adverse [effects] with all their other medications and give recommendations [about antibiotics]. (ID 13, Nurse Practitioner, Northeast)
Theme #3: Local initiatives within programs support antibiotic prescribing decisions
• **Peer review and discussion** So usually my notes are all cosigned by our medical director . . . when there's prescribing, we do talk about stuff, especially if I come on the fence about something like, what do you think about this? And . . . we kind of bat it around a little bit before we make a final decision [on antibiotic prescribing]. (ID 26, Nurse Practitioner, Midwest)
• **Tools in the electronic health record** [We have] an infectious disease ordering panel. So I'm constantly consulting that ordering panel based upon what I'm treating . . . So I use that [ordering panel] to guide what antibiotic I choose . . . we have a really, really good infectious disease ordering menu. (ID 8, Physician Assistant, Northeast)
• **Educational resources** We talked through [a challenging case] using antibiotic stewardship guidance, which we keep on our intranet page with educational resources. You can also access this page through [the electronic health record]. (ID 5, Physician, Mid-Atlantic)

the attitudes and experiences of clinicians. We did not observe HBPC clinicians in practice. Additionally, clinicians were recruited, so study participants may have specific views of antibiotic stewardship. Notwithstanding these limitations, we show that infectious disease specialists, clinical pharmacists, and local initiatives within programs are key facilitators of antibiotic decision-making in HBPC. Future research should develop stewardship interventions that facilitate specialist engagement, support tailored approaches to antibiotic prescribing, and incorporate health outcomes to quantify the impact of antibiotic stewardship in HBPC.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/ice.2024.241

Acknowledgments. This work was supported with resources from and the use of facilities at the Hospital Epidemiology and Infection Prevention Program at the Veterans Affairs Connecticut Healthcare System, West Haven, Connecticut.

Financial support. Dr. Datta was supported by a career development award from the National Institute of Aging (NIA) of the National Institutes of Health (NIH) under Award Number U54AG063546, which funds the NIA Imbedded Pragmatic Alzheimer's Disease and AD-Related Dementias Clinical Trials Collaboratory (NIA IMPACT Collaboratory). This publication was made possible by CTSA Grant Award UL1 TR001863 from the National Center for Advancing Translational Science (NCATS), a component of the NIH, the Operations Core of the Claude D. Pepper Older Americans Independence Center at Yale School of Medicine (P30AG021342), the Yale Physician-Scientist Development Award, and the Society for Healthcare Epidemiology of America Epidemiology Competition Award. Dr. Krein receives funding support from a VA Health Services Research & Development Service Research Career Scientist Award (11-222). Dr. Cohen was supported in part by NIA grant K76AG059987.

Competing interests. All authors report no conflicts of interest relevant to this article.

Disclaimer. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Department of Veterans Affairs.

Role of the funding source. The funders had no role in the study design; in the collection, analysis, or interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

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https://doi.org/10.1017/ice.2024.241 Published online by Cambridge University Press