# Migrants Living with HIV: Exploring Barriers to HIV Care Engagement and an Approach to Address Challenges Beyond Diagnosis

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April 2024

A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of Doctor of Philosophy (Ph.D.).

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# Abstract

**Background:** Migrants living with HIV (MLWH) are a rapidly growing population in countries affiliated with the Organization for Economic Co-Operation and Development (OECD). Across OECD countries, MLWH have poorer health outcomes compared to their non-migrant counterparts. Research on the barriers and facilitators to care for MLWH in OECD countries has centered on HIV testing. Concurrently, to champion an equity-focused response to eliminating HIV and AIDS as public health threats, HIV scholars and organizations have called for developing, evaluating, and scaling targeted clinical interventions specifically for MLWH. To respond to these calls, a new approach to caring for MLWH in Montreal, Canada, has been piloted in a multidisciplinary clinic since 2020. Specifically, "the ASAP study" provides MLWH with free antiretroviral therapy (ART), on-site and rapidly (i.e., within 7 days of being linked to care).

**Objectives:** The specific objectives of this doctoral thesis are to: (1) systematically review the barriers and facilitators MLWH in OECD countries encounter beyond diagnosis; (2) investigate the patient-reported experiences and outcomes of MLWH enrolled in ASAP through qualitative and quantitative methods; and (3) explore HIV-related clinical outcomes and the effect of social determinants of health on these outcomes for MLWH enrolled in ASAP.

**Methods:** To address these objectives, I conducted: a systematic mixed studies review (protocol published in *BMJ Open*, and results published in *AIDS Patient Care & STDs*); a longitudinal qualitative analysis of semi-structured interviews with MLWH enrolled in ASAP (manuscript published in the *Journal of Personalized Medicine*); a quantitative analysis encompassing descriptive statistics and linear mixed modelling for patient-reported outcome and experience measures among MLWH enrolled in ASAP (manuscript under review in *AIDS Research and Therapy*); and a quantitative analysis involving descriptive statistics and survival analyses on HIV-related clinical outcomes, and the effect of social determinants on these outcomes for MLWH enrolled in ASAP (manuscript published in *HIV Medicine*).

**Results:** Manuscripts 1 and 2: MLWH experience numerous challenges that impede their initial linkage to and sustained engagement with HIV care and treatment, and ultimately their HIV viral suppression. In particular, not meeting basic needs such as housing and food, or not having stable and secure finances, occupation, or immigration status can lead to disengagement with HIV services among MLWH. However, in this review, providing MLWH with multidisciplinary care was identified as a facilitator to sustained engagement with HIV services. Manuscript 3: Receiving humanizing, holistic, and empowering care from a multidisciplinary team, alongside free ART rapidly, were identified as highly positive elements in the HIV care experience of MLWH, and seemed to motivate their HIV self-management and encourage sustained engagement with care. However, throughout their time in care, MLWH expressed that they continued experiencing complex psycho-social challenges. Manuscript 4: MLWH reported highly positive experiences and outcomes around their HIV care and treatment but continued to report high levels of psychological distress throughout their time engaged in care. Manuscript 5: On median, MLWH enrolled in ASAP were able to initiate ART and reach HIV viral undetectability within 5 (range: 0-50) and 57 days (range: 5-365), respectively. Those who took significantly longer to initiate ART: were less than 35 years old; identified as heterosexual; had less than university-level education; or were unemployed. No social determinant was found to significantly affect time to undetectability.

**Conclusion:** This doctoral thesis contributes timely findings towards understanding the healthcare experiences and outcomes of MLWH. Notably, MLWH experience tremendous multifaceted barriers across each step of the HIV Care Cascade. However, preliminary evidence supports an approach to care grounded in aspects of patient-centred care (e.g., the provision of humanizing and empowering services), with the provision of free ART dispensed on-site and rapidly, to facilitate ART initiation, sustain HIV care engagement, and efficiently reach HIV viral undetectability among MLWH. However, these services appear insufficient for thoroughly addressing the mental health needs of MLWH. Concurrently, ART initiation appears to be influenced by social determinants. This suggests the importance of embedding dedicated, well-funded, and accessible mental health support in HIV clinical settings, and further considering the impact of social determinants of health when designing clinical interventions for more equitable outcomes.

# Résumé

**Contexte:** Les migrants vivant avec le VIH (MVV) constituent une population en croissance rapide dans les pays affiliés à l'Organisation de coopération et de développement économiques (OCDE). Dans ces pays, les MVV ont de moins bons résultats en matière de santé que leurs homologues non migrants. Jusqu'à présent, les recherches sur les barrières et les facilitateurs de leur prise en charge clinique dans les pays de l'OCDE se sont surtout focalisées sur le dépistage du VIH. Parallèlement, afin d'éliminer le VIH et sa menace à la santé publique, les spécialistes et les organismes du VIH ont promu une réponse axée sur l'équité et appelé au développement, à l'évaluation et à la mise à l'échelle d'interventions cliniques ciblant spécifiquement les MVV. Ainsi, depuis 2020, nous testons une nouvelle approche de prise en charge des MVV dans une clinique VIH multidisciplinaire basée à Montréal, au Canada. Plus précisément, « l'étude ASAP » fournit rapidement aux MVV le traitement antirétroviral (TAR) gratuit (c'est-à-dire dans les 7 jours suivant la mise en relation avec la clinique).

**Objectifs:** Les objectifs de cette thèse de doctorat sont les suivants: (1) synthétiser les obstacles et les facilitateurs aux soins VIH que rencontrent les MVV dans les pays de l'OCDE au-delà du diagnostic; (2) étudier l'expérience des soins VIH et l'évolution de l'état de santé auto-rapportés par les participants MVV de l'étude ASAP à l'aide de méthodes qualitatives et quantitatives; et (3) explorer, parmi ces participants, les résultats cliniques du VIH et l'effet des déterminants sociaux de la santé sur ces derniers.

**Méthodes:** Pour répondre à ces objectifs, j'ai mené: une revue systématique d'études mixtes (protocole publié dans *BMJ Open* et résultats publiés dans *AIDS Patient Care & STDs*); une analyse qualitative longitudinale d'entretiens semi-structurés avec des MVV participants à l'étude ASAP (article publié dans le *Journal of Personalized Medicine*); une analyse quantitative avec des statistiques descriptives et une modélisation mixte linéaire sur la santé et l'expérience des soins auto-rapportées par les MVV participants à l'étude ASAP (article en révision au journal *AIDS Research and Therapy*); et une analyse quantitative avec des statistiques descriptives et une analyse de survie sur des résultats cliniques liés au VIH des participants MVV de l'étude ASAP (article publié dans *HIV Medicine*).

**Résultats:** Articles 1 et 2 (revue systématique): Les MVV sont confrontés à de nombreux défis qui entravent chaque étape de leur cascade de soins VIH. En particulier, les défis liés aux besoins fondamentaux tels que le logement, la sécurité alimentaire, la stabilité financière et la sécurité de l'emploi peuvent conduire à leur désengagement des soins VIH. Offrir des soins multidisciplinaires fondés sur des stratégies axées sur le patient pourrait faciliter un engagement durable chez ces MVV. Article 3 (analyses qualitatives): Les MVV ont apprécié recevoir rapidement des soins humanisants, holistiques et responsabilisants de la part d'une équipe multidisciplinaire, parallèlement au TAR gratuit, et ces facteurs pourraient contribuer à un engagement soutenu dans leurs soins. Cependant, ils rapportent des défis psychosociaux complexes. Article 4 (analyses quantitatives): L'expérience des soins VIH parmi les MVV s'est avéré très positive au cours de la période d'étude. Toutefois, les MVV éprouvent des niveaux élevés et persistants de détresse psychologique. Article 5 (analyses quantitatives): En médiane, les MVV inscrits à ASAP ont débuté leur TAR en 5 jours (étendue: 0-50) et atteint l'indétectabilité virale en 57 jours (étendue: 5-365). Ceux qui ont pris plus de temps à initier leur TAR avaient moins de 35 ans, s'identifiaient comme hétérosexuel, avaient moins qu'une formation universitaire, ou étaient au chômage. Cependant aucun facteur étudié n'était associé de manière significative au délai à l'indétectabilité.

**Conclusions:** Cette thèse de doctorat apporte des résultats opportuns pour mieux comprendre l'expérience des soins et la santé des MVV. Les MVV sont confrontés à des obstacles considérables et multiples à chaque étape de leur cascade de soins du VIH. Cependant, nous avons généré des preuves préliminaires pour un modèle de soins centré sur le patient qui fournit rapidement le TAR sans frais au patient, pour faciliter l'initiation du traitement, maintenir l'engagement dans les soins, et atteindre efficacement l'indétectabilité virale parmi les MVV. Toutefois, ces services ne suffisent pas à répondre aux besoins en santé mentale des MVV. Cela suggère l'importance d'intégrer un soutien dédié et bien financé en matière de santé mentale dans les centres de soins du VIH, et de tenir compte davantage de l'impact des déterminants sociaux de la santé lors de la conception d'interventions cliniques pour des résultats plus équitables.

# Preface

## General Acknowledgements

I would like to begin by expressing my utmost gratitude to Dr. Bertrand Lebouché – you have been an instrumental pillar of support; guiding my thesis, facilitating my growth as a scholar, and enabling me to strive for excellence in all of the work that I have had the pleasure to conduct and produce over these last five years. Thank you also to Drs. Kim Engler, Serge Vicente, David Lessard, my thesis committee, my academic mentors, as well as the many clinicians and research partners that have been involved in the *ASAP Study*, and in guiding and supporting my doctoral work – all of you, in your own ways, have been influential in strengthening my capacity to conduct rigorous and meaningful research. I would also like to thank the patient-partners that I had the opportunity to collaborate with and learn from during this doctoral program – the time you spent speaking with me about your lives and your experiences, alongside your consistent involvement in my research, has truly shaped and evolved this thesis. Finally, a "thank you" is not sufficient in expressing my gratitude towards my family – I would not be here without your unwavering love and support, and I hope that everything I have done and will continue to do serves to honour all that you have sacrificed and done for me.

## Funding Acknowledgements

I gratefully acknowledge the financial funding that I received throughout my doctoral degree. I received a: Graduate Excellence Award from the Department of Family Medicine at McGill University in 2019; a Studentship Award from the Research Institute of the McGill University Health Centre in 2020 (ranking 1st in my division); a Doctoral Scholarship from Fonds de Recherche Santé in partnership with Unité de Soutien SRAP de Québec in 2020 (ranking 2nd in my division); and a Vanier Canada Graduate Scholarship awarded by the Canadian Institutes of Health Research in 2021 (ranking 7th nationally). Additionally, I received a Healthy Cities SMART Trainee Fellowship through the Canadian Institutes of Health Research in 2021. I have also received travel awards from: the Department of Family Medicine at McGill University in 2019, 2021, and 2022; Canadian Institutes of Health Research in 2020 and 2023; the International AIDS Society in 2022; the McGill Centre for Viral Diseases in 2022; the Post-Graduate Student Society of McGill University in 2022; and the McGill Graduate and Postdoctoral Studies unit in 2023.

## Contribution to Original Knowledge

This manuscript-based dissertation comprises five scientific manuscripts, four published and one currently under review. The body of work described in this thesis presents original research and an original contribution to the fields of migrant health and primary HIV clinical research. To adhere to the requirements set forth by McGill University's Graduate and Postdoctoral Studies (GPS) for doctoral thesis requirements, the content of each manuscript included in this dissertation remains the same as the published and/or final submitted version (i.e., full title pages, reference lists, figures, and tables for each manuscript are included within their respective chapters). Changes are only made with respect to text formatting, to conform with requirements set by GPS.

The first two manuscripts pertain to a systematic mixed studies review (one article encompasses the review protocol and the other presents the results of the search – both published). This review is the first to report a multilevel analysis of barriers and facilitators that impact migrants living with HIV (MLWH) across OECD countries, with respect to the socio-ecological model and steps of the HIV Care Cascade beyond diagnosis. Notably, this is one of the first systematic reviews conducted within this field of inquiry which included patients as research partners and co-authors, championing a patient- and stakeholder-engaged approach to research.

The third manuscript I published was the first to report a qualitative analysis in a longitudinal cohort study on the experiences of MLWH enrolled in multidisciplinary HIV care where treatment was being provided on-site, free-of-charge, and initiated rapidly. This study is among the first globally to shed light on the experiences of MLWH in a primary HIV care model with rapid treatment initiation, and particularly vis-à-vis their health-related quality-of-life – a topic which is being heralded as the next major frontier in HIV research and care.

The fourth manuscript, which is currently in review, was the first to quantitatively and longitudinally explore the perspectives of MLWH around their: perceived social support, internalized HIV-related stigma, and psychological distress; treatment compliance, self-efficacy, and satisfaction; and the perceptions of MLWH around their healthcare providers' cultural competence and empathy. This study is among the first to suggest that even when engaged in multidisciplinary care with free, onsite, and rapid treatment dispensation, MLWH continue experiencing concerning levels of psychological distress, underscoring a need to embed targeted and accessible mental health support within HIV care models.

Finally, the fifth manuscript I published is among the first to assess time to HIV treatment initiation and HIV viral undetectability for MLWH within a primary HIV care model with onsite, rapid, and free treatment dispensation, as well as evaluate the impacts of social determinants of health on these times. This study is among the first to suggest the feasibility of rapidly initiating B/F/TAF (a specific antiretroviral therapy) with MLWH within this model of care (i.e., cost-covered treatment dispensed on-site within a multidisciplinary clinic), and further, providing preliminary quantitative support for this model. Concurrently, this is among the first studies to suggest that social determinants of health can continue affecting time to treatment initiation in such a model of care, and thus need to be considered further when designing clinical interventions for MLWH.

## Contribution of Authors

Under the supervision of Dr. Bertrand Lebouché, I was responsible for the conception of the thesis design, as well as the analysis, interpretation, and writing for each manuscript included in this thesis. My PhD was imbedded within a 96-week pilot feasibility study with a prospective cohort design (i.e., the *ASAP study*), which was led by my supervisor, Dr. Bertrand Lebouché. As such, my work reflected a collaboration with clinicians (including physicians, nurses, and pharmacists), researchers (including epidemiologists, anthropologists, sociologists, statisticians, qualitative and quantitative health scientists), and migrants living with HIV. Though my work was enriched by various stakeholders' input, I declare that the conception, analysis, interpretation, and writing of this thesis is my original doctoral work.

### **Manuscript 1**: Barriers and facilitators associated with steps of the HIV care cascade for migrants in OECD countries: a systematic mixed studies review protocol.

Anish K. Arora, Amélie Quesnel-Vallée, David Lessard, Kedar Mate, Adriana Rodriguez-Cruz, Nadine Kronfli, Kim Engler, Isabelle Vedel, Bertrand Lebouché, in collaboration with the Antiviral Speed Access Program (ASAP) Migrant Advisory Committee.

AKA conceptualized this study with input from AQV, DL, KM, KE, and BL. The migrant patient advisory committee, collectively assigned the sixth author role, also provided input in the design of this work. AKA worked with an academic librarian to establish the search strategy and eligibility criteria. The search strategy, eligibility criteria and study design were further revised in consultation with AQV, DL, KM, KE, IV, BL and the migrant patient advisory committee. AKA wrote several versions of this manuscript. All authors provided substantial edits to multiple versions of this manuscript.

In terms of knowledge dissemination at the international level, AKA presented this work as a poster presentation at the North American Primary Care Research Group (NAPCRG) annual meeting held virtually in November 2020.

### **Manuscript 2**: Barriers and Facilitators Affecting the HIV Care Cascade for Migrant People Living with HIV in Organization for Economic Co-Operation and Development Countries: A Systematic Mixed Studies Review.

Anish K. Arora, David Ortiz-Paredes, Kim Engler, David Lessard, Kedar K.V. Mate, Adriana Rodriguez-Cruz, Nadine Kronfli, Isabelle Vedel, Joseph Cox, Antiviral Speed Access Program (ASAP) Migrant Advisory Committee, Amélie Quesnel-Vallée, and Bertrand Lebouché.

AKA conceptualized this study with input from AQV, DL, KKVM, KE, and BL. The migrant patient advisory committee, collectively assigned as an author, also provided input in the design of this work. AKA, DL, KKVM, and ARC were involved in the title and abstract screening. AKA and DOP conducted the full-text screening, critical appraisal, and qualitative analysis. AQV, DL, ARC, KE, the migrant patient advisory committee, and BL were involved in the data interpretation and analysis phase, which was led by AKA. AKA wrote several versions of this article. All authors provided substantial edits to multiple versions of this article.

Due to the COVID-19 pandemic, all presentations for this work were focused on the local level (i.e., through presentations at the Research Institute of the McGill University Health Centre).

**Manuscript 3**: Experiences of Migrant People Living with HIV in a Multidisciplinary HIV Care Setting with Rapid B/F/TAF Initiation and Cost-Covered Treatment: The 'ASAP' Study.

Anish K. Arora, Kim Engler, David Lessard, Nadine Kronfli, Adriana Rodriguez-Cruz, Edmundo Huerta, Benoit Lemire, Jean-Pierre Routy, René Wittmer, Joseph Cox, Alexandra de Pokomandy, Lina Del Balso, Marina Klein, Giada Sebastiani, Isabelle Vedel, Amélie Quesnel-Vallée, ASAP Migrant Advisory Committee, and Bertrand Lebouché.

AKA conceptualized this study with input from KE, DL, ARC, NK, BLem, JPR, RW, JC, AdP, MK, GS, the Migrant Advisory Committee, and BLeb. Data collection was conducted by AKA, DL, ARC, EH, LDB, the Migrant Advisory Committee, and BLeb. AKA led the data analysis and was supported by KE, DL, ARC, EH, LDB, the Migrant Advisory Committee, and BLeb. AKA drafted multiple versions of the manuscript. All authors provided substantial edits to multiple versions of this article.

In terms of knowledge dissemination at the national level, AKA presented this work as an oral presentation at: the 2022 Annual Canadian Association for Health Services and Policy Research (CAHSPR) Conference held virtually from 31 May – 2 June 2022; and the 31st Annual Canadian Conference on HIV/AIDS Research, held virtually from April 28 – May 1, 2022. At the international level, AKA presented this work as a poster presentation at: the Health Systems Global

(HSG) 7th Global Symposium on Health Systems Research held from 31 Oct – 4 Nov 2022 in Bogota, Colombia; and the 24th International AIDS Conference (AIDS 2022) held in Montreal, Canada from 29 July – 2 August 2022.

**Manuscript 4**: Patient-Reported Outcomes and Experiences of Migrants Enrolled in a Multidisciplinary HIV Clinic with Rapid, Free, and Onsite Treatment Dispensation: The 'ASAP' Study.

Anish K. Arora, Serge Vicente, Kim Engler, David Lessard, Edmundo Huerta, Joel Ishak, Nadine Kronfli, Jean-Pierre Routy, Joseph Cox, Benoit Lemire, Marina Klein, Alexandra de Pokomandy, Lina Del Balso, Giada Sebastiani, Isabelle Vedel, Amélie Quesnel-Vallée, ASAP Migrant Advisory Committee, Bertrand Lebouché.

AKA conceptualized this study with input from SV, KE, and BLeb. Data collection was managed by DL, EH, and JI. Data was analyzed by AKA. SV guided the analytical process and verified all outputs. AKA drafted multiple versions of the manuscript. All authors provided substantial edits to multiple versions of this article.

In terms of knowledge dissemination at the national level, AKA presented preliminary results of this work as a poster presentation at the 32nd Annual Canadian Conference on HIV/AIDS Research (CAHR 2023), held April 27-30, 2023 in Quebec City, Canada. At the international level, on behalf of AKA, BLeb presented preliminary results of this work as a poster presentation at the 11e Conférence Internationale Francophone VIH / Hépatites / Santé sexuelle / Infections émergentes AFRAVIH 2022 held in Marseille, France from April 6 to 9, 2022.

**Manuscript 5**: The Impact of Social Determinants of Health on Time to Antiretroviral Therapy Initiation and HIV Viral Undetectability for Migrants enrolled in a Multidisciplinary HIV Clinic with Rapid, Free, and Onsite B/F/TAF: "The ASAP Study."

Anish K. Arora, Serge Vicente, Kim Engler, David Lessard, Edmundo Huerta, Joel Ishak, Jean-Pierre Routy, Marina Klein, Nadine Kronfli, Joseph Cox, Benoit Lemire, Alexandra de Pokomandy, Lina Del Balso, Giada Sebastiani, Isabelle Vedel, Amélie Quesnel-Vallée, ASAP Migrant Advisory Committee, Bertrand Lebouché.

AKA conceptualized this study with input from SV, KE, and BLeb. Data collection was managed by DL, EH, and JI. Data was analyzed by AKA. SV guided the analytical process and verified all outputs. AKA drafted multiple versions of the manuscript. All authors provided substantial edits to multiple versions of this article.

In terms of knowledge dissemination at the national level, AKA presented preliminary results of this work as an oral presentation at the 32nd Annual Canadian Conference on HIV/AIDS Research (CAHR 2023), held April 27-30, 2023 at Quebec City, Canada. At the international level, AKA presented preliminary results of his work as an e-poster at the 12th the International Aids Society (IAS) Conference on HIV Science, held 23 to 26 July 2023 in Brisbane, Australia. Additionally, at the international level, on behalf of AKA, BLeb presented preliminary results of this work as an oral presentation at Fast-Track Cities 2023, held between 25 to 27 September 2023 in Amsterdam.

## List of Abbreviations

AIDS – Acquired Immune Deficiency Syndrome

ART – Antiretroviral Therapy

ASAP – Antiretroviral Speed Access Program

B-CR – Bootstrapped Cox Regression

B/F/TAF – Bictegravir/Emtricitabine/Tenofovir Alafenamide

CARE – Consultation and Relational Empathy Measure

CIHR – Canadian Institutes of Health Research

CVIS/MUHC – Chronic Viral Illness Service of the McGill University Health Centre

FRQS – Fonds de Recherche Québec Santé

G-MISS – Generic Medical Interview Satisfaction Scale

HCC – HIV Care Cascade

HIV – Human Immunodeficiency Virus

HIVTSQ – HIV Treatment Satisfaction Questionnaire

HrQoL – Health-related Quality of Life

IA-RSS – Internalized AIDS-Related Stigma Scale

IFHP – Interim Federal Health Program

IOM – International Organization for Migration

K6 – Kessler Psychological Distress Scale

KM – Kaplan-Meier Estimation

MLWH – Migrants Living with HIV

MMAT – Mixed Methods Appraisal Tool

mMOS-SS – Medical Outcomes Study Social Support Survey

OECD – Organization for Economic Co-Operation and Development

PLWH – People Living with HIV

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PROMIS – PROMIS Self-efficacy for Managing Chronic Conditions Instrument

PRPCC – Physician Cultural Competency Measure

SDH – Social Determinants of Health

SMSR – Systematic Mixed Studies Review

SPOR – Strategy for Patient-Oriented Research

STTBI – Sexually Transmitted and Blood Borne Illness

UNAIDS – Joint United Nations Programme on HIV/AIDS

WHO – World Health Organization

# Chapter 1: Introduction to the Thesis

With major advancements in antiretroviral therapy (ART) over the last two decades, HIV has successfully transitioned from an acute life-limiting condition to a manageable chronic illness [1]. Given this tremendous accomplishment, the World Health Organization, through their Sustainable Development Goals, has championed the effort to end AIDS as a public health threat by 2030 [2]. To help guide international effort towards this end, the Joint United Nations Programme on HIV/AIDS (UNAIDS) has called on all countries to meet the ’95-95-95’ targets, whereby 95% of people living with HIV know their status, 95% of those who know their status are receiving treatment, and 95% of those on treatment have a suppressed viral load by 2030 [2]. As of 2023, UNAIDS reported that only Botswana, Eswatini, Rwanda, the United Republic of Tanzania, and Zimbabwe have thus far achieved the 95-95-95 targets overall [3]. While significant progress is being made towards these targets in countries located within sub-Saharan Africa, countries affiliated with the Organization for Economic Co-operation and Development (OECD) are lagging behind [3, 4].

Both UNAIDS and scholars working within the global HIV community have expressed that the path to effectively and efficiently tackling the HIV/AIDS epidemic requires an equity-focused approach [1, 3, 5]. When efforts are targeted to specific populations with the heaviest burden of HIV, there is a greater potential for improved population health and lower HIV transmission rates [3, 5]. Thus, greater attention is being placed on key populations (i.e., groups of people that are at increased risk of HIV, irrespective of the national epidemic type or local context, due to engaging in higher-risk behaviours, such as men who have sex with men, people who inject drugs, and sex workers) and vulnerable populations (i.e., groups of people that are vulnerable to HIV in certain situations and contexts, such as adolescents) [6].

International migrants (henceforth, migrants) are increasingly being recognized as a vulnerable population, if not, a key population [6]. Migrants include people that relocate temporarily or permanently outside of their country of birth, irrespective of their reason for translocation [7, 8]. Migration alone may not be considered a risk factor for HIV; however, other factors associated with migration can place migrants at a higher risk of HIV acquisition throughout their migratory journey (i.e., pre-departure, transit, arrival, and in many cases, return or further transience before settling) [9-13]. For example, research particularly on the post-migration phase has identified high-risk HIV factors such as: being separated from spouses, families, and social networks; working in exploitative conditions; and being sexually active within migrant communities which may have a higher HIV prevalence compared to other communities in their host countries [9, 12]. Alongside their potential to face these risk factors, migrants often experience tremendous challenges when accessing care and treatment in new regions, including: language barriers; lack of knowledge about and access to health care services; as well as stigma and discrimination [9, 12].

Notably, migrants living with HIV (MLWH) are a rapidly growing population and account for increasing proportions of new HIV diagnoses in countries affiliated with the OECD [10, 14-17]. Furthermore, preliminary evidence across OECD countries suggests that MLWH have poorer HIV-related health outcomes compared to their non-migrant counterparts throughout all steps of the HIV Care Cascade (i.e., diagnosis, linkage to care, ART initiation, long-term retention in care and adherence to ART, and HIV viral suppression) [14, 18-22]. It is hypothesized that the intersectional experience of being a migrant and living with HIV amplifies the barriers MLWH encounter along the steps of the HIV Care Cascade (e.g., MLWH may experience a complex interaction between their fear of stigma and fear of deportation, among other challenges, which may exacerbate their reticence to get tested) [23]. However, systematic exploration of the barriers and facilitators to care for MLWH in OECD countries has thus far been dominated by research on HIV testing [14, 18, 24, 25]. An in-depth analysis of the barriers and facilitators that MLWH face in relation to HIV care engagement beyond diagnosis is lacking.

In the Canadian context, migrants accounted for 45% of new HIV diagnoses in 2019 [26]. In Montreal specifically, 310 new HIV cases were reported in 2022, the highest number reported annually in 10 years, which is an increase of 120% since 2021 and mostly attributed to people from countries where HIV infection is highly endemic [27-29]. Importantly, the 'Canadian Institutes of Health Research (CIHR) HIV/AIDS and Sexually Transmitted and Blood Borne Illness (STBBI) Research Initiative Strategic Plan for 2022-2027' identified MLWH as a key population [30]. In their strategy, the Institute lists several major action areas, including investing in research on emerging and innovative approaches to care for key populations, as well as understanding how social determinants of health affect HIV/AIDS outcomes [30]. The action areas echo calls from HIV scholars to develop targeted interventions specifically for MLWH [14], which specifically respond to this population's unique needs and associated social determinants of health (e.g., barriers to care based on structural racism) [1, 3, 5]. To respond to these action areas and calls, a new approach to caring for MLWH is being piloted since 2020 within a multidisciplinary clinic in Montreal, Canada. Specifically, through a 96-week prospective cohort design, “the ASAP study” (led by my supervisor, Dr. Bertrand Lebouché) seeks to provide MLWH with free ART, dispensed on-site and as soon as possible (ideally within 7 days from linkage to care), at the Chronic Viral Illness Service of the McGill University Health Centre (CVIS/MUHC).

Therefore, the purpose of this doctoral thesis is three-fold: (1) to systematically review the barriers and facilitators MLWH in OECD countries encounter along the steps of the HIV Care Cascade beyond diagnosis; (2) investigate the experiences of MLWH enrolled in the ASAP study through both (a) qualitative and (b) quantitative methods; and (3) explore HIV-related clinical health outcomes, and the effect that social determinants of health may have on these outcomes, for MLWH enrolled the ASAP study.

# Chapter 2: Comprehensive Literature Review

## Preamble for Chapter 2

For the first phase of my doctoral thesis, I conducted a large-scale systematic mixed studies review (SMSR). This comprehensive review corresponds to the first aim of my thesis which is to thoroughly review the barriers and facilitators MLWH in OECD countries encounter with respect to steps of the HIV Care Cascade beyond diagnosis. I published the protocol for this SMSR (Manuscript 1) in *BMJ Open*, which has a current impact factor of 2.9. The electronic version of this article can be found at: https://bmjopen.bmj.com/content/10/11/e040646.abstract. I published the results of this SMSR (Manuscript 2) in *AIDS Patient Care and STDs*, which has a current impact factor of 4.9. The electronic version of this article can be found at: https://www.liebertpub.com/doi/full/10.1089/apc.2021.0079. Both publications went through a rigorous peer-review process.

# Chapter 2, Manuscript 1: SMSR Protocol

## Title

Barriers and Facilitators Associated with Steps of the HIV Care Cascade for Migrants in OECD Countries: A Systematic Mixed Studies Review Protocol

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## Keywords

Migrants; OECD; Systematic Review; Patient Engagement; Barriers; Facilitators

## Abstract

**Introduction:** In 2019, the United Nations signaled a substantial rise in the number of international migrants, up to 272 million globally, about half of which move to only 10 countries, including 8 member nations of the Organization for Economic Co-operation and Development (OECD). Migrants in OECD countries are often at higher risk for acquiring human immunodeficiency virus (HIV) and have a higher frequency of delayed HIV diagnosis. The barriers and facilitators that migrant people living with HIV (PLWH) in OECD countries face in relation to HIV care are insufficiently understood. The five step HIV Care Cascade Continuum (HCCC) is an effective model to identify gaps, barriers, and facilitators associated with HIV care. The purpose of this study is to generate a comprehensive, multilevel, understanding of barriers and facilitators regarding the five steps of the HCCC model in OECD countries by migration status.

**Methods & Analysis:** A systematic mixed studies review using a data-based convergent design will be conducted. Medline, Embase, Scopus, CINAHL, and the Cochrane Library will be searched on March 25, 2020. Screening and critical appraisal will be conducted independently by the first author. Authors 3 to 5 will act as second reviewers, each independently conducting 33% of the screening and appraisal. Quantitative data will be transformed to qualitative data and be synthesized using thematic analysis. The Mixed Methods Appraisal Tool will be used for quality assessment. An advisory committee, composed of 4 migrant PLWH, will be involved in screening and appraising 5% of articles to build knowledge and experience with systematic reviews. They will also be involved in analysis and dissemination.

**Ethics & Dissemination:** Ethics approval was obtained from the McGill University Health Centre (15-188-MUHC, 2016-1697, eReviews 4688). Publications arising from this study will be open-access.

**Registration:** The study protocol has been registered on PROSPERO (ID:CRD42020172122).

## Strengths & Limitations of the Study

- This protocol consists of a review methodology that facilitates the synthesis of qualitative, quantitative, and mixed-methods studies.
- Centering around the HCCC model, this synthesis will provide a comprehensive and multilevel understanding of barriers and facilitators impacting access to HIV care by PLWH with different migratory statuses in OECD countries.
- Patient engagement at each step of the literature review and synthesis is expected to center the analysis and interpretation of results on patients' concerns, which will be critical to ensuring the relevance of the research to this population and increased knowledge translation and impact.
- Limits include risks of low inter-rater reliability due to the number (4) of reviewers involved in the screening and appraisal of studies.
- Strategies have been implemented to mitigate risk of inconsistencies, including the use of workshops, screening guides, and maintaining communication and regular meetings between reviewers.

## INTRODUCTION

International migrants are people engaging in all forms of movement across countries, temporarily or permanently, and for a variety of reasons [1, 2]. As of September 2019, the United Nations estimated that there were 272 million international migrants globally, a number that has increased by 51 million since 2010 [3]. Approximately 50% of all international migrants travel to and reside in only 10 countries [3], eight of which are members of the Organization for Economic Co-operation and Development (OECD) [4].

An extensive body of literature highlights that several international migrant populations in OECD countries are at increased risk of acquiring human immunodeficiency virus (HIV) infection and are more likely to experience delayed HIV diagnosis and linkage to care compared to native-born populations [5-24]. The International Organization for Migration (IOM), a leading inter-governmental organization established in 1951, has called for efforts to be made in the reduction of barriers to HIV health services for migrant populations [22].

An understanding of the barriers and facilitators experienced by various international migrant populations vis-a-vis HIV care is needed. To support this understanding, the HIV care cascade continuum (HCCC) presents a series of health care steps that assist in ensuring optimal health outcomes for people living with HIV (PLWH), as well as in effectively gauging national and international goals associated with HIV such as the 90-90-90 target proposed by the United Nations Programme on HIV/AIDS (UNAIDS) [25-27]. The HCCC model consists of five steps: (1) diagnosis; (2) linkage to care; (3) treatment provision (i.e. receiving HIV medical care); (4) retention in care; and (5) achievement of viral suppression [26, 27]. Engagement and retention in each of these steps is important to achieve and maintain viral suppression, which provides optimal clinical benefit and quality of life for patients, with suppressed risk of HIV transmission to others such as host populations [28]. Data from some OECD countries indicates that migrant populations have a delayed entry into the HCCC and are at an increased risk for discontinuity in the HCCC compared to host populations [29-31]. Different barriers and facilitators impact access to and delivery of care at the individual, organizational, and policy levels at each step of the HCCC. Thus, this model could be utilized alongside a social-ecological model to identify barriers and facilitators in a comprehensive manner.

Several systematic reviews have reported barriers and facilitators associated to specific HCCC steps for migrant PLWH in high-income countries [7, 14, 19, 32-35]. These reviews, however, focus on HIV health-seeking behaviour [34], on only certain steps of the HCCC, mostly screening [7, 14, 19, 34, 35], and on specific migrant populations such as migrants from sub-Saharan Africa and South East Asia [34], labour migrants [32], and displaced populations [33]. There is a lack of knowledge on barriers and facilitators with respect to all steps of the HCCC, and other migrant populations, such as non-status or undocumented immigrants, refugee claimants and asylum seekers, transient migrants (i.e. visitors or tourists), and international students living with HIV. Additionally, though migrant populations are very broad in terms of their origins and rationales for migrating, understanding the points of similarity and dissimilarity between the barriers and facilitators these groups face may assist in establishing more effective and efficient interventions to assist these populations.

It is thus important to understand barriers and facilitators at the individual, organizational, and policy levels, for international migrant populations in OECD countries at each step of the HCCC. As such, the purpose of this study is to contribute evidence towards a comprehensive and multilevel understanding of barriers and facilitators regarding each of the five steps of the HCCC model in OECD countries by migration status.

## METHODS & ANALYSIS

### Review Question

What are the barriers and facilitators that migrant PLWH in OECD countries encounter in relation to each of the five steps of the HCCC?

### Study Design

The PRISMA-P 2015 checklist detailing the preferred reporting items for systematic reviews was used to develop this protocol [36, 37].

A systematic mixed studies review (SMSR) will be conducted [38-41]. SMSRs enable the synthesis of data or results from studies with diverse research designs including quantitative and qualitative methods [40, 42, 43]. The diversity of research that is included in this type of review allows for the development of a comprehensive and practical understanding of complex interventions or issues [38, 42].

SMSRs adhere to the following seven steps: (1) development of a review question; (2) definition of eligibility criteria; (3) development and application of an extensive search strategy across multiple databases; (4) identification of relevant studies; (5) selection of relevant studies; (6) appraisal of all included studies; and (7) synthesis of results [40].

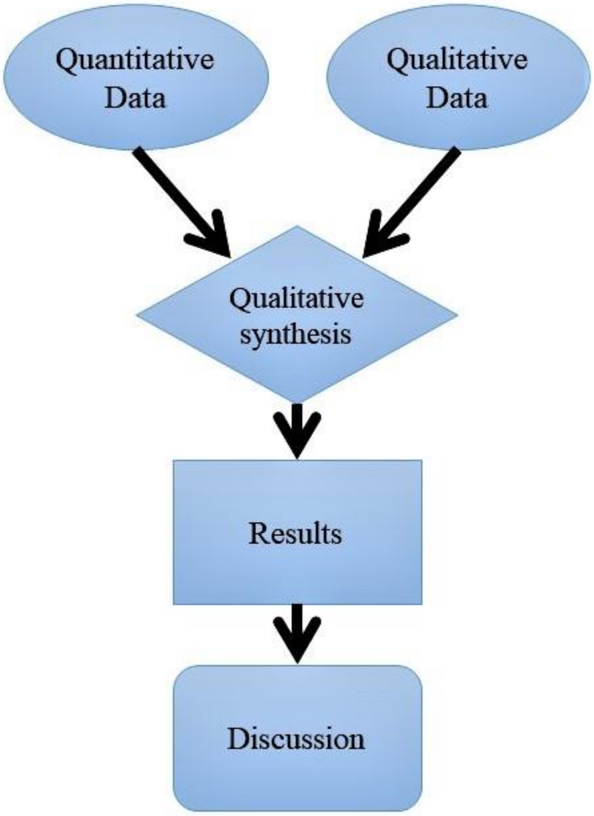
Following SMSR guidance [40], an academic librarian will be involved in the revision of the eligibility criteria and development of the search strategy (i.e. steps 2 and 3). It is recommended that two or more reviewers participate in independently screening title/abstracts and full-text articles, and study appraisal [37, 40]. As such, the first author (AA) will import all files into *EndNote X9.3.3* and independently complete the title/abstract and full-text screening and study appraisal. Three experts with previous experience of conducting systematic reviews (DL, KM, & ARC) will act as second reviewers, each independently completing 33% of the title/abstract and full-text screening and study appraisal. Disagreements will be resolved through discussion and consensus if any arise.

Data will be extracted by the first author and will be imported into a *Microsoft Excel* file. Data includes: author(s), year of publication, title, study design and objectives, country or location where the study was conducted, characteristics of the international migrant study population, barriers and facilitators identified in the study, which step of the HCCC the barriers and facilitators address, and what level of the socio-ecological model the barriers and facilitators address (i.e. individual, organizational, or policy). Extracted data will be verified by the last author.

A data-based convergent design will be utilized where qualitative and quantitative data will be collected from all studies and integrated into one dataset, as shown in Figure 1 [39, 41]. Quantitative data will be transformed into qualitative data (i.e. themes, categories, and factors) [39]. Qualitative thematic analysis and visualization methods (i.e. figures and mapping) will be utilized to synthesize the data. Barriers and facilitators will be categorized in relation to the HCCC model's five steps: (1) diagnosis; (2) linkage to care; (3) treatment provision (i.e. receiving HIV medical care); (4) retention in care; and (5) achievement of viral suppression. Barriers and facilitators will also be categorized according to a social-ecological model with the following levels: individual; interpersonal; organizational; community; and policy. No meta-analysis will be conducted.

The Mixed Methods Appraisal Tool (MMAT) will be used for quality assessment of all the included studies as it has been developed, reliability tested, and validated specifically for SMSRs [40, 41, 44-46]. All studies will be included regardless of their methodological quality. However, if studies are identified as having poor quality through the MMAT, this will be explicitly stated where necessary.

**Manuscript 1, Figure 1:** Data-based convergent design.



## Eligibility Criteria

*Study Characteristics*

Empirical qualitative, quantitative, and mixed method studies based on primary data collected at least partially from migrant PLWH in one or several OECD countries with respect to at least one of the five steps on the HCCC will be included.

Literature reviews and method, theory, commentary, and mathematical modelling papers will not be included in this study. Abstracts without full-texts will be excluded.

No limit for language will be set because many different official languages are present across the OECD countries. Our team is able to read in English, French, Spanish, Italian, and German. If articles are retained from other languages that the reviewers are not fluent in (i.e. Japanese), we will utilize a translating service to ensure that we are able to retain data from those articles. No restriction based on year of publication was set so that a broad range of barriers and facilitators, that may have lingered or disappeared over time, can be identified.

### *Population*

International migrants include people engaging in all forms of movement across countries, temporarily or permanently, and for a variety of reasons [1, 2]. Thus, studies will be included in this SMSR if they explicitly and either completely or partially focus on any population of international migrants (e.g. economic migrants such as international farmworkers, international students, migrants moving across borders for familial reasons, and refugees and asylum seekers to name a few overarching categories of migrants), irrespective of age. Studies must explicitly indicate if their population is comprised of international migrants to be included.

Studies must indicate the specific country where data was collected. The focus of this SMSR will be on studies conducted in OECD countries: Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States [4].

Studies will be excluded if conducted on populations living in international border regions, but not specifying that their study population moves between boarders to an OECD country. Additionally, studies that comprise various populations and include a subset of international migrant PLWH must complete a subset analysis or generate themes specific to migrant PLWH.

### *Outcomes*

Primary outcomes are individual (i.e. knowledge, attitudes), interpersonal (i.e. social network), organizational (i.e. organizations, social institutions), community (i.e. relationships between institutions, cultural values, norms), or public policy (i.e. local, national, or federal laws and regulations) related barriers and/or facilitators to one of five steps of the HCCC for a given migrant population in an OECD country. Barriers include any factor that hinders people from meeting any step of the HCCC. Facilitators include factors that improve the potential of people to meet any step of the HCCC. Primary outcomes must be explicitly stated or reported in the results of the study.

## Search Strategy

Medline, Embase, Scopus, CINAHL, and Cochrane Library will be searched on March 25, 2020. It was determined through consultation with an academic librarian that searching these five chosen databases will be sufficient. Thus, the search strategy will not include hand searching of reference lists of eligible studies for additional records. The search strategy was developed around three central concepts: migration, HIV, and HIV care service access and adherence. The search strategy for Medline can be found in Table 1. The strategy employed in Medline was revised slightly for each of the five databases in accordance with their specific search engines. The search strategy for each database can be found in the Supplementary Appendix (see Tables 1 – 5).

**Manuscript 1, Table 1:** Search Strategy for Medline.

| Ovid MEDLINE(R) ALL 1946 to March 24, 2020 | | |
|---|---|---|
| # | Searches | Results |
| 1 | "emigrants and immigrants"/ or undocumented immigrants/ or refugees/ or "transients and migrants"/ | 31455 |
| 2 | "Emigration and Immigration"/ | 25055 |
| 3 | (migrant* or migration* or immigrant* or emigrant* or inmigrant* or inmigration* or outmigrant* or outmigration* or refugee* or transient* or nomad* or alien* or (asylum adj2 seek*) or (displace* adj3 (people or person or individual*)) or foreigner* or (foreign* adj2 born) or (new* adj2 (arriv* or comer*)) or newcomer* or visitor* or tourist* or traveler* or passer?by or ((permanent* or temporar*) adj3 resident*) or (international adj2 stud*) or (permit* adj2 hold*) or ((foreign* or temporar* or seasonal* or undocument*) adj3 worker*) or ((Non-naturali* or undocument* or non*) adj2 citizen*) or ((no or non) adj2 status*)).tw,kw. | 671304 |
| 4 | 1 or 2 or 3 | 685727 |
| 5 | exp HIV Infections/ | 279098 |
| 6 | ((Human adj2 immunodeficiency adj2 virus) or HIV).tw,kf. | 328145 |
| 7 | (acquir* adj2 (immun?-deficiency or immun?deficiency) adj3 syndrom*).tw,kf. | 25611 |
| 8 | 5 or 6 or 7 | 399273 |
| 9 | exp Health Services Accessibility/ | 108826 |
| 10 | exp "Treatment Adherence and Compliance"/ | 239082 |
| 11 | ((Access* or link* or availab* or refer*) adj5 (treat* or therap* or screen* or test* or care* or program* or service*)).tw,kf. | 339131 |
| 12 | ((adher* or compliance* or nonadher* or noncompliance*) adj4 (treat* or therap* or care* or program*)).tw,kf. | 49761 |
| 13 | ((initat* or uptake* or start* or begin* or continu*) adj4 (treat* or therap*)).tw,kf. | 139868 |
| 14 | ((treat* or therap*) adj5 (uptake* or start* or initiat* or begin* or access* or link* or referr*)).tw,kf. | 202976 |
| 15 | 9 or 10 or 11 or 12 or 13 or 14 | 860012 |
| 16 | 4 and 8 and 15 | 1617 |

## Patient & Public Involvement

Patient engagement is defined as the “meaningful and active collaboration in governance, priority setting, and conducting research and knowledge translation” [47]. Patient engagement in HIV research increases relevancy to patients while emphasizing knowledge translation and improving outcomes through increased application of results into practice [48-50]. As such, an advisory committee has been established with 4 migrant PLWH currently living in Montréal, Canada, and receiving care at the McGill University Health Centre. These four patients were invited to this committee based on their expressed interest to their HIV physician in being involved in research. They entered Canada as international students, economic migrants, landed immigrants, and asylum seekers. They bring their expertise, which stems from their lived experience of HIV, migration, and care, to this project. As such, these migrant PLWH will be involved in this project in the capacity of collaborators under the collective title *Migrant Advisory Committee.* No other patient is expected to join the committee.

We organized patient engagement around a principle of reciprocity in the sharing of expertise and skills. As such, advisory committee meetings will be held frequently. These meetings will be facilitated by the first author, a research assistant in patient engagement (DL), and a clinical research coordinator (ARC). Meetings consist of training on the scientific and research processes of the SMSR. We also plan to have deliberative discussions on patient-partners’ experiences of engaging with the SMSR process throughout the duration of the study, and their interpretation of results. Final results will be disseminated to study participants through a post-study advisory committee meeting in which a presentation will be given by the first author. Participants will also be given a PDF version of the article once published. To note, the advisory committee was consulted during the brainstorming and conceptualization phases of this review and in the writing of this article. The research question and outcome measures were informed by their priorities, experience, and preferences through consultation prior to the development of this protocol.

To help the migrant advisory committee build knowledge and experience in relation to systematic review studies, as well as understand the content of retained articles, the first author will train engaged committee members and engage them in each step of the SMSR by mentoring them in a duplicate screening of a fraction of papers that will not be included to substantiate the screening conducted by reviewers. Therefore, engaged patients will (1) independently screen 5% of the titles and abstracts; (2) independently revise 5% of the full-text articles; (3) provide feedback during the analysis findings; (4) participate in the dissemination of findings. Hopefully, they will also be involved in the implementation of results and further research and interventions that could arise from this SMSR. This applied training is conducted in parallel to the work of reviewers mentioned above. Patients will be compensated $50 for each meeting attended and $20 for each hour of work completed in relation to the systematic review.

The purpose of this work conducted by the patients is to train them on the systematic review process, as well as expose them to HIV empirical research. Through this, we believe their interpretations and feedback, during data analysis, will be more informed, relevant, and complete. Knowledge and skills developed during this involvement, we believe, will also encourage our patients to feel more empowered and involved with the work, which in turn may lead to increased knowledge translation and future impact with respect to their networks.

### Ethics & Dissemination

As PLWH are engaged in this study, ethics approval from the McGill University Health Centre was obtained (15-188-MUHC, 2016-1697, eReviews 4688). This study will follow an integrated approach to knowledge translation. Patient-partners will be regularly informed and consulted throughout this study. This will allow them to share generated knowledge with their peers, community members, healthcare professionals, and policy-makers, when possible. Progress and findings will be presented at several relevant national and international conferences. All publications arising from this study will be open-access, to ensure that all stakeholders are able to access all generated results.

## SIGNIFICANCE

The barriers and facilitators that PLWH face in relation to HIV care access and adherence are complex and longstanding. Migratory status adds further complexity at the individual, interpersonal, community, organizational, and policy levels. To begin addressing these issues, we need to improve understanding of migrant PLWH's barriers and facilitators. As such, this is the first systematic mixed studies review that will utilize both the HCCC model, alongside a socio-ecological model, to delineate and map the barriers and facilitators migrant PLWH face across

OECD nations. Additionally, a patient engagement component will be undertaken in this initiative to ensure appropriate and holistic analysis of results, as well as effective and efficient knowledge translation.

## Acknowledgements

The authors would like to thank Taline Ekmekjian for her support as an academic librarian. She assisted with the revision of our eligibility criteria and the development of the search strategy.

## Funding Statement

Anish Arora is supported by a studentship from the Research Institute of the McGill University Health Centre and a scholarship from the Fonds de Recherche Québec – Santé given in partnership with Unité de Soutien SRAP de Québec. Dr. Bertrand Lebouché is supported by Canadian Institutes for Health Research, Strategy for Patient-Oriented Research Mentorship Chair in Innovative Clinical Trials for HIV Care, Gilead Investigator Sponsored Research Program. Dr. Bertrand Lebouché is also supported by a career award LE 250 from the Quebec's Ministry of Health for researchers in Family Medicine. Dr. Nadine Kronfli is supported by a career award from the Fonds de Recherche Québec – Santé (FRQ-S; Junior 1).

## Competing Interests Statement

The authors declare no conflicts of interest**.**

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## Chapter 2, Manuscript 2: SMSR Results

### Title

Barriers and Facilitators Affecting the HIV Care Cascade for Migrant People Living with HIV in OECD Countries: A Systematic Mixed Studies Review

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## Keywords

HIV; Migrants; Systematic Mixed Studies Review; HIV Care Cascade; OECD; Socio-Ecological Model

## Abstract

Migrants in countries affiliated with the Organization for Economic Co-operation and Development (OECD) have a higher risk of acquiring HIV, experience delayed HIV diagnosis, and have variable levels of engagement with HIV care and treatment when compared to native-born populations. A systematic mixed studies review was conducted to generate a multilevel understanding of the barriers and facilitators affecting HIV Care Cascade steps for migrants living with HIV (MLWH) in OECD countries. Medline, Embase, Scopus, CINAHL, and the Cochrane Library were searched on March 25, 2020. Screening, critical appraisal, and analysis were conducted independently by two authors. We used qualitative content analysis and the five-level Socio-Ecological Model (i.e., individual, interpersonal, organizational, community, and policy) to categorize barriers and facilitators. Fifty-nine studies from 17 OECD countries were included. MLWH faced similar barriers and facilitators regardless of their host country, ethnic and geographic origins, or legal status. Most barriers and facilitators were associated with the individual and organizational levels and centred around retention in HIV care and treatment. Adapting clinical environments to better address MLWH's competing needs via multidisciplinary models would address retention issues across OECD countries.

## INTRODUCTION

As of 2019, an estimated 272 million people moved to a new country temporarily or permanently.[1] Over half (55%) of all international migrants moved to one of twelve countries, nine of which are members of the Organization for Economic Co-Operation and Development

(OECD).[2] The OECD connects 38 countries from around the world (e.g., Canada, France, Germany, Japan, Switzerland, United States), 34 of which are listed as high income countries and 4 as upper middle income countries according to the World Bank.[3,4] The OECD identifies standards, programmes, and initiatives to drive and anchor reform globally.[4] Additionally, country reviews and data provided by the OECD give member countries an opportunity to inform policy decisions and encourage better performance.[4]

Migrant people living with HIV (MLWH) in OECD and other high income countries account for increasing proportions of new HIV diagnoses in these countries. They also experience delayed entry into HIV care and have poorer HIV-related outcomes when compared to native-born populations in their host country.[5-13] An extensive body of literature indicates that MLWH in these countries face numerous barriers that hinder their HIV testing.[14-25] This knowledge is critical for understanding what strategies are needed to improve HIV diagnosis and status awareness in MLWH.

However, HIV testing is only the first step to engagement with HIV care as proposed in the HIV Care Cascade (HCC).[26-29] The HCC is a public health model that represents key steps in HIV care, including diagnosis, linkage to care, treatment provision, retention in care, and achievement of viral suppression.[26-29] The HCC is generally used as a population-level aggregate to cross-sectionally understand engagement with HIV care.[26-29] It can be particularly useful in visualizing global efforts towards the 95-95-95 targets set by the Joint United Nations Programme on HIV/AIDS (UNAIDS), where 95% of people living with HIV know their status, 95% of those individuals are receiving treatment, and 95% of those on treatment have a suppressed viral load by the year 2030, which could stop forward transmission.[30]

To meet the overarching goal of eliminating HIV/AIDS as a public health threat by 2030, it is necessary to identify the barriers and facilitators that MLWH in OECD countries encounter within the context of the HCC, beyond diagnosis. A preliminary review of the literature[7] has been published which presents challenges faced by MLWH in high income countries to engage in HIV care as well as possible avenues for action. However, a rigorous and comprehensive systematic review using a multilevel lens to understand the factors identified is still lacking. This study attempts to fill that gap.

## METHODS

## Protocol and Registration

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement and associated Checklist were used to develop this review.[31] A systematic mixed studies review (SMSR) using a data-based convergent design was conducted.[32-35] A protocol of this SMSR was registered on PROSPERO (CRD42020172122) and published in open-access format.[36]

## Study Design

SMSRs enable the synthesis of data from studies with diverse research designs including qualitative, quantitative, and mixed methods.[32-35] By bringing together qualitative and quantitative data, a greater understanding can be achieved than would be gained by analyzing either type of data alone. These reviews consist of six steps: (1) develop a review question; (2) define eligibility criteria; (3) develop and apply an extensive search strategy; (4) identify and select relevant studies; (4) appraise the quality of included studies; and (6) synthesize data from included studies.[34,35]

## Review Question

The review question was: what are the barriers and facilitators that MLWH in OECD countries encounter in relation to the steps of the HCC beyond diagnosis?

## Eligibility Criteria

### *Study Characteristics*

We included primary empirical studies using qualitative, quantitative, and mixed method designs in this review, and excluded literature reviews, methodological, theoretical, commentary, and papers that involved simulations or modelling approaches. Initially, we set no limit for language as OECD countries have different official languages.[36] However, substantial changes in our resources (i.e., team-member availabilities) arose as a result of the COVID-19 pandemic. Thus, we retained only studies published in English.

### *Population*

Migrants include all people who relocate temporarily or permanently to countries irrespective of a reason for translocation.[36-38] We included studies that are explicitly focused, either partially or completely, on MLWH living in any of the 38 OECD countries, irrespective of their age.[4,36] If studies collected data on multiple populations (e.g., non-migrants and migrant populations), sub-analyses specific to MLWH were required for retention. For qualitative studies, deciphering if a sub-analysis was conducted can be difficult. In these cases, only results that explicitly referred to international migrants were imported into our amalgamated dataset.

### *Outcomes*

We defined barriers and facilitators as any factors that were reported to impact one or more HCC steps beyond diagnosis.[26-28] To facilitate integration of data from studies with no explicit reference to MLWH engagement with HCC steps, we categorized factors into three groups, those that impact: (1) initial linkage to care and treatment provision; (2) retention in care and in treatment; and (3) achievement and/or maintenance of an undetectable HIV viral load.

## Search Strategy

An academic librarian collaborated in developing a comprehensive search strategy. We searched Medline, Embase, Scopus, CINAHL, and Cochrane Library on March 25, 2020. See the protocol and its associated supplementary appendix for the full search strategy implemented in each database.[36]

## Screening

Screening was done in two phases. In the first phase, the first author (AKA) imported all records identified into EndNote V.X9.3.3 and screened all titles and abstracts. Three other authors (DL, KM, and ARC) each independently completed 33% of the title and abstract screening. Any disagreements were resolved through discussion and consensus. Records deemed eligible following title and abstract screening were then included for the full-text review (phase 2), which was completed independently by AKA and DOP. Weekly meetings to address any disagreements were held. An agreement score (number of agreed articles / total number of articles) between the two reviewers was calculated, as well as interrater reliability according to Cohen’s Kappa.[39]

## Critical Appraisal

AKA and DOP each independently appraised the quality of all retained studies with the Mixed Methods Appraisal Tool (MMAT). The MMAT is a valid and reliable tool for quality assessment in SMSRs.[34,35,40-43] All studies were included even after critical appraisal regardless of their methodological quality. Studies with poor quality were identified and labelled accordingly in the results section.

## Data Extraction, Synthesis, & Analysis

A data-based convergent design was used in which qualitative and quantitative data were integrated in the synthesis phase.[32] All data were extracted by the first author and verified by DOP. Data were imported into Microsoft Excel©. Data included: author(s), year of publication, study design, country of publication, and demographic characteristics of the MLWH studied (i.e., immigration status, ethnic backgrounds, geographic origins, and gender or sex, if specified), and the factors affecting HCC steps. The quantitative data extraction phase involved an analytic process whereby all statistically significant results based on p-values and confidence intervals were classified as different types of barriers and facilitators.

Qualitative content analysis, using the conventional approach by Hsieh and Shannon,[44] was then conducted independently by the first author and verified by DOP and in research team and stakeholder engagement meetings. A hybrid approach to analysis was taken, where all barriers and facilitators from quantitative, qualitative, and mixed methods studies, were first grouped under inductively developed categories, and then deductively linked to HCC steps.

To establish a multilevel understanding, factors were also linked to levels of the Socio-Ecological Model, which consists of five levels: individual (i.e., personal characteristics and factors that influence behaviours), interpersonal (i.e., relationships with others), organizational (i.e., clinical settings, hospitals, and health systems), community (i.e., broader social factors such as cultural values), and policy (i.e., laws and regulations).[45-47] Descriptive statistics were produced to depict trends found in the demographic data, as well as in the frequencies of barrier and facilitator categories.

## Patient Engagement in Research

Patient engagement in research involves the active collaboration of patients in governance, priority setting, the overall conduct of research, and knowledge translation.[48,49] This approach enables direct dialogue and equitable partnerships between patients and researchers, grounded in values such as trust and reciprocity. Patient engagement can improve the relevance of research to patients, increase uptake of results and facilitate knowledge translation in concerned communities.[48-53]

As such, 4 MLWH living in Canada were engaged in this review as stakeholders. The MLWH included a refugee from Africa, an asylum seeker from Africa, an international student from Asia, and an international student from Western Europe. Six stakeholder engagement meetings were held virtually with the MLWH between March and December 2020.

Initially, the MLWH acted as consultants, assisting in guiding the different aspects of the review via their experiences with migration and living with HIV. However, after the second meeting, the MLWH acted as collaborators. They each completed 5% of the title and abstract screening and 5% of the full-text screening for knowledge (i.e., HIV-related information) and skill (i.e., how to conduct research and more specifically, phases of literature review studies) development.[36] Workshops were provided by the first author to train them. The MLWH also provided feedback during the analysis and interpretation phase to provide nuance to the results via their lived experiences. See the protocol for more details.[36]

### Ethics Statement

Systematic reviews do not require research ethics approval. However, as patients were engaged in this study, ethics approval was obtained from the McGill University Health Centre (15-188-MUHC, 2016-1697, eReviews 4688).

## RESULTS

### Eligible Studies & Interrater Reliability

A total of 2789 records were identified after the exclusion of duplicates. Title and abstract screening left 707 records to be full-text reviewed. Ultimately, 59 studies were retained.[54-112] Figure 1 presents the PRISMA flow diagram which depicts the process of including and excluding studies. Agreement between AKA and DOP for the full-text review was 94%. Interrater reliability according to Cohen's Kappa was 0.64 suggesting a moderate level of agreement.

### Critical Appraisal of Retained Articles

The critical appraisal showed that 51 of 59 studies (86%) were of high quality (i.e., MMAT summative score above 85%), while seven (12%) were of moderate quality (i.e., summative score between 70% – 84%) and one study (2%) was of poor quality (i.e., summative score of 57%). The critical appraisal of qualitative studies was most often impacted by low credibility and confirmability (i.e., insufficient evidence that findings were grounded in the data). For quantitative studies, incomplete or inadequate reporting of the statistical analysis (e.g., not addressing all confounders) most impacted the quality assessment. Mixed methods studies were impacted by poor justification for their study design or had inadequate integration of qualitative and quantitative data. Refer to Table 1 for responses to each MMAT question and respective summative scores. For improved readability, only 33 of the 59 studies that failed to meet at least one quality assessment criteria according to the tool are presented in Table 1 (the other 26 studies met all quality assessment criteria completely and are thus not presented in the table).

## Demographic Data

Table 2 depicts the characteristics of included studies, grouped by OECD countries. Notably, included studies were published in 17 OECD countries between 1999 and 2020. The majority of the studies were published in the United States (22/59; 37%), followed by the United Kingdom (10/59; 17%), and France (6/59; 10%). Only one study was multinational and reported data from several OECD countries.[76] Designs of the retained studies were qualitative (36/59; 61%), non-randomized experimental (16/59; 27%), quantitative descriptive (3/59; 5%), and mixed methods (4/59; 7%).

The majority of retained studies (53/59; 90%) reported the ethnic backgrounds or geographic origins (e.g., country of birth) of the MLWH whom they focused on. Most studies focused on people of African origin (21/53; 40%), mostly from the Sub-Saharan region, followed by Latin American (henceforth Latinx) (7/53; 13%), Caribbean (3/53; 6%), and Asian and Pacific Islander (3/53; 6%) populations. The remaining studies (19/53; 36%), focused on populations composed of MLWH with different ethnic backgrounds or geographic origin. Of these 19 studies, 11 (58%) were published in European countries.

Over half of the studies (31/59; 53%) did not report the immigration or legal status of MLWH. Among those that did, six (21%) focused only on undocumented MLWH, two (7%) on asylum seekers, and one (4%) on temporary visa holders. The remaining studies (19/28; 68%) focused on MLWH with more than one immigration or legal status. Notably, the majority of studies (46/59; 78%) were not gender or sex specific. However, nine studies (15%) focused solely on women, two (3%) on men, one (2%) on men who have sex with men, and one (2%) on people who identify as LGBTQ.

## Barriers – Key Descriptive Trends

Nineteen categories of barriers were identified. These barrier categories were reported a total of 225 times across the 59 retained studies. The most reported barrier categories were fear (22/59; 37%), competing priorities (18/59; 31%), language issues (16/59; 27%), and inadequate clinical environments (22/59; 37%). Barriers could be attributed to multiple levels of the Socio-Ecological Model and steps of the HCC. Regarding the Socio-Ecological Model, most reported barriers were attributed to the individual (145/225; 64%) and organizational levels (44/225; 20%). For steps of the HCC, most reported barriers were found to be associated with retention (176/257; 68%), as compared to linkage to care (77/257; 30%). Barriers pertaining directly to the achievement of viral suppression were rarely reported (4/257; 2%). No apparent patterns were identified by country or year. See Table 3 for a cross-map of barrier categories with examples for each Socio-Ecological Model level and step of the HCC.

## Barriers – Linkage

### *Individual-Level Barriers*

Fear was at the forefront of the individual-level barriers associated with linkage to care and initial treatment provision. Fear was most notably ascribed to deportation,[56,60,61,63,66,70,75,78,82,86,95,97,100-102,105,112] consequences related to disclosure of HIV status (e.g., loss of job, social isolation, stigma, incarceration),[56,57,65,68,70,75,77,82,95,97,102,105] and negative effects from initiating treatment (i.e., potential side-effects to health).[57,78,105]

Lack of proficiency in the host country's language among MLWH was the second most reported barrier impeding initial access to care and treatment at the individual level.[56,58,62,63,65,66,68,70,77,80,82,85,86,94,102,105] Language seemed to amplify navigation-related challenges in particular.[77,102] For example, physically navigating clinics and hospitals in North Carolina was made difficult due to lack of Spanish signage.[63] Lack of language proficiency was also reported to hinder MLWH from applying to government services for which they were eligible (e.g., documents only available in one language), possibly impeding their initial access to HIV care and treatment.[63]

Navigation-related challenges, such as not knowing the structure of the healthcare system, were a major hurdle for MLWH. Retained studies indicated that these populations often lacked knowledge and education about HIV care and services, and were often unfamiliar with the healthcare system and overarching culture in their host countries.[58,60,68,77,78,80,84,85,97,101,102,105]

Concerns, uncertainty, or lack of awareness regarding their eligibility for care as a result of their immigration and HIV status seemed to delay MLWH's entry into HIV care and treatment.[58,60,62,65,75,81,94,100,101,105] In cases where MLWH could be eligible for subsidized or free HIV care and treatment, delays were potentially experienced by some due to lack of relevant documentation.[70,77,110] For example, in some jurisdictions, proof of residence was required to receive free medical examinations. For some women, this was identified as a barrier to initial care, particularly when documentation was not under their own name.[77]

### *Interpersonal-Level Barriers*

Lack of a social support system which includes people who are aware of one's status seemed to be an impediment to HIV care linkage.[85] Loved ones and personal networks can provide important guidance and assistance post-HIV diagnosis. However, if key members of the network (e.g., family members) lack education or knowledge about HIV-related health and social systems, or worse, if these members harbour stigmatizing attitudes towards HIV, they can impede linkage to initial care and treatment.[61]

### *Organizational-Level Barriers*

General practitioners (i.e., family physicians, primary care specialists) and immigration medical exam physicians were critical for linking MLWH to HIV care in several OECD countries. Stigma experienced by MLWH from these clinicians appeared to delay HIV care linkage.[59,78,102] These practitioners were also seen as crucial for disseminating information on the nature, access, and reasons to seek HIV care and services. Failure to give MLWH sufficient or tailored information is likely to hinder linkage.[71,85] Additionally, one study reported that women could be linked to HIV care through pregnancy and childcare services, while men appeared to lack a comparable front door to care.[65]

### *Community-Level Barriers*

Communities and their affiliated centres had the potential to facilitate MLWH linkage to HIV care and treatment. However, HIV-related stigma was reported to impede the development of effective community-based responses that impacted MLWH's initial linkage to care and treatment.[61] This was exemplified in the context of a Haitian American community in Florida, USA, where the sense of humiliation, dehumanization, and alienation experienced by MLWH from community members extended into the church setting, which in turn prevented this traditional social system within the community from acting as a strong source of linkage for MLWH to professional care.[61]

### *Policy-Level Barriers*

When policy changes that could improve MLWH's HIV care access were not taken up consistently across HIV care services, some MLWH were turned away from free medical examinations or prescription coverage.[77,85,105] Immigration-related policies, such as a 3-month wait period to access insurance, and ineligibility to join national health insurance, also hindered some MLWH from initially accessing HIV care and treatment.[64,66,85,89,98,110] For some MLWH, enrolling in clinical trials or importing generic drugs from overseas were the only way to obtain treatment, both of which were not ideal and could delay or impede treatment initiation.[85]

## **Barriers – Retention**

### *Individual-Level Barriers*

Once linked to HIV care, MLWH faced several challenges that limited their ability to engage with care and treatment in the long-term. Competing priorities such as housing, food, financial and work commitments, familial responsibilities, obtaining legal status, addressing or improving mental health, and preserving confidentiality, were often deemed more or as important as HIV care and treatment by MLWH.[54,63,65,66,70,75,80,86,94,97,99-102,104-107,112] If these competing priorities were not adequately met, disengagement with care could result.

Particularly for undocumented MLWH, lack of legal status led to work restrictions and lack of employee benefits (e.g., paid leave), often making retention in care considerably difficult.[70] Moreover, MLWH's fears when first accessing services and treatment in their host country was reported to persist in some undocumented MLWH, even after several years.[70] MLWH's worry for losing their jobs and becoming socially isolated sometimes led to mismanagement of treatment (e.g., not taking medication on time due to people being around) or disengagement with care.[66,107]

### *Interpersonal-Level Barriers*

Lack of a social support system and resulting feelings of isolation were reported to impede both linkage to and retention in care and treatment.[80,82,86] Furthermore, retention in care and treatment were negatively affected when MLWH experienced or perceived discrimination, threats, physical abuse, and unfair treatment due to their HIV status by family, friends, and community members.[86]

### *Organizational-Level Barriers*

After individual-level barriers, an inadequate clinical environment appeared to be the largest threat to retention in HIV care and treatment.[56,61,65,66,68,70,71,73,77,78,80,83,84,85,90,94,100,102,105,112] Several factors determined the inadequacy of a clinical environment for MLWH. Lack of space and capacity were associated with increased numbers of patients in clinics and thereby longer waiting times.[56,65,73,78,94] This, in turn, seemed to propel fear of disclosure which impacted decisions to attend appointments. In fact, any aspect of the clinical environment that could impact confidentiality seemed to be detrimental to appointment attendance.[78] This included dispensing medications in public, dedicated wards for in-patients, and the use of interpreters and translators from the same community as the MLWH.[78]

A poor patient-physician relationship seemed to be the hallmark of poor retention.[65,78,80,100] Feeling judged by healthcare providers, lack of perceived emotional support or consideration, and rigidity in the time allotted for consultations, could engender loss-to-follow-up. Conversations around sexual health were taboo or uncomfortable for some MLWH and could diminish trust in clinicians.[61,86,97] Furthermore, discrimination experienced in the clinical environment threatened MLWH's willingness to engage with care.[78,102] Aside from the patient-physician relationship, poor coordination and a highly fragmented healthcare system in which HIV care and services are provided were associated with loss-to-follow-up.[90,102] Also, if medications were not available on the same day as scheduled appointments, treatment adherence could be affected.[80]

Unprofessional, stigmatizing, and undertrained clinical staff negatively impacted engagement.[61,68,83] In particular, lack of acknowledgement, awareness, and response to cultural diversity by clinical staff translated into several challenges for MLWH.[63,65,77] For instance, Latinx populations often use two last names (which can be hyphenated) and sometimes alternate between the use of these names.[63] Unaware receptionists may not look for the appropriate name associated with the patient's file which, in turn, meant MLWH had to reschedule appointments for another date and thereby incur substantial economic loss (e.g., missed work and transportation costs).[63] Situations like this could discourage MLWH from continuing to engage with care.

Lack of funding added to the plethora of issues with the clinical environment, by hindering planning, service stability, and the ability of clinics to hire more staff and develop initiatives to appropriately respond to the needs of MLWH.[56,58,65]

### *Community-Level Barriers*

MLWH could face stigmatizing attitudes towards HIV by family, friends, community members, alongside the overall HIV phobia and antagonism related to immigration that exits in certain countries.[65,66] Both stigma in relation to HIV and immigration were discussed in the retained studies as an indirect negative influence on the psychological wellbeing of MLWH (i.e., internalized stigma, living in fear, lack of social support) and as directly impacting their willingness to engage with care and adhere to treatment.[107,108]

### *Policy-Level Barriers*

Uncertainty about immigration status and possibility of deportation was reported as a possible reason to space medication-taking to save doses for the future,[85] which could impact MLWH's medication management (i.e., properly following prescriptions). Moreover, antiretroviral treatment could be withdrawn if MLWH's appeal against immigration authorities to remain in their host country if seeking refuge or asylum was unsuccessful.[85] In some OECD countries, social service support by the government to resolve or mitigate MLWH's competing needs (e.g., food, housing, finances) was provided (i.e., the UK), but was discussed in a few studies as not sufficient to address their challenges.[57,58]

## **Facilitators – Key Descriptive Trends**

Ten descriptive categories of facilitators were identified. These facilitator categories were reported a total of 75 times across the 59 retained studies. The most prevalent facilitator categories reported across the dataset were having: an adaptive clinical environment (25/59; 42%); sufficient social support (15/59; 25%); and positive personal attitudes and traits (12/59; 20%). Facilitators could be attributed to more than one level of the Socio-Ecological Model and step of the HCC. In the Socio-Ecological Model, most reported facilitators were associated with the organizational level (34/75; 45%), followed by the individual (18/75; 24%), interpersonal (16/75; 21%), policy (6/75; 8%), and community (1/75; 1%) levels. In the HCC, most reported facilitators seemed to influence retention (64/84; 76%), followed by linkage (15/84; 18%), and then achievement and maintenance of viral suppression (5/84; 6%). No significant pattern by country or year were identified. See Table 4 for a cross-map of facilitator categories with examples by Socio-Ecological Model level and step of the HCC.

## Facilitators – Linkage & Retention

### *Individual-Level Facilitators*

Having intrinsic motivation, self-reliance, or resilience greatly increased the likelihood that MLWH were initially linked to and retained in care and treatment.[57,72,73,80,81,100,106,112] Belief in the value of treatment increased the extent to which MLWH engaged with care and treatment.[80,81,96] For MLWH who were able to access HIV treatment in their host country, willingness to adhere to their regimens seemed bolstered by an understanding that HIV treatment for many in their country of origin was inaccessible, unaffordable, and very limited.[96,100] Higher levels of education and socioeconomic status were identified in the retained studies as facilitators to linkage and retention (e.g., employed individuals may have access to health insurance).[61,103] Spiritual beliefs and religious faith were also found to be important for some MLWH as this could offer a source of hope and optimism that fostered resilience after HIV diagnosis, strengthening commitment to HIV care and treatment.[57,80,86,95]

### *Interpersonal-Level Facilitators*

Informal social support provided by friends, family, partners, and peers, as well as formal social support provided by peer support groups, HIV service organizations, faith leaders, and counselling services were identified as important for MLWH.[56,57,69,72,78,80,86,87,93,95,96,100,105,106,112] Negative consequences of stigma could be buffered when MLWH had social support systems in place.[100] Additionally, having a support system was identified as giving meaning to life, which in turn was reported as facilitating and encouraging willingness to remain engaged in HIV care, especially in periods of low intrinsic motivation.[86] Being a parent motivated both male and female MLWH to remain healthy so as to fulfil their responsibilities and avoid becoming a burden on their family.[86,100] Members of the social support team for MLWH could provide emotional support and remind them of their appointments and medications, all of which encouraged appointment attendance and treatment adherence.[80,86,106,112] These individuals could act as doctors' allies by listening to and reciting doctor recommendations if they joined MLWH in their medical appointments.[80]

### Organizational-Level Facilitators

The clinical environment played one of the most important roles in linking MLWH to and retaining them in HIV care and treatment.[56-58,61,67,72-74,77,79-81,84,86,91,92,95,96,98,100,101,105,106,109,112] The backbone of an excellent clinical environment seemed to be strong patient-physician relationships.[72,73,80,86,100,106,106] For MLWH, good relationships included efficient communication, attention, a caring attitude, compassion, trust, flexibility with scheduling appointments, provision of psychological support, giving results over the phone, and knowledge-sharing.[72,73,80,86,100,105,106] However, the clinical environment's significance was not limited to the primary attending clinician, but extended to the entire clinical team, including the staff.[56,77,96,105] In fact, the availability and approachability of staff was deemed important to MLWH.[56,96,105]

Furthermore, having a designated staff member to coordinate appointments was reported to improve MLWH's appointment attendance.[56] A multidisciplinary team including nurses, community health workers, case managers, social workers, or health advisors facilitated continuity of care for MLWH and helped address several barriers.[56,77,79,81,84,86,95,96,100,101,112] For instance, team members in some jurisdictions found ways to obtain care for MLWH without health insurance.[56,77,81] They also resolved critical needs such as those related to housing, acquiring health insurance, receiving food assistance, and accompaniment of MLWH to clinical or legal appointments.[56,79,95,100,101]

Interventions that enabled clinics to dispense antiretroviral medication directly to patients in-clinic saw decreases in loss-to-follow-up among MLWH and overall better adherence to treatment.[74] Taking services directly to MLWH in rural and urban settings also facilitated linkage to care, particularly when fear of obtaining care was heightened for MLWH as a result of the 2016 elections in the United States.[58] In addition, establishing medical-legal partnerships enabled a direct response to immigration needs.[58,67,79] These partnerships between clinics and legal offices improved the medical teams' understanding of immigration policy, facilitated the development of procedures to guide the team's interactions with immigration authorities, and linked MLWH with relevant legal services.[58,67,79]

Establishing a clinical environment with an inclusive approach to address cultural diversity also appeared crucial to linking MLWH with HIV care and encouraging their sustained engagement.[56,58,63,78,105] Training staff increased their awareness of the challenges MLWH face, and thereby their empathy.[56] Providing language-concordant services (i.e., offering services in multiple languages); hiring multilingual staff familiar with the immigration process; understanding the heterogeneity within MLWH populations; posting tailored signage; and having protocols and referrals in place for MLWH, were also instrumental in establishing a supportive and accepting environment for MLWH.[56,58,105]

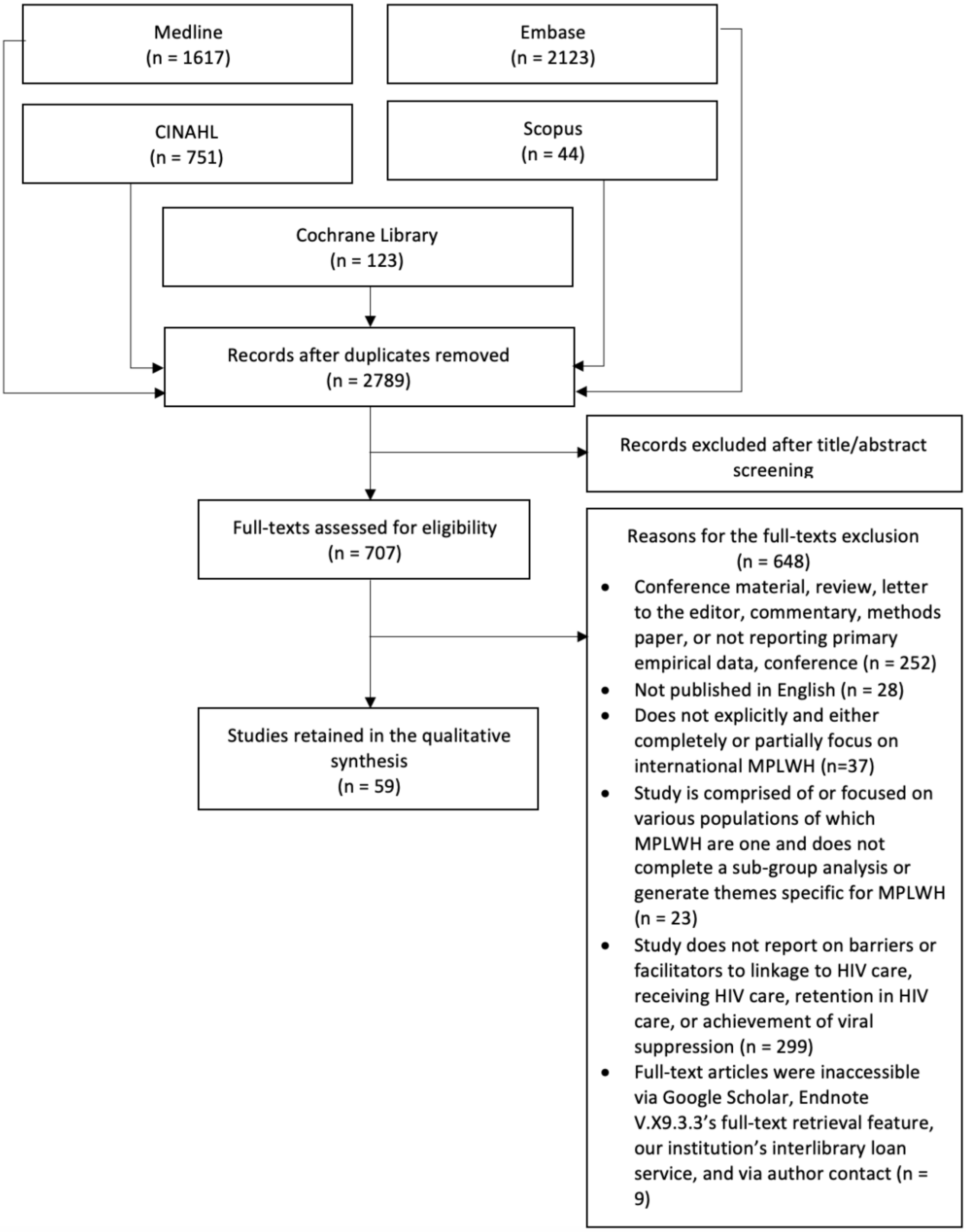
### *Community-Level Facilitators*

Very few facilitators at the community level were identified. One study mentioned MLWH use of local Latinx newspapers and radio stations to identify potential HIV/AIDS services within their community which may have facilitated their linkage to HIV care and services.[63] In two other studies, the importance of having integrated community-based interventions or services was highlighted, which may have facilitated MLWH's retention in HIV care and treatment.[78,101]

### *Policy-Level Facilitators*

Policies around universal health coverage differed across OECD countries. Health policies and systems that enabled compassionate HIV care and treatment provision for MLWH seemed to facilitate linkage.[72,75,85,90,92,110,111] In this respect, Sweden and France particularly stood out. For example, in Sweden efforts have been made to establish equitable health systems for all: "the Swedish Health and Medical Services Act mandates that all citizens and residents in Sweden should have equal access to health care regardless of gender; socioeconomic status; geographical region of residence; or national, ethnic, cultural, religious, and linguistic background."[90] Whereas in France, efforts have been made to enable access to care for documented and undocumented foreign-born residents through their combined Universal Health Insurance Coverage and State Medical Assistance systems.[110]

**Manuscript 2, Figure 1:** PRISMA flow diagram of retained and excluded studies.



**Manuscript 2, Table 1:** Critical appraisal of retained studies using the Mixed Methods Appraisal Tool (MMAT).

*Of the 59 retained studies, only 33 are presented where at least one item in the tool did not receive a "Yes" (i.e., studies that did not receive a perfect score are shown)*

| In-text Citation | SCREENING QUESTIONS | | 1. QUALITATIVE STUDIES | | | | | 3. NON-RANDOMIZED STUDIES | | | | | 4. QUANTITATIVE DESCRIPTIVE STUDIES | | | | | 5. MIXED METHODS STUDIES | | | | | Total Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SQ.1 | SQ.2 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 5.1 | 5.2 | 5.3 | 5.4 | 5.5 | |
| 56 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 65 | Yes | Yes | Yes | Yes | Yes | **Can't tell** | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 72 | Yes | Yes | Yes | Yes | **Can't tell** | **No** | Yes | - | | | | | - | | | | | - | | | | | 5/7 |
| 73 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 75 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 77 | Yes | Yes | Yes | **No** | Yes | **No** | Yes | - | | | | | - | | | | | - | | | | | 5/7 |
| 81 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 82 | **Can't tell** | Yes | Yes | **Can't tell** | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 4/7 |
| 87 | Yes | Yes | **No** | Yes | Yes | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 89 | Yes | Yes | Yes | Yes | Yes | **No** | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 97 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |
| 99 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | | | | | - | | | | | 6/7 |

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| 100 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | - | 6/7 |
| 102 | Yes | Yes | Yes | Yes | **No** | Yes | Yes | - | | | | | - | - | 6/7 |
| 105 | Yes | Yes | Yes | Yes | **Can't tell** | **No** | Yes | - | | | | | - | - | 5/7 |
| 107 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | | | | | - | - | 6/7 |
| 55 | Yes | Yes | - | | | | | Yes | Yes | **Can't tell** | Yes | Yes | - | - | 6/7 |
| 62 | Yes | Yes | - | | | | | Yes | Yes | **No** | Yes | **Can't tell** | - | - | 5/7 |
| 64 | Yes | Yes | - | | | | | Yes | Yes | Yes | **No** | **Can't tell** | - | - | 5/7 |
| 69 | Yes | Yes | - | | | | | Yes | Yes | Yes | Yes | **Can't tell** | - | - | 6/7 |
| 74 | Yes | Yes | - | | | | | Yes | Yes | Yes | **No** | Yes | - | - | 6/7 |
| 76 | Yes | Yes | - | | | | | Yes | Yes | **Can't tell** | Yes | Yes | - | - | 6/7 |
| 91 | Yes | Yes | - | | | | | Yes | Yes | Yes | Yes | **Can't tell** | - | - | 6/7 |
| 98 | Yes | Yes | - | | | | | Yes | Yes | Yes | **Can't tell** | Yes | - | - | 6/7 |
| 103 | Yes | Yes | - | | | | | Yes | Yes | Yes | Yes | **Can't tell** | - | - | 6/7 |
| 104 | Yes | Yes | - | | | | | Yes | Yes | **Can't tell** | Yes | Yes | - | - | 6/7 |
| 108 | Yes | Yes | - | | | | | Yes | Yes | Yes | Yes | **Can't tell** | - | - | 6/7 |
| 110 | Yes | Yes | - | | | | | Yes | Yes | Yes | Yes | **Can't tell** | - | - | 6/7 |
| 111 | Yes | Yes | - | | | | | Yes | Yes | **No** | Yes | Yes | - | - | 6/7 |

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| 67 | **Can't tell** | Yes | - | | | | | - | Yes | Yes | Yes | Yes | Yes | - | | | | | 6/7 |
| 83 | Yes | Yes | - | | | | | - | Yes | Yes | Yes | **Can't tell** | **Can't tell** | - | | | | | 5/7 |
| 61 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | - | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | 16/17 |
| 78 | Yes | Yes | Yes | Yes | **Can't tell** | Yes | Yes | - | Yes | Yes | **Can't tell** | Yes | Yes | **No** | Yes | Yes | Yes | Yes | 14/17 |

*Note that no study in the retained set of articles applied a randomized controlled design. As such, the questions associated with randomized designs (labelled #3) from the MMAT tool are not presented.

**Manuscript 2, Table 2:** Characteristics of included studies in this systematic review, presented by OECD country.

| In-text citation number | Author(s) | Year | Study design | Migrant population as described in retained studies |
|---|---|---|---|---|
| **United States (n=22)** | | | | |
| 58 | Arnold et al. | 2020 | Qualitative | Immigrants from various ethnic and racial backgrounds |
| 60 | Barrington et al. | 2019 | Qualitative | Gay Latino immigrant men with documentation status for participants classified as “Not clear; US Citizen; or Undocumented” |
| 61 | Barsky and Albertini | 2006 | Mixed Methods | Caribbean (Haitian) Americans living in the United States for <5 years to >20 years |
| 63 | Bowden et al. | 2006 | Qualitative | Latinx |
| 68 | Chin et al. | 2006 | Mixed Methods | Asian and Pacific-Islanders with immigration status classified as either “Undocumented” or “Documented and U.S. citizen” |
| 70 | Dang, Giordano, and Kim | 2012 | Qualitative | Undocumented Latinx immigrants |
| 77 | Foley | 2005 | Qualitative | African Immigrant women |
| 79 | Fuller et al. | 2020 | Qualitative | Immigrants |

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|---|---|---|---|---|
| 82 | Johansen | 2006 | Qualitative | Latina migrant trafficking victim |
| 84 | Kang et al. | 2003 | Qualitative | Asian undocumented, non-citizens |
| 86 | Levison et al. | 2017 | Qualitative | Latinx immigrants |
| 89 | Martin, Meehan, and Schackman | 2013 | Qualitative | Undocumented migrants |
| 91 | Mishreki et al. | 2020 | Non-Randomized | Migrant detainees from various geographic locations |
| 95 | Ojikutu et al. | 2018 | Qualitative | African born women with immigration status classified as “undocumented; asylee; permanent resident; or other” |
| 97 | Othieno | 2007 | Qualitative | African born immigrants and refugees |
| 99 | Pivnick et al. | 2010 | Qualitative | English speaking Caribbean immigrants (documented and undocumented) |
| 100 | Remien et al. | 2015 | Qualitative | African immigrants |
| 101 | Ross et al. | 2019 | Qualitative | Undocumented African immigrants |
| 102 | Russ et al. | 2012 | Qualitative | Asian Americans and Pacific Islanders, foreign-born, categorized into the following citizenship categories “US citizens or Permanent residents” |
| 103 | Saint-Jean et al. | 2011 | Non-Randomized | Caribbean (Haitian) immigrants |
| 105 | Shedlin and Shulman | 2004 | Qualitative | Dominican, Mexican, and Central American immigrants |
| 112 | Vissman et al. | 2011 | Qualitative | Immigrant Latinx |
| **United Kingdom (n=10)** |  |  |  |  |
| 56 | Allan and Clarke | 2005 | Qualitative | Asylum seekers |
| 57 | Anderson an Doyal | 2004 | Qualitative | African women self-classified as black that lived in the UK for at least 6 months |
| 65 | Burns et al. | 2007 | Qualitative | African migrants |
| 72 | Doyal and Anderson | 2005 | Qualitative | Sub-Saharan African women |
| 73 | Doyal, Anderson, and Paparini | 2009 | Qualitative | Heterosexual African men |

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| 75 | Erwin and Peters | 1999 | Qualitative | Africans |
| 83 | Jones, Finnerty, and Richardson | 2019 | Quantitative Descriptive | Clinicians encountering refugees, asylum seekers and/or undocumented migrants |
| 93 | Ndirangu and Evans | 2009 | Qualitative | African women – immigration/visa status was indicated by mentioning that 2 participants were students, 4 were asylum seekers and 2 were entitled to settle permanently in the UK |
| 96 | Orton et al. | 2012 | Qualitative | Asylum seekers from Africa (25/26 participants) and Brazil (1/26) |
| 106 | Spiers et al. | 2016 | Qualitative | Black African women |
| **France (n=6)** |  |  |  |  |
| 54 | Abgrall et al. | 2013 | Non-Randomized | Sub-Saharan Africans |
| 55 | Abgrall et al. | 2019 | Non-Randomized | Migrants are those individuals that are either born outside of France without French nationality, or those who arrived in France when they were >15 years of age and have received French nationality |
| 92 | Morel | 2019 | Qualitative | Recently arrived immigrants |
| 88 | Mambet Doue and Roussiau | 2016 | Non-Randomized | Sub-Saharan Africa migrants |
| 110 | Vignier et al. | 2018 | Non-Randomized | Migrants born in Sub-Saharan Africa with the following resident permit at arrival “none; temporary; resident permit; or French nationality” |
| 111 | Vignier et al. | 2019 | Non-Randomized | Migrants born in Sub-Saharan Africa with the following resident permit at arrival “none; temporary; resident permit; or French nationality” |
| **Australia (n=3)** |  |  |  |  |
| 81 | Herrmann et al. | 2012 | Qualitative | Migrants from various countries of origin and ethnicities and with their visa status classified as either “457 long stay business visa; student; spousal; other; permanent resident; or New Zealand citizen” |
| 85 | Korner | 2007 | Qualitative | Migrants born overseas and moved to Australia as temporary or permanent residents for various situations including work, family, humanitarian, and educational purposes |
| 98 | Petoumenos et al. | 2015 | Non-Randomized | Temporary residents originating from various geographic regions with the following visa types: bridging, other, spouse, student, and working |

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| **Canada (n=3)** | | | | |
| 71 | Dela Cruz et al. | 2020 | Mixed Methods | Sub-Saharan African immigrants |
| 87 | Logie et al. | 2016 | Qualitative | African and Caribbean lesbian, gay, bisexual and transgender newcomers and refugees |
| 64 | Bunn et al. | 2013 | Non-Randomized | Landed immigrants (3-month waiting period), those with no permanent resident status, and those considered foreign visitors |
| **Israel (n=3)** | | | | |
| 69 | Cohen et al. | 2007 | Non-Randomized | Ethiopian Jewish immigrants |
| 74 | Elbirt et al. | 2014 | Non-Randomized | Immigrants from Ethiopia |
| 67 | Chemtob et al. | 2019 | Quantitative Descriptive | Undocumented migrants from various geographic regions |
| **Netherlands (n=3)** | | | | |
| 62 | Bil et al. | 2019 | Non-Randomized | Migrants >18 years, foreign-born and resident in the country of recruitment for >6 months – categorized as originating from various geographic origins – immigration status classified as permanent residency permit; temporary residency permit; and refugee status/unknown |
| 107 | Stutterheim et al. | 2012 | Qualitative | Africans and Afro-Caribbean (Antillean and Surinamese) |
| 108 | Sumari-de Boer et al. | 2012 | Non-Randomized | Immigrants from various geographic origins (primarily from Sub Sahara Africa, Surinam and the Dutch Antilles) |
| **Spain (n=2)** | | | | |
| 80 | Guionnet et al. | 2014 | Qualitative | Immigrant women originating from various countries |
| 94 | Ndumbi et al. | 2018 | Quantitative Descriptive | Migrants originating from various countries and continents with immigration status classified as “national/resident or irregular status” |
| **Belgium (n=1)** | | | | |
| 59 | Arrey et al. | 2017 | Qualitative | Sub-Saharan African migrant women |
| **Ireland (n=1)** | | | | |

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| 78 | Foreman and Hawthorne | 2007 | Mixed Methods | Migrants that originated from outside the European Union – indication of participant status (refugee, in asylum process, and ‘leave to remain’ application) was indicated |
| **Italy (n=1)** | | | | |
| 104 | Saracino et al. | 2014 | Non-Randomized | Migrants were those born outside Italy, based on geographical origin, derived from nationality or from country of birth/origin |
| **Japan (n=1)** | | | | |
| 66 | Castro-Vázquez and Tarui | 2007 | Qualitative | Latin American (Brazilian and Peruvian) men |
| **Sweden (n=1)** | | | | |
| 90 | Mehdiyar et al. | 2016 | Qualitative | Migrants from various continents living in Sweden for 2-20 years |
| **Switzerland (n=1)** | | | | |
| 109 | Thierfelder et al. | 2012 | Non-Randomized | Immigrants from various geographic origins |
| **Multinational study including: Belgium, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, and the United Kingdom (n=1)** | | | | |
| 76 | Fakoya et al. | 2017 | Non-Randomized | Migrants living in Europe with permanent residency; temporary residency; asylum seeker or refugee status; undocumented status; or unknown from >1 geographic region and ethnicity |

**Manuscript 2, Table 3:** Barrier categories with examples cross-mapped to the levels of the Socio-Ecological Model and steps of the HIV Care Cascade.

| | **Individual** | **Interpersonal** | **Organizational** | **Community** | **Policy** |
|---|---|---|---|---|---|
| **Linkage** | **Fear:**<br>Of accessing care; disclosure; deportation; incarceration; isolation, stigma, and termination of employment<br>[56, 60, 61, 63, 75, 82, 86, 95, 97, 100, 101, 112]<br><br>**Lack of knowledge:**<br>Lack of understanding of the health and social system; unfamiliarity with biomedicine; lack of awareness about the HIV support organizations | **Lack of education:**<br>Lack of general education level and education about HIV/AIDS-related health and social systems in | **Inadequate clinical environment:**<br>GP receptionists were associated with breaches of confidentiality; lack of HIV care-related information dissemination to patients by immigration medical exam panel physician; policy changes | **Distrust:**<br>Community-based distrust with care providers and care systems<br>[61]<br><br>**Stigma:**<br>From community | **Insufficient governmental social service support:**<br>Lack of funding for social support services; lack of legal status led to work restrictions, lack of insurance, and difficulties meeting paperwork requirements |

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| | available to them and how to access them; insufficient HIV-related knowledge<br>[56, 60, 77, 78, 84, 85, 97, 100]<br>**Lack of education:**<br>Lack of general education level and education about HIV/AIDS-related health and social systems in individuals<br>[61]<br>**Language issues:**<br>Not fluent in host country language<br>[58, 62, 63, 70, 77, 80, 82, 85, 102]<br>**Mental health challenges:**<br>Overwhelming sense of social isolation<br>[101]<br>**Navigation challenges:**<br>New or unfamiliar healthcare system; confusion around service provision and the process of obtaining health insurance; appointment systems were intimidating for those unfamiliar with the system or with English as a second language<br>[58, 63, 65, 68, 77, 80, 95, 97, 101, 102]<br>**Personal attitudes and traits:**<br>Lack of willingness to seek care unless absolutely necessary; lack of confidence in American medicine; feelings of social exclusion, shame, self-loathing; fatalistic views about HIV<br>[65, 77, 78, 86, 97, 112]<br>**Policy confusion:**<br>Around care entitlement<br>[60, 62, 65, 75, 81, 94, 97, 101]<br>**Stigma:**<br>General feelings of stigma were found to impact access to care<br>[78] | family members<br>[61]<br>**Lack of social support:**<br>Lack of people to turn to for assistance and guidance<br>[85]<br>**Stigma:**<br>From families<br>[61] | by the city that effect patient care provision have not been consistently taken up at health centres<br>[65, 71, 77, 83, 92, 93]<br>**Lack of acknowledgement, awareness, and response to cultural diversity:**<br>Difference in communication styles and cultures between migrant patients and US clinicians<br>[97]<br>**Language issues:**<br>Lack of Spanish signage in hospitals makes navigation difficult<br>[63]<br>**Navigation challenges:**<br>Lack of ‘front door’ entry to HIV care and services for men; being referred between services without knowing what they were for<br>[65, 85]<br>**Stigma:**<br>By non-HIV healthcare professionals<br>[59] | settings<br>[61, 65, 101] | which are necessary for entry into HIV care<br>[58, 64, 65, 70, 85, 89]<br>**Language issues:**<br>Forms for government services (for which migrant patients were eligible to apply to) were not available in Spanish<br>[63] |
| **Retention** | **Competing priorities:**<br>Housing, shelter, homelessness; unexpected travel duration extension; work commitments, | **Disclosure and confidentiality issues:** | **Disclosure and confidentiality issues:**<br>Geographic area of | **Distrust:**<br>**Community**-based distrust with care | **Insufficient governmental social service support:** |

| | | | | | |
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| | employment, and finances; family, childcare; transportation; food; clothing and poverty; immigration, obtaining legal documents and insurance; rape, domestic violence, death and loss<br>[54, 63, 65, 66, 70, 75, 80, 86, 94, 97, 99, 100, 101, 102, 104, 105, 106, 112]<br><br>**Disclosure and confidentiality issues:**<br>Keeping HIV status confidential takes precedence over taking medication on time<br>[57, 61, 78, 102, 107, 108]<br><br>**Distrust:**<br>With treatment and care providers<br>[54, 66, 80, 105, 112]<br><br>**Fear:**<br>Of side effects and long-term harm from care; deportation; disclosure; losing their job; incarceration; isolation; stigma<br>[56, 57, 58, 60, 61, 63, 65, 66, 68, 70, 77, 78, 82, 95, 97, 102, 105, 112]<br><br>**Financial issues:**<br>Inability to afford care and/or insurance co-payments; travel costs lead to missing appointments; cost of taking time off to attend appointments<br>[61, 62, 68, 76, 80, 82, 111; 112]<br><br>**Intensity and novelty of treatment adherence:**<br>Meeting multiple medical appointments and adhering to rigorous medication regime was daunting and demanding; participants had to absorb lots of info and medical terminology<br>[84, 85, 106]<br><br>**Lack of education:**<br>General education level of patient<br>[82, 109]<br><br>**Lack of knowledge:**<br>Lack of awareness and use of a policy to get legal status and benefits; insufficient HIV-related knowledge which affects care navigation | Undisclosed HIV status to parents, family members, and/or friends; difficulty concealing medicines when living in shared accommodations and need to avoid taking them in public; many would sacrifice care than have their status disclosed; several reported that if HIV status was accidently disclosed, they were fired from their jobs, ostracized, and/or evicted<br>[54, 72, 73, 80, 86, 100]<br><br>**Lack of social support:**<br>Lack of emotional and social support<br>[82, 86]<br><br>**Stigma:**<br>Discrimination, threats, physical abuse, and unfair treatment by family, friends due to | community members in relation to HIV services; use of interpreters from the same communities as clients<br>[97]<br><br>**Inadequate clinical environment:**<br>Lack of space, capacity, funding, staff, and services; unprofessional staff; weak patient-physician relationship with GPs; dispensing medications in public; medications may not be available on the same day as scheduled appointments; distance to HIV clinician; insufficient or inappropriate translation services; poor coordination of services; highly fragmented system of care; inconsistent uptake policies at clinics<br>[56, 61, 65, 66, 68, 70, 73, 77, 78, 80, 82, 83, 84, 85, 90, 92, 93, 100, 102, 105, 112]<br><br>**Lack of acknowledgement, awareness, and response to cultural diversity:**<br>Lack of understanding by clinic admin of Latinx cultural naming system; failure of clinicians to understand cultural factors, social exclusion, and poverty<br>[63, 65, 77, 86, 97, 102] | providers and care systems<br>[61]<br><br>**Lack of acknowledgement, awareness, and response to cultural diversity:**<br>Community-based acculturation, cultural factors – especially gender roles<br>[105]<br><br>**Stigma:**<br>Propelled by the media; HIV phobia exists in Japan; migrants faced discrimination and/or dismissal when found taking medication at work<br>[65, 66, 86, 97] | Social service provision is not sufficient; lack of health insurance due to immigration status<br>[57, 58, 64, 65, 66, 70, 75, 77, 82, 85, 89, 98, 110]<br><br>**Lack of acknowledgement, awareness, and response to cultural diversity:**<br>Avoidance of responsibilities associated with foreigners by officials<br>[66] |

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| | [60, 77, 82, 84, 97, 105]<br><br>Language issues:<br>Not fluent in host country language<br>[56, 58, 65, 66, 68, 70, 80, 82, 85, 86, 94, 105]<br><br>**Medication consumption difficulties:**<br>Drugs requiring dietary manipulation were difficult to manage for those with limited access to food or cooking facilities; number of pills that needed to be taken and side effects with treatment including as diarrhoea, rash, lipodystrophy, pain and weakness<br>[62, 72, 73, 80, 105, 106, 112]<br><br>**Mental health challenges:**<br>Trauma; depression, anxiety, post-traumatic stress, and substance use; feeling trapped, due to immigration status; negative internal dialogue<br>[54, 86, 95, 100, 102, 106, 112]<br><br>**Navigation challenges:**<br>Appointment systems were intimidating for those unfamiliar with the system or with English as a second language; little ability to navigate through bureaucratic US systems<br>[58, 65, 95, 97, 102]<br><br>**Personal attitudes and traits:**<br>Pride; lack of claiming rights because of status; lack of confidence in American medicine; asymptomatic HIV self-blame and shame; self-loathing; magical-religious beliefs; fatalistic views about HIV; denial<br>[57, 61, 66, 77, 80, 82, 86, 88, 97, 105, 111]<br><br>**Policy confusion:**<br>Uncertainty regarding regulations and power ascribed to Immigration and Customs Enforcement; confusion around availability of the AIDS Drug Assistance Program to undocumented immigrants and around immigration policies<br>[58, 60, 85, 94, 105]<br><br>**Stigma:**<br>Indirectly influences psychological well-being and | HIV<br>[86] | **Lack of education:**<br>Providers found it difficult to communicate effectively with patients that had little or no formal education<br>[77]<br><br>**Language issues:**<br>Services provided in English; no comprehensive translation system exists<br>[56, 66, 68, 77, 86]<br><br>**Navigation challenges:**<br>Being referred between services without knowing what they were for; patients had to go back-and-forth between various HIV specialist units<br>[58, 65, 85, 90]<br><br>**Policy confusion:**<br>Lack of clarity around changes in immigration policies and associated implications to public charge rules<br>[58]<br><br>**Stigma:**<br>By non-HIV healthcare professionals; migrants denied right to care because of route of infection<br>[59, 66, 102] | | |

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| | social support; directly complicates adherence<br>[107, 108] | | | | |
| **Suppression** | **Financial issues:**<br>Lack of finances and unemployment<br>[55]<br>**Lack of education:**<br>In reference to general education level of patient.<br>[55]<br>**Mental health challenges:**<br>Several stressors including feelings of limbo, uselessness, shock, anxiety, panic, and depression; clinically significant depressive symptoms<br>[96, 108] | - | - | - | - |

**Manuscript 2, Table 4:** Facilitator categories with examples cross-mapped to the levels of the Socio-Ecological Model and steps of the HIV Care Cascade.

| | Individual | Interpersonal | Organizational | Community | Policy |
|---|---|---|---|---|---|
| **Linkage** | **Appropriate acknowledgement, awareness, and response to cultural diversity:**<br>General acculturation to American culture<br>[61]<br>**Sufficient education:**<br>Higher levels of general education<br>[61]<br>**Sufficient finances:**<br>Higher levels of socioeconomic status; those employed were covered by health insurance<br>[61] | **Sufficient social support:**<br>From peers<br>[57] | **Appropriate acknowledgement, awareness, and response to cultural diversity:**<br>Making immigrants feel explicitly welcome; training reception staff; posting signage; having protocols and referrals in place for clients; and staffing programs and clinics with individuals who spoke multiple languages and experienced immigration themselves<br>[58]<br>**Remarkable/Adaptive clinical environment:**<br>Approachability, supportiveness, and availability of staff; staffing of Health Advisors; existence of non-HIV/AIDS specific services; the existence of a sector composed of hospital structures and humanitarian organizations that specializes in caring for the most vulnerable patients<br>[56, 58, 61, 84, 91, 92, 101] | **Appropriate acknowledgement, awareness, and response to cultural diversity:**<br>Use of local Latinx newspapers and radio stations to identify potential HIV/AIDS services within their community<br>[63] | **Sufficient governmental social service support:**<br>Universal Health Coverage and State Medical Assistance provides social protection for the entire population including the poor and the undocumented since 2000<br>[72, 75, 85, 90, 92, 110, 111] |

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| **Retention** | **Personal attitudes and traits:**<br>Intrinsic motivation; perceived benefit of treatment; spiritual belief and religious faith; personal strength, accountability, self-reliance,<br>[57, 72, 73, 80, 81, 86, 95, 96, 100, 105, 106, 112]<br><br>**Physiological variables and dispositions:**<br>Older age; higher HIV viral load at enrolment; occurrence of an AIDS event before enrolment; pregnancy; hepatitis B virus co-infection<br>[104]<br><br>**Sufficient education:**<br>Higher levels of general education<br>[103] | **Familial responsibility:**<br>Both men and women described parenting responsibilities and avoidance of becoming a burden on family as motivations for staying healthy<br>[80, 86, 100]<br><br>**Mitigating issues of disclosure and confidentiality:**<br>Avoiding disclosure issues by being single<br>[54]<br><br>**Sufficient social support:**<br>From peers, partner, family, voluntary organizations, peer support groups<br>[56, 57, 72, 78, 80, 86, 87, 100, 105, 106, 112] | **Appropriate acknowledgement, awareness, and response to cultural diversity:**<br>Providing language concordant services; hiring staff that were familiar with the immigration process; recognizing heterogeneity within immigrant communities; training for staff; culturally appropriate, gender specific, and integrated community-based interventions<br>[56, 58, 78, 105]<br><br>**Remarkable/Adaptive clinical environment:**<br>Assistance with conflicting individual needs such as housing, finances, and food; designated staff member to coordinate appointments and interpreters to overcome issues with appointment keeping; establishing medical-legal/public-private partnerships enabled direct response to immigrant patient needs; taking services directly to immigrants in both rural and urban settings; strong patient-physician relationship; supply ART directly to patients at the HIV/AIDS clinic; multidisciplinary teams<br>[56, 57, 58, 61, 67, 72, 73, 74, 77, 79, 80, 81, 84, 86, 92, 95, 96, 100, 105, 106, 109, 112]<br><br>**Sufficient social support:**<br>From HIV service organizations, consultation with faith leadership, and counseling services<br>[93, 95, 96] | - | **Sufficient governmental social service support:**<br>Free or subsidized healthcare and treatment coupled with provision of social support<br>[72, 75, 85, 90, 99, 110] |
| **Suppression** | - | **Mitigating issues of disclosure and confidentiality:** | **Remarkable/Adaptive clinical environment:** | - | - |

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| | | Disclosure to mother or friends<br>[55]<br>**Physiological variables and dispositions:**<br>Being a woman was related to higher T CD4+ lymphocyte count and a lower viral load<br>[69]<br>**Sufficient social support:**<br>Perceived informal support<br>[69] | Interventions that enable free provision of ART and directly to patients in the clinic were essential to establishing suppression<br>[74, 98] | | |

## DISCUSSION

This systematic mixed studies review synthesized the results from 59 studies and identified many barriers and facilitators related to HIV care and treatment, as experienced by MLWH in OECD countries. Drawing on both the HCC and the Socio-Ecological Model, this review is the first to conduct a multilevel analysis of the complex factors that affect MLWH across 17 OECD countries.

This review highlights that most reported barriers are associated with *retention* in care (i.e., long-term engagement with HIV care) and treatment adherence (i.e., long-term adherence to medication as prescribed), and not with linkage to care and treatment initiation or the achievement of viral suppression. In fact, 68% of reported barriers centered on retention, as compared to 30% on linkage. Additionally, almost two-thirds of these barriers focused on the individual level (64%). In fact, a crucial finding of this review was the considerable impediment unmet or unfulfilled basic needs (e.g., housing, food security, financial stability, work commitments, mental health) can be to MLWH. If these patients are linked to care and treatment but their "competing priorities" are not addressed, disengagement is likely.

In comparison, a key facilitator identified in this review was establishing multidisciplinary teams for HIV care in clinical settings, as this enabled the hiring of designated clinicians and staff to ensure that MLWH's essential needs were met. Social workers and clinical staff with similar training, were particularly adept at facilitating access to compassionate care for MLWH despite differences in legal status, while also helping these patients secure housing, food, financial, and psychological support. These results highlight the great potential of multidisciplinary teams to resolve competing issues faced by MLWH, and thereby improve their long-term engagement with HIV care and treatment. As such, HIV-related care settings, and especially primary HIV care clinics, should consider adopting multidisciplinary models with sufficient funding for a social worker or clinical staff member with similar training and expertise. This can be done in conjunction with the adoption of other existing evidence-based interventions that improve HIV care engagement and treatment adherence, such as the Centers for Disease Control and Prevention's Anti-Retroviral Treatment and Access to Services intervention,[113] or the Retention through Enhanced Personal Contacts intervention as presented by Gardener et al[114] – though these would require tailoring and piloting to ensure they are sufficiently adapted to the needs of MLWH.

## A Note on Achieving Viral Suppression

Very few barriers and facilitators directly related to achieving viral suppression were identified. This is understandable as final or downstream steps in the HCC are impacted by factors associated with upstream care steps. However, this finding may also indicate that much work remains to be done at the levels of linkage, retention, and re-engagement for MLWH globally (e.g., for those who have been lost to follow-up or dropped out of care). Additionally, this may point to the need to better understand bidirectional movements along the steps of the HCC (e.g., managing loss-to-follow-up of MLWH due to further migration). In this respect, future scholars may want to consider utilizing the HCC framework established by Kay, Batey, and Mugavero,[29] which highlights these dynamic movements along the spectrum of HIV care engagement, or the revised HCC framework presented by Ehrenkranz et al.[115] which explicitly integrates the idea of disengagement and re-engagement with HIV care.

## Intersectionality & Paths for Future Research

Many of the barriers identified in this review, particularly those related to the individual-level of the Socio-Ecological Model (e.g., fear, lack of host-language proficiency, and care navigation-related challenges) have been previously reported as commonly experienced by international migrant populations living in OECD countries.[116-122] However, several included studies showed how complex identity dynamics experienced by MLWH (e.g., based on their immigration or HIV status, gender, and racial or ethnic backgrounds) magnified barriers. For example, experiences and perceptions of stigma based on one's HIV *and* migrant statuses were reported to amplify MLWH's perceived vulnerability when accessing care and treatment. Intersectionality theory, which posits that people generally experience discrimination and oppression uniquely and that consideration should be given to all potential contributors to their marginalization or vulnerability, may be useful to future, more granular, analyses of these issues. Importantly, the viability of this theory has previously been explored in scholarly articles.[123,124]

## The COVID-19 Pandemic

Since the implementation of our search strategy (March 25, 2020), the COVID-19 pandemic has taken an unprecedented toll on society. The effects of COVID-19 have penetrated HIV care and have affected MLWH in diverse ways.[125-128] Economic disruptions, social and physical isolation, vaccine and care access hesitancy, overburdened health systems, shifts in clinical and funding priorities from HIV care to COVID-19, among many other challenges, have fed into the impact the pandemic has had (and continues to have) on MLWH. Future studies should thoroughly explore the challenges faced by MLWH during the COVID-19 pandemic. However, we posit that adapting the clinical environment to host a multidisciplinary team with a designated community health worker, case manager, social worker, or health advisor would help address the needs of MLWH and facilitate their sustained engagement in care amidst the pandemic and future instances of lockdown and social distancing measures.

### Strengths & Limitations

The comparability of the data and the generalizability of interpretations were complicated by variation across OECD countries in the legal definition and descriptions of categories or statuses of migrants and in their healthcare eligibility (i.e., existence of specific health insurance or care provision policies). They were also complicated by the overall heterogeneity of the migrant populations studied. Furthermore, retained studies lacked consistent reporting of data in relation to the age range, age at migration, and years living in the receiving country for each sample of MLWH. Nevertheless, comparing data from OECD countries can generate a comprehensive understanding of health system performance that can help guide and promote the development of evidence-based international standards for a range of social and economic challenges.[129-131] Use of the SMSR methodology, which enables the amalgamation and analysis of data from various study designs, alongside qualitative content analysis was key to mitigating this limitation. The qualitative analysis also indicated that despite the heterogeneity of the data sources, the reported barriers and facilitators faced by MLWH proved similar regardless of their ethnic and geographic origins, host country, sex or gender, and legal status.

As this is a systematic review, results are necessarily secondary in nature (i.e., developed based on findings from other scholars) and may reflect research interests (e.g., retention issues) in the scholarly community. However, rigorous analytical techniques (i.e., qualitative content analysis) and careful interpretation of data using established frameworks (i.e., the HCC) and models (i.e., the Socio-Ecological model), nuanced by the engagement of patient-partners, helps address this limitation in part.

A final limitation to note is that only studies published in English were retained beyond the full-text screening phase. OECD countries have a diversity of official languages, and therefore, non-English speaking countries may be under-represented in the dataset. Twenty-eight studies were excluded on the basis of language during the full-text review phase. However, the dataset does include studies from 17 OECD countries, with the majority (n=12) not having English as their primary official language.

In conclusion, this is the first review to report a multilevel analysis of barriers and facilitators that impact MLWH in OECD countries with respect to linkage and retention in HIV care and treatment. While linking MLWH to care is challenging, the problem of long-term engagement in HIV care and treatment seems to have received the most attention. Addressing policy-related barriers may improve initial linkage to HIV care and treatment. However, adapting clinical environments to better address the complex individual needs and concerns of MLWH with multidisciplinary care models and sufficient funding for social workers or clinical staff with similar training, offers a promising strategy to attenuate and potentially resolve care retention issues across OECD countries.

## Acknowledgements

The authors would like to thank Taline Ekmekjian for her support as an academic librarian. She assisted with the revision of our eligibility criteria and the development of the search strategy.

## Author Disclosure Statement

The authors have no conflict of interest to disclose.

## Funding Statement

AKA was supported by a doctoral scholarship from the Fonds de Recherche Québec – Santé (FRQ-S) given in partnership with the Strategy for Patient-Oriented Research (SPOR) Support Unit of Quebec. AKA is supported by a Vanier Canada Graduate Scholarship given through the Canadian Institutes of Health Research. BL is holder of a Canadian Institute of Health Research, Strategy for Patient Oriented-Research (CIHR/SPOR) Mentorship Chair in Innovative Clinical Trials for HIV Care. BL holds a grant funded by Gilead Investigator Sponsored Research Program, which partially funded AKA’s doctoral studies. BL is also supported by a career award LE 250 from the

Quebec's Ministry of Health for researchers in Family Medicine. NK is supported by a career award from the FRQ-S (Junior 1).

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# Chapter 3: Exploring the Experiences of MLWH Enrolled in the ASAP Study Qualitatively

## Preamble to Chapter 3

Through the SMSR conducted in chapter 2, it was made apparent that MLWH encounter numerous complex barriers at each step of their HIV care journey beyond diagnosis and across each level of the socio-ecological model. Comparatively few facilitators to HIV care and treatment engagement beyond the HIV testing phase were reported in the literature. Interestingly, most barrier and facilitators were associated with the individual and organizational levels of the socio-ecological model and were centred around retention in HIV care and treatment. Specifically, this review stressed that adapting clinical environments to better address the complex individual needs and concerns of MLWH with multidisciplinary care models, dispensing ART on-site (i.e., not fragmenting health services), and having sufficient funding for social workers or clinical staff with similar training, offers a promising strategy to attenuate and potentially resolve care retention issues across OECD countries.

While I was conducting my SMSR, my supervisor Dr. Bertrand Lebouché initiated, in January 2020, the ASAP study. ASAP is a 96-week pilot feasibility study with a prospective cohort design implemented at the Chronic Viral Illness Service of the McGill University Health Centre (CVIS/MUHC), a quaternary hospital-based clinic serving the largest proportion of MLWH in Montreal, Canada. This study was initiated to increase support for the rising number of MLWH and PLWH who have precarious legal and insurance statuses in Canada. ASAP participants are provided with free ART, within a multidisciplinary team composed of on-site physicians, nurses, social workers, and a pharmacist. Another innovation this approach brings is that it aims to dispense ART on-site to patients rapidly (i.e., ideally within 7 days of being linked to care at the CVIS/MUHC). Therefore, the ASAP study embodies a number of the facilitators identified in the SMSR, and provides an excellent opportunity to explore the experiences of MLWH enrolled in this innovative approach to care in Canada, through both qualitative and quantitative approaches.

However, it is necessary to note that during this time, the COVID-19 pandemic dramatically disrupted participant recruitment and data collection at the CVIS/MUHC. With limited patient enrolment and progress through the 96-week program, it was difficult to begin quantitatively analyzing patient-reported experiences and clinical outcomes for MLWH enrolled in ASAP. However, by March 2022, 32 qualitative interviews had been conducted with 16 MLWH at three time-points (16 after 1 week of ART initiation, 8 after 24 weeks, 8 after 48 weeks). This was sufficient for me to complete a thorough qualitative exploration which is presented below in manuscript 3. Note that I published this work in the *Journal of Personalized Medicine*, which has a current impact factor of 3.4. The electronic version of this article can be found at: https://www.mdpi.com/2075-4426/12/9/1497. This manuscript went through a rigorous peer-review process.

# Chapter 3, Manuscript 3: Longitudinal Experiences of MLWH in the ASAP Study

## Title

Experiences of migrant people living with HIV in a multidisciplinary HIV care setting with rapid B/F/TAF initiation and cost-covered treatment: The 'ASAP' Study

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## Abstract

This study aimed to explore the experiences of migrant people living with HIV (MLWH) enrolled in a Montreal-based multidisciplinary HIV care clinic with rapid antiretroviral treatment (ART) initiation and cost-covered ART. Between February 2020 and March 2022, 32 interviews were conducted with 16 MLWH at three time-points (16 after 1 week of ART initiation, 8 after 24 weeks, 8 after 48 weeks). Interviews were analyzed via the Framework Method. Thirty categories were identified, capturing experiences across the HIV care cascade. At diagnosis, most MLWH described "initially experiencing distress." At linkage, almost all MLWH discussed "navigating the health system with difficulty." At treatment initiation, almost all MLWH expressed "being satisfied with treatment" particularly due to a lack of side effects. Regarding care retention, all MLWH noted "facing psychosocial or health-related challenges beyond HIV." Regarding ART adherence, most MLWH expressed "being satisfied with treatment" with emphasis on their taking control of HIV. At viral suppression, MLWH mentioned "finding more peace of mind since becoming undetectable." Regarding perceived health-related quality of life, most MLWH indicated "being helped by a supportive social network." Efficient, humanizing, and holistic approaches to care in a multidisciplinary setting, coupled with rapid and free ART initiation, seemed to help alleviate patient concerns, address their bio-psycho-social challenges, encourage their initial and sustained engagement with HIV care and treatment, and ultimately contribute to positive experiences.

## Keywords

HIV; Migrants; B/F/TAF; Antiretroviral; Rapid ART Initiation; Multidisciplinary; Cost-Covered Treatment; HIV Care Cascade; Patient Experiences

## INTRODUCTION

Migrant people living with HIV (MLWH) are a diverse, growing, and at times a vulnerable and/or marginalized population in Canada and other countries affiliated with the Organization for Economic Co-Operation and Development [1-3]. Across these countries, MLWH often experience delayed entry into HIV care, late antiretroviral treatment (ART) initiation, higher rates of care drop-out, poorer adherence to ART, and variable rates of viral suppression when compared to native-born populations living with HIV [1-9]. These issues are in part due to the numerous multilevel barriers that MLWH experience across their HIV care trajectory [10-22].

To address barriers faced by MLWH, who have diverse ethnic, geographic, and cultural origins, and may often experience precarious legal and health coverage statuses, targeted interventions may be necessary [3]. In fact, HIV scholars who call for an equity-focused approach to ending the HIV epidemic point out that when efforts are targeted to specific populations with the heaviest burden of HIV, there is greater potential for improved population health and lower HIV transmission rates [23]. Targeted interventions which specifically respond to population needs and associated social determinants of health (e.g., housing, poverty, and other barriers to care based on structural racism) may also be economically favourable [23]. Multidisciplinary care models with sufficient funding for social workers or staff with similar training and expertise (e.g., case managers) may facilitate the development and implementation of targeted interventions. These professionals can assist MLWH in addressing specific individual-level challenges (e.g., immigration, obtaining health coverage, finding a job, mental health issues), which require resolution to allow for long-term engagement with HIV care and treatment [22].

Rapid ART initiation has been endorsed as another strategy to efficiently engage populations in HIV care and treatment, particularly those that are vulnerable or marginalized [24-31]. Rapid ART initiation is defined as linkage to care and start of ART as soon as possible after a new HIV diagnosis [30]. Major advancements in ART over the last two decades have given rise to biological and clinical benefits for people living with HIV, and public health benefits for populations and public health systems in general [24-30]. Moreover, rapid ART initiation has been shown to reduce loss-to-follow-up between HIV testing and treatment initiation, improve retention in care, and reduce time to viral suppression, without compromising safety [25, 26, 28-31]. However, to ensure that potentially vulnerable and marginalized groups like MLWH can experience sustained benefit from rapid ART initiation, additional resources and support are recommended [27]. Using a multidisciplinary model of HIV care with rapid ART initiation may assist in addressing underlying challenges that prevent patients from starting and remaining engaged in care and treatment, while also effectively responding to emerging priorities for HIV service delivery [32]. Additionally, having pharmacists embedded in the multidisciplinary model of HIV care may facilitate rapid ART initiation through easier and more efficient access to treatment and thorough consideration of drug-drug interactions. Moreover, if ART is provided free-of-charge, this may further reduce challenges faced by MLWH with treatment initiation (e.g., lack of health coverage).

Importantly, although the clinical and public health importance of rapid ART initiation and multidisciplinary HIV care have been well described in the literature, the experiences of MLWH around such care models have rarely been explored, especially in the context of cost-covered treatment. Exploring patient experience is important to understand how services are received by patients and how they could be improved to better meet their needs [33, 34]. This information may also help orient priorities within clinics or across health systems [33, 34]. Thus, the purpose of this study is to explore and document the experiences of MLWH who are enrolled in a care model comprising multidisciplinary HIV care, rapid ART initiation, and cost-covered treatment.

## MATERIALS AND METHODS

### *Research Question*

The following question guided this research endeavour: what are the care experiences of MLWH enrolled in multidisciplinary HIV care with free and rapid initiation of ART?

### *Design*

In January 2020, we initiated a 96-week prospective cohort study (the 'ASAP' study) with a convergent mixed-method design at the Chronic Viral Illness Service of the McGill University Health Centre (CVIS/MUHC), a quaternary hospital-based clinic serving the largest proportion of MLWH in Montreal, Canada. As of June 2022, 40 patients were enrolled, of whom 30 were migrants. All participating patients were provided care by a multidisciplinary team composed of on-site physicians, nurses, social workers, pharmacists, and a psychiatrist.

All patients received bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) as soon as possible (ideally within 7 days) after being linked to care. B/F/TAF was provided free of charge for the duration of the study. It is a once-daily, single-tablet, regimen for the treatment of HIV-1 infection in adults [35, 36]. It has a high genetic barrier to the development of resistance, is generally well tolerated, requires no prior HLA-B*5701 testing, fulfils the antiretroviral regimen requirement for patients with hepatitis B virus co-infection, and can be used in renally impaired patients with creatinine clearance ≥ 30 mL/min [35, 36]. Moreover, B/F/TAF has few potential drug-drug interactions, a small pill size, no food intake requirements, and no baseline viral load or CD4 cell count restrictions, thus making it suitable for rapid ART initiation [36]. Health Canada approved B/F/TAF as a complete regimen for the treatment of HIV-1 infection in July 2018 [36]. Details on the 'ASAP' study's design are reported elsewhere [37]. This manuscript presents an analysis of the study's qualitative data collected from MLWH up to March 2022.

### *Data Collection*

Semi-structured individual interviews were conducted with MLWH face-to-face, by telephone, or video-conferencing at three time-points: after 1 week of treatment initiation, after 24 weeks, and after 48 weeks. The first interview solicits information on the experience of beginning HIV care and treatment, focusing specifically on participants' satisfaction, worries, expected benefits, and suggestions for improving HIV services. The second interview initially asks patients to recount their experience of being linked to HIV care and treatment. Patients are then asked to describe how their "general situation" has evolved since beginning HIV care and treatment (with prompts around changes in quality of life, sociodemographics, and access to social services and healthcare). Then, the interview probes the impact of services and staff at the clinic on the participants' "situation" (i.e., their health, wellbeing, and life in general) and treatment taking. It concludes with a question about their thoughts on their care and treatment (with prompts on the negative and positive aspects, things that could be improved, and related impacts of the immigration process). The third interview asks about responsibility to manage care and treatment, comfort with care providers, impacts on health and lifestyle since initiating care and treatment, and suggestions for improving services at the clinic. See the supplementary material for the full interview guides.

### *Data Analysis*

In the ASAP study, interviews with MLWH were conducted in English, French, and Spanish. Data pertaining only to interviews conducted in English and French were analyzed for this article (as these were the only interviews available for analysis at this time and because most of our team is fluent in both of these languages). Interviews were transcribed verbatim by a professional transcriber who is fluent in English and French. The transcribed interviews were imported into QSR's NVIVO 12 and analyzed via the Framework Method [38-41]. This qualitative method, in use since the 1980s, was originally developed by Richie and Spencer as a pragmatic approach for large-scale social policy research [38-41]. Over the last four decades, it has been widely taken up in medical and health research [38]. Gale et al. highlight the appropriateness of this method when engaging in applied health research with large qualitative datasets and multidisciplinary teams that incorporate patients, clinicians, and scientists [38], which is precisely the context in which this study was conducted. The Framework Method provides a highly structured approach to data analysis akin to content and thematic analysis; however, its defining feature is the presentation of results through data displays or matrices [38-41].

The approach by Gale et al. consists of seven stages: (1) transcription, where qualitative data are transcribed; (2) data familiarization, where researchers review the dataset to understand its content and structure and begin interpreting the data and identifying possible codes and patterns; (3) coding, where researchers read transcripts line-by-line and apply a paraphrase or label (a 'code') to each line or substantive block of text; (4) developing a working analytical framework, where, after coding the first few transcripts, researchers meet to iteratively compare codes and discuss possible categories for grouping codes; (5) applying the analytical framework, where the agreed upon analytical framework is applied to all transcripts; (6) charting data into the framework matrix, where summarized data/quotes are added, by category, to a data display or matrix, which is then viewed, revised, and validated by multidisciplinary members of the team; and lastly, (7) interpreting the data, where characteristics of and differences between data are identified, and if data are rich enough, findings can go beyond description to explanation of phenomena [38].

An inductive-deductive approach to analysis was taken in this study. Codes were inductively generated to thoroughly capture participant experiences, and were iteratively revised and grouped to generate categories. Categories were then deductively grouped based on the seven steps of the HIV care cascade (i.e., HIV diagnosis, linkage to care, treatment initiation, retention in care, adherence to treatment, viral suppression, and health-related quality of life) [42, 43]. Grouping by HIV care cascade steps occurred based on the way MLWH described their experiences, feelings, or overall thoughts. For example, when participants spoke about their experience of being linked to care, all codes generated in that block of text were ascribed to the linkage step of the cascade. Caution was taken when participants had not experienced a particular HIV care cascade step (e.g., retention in care) but still described their initial feelings and thoughts about that step in the earlier interviews. The first author performed all coding. Codes, categories, and the framework matrix were iteratively reviewed, revised, and validated through research and stakeholder committee meetings held between May 2022 and June 2022. Specifically, seven meetings were held with the research team responsible for analysis (AKA, KE, BL, and twice with DL); one was held with the first author's thesis advisory committee (BL, AQV, NK, and IV), two were held one-on-one with two different patient-partners (names kept anonymous to protect identities); one was held with the study coordinator (ED); and an additional meeting was held with a research nurse (LDB). Note that only categories with three or more contributing participants (i.e., minimum saturation of 19%) are presented in this manuscript to further ensure trustworthiness.

### *Patient and Stakeholder Engagement*

A patient and stakeholder engagement approach was taken whereby key stakeholders (i.e., patients, clinicians, and community organization leaders) were involved throughout the research process via advisory committee meetings [44-46]. Specifically, three MLWH (a Latin American asylum seeker, a European international student, and an African asylum seeker) receiving care at the study site (CVIS/MUHC), three community representatives, and five CVIS/MUHC healthcare professionals (i.e., two social workers and 3 nurses): provided feedback on the study design; validated the 'ASAP' study protocol; and reviewed the interview schedules for acceptability, clarity, and quality [37]. Also, as noted above, two patient-partners, a research nurse, and a research coordinator were involved in data analysis through one-on-one engagement to enable appropriate interpretation of the data for this study.

### *Ethics*

This study was conducted in accordance with applicable Health Canada regulations, International Conference on Harmonisation guidelines on current Good Clinical Practice, and the Declaration of Helsinki. It was approved by the Research Ethics Board of the Research Institute of the McGill University Health Centre (reference #: MP-37-2020-4911). Informed consent was obtained from all study participants.

## RESULTS

A total of 32 semi-structured interviews were conducted with 16 MLWH at three time-points (16 after 1 week of treatment initiation, 8 after 24 weeks, and 8 after 48 weeks) between

February 2020 and March 2022. Average duration of interviews based on available timestamps (n=26/32; timestamps were unavailable for interviews where participants did not want to be recorded) were: 20 minutes (range: 15-43 minutes); 41 minutes (range: 23-72 minutes); and 28 minutes (range: 13-42 minutes), respectively.

### *Participant demographics at enrollment*

Interviewee sociodemographic characteristics at enrollment are displayed in Table 1. The average age of participants was 36 years old (range: 24-55). Most (11/16; 69%) were males that identified as gay or bisexual. Participants were born in Africa (n=6), Asia (n=4), Europe (n=1), Latin America (n=3), and the Caribbean (n=2). Participants had varied immigration statuses in Canada: asylum seeker (7/16; 44%); international student (3/16; 19%); international worker (1/16; 6%); visitor (3/16; 19%), naturalized citizen (1/16; 6%) and undocumented (1/16; 6%). Seven participants (44%) had no or low health coverage, whereas nine (56%) had sufficient coverage (i.e., HIV treatment and care was covered by their insurance). Most had prior university level education (10/16; 63%), while the remaining participants had either a college diploma (4/16; 25%) or secondary education/professional degree (2/16; 13%). Most were unemployed (10/16; 63%); all others had paid employment (6/16; 38%).

### *Categories*

Through the framework analysis, a total of 30 categories were identified which capture the experiences of MLWH across the HIV care cascade steps while in multidisciplinary HIV care, with rapid ART initiation, and cost-covered ART. Categories are presented in quotations and associated sub-categories are presented in italics. Figure 1 provides a summary of the main categories. The data framework matrix, presented in Table 2, provides illustrative interview excerpts. Table 2 also presents the number of participants that contributed to the category (i.e., out of the 16 participants, how many spoke about each category and sub-category) and the number of interviews that contributed to the category (i.e., out of the 32 interviews, how many had content for each category and sub-category). This information is provided to demonstrate data saturation both by participant number and longitudinally (since only half of the participants were able to complete interviews in weeks 24 and 48). Saturation level by number of participants is also provided in the text.

### *HIV Diagnosis*

Four categories were ascribed to the HIV diagnosis step of the HIV care cascade. Upon learning of their positive HIV status, most participants (10/16) discussed "initially experiencing distress," or more specifically, feeling: worried and/or scared (7/16), shocked (6/16), confused (6/16), or like they lost control of their life (4/16). Beyond initial distress, a little over a third of the participants (6/16) were "questioning the impact of HIV diagnosis on immigration," specifically wondering about the effect that their new HIV status would have on their immigration applications. Four participants also discussed how they were "fearing stigmatization." In this regard, participants expressed concern about how others would treat them once they found out about their HIV status (e.g., backbiting in the community, being discriminated against by healthcare professionals, being ostracized by family, losing one's job). Three participants also underscored their "uncertainty about HIV testing requirements for migrants." These participants explained that due to variation in policies, certain migrant populations (e.g., temporary visitors or international students from certain regions) were exempt from HIV testing via the Immigration Medical Exam. As a result, testing for HIV was either left to the patients' judgement or occurred during specialty care for another health issue.

### *Linkage to HIV Care*

Six categories were ascribed to the linkage to care step of the HIV care cascade. While being linked to HIV care, almost all interviewed participants (15/16) mentioned that they were "navigating the health system with difficulty." Almost all participants (15/16) discussed challenges with navigation across clinics and organizations (e.g., from the service that diagnosed them to their HIV care centre, the CVIS/MUHC). Nine discussed challenges specifically within the CVIS/MUHC clinic. Difficulties with navigation were attributed to their unfamiliarity with the Québec culture, language, and healthcare system, as well as to confusion around the specific roles and responsibilities of the numerous healthcare professionals they were encountering at care onset.

An element that most participants (14/16) described as being indispensable to their early engagement with care and treatment was experiencing "humanizing clinical encounters." This category encompassed five sub-categories: feeling supported and cared for (12/16), feeling kindness from healthcare professionals (10/16), feeling safe and comfortable (7/16), feeling heard and accepted (5/16), and feeling respected (3/16). Participants also expressed "being reassured about living with HIV" (12/16) which was deemed helpful in calming initial negative emotions and fears. Additionally, most participants (13/16) discussed "receiving personalized health information" which consisted of adapted answers to HIV-related health concerns, reference to resources to better manage health and wellbeing, and advice based on the individual and their lifestyle. Ten participants emphasized their experience of "quickly accessing care," which was often expressed with appreciation. The final category associated with linkage to HIV care was "facing psychosocial challenges beyond HIV" (12/16). Participants expressed that, beyond their HIV, they dealt with tremendous stressors including: mental health (11/16), immigration (8/16), securing finances and/or health insurance (6/16), and learning Quebec's official language (4/16).

### *Treatment Initiation*

Four categories were ascribed to the ART initiation step of the HIV care cascade. Almost all participants (15/16) expressed "being satisfied with treatment" within the first week of initiation. Satisfaction with B/F/TAF was attributed to seven main factors: lack of side effects (11/16), improved health (7/16), being able to set the daily time for treatment taking (7/16), an easy treatment regimen (6/16), quick access to treatment (6/16), cost-covered treatment (3/16), and taking control of HIV (3/16). However, most participants (11/16) discussed "having concerns with starting treatment." Specifically, participants indicated fearing side effects in the short and long-term (8/16) and that taking treatment for life was daunting (5/16). Half of the participants expressed "needing reassurance about treatment safety" (8/16) before feeling comfortable enough to begin taking it and/or after experiencing initial side effects. Interestingly, seven participants noted "dissipating side effects over time" after one week of treatment.

### *Retention in Care*

Eight categories were ascribed to the retention in care step of the HIV care cascade. All participants (16/16), at some point during their journey between being linked to HIV care and achieving viral suppression, discussed "facing psychosocial or health-related challenges beyond HIV." These challenges included: difficulty obtaining legal status in Canada and navigating the immigration process (12/16), difficulty accessing healthcare for issues other than HIV (12/16), a lack of income (12/16), social isolation (13/16), fearing COVID-19 infection (11/16), and difficulty integrating into Canadian society (8/16).

Almost all participants (15/16) discussed "feeling empowered to self-manage HIV." They discussed three factors that contributed to this feeling: receiving education about managing HIV from healthcare professionals (13/16) (e.g., who answered HIV-related questions, explained biomedical test results, provided health advice), receiving reassurance about living with HIV (13/16) (e.g., feeling consoled by healthcare professionals about living with HIV), and receiving relevant resources to manage health (6/16) (e.g., healthcare professionals providing information about social and HIV-specific organizations that patients can access, alongside sharing educational websites for reliable HIV information). Relatedly, most participants (12/16) also expressed their experience with "humanizing clinical encounters." These encounters were described along six dimensions, five of which remain the same as those described at linkage: feeling supported and cared for (9/16), feeling kindness from healthcare professionals (10/16), feeling safe and comfortable (10/16), building a patient-provider relationship based on trust (7/16), feeling heard and accepted (8/16), and feeling respected (7/16).

Most participants (11/16) noted that they were "enjoying smooth operations in the clinic," which consisted of five factors: accessible healthcare professionals (9/16), easy access to free care (8/16), care coordination issues often dissipated and/or addressed (8/16) (e.g., patient confusion around navigation within the clinic diminished as they became more familiar with the system or after receiving clarification from healthcare professionals), easy appointment bookings (7/16), and ability to speak with healthcare professionals in one's native language (4/16) (which in these cases were English, French, and Spanish).

Most participants (12/16) described an experience of "receiving holistic care" through their multidisciplinary team. This was discussed by participants as care that addressed their bio-psycho-social needs and sometimes expanded beyond their HIV-related health concerns (e.g., immigration and mental health related support). In this regard, participants expressed the importance of complimentary care provided by different clinicians on their team. Notably, patients mentioned turning to their doctors for their biomedical healthcare needs (e.g., questions around HIV management) and to social workers for their psychosocial needs (e.g., questions around food security or financial challenges). In fact, nine participants specifically highlighted the importance of the social worker in assisting with their immigration process, dealing with financial challenges, or being linked to other community organizations or services.

Two-thirds of participants (11/16) discussed "wanting more frequent contact with healthcare professionals" through four means in particular: via telecommunication (10/16), outside of regular work hours (4/16), via more appointments in general (4/16), and via more appointments specifically with the social worker (4/16). Most participants (11/16) mentioned "dealing with HIV-related psychological distress" (e.g., depression or fear of immigration rejection due to their HIV). Over half of participants (9/16) also indicated "sharing responsibility to manage HIV" with healthcare professionals. All nine participants discussed specific healthcare team duties, which included: providing clear explanations and guidance (8/16), creating kind and safe environments (7/16), ensuring that patient health improves (6/16), helping with navigation (5/15), and providing medication (4/16). Eight patients discussed patient duties which included: self-managing HIV care and treatment (8/16), following clinicians' instructions (6/16), asking questions (5/16), and attending appointments (3/16).

### *Adherence to Treatment*

Two categories were ascribed to the treatment adherence step of the HIV care cascade. Two-thirds of interviewed participants (11/16) expressed "being satisfied with treatment" beyond the first few days of starting treatment. Their satisfaction with B/F/TAF was attributed to seven factors: improved health (8/16), an easy treatment regimen (7/16), taking control of HIV (6/16), quick access to treatment (6/16), a consistent supply of treatment (5/16), a lack of side effects (4/16), and cost-covered treatment (4/16). Two-thirds of participants (11/16) also mentioned "feeling resilient and responsible" which was discussed as important in facilitating their sustained adherence to treatment. This feeling was most often identified as coming from a desire to control HIV (6/16) and to protect others (4/16).

### *Viral Suppression*

One category was ascribed to the viral suppression step of the HIV care cascade. Five participants expressed "finding more peace of mind since becoming undetectable." Participants highlighted that alongside feeling relieved, they also felt that this milestone confirmed their discipline and control over HIV.

### *Perceived Health-related Quality of Life (HrQoL)*

Five categories were ascribed to the perceived HrQoL step of the HIV care cascade. Most participants (12/16) discussed “being helped by a supportive social network” beyond their healthcare team. Most (11/16) mentioned “wanting a long, healthy, and normal life.” Relatedly, over half (9/16) indicated “deciding to improve lifestyle habits since diagnosis.” Steps to improve their lifestyle habits included: being more mindful and/or careful with their health and wellbeing (7/16), eating healthier (7/16), exercising more (5/16), and taking more time for self-reflection and/or self-care (5/16). Furthermore, half (8/16) mentioned “feeling better physically and mentally since starting care and treatment.” Finally, seven participants expressed that they were “fostering quality-of-life through activities” such as focusing on their occupation, education, and/or hobbies.

**Manuscript 3, Table 1.** Sociodemographics at study enrollment of interviewed MLWH.

| Participant # | Age | Sex | Sexual Orientation | Region of Birth | Immigration Status | Health Coverage | Education | Paid Employment Status | Interviews Completed | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Week 1 | Week 24 | Week 48 |
| 1 | 41–50 | Male | Heterosexual | East Asia | Visitor | No or Low Coverage | College/CEGEP/Technical Degree | Unemployed | ✓ | ✓ | ✓ |
| 2 | 21–30 | Male | Bisexual | East Africa | International Student | No or Low Coverage | University | Unemployed | ✓ | ✓ | ✓ |
| 3 | 21–30 | Female | Heterosexual | Southern Africa | Asylum Seeker | Sufficient | University | Paid Employment | ✓ | ✓ | ✓ |
| 4 | 51–60 | Female | Heterosexual | Southern Africa | Asylum Seeker | Sufficient | College/CEGEP/Technical Degree | Unemployed | ✓ | ✓ | ✓ |
| 5 | 41–50 | Male | Homosexual | Southeast Asia | Asylum Seeker | Sufficient | University | Unemployed | ✓ | ✓ | ✗ |
| 6 | 21–30 | Male | Homosexual | North Africa | International Student | No or Low Coverage | University | Unemployed | ✓ | ✓ | ✓ |
| 7 | 31–40 | Male | Homosexual | Latin America | Asylum Seeker | Sufficient | College/CEGEP/Technical Degree | Paid Employment | ✓ | ✓ | ✓ |
| 8 | 21–30 | Male | Bisexual | North Africa | Temporary Worker | No or Low Coverage | University | Paid Employment | ✓ | ✗ | ✓ |
| 9 | 31–40 | Male | Bisexual | Southern Africa | Asylum Seeker | Sufficient | University | Paid Employment | ✓ | ✓ | ✓ |
| 10 | 21–30 | Male | Homosexual | Latin America | No Status | No or Low Coverage | University | Paid Employment | ✓ | ✗ | ✗ |
| 11 | 41–50 | Male | Homosexual | Latin America | Visitor | Sufficient | University | Unemployed | ✓ | ✗ | ✗ |
| 12 | 21–30 | Male | Homosexual | East Asia | International Student | No or Low Coverage | Secondary/Professional Degree | Paid Employment | ✓ | ✗ | ✗ |
| 13 | 21–30 | Male | Homosexual | Southeast Asia | Visitor | No or Low Coverage | Secondary/Professional Degree | Unemployed | ✓ | ✗ | ✗ |
| 14 | 21–30 | Male | Heterosexual | Caribbean | Asylum Seeker | Sufficient | College/CEGEP/Technical Degree | Unemployed | ✓ | ✗ | ✗ |
| 15 | 51–60 | Male | Homosexual | Western Europe | Naturalized Citizen | Sufficient | University | Unemployed | ✓ | ✗ | ✗ |
| 16 | 31–40 | Male | Heterosexual | Caribbean | Asylum Seeker | Sufficient | University | Unemployed | ✓ | ✗ | ✗ |

**Manuscript 3, Table 2.** Data framework matrix for MLWH care experiences.

| Category | Illustrative Excerpt | Contributing Participants (n/16) | Contributing Interviews (n/32) |
|---|---|---|---|
| **HIV Diagnosis** | | | |
| Initially experiencing distress<br>Feeling:<br>- Worried and/or scared<br>- Shocked<br>- Confused<br>- A loss of control over their life | "I could not believe it. I came [to Canada] with hopes, I had a dream. And I did not believe it […] I blacked out." Participant #5, W1 | 10<br><br>7<br>6<br>6<br>4 | 14<br><br>8<br>7<br>6<br>4 |
| Questioning the impact of HIV diagnosis on immigration | "I was very concerned about how the diagnosis might impact my permanent residency process. I thought I had to go back to my country." [Translated from French]—Participant #8, W1 | 6 | 6 |
| Fearing stigmatization (from clinicians, family, friends, and/or community members) | "I just worried about [how] to tell people around me, for the first thing."—Participant #30, W1 | 4 | 5 |
| Uncertainty about HIV testing requirements for migrants | "Normally, the work permit does not require a medical visit. […] It was not mandatory to have a medical examination. Me, I wanted to do [the examination] for if I find a volunteer [position] in a hospital [so] I can work without any problem…" [Translated from French]—Participant #6, W1 | 3 | 3 |
| **Linkage to HIV Care** | | | |
| Facing psychosocial challenges beyond HIV<br>- Mental health<br>- Immigration<br>- Securing finances and/or health insurance<br>- Learning Quebec's official language (French) | "I feel dreaded, maybe I wasn't eating well. I was worrying about so many things that, so many financial challenges there… I haven't seen doctors for months, years maybe, because I don't [have] insurance or anything and I couldn't afford it."—Participant #4, W48 | 12<br><br>11<br>8<br>6<br>4 | 23<br><br>16<br>10<br>10<br>4 |
| Navigating the health system with difficulty<br>- Across clinics and organizations<br>- Within the CVIS | "You have to understand as a foreigner […] for all the [health] system running in North America, I have no clue, no idea … And then the language problem as well, ok … Because especially for me, I'm a foreigner. I don't know the procedure [for accessing care] or the round, you know."—Participant #1, W1 | 15<br><br>15<br>9 | 21<br><br>20<br>12 |
| Humanizing clinical encounters<br>Feeling:<br>- Supported and cared for<br>- Kindness from healthcare professionals<br>- Safe and comfortable<br>- Heard and accepted<br>- Respected | "[The care I received] was perfect, I felt loved, cared for. I felt understood, for the first time. Everything that happened to me was not planned. I did not have a plan to take care of this. Then, when I arrived here, I had it, I had a plan. I met Dr. [name omitted] and the other people and they told me it was important to start care, and they told me how it would happen. I never felt any safer than I felt around these people. I felt helped […]"—Participant #4, W1 | 14<br><br>12<br>10<br>7<br>5<br>3 | 19<br><br>15<br>12<br>7<br>6<br>3 |
| Being reassured about living with HIV | "Well, before I had misinformation, bad ideas about this disease. But when I came to the hospital, [the health professionals] calmed me down. They said to | 12 | 19 |

|  |  |  |  |
|---|---|---|---|
|  | me, 'There's nothing to worry about. It's just that you're going to have treatment and then you're going to be fine and you're going to live your normal life.' With their behavior, how they talk to me, all that was good. I left the clinic really happy. […] There was a big difference between how I entered the clinic and when I left the clinic." [Translated from French]—Participant #6, W1 |  |  |
| Receiving personalized health information | "And also, I'm always asking like: 'My blood pressure, is that a good thing?' And they are like: 'Yeah, yeah, that's good.' And I always have questions and they answer very well … Because it's not like, you know when you ask a question and then somebody gives you one answer one way. No, they actually explain."—Participant #3, W1 | 13 | 17 |
| Quickly accessing care | "In fact, it went very quickly, I received a call telling me that I had to show up here. I was given the news and it was very difficult to take at that time. But very quickly, I think the next day or two, I had an appointment. And I met everyone, the social worker, the nurse, the doctor." [Translated from French]—Participant #2, W24 | 10 | 12 |
| **Treatment Initiation** |  |  |  |
| Being satisfied with treatment<br>Due to:<br>- Lack of side effects<br>- Improved health<br>- Being able to set the daily time for treatment taking<br>- An easy treatment regimen<br>- Quick access to treatment<br>- Cost-covered treatment<br>- Taking control of HIV | "The medicine is really good, it's really great because I don't feel bad at all. I feel fine, no pain, nothing." [Translated from French]—Participant #14, W1 | 15<br>11<br>7<br>7<br>6<br>6<br>3<br>3 | 18<br>11<br>8<br>7<br>7<br>6<br>4<br>4 |
| Having concerns with starting treatment<br>- Fearing side effects in the short and long-term<br>- Taking treatment for life was daunting | "[Starting treatment] was a hard decision because [when] you start, you cannot stop to take [the treatment]. But you cannot avoid the situation, you have to take it. So, you have no choice. So, personally it's hard because I like to choose everything that I do but, in this case, I don't have any option."—Participant #7, W1 | 11<br>8<br>5 | 15<br>9<br>8 |
| Needing reassurance about treatment safety | "The only thing for me is dizzy[ness]. Especially for the first day … So, I talked [about] this to Dr. [name omitted] again. He said: 'The body needs time for the medication.' So, it's have to be take time."—Participant #1, W1 | 8 | 13 |
| Dissipating side effects over time | "Well the first 2 days I was in a lot of pain. I think, like, my body was getting used to it, but I was really nauseous. And I had nightmares. A lot. […] it was intense at first, but now it's okay." [Translated from French]—Participant #2, W1 | 7 | 7 |

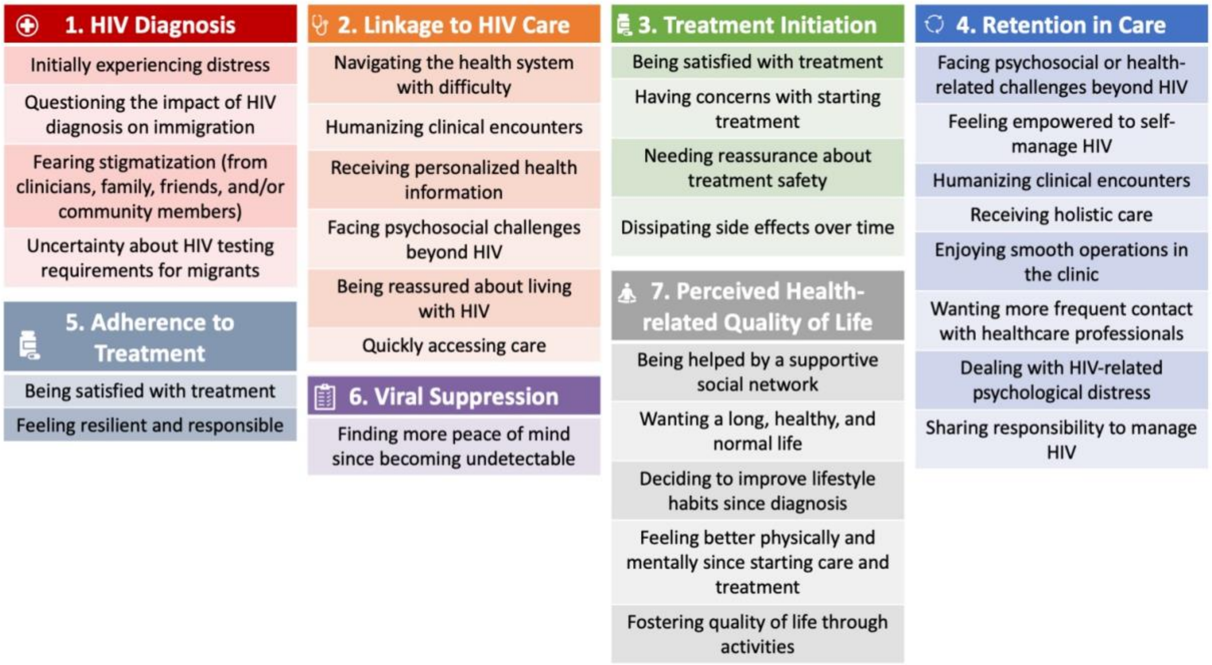
| | | | |
|---|---|---|---|
| **Retention in Care** | | | |
| Facing psychosocial or health-related challenges beyond HIV | “Yeah, not having enough money, that is a barrier. So, I couldn’t even go, if I wanted to go get some fruit or something, the money would challenge me. I would just stay and do with whatever I had. […] Financially, if there is some organizations that can help give you something like a coupon to go get some food at [the grocery store], whatever, I would welcome that. But I don’t have that kind of access.”—Participant #4, W48 | 16 | 31 |
| - Difficulty obtaining legal status in Canada and navigating the immigration process | | 12 | 22 |
| - Difficulty accessing healthcare for issues other than HIV | | 12 | 20 |
| - Lack of income | | 12 | 18 |
| - Social isolation | | 13 | 17 |
| - Fearing COVID-19 infection | | 11 | 13 |
| - Difficulty integrating into Canadian society | | 8 | 12 |
| Feeling empowered to self-manage HIV | “I got control of my health. So, if I come here then I understand: ‘Ok, my CD4 count is 715.’ Then I know: ‘Ok, now I know that [I’m] ok. I’m a step ahead. My health is excellent, so I have to maintain it.’ And what is CD4 count? That’s what I’m going on Google. On Google ‘what is CD4 count’. Then I know: ‘Ok. These are the white blood cells and bla, bla, bla. And what is viral load?’ That’s how I do it. So, yeah, I feel good about it. I feel like I’ve got control of my health.”—Participant #9, W48 | 15 | 31 |
| - Receiving education about managing HIV from healthcare professionals | | 13 | 29 |
| - Receiving reassurance about living with HIV | | 13 | 21 |
| - Receiving relevant resources to manage health | | 6 | 6 |
| Humanizing clinical encounters | “I think I like the attitude of the staff. You know, they’re always like happy and excited to see you and talk and listen. It’s more like they’re concern[ed] about, you know, for you as a person not just like as in a patient. Ok, you know, looking at the time. It’s not like that. It’s like they have time for you. I think that’s really good because, you know, you don’t feel like you’re inconveniencing people or anything like that. So, that makes me look forward to the visits and also all the questions I have, they get answered and they get explanations. Because naturally, I’m anxious on my health questions and things, and I always get them answered.”—Participant #3, W24 | 12 | 25 |
| - Feeling supported and cared for | | 9 | 21 |
| - Feeling kindness from healthcare professionals | | 10 | 20 |
| - Feeling safe and comfortable | | 10 | 15 |
| - Building a relationship based on trust with healthcare professionals | | 7 | 14 |
| - Feeling heard and accepted | | 8 | 12 |
| - Feeling respected | | 7 | 9 |
| Enjoying smooth operations in the clinic | “Personally, I find that the system you have adopted, especially for follow-ups with foreigners without [provincial health insurance], is really effective. […] And I also like the fact that the main person I come into contact with is either [the study coordinator] or [their HIV physician] only because they are the main people that are directly related to care, and who I think are, for this team, the main players in what you call caregivers. I like the format that even if I know there are people who are ‘back-up’ like social workers or nurses, there are still only two people who come into | 11 | 23 |
| - Accessible healthcare professionals | | 9 | 16 |
| - Easy access to free care | | 8 | 14 |
| - Care coordination issues often dissipated and/or addressed | | 8 | 14 |
| - Easy appointment bookings | | 7 | 8 |
| | | 4 | 4 |

|  |  |  |  |
|---|---|---|---|
| - Ability to speak with healthcare professionals in one's native language | contact with me. Because, from the moment there are too many people who intervene, it is more difficult to manage, you see. And I think that precisely for a patient, it is not what he would want that there are too many things to do. I think that's just like enough for it to be effective…" [Translated from French]—Participant #2, W48 |  |  |
| Receiving holistic care | "[The healthcare professionals] have different responsibilities because, you know, they all have different experience in their professions. So, like, for example, I have a social worker who can help me like: 'Oh, you can go to this if you need food, there are food banks or this, this.' And then, the doctor will tell you about like, you know, what questions I have about health and that's good. So, it's like they both have different… Everybody has their own [role]. Just like, you know, how the body like the head has its function and the hands has its function, I feel like it's like that. And then together they make like a complete."—Participant #3, W48 | 12 | 20 |
| Wanting more frequent contact with healthcare professionals | "I know that you guys are busy but maybe when I go after a month or so, just text, email: 'How is everything?', whatever. It would also add more to my confidence as well, knowing there are people out there."—Participant #4, W48 | 11 | 20 |
| - Via telecommunication |  | 10 | 16 |
| - With the social worker |  | 4 | 6 |
| - Outside of regular work hours |  | 4 | 6 |
| - Via more appointments |  | 4 | 5 |
| Dealing with HIV-related psychological distress | "Taking medication is important to physical health, but my social and mental health is still not good."—Participant #5, W24 | 11 | 17 |
| Sharing responsibility to manage HIV | "I feel 100% responsible. I'm on top of my game. I'm doing what's right. I don't forget. I don't need an alarm, my brain I programmed it. It's [a] mindset […] [The healthcare professionals are] 200% plus responsible for all this, yes. They've helped me a lot in achieving [undetectability], brought my confidence […] Everybody, the whole team involved in this, I appreciate what they have done. They have made me feel comfortable. They've never made me feel any different. Like I'm when I walk in, I'm like I'm coming home. So, this has really driven me to commit to it. If I [was] feeling judged or didn't feel wanted, or looked at in a different way I wouldn't have committed. So, they've helped a lot."—Participant #4, W48 | 9 | 9 |
| - Healthcare team duties |  | 9 | 9 |
| - Patient duties |  | 8 | 8 |
| **Adherence to Treatment** |  |  |  |
| Being satisfied with treatment<br>Due to: | "Oh, yeah, yeah, yeah! Absolutely! Yeah, there are a lot of changes. I feel energetic. I don't feel that fatigued. I feel confident. I see life with HIV. So, yeah definitely things, they have changed […] on the | 11 | 23 |
| - Improved health |  |  |  |
| - An easy treatment regimen |  | 8 | 14 |

| | | | |
|---|---|---|---|
| - Taking control of HIV<br>- Quick access to treatment<br>- Consistent supply of treatment<br>- Lack of side effects<br>- Cost-covered treatment | psychological side, it’s been so positive […] now I feel much better. My emotions they’re not as how they were before. So, yeah, I feel much better […] now I feel more calm. I feel like I’m at the right place. I’m getting the right treatment…”—Participant #9, W24 | 7<br>6<br>6<br>5<br>4<br>4 | 10<br>9<br>7<br>7<br>5<br>5 |
| Feeling resilient and responsible<br>- From a desire to control HIV<br>- From a desire to protect others | “I quickly got into the habit of taking [my HIV medication] because that's what I can do to keep my partner healthy and safe. So I take it and for me it's positive, it allows me to keep discipline and control over what's going on. […] I don't think I forget, or else it happens very rarely […] Then too, there is my discipline. I'm studying and working, so I can't, I don't have time to think about it, I maintain my discipline and I take my medicine and go to consultations, and the team is there for me too. So I don't think about the disease anymore, I do what I have to do and I don't have to think about it. It's just a routine for me.” [Translated from French]—Participant #2, W24 | 11<br>6<br>4 | 18<br>8<br>4 |
| **Viral Suppression** | | | |
| Finding more peace of mind since becoming undetectable | “Now it’s more quiet like more relaxed […] It’s like less anxiety […] Because now I know I’m undetectable so, it makes me feel like: ‘Ok, you are doing it well. It’s part of your routine. So, you are like well disciplined. So, you are doing something good for yourself.’ So, it’s a big difference. Like when I start, I was scared like: ‘Oh, maybe I’m not capable but I have to do it. I need to try it.’ And now I know I’m capable so it’s like: ‘Ok. It’s a really, really big change.’”—Participant #7, W24 | 5 | 6 |
| **Perceived Health-related Quality of Life** | | | |
| Being helped by a supportive social network | “Everyone around me just like told me to live a stronger and don’t think so much. They always support me […] Because I have a few close friends that I [can] talk [with]. Yeah, so everyone like [comforts] me and yeah, excepts [me].”—Participant #13, W1 | 12 | 16 |
| Deciding to improve lifestyle habits since diagnosis<br>- Being more careful with their health and wellbeing<br>- Eating healthier<br>- Exercising more<br>- Taking more time for self-reflection and/or self-care | “My quality of life is getting better because now I’m conscious. I was living carelessly and I cannot do it anymore. So it will improve my quality of life. This is a lifetime process and I need to make changes. I am reading books and information to know if I eat right so my immune system is helping me. I know this is all for the better.”—Participant #4, W24 | 9<br>7<br>7<br>5<br>5 | 15<br>10<br>8<br>7<br>6 |
| Wanting a long, healthy, and normal life | “I hope to be healthy and be able to live normal. I still have my hopes and dreams and I hope that the treatment will help me achieve them. I just wanna be healthy and normal. I don’t ask for [more] benefits.”—Participant #5, W1 | 11 | 14 |

| | | | |
|---|---|---|---|
| Feeling better physically and mentally since starting care and treatment | “In fact, everything that I had a problem with related to my physical health was related to the virus. […] Because I was diagnosed, I think, a little too late. […] so when I started taking the medicine, well all those little things that were bothering me [with] my physical health went away. So inevitably my mental health has improved […]” [Translated from French]—Participant #8, W48 | 8 | 15 |
| Fostering quality-of-life through activities | “I think I have a good quality of life. I work. I pay more attention to what I miss. I exercise. I run three times a week. I think I improved on that.” [Translated from French]—Participant #2, W24 | 7 | 8 |

**Manuscript 3, Figure 1:** Main categories of the care experience of MLWH by stage in the HIV care cascade.



## DISCUSSION

This study explores the experiences of 16 MLWH enrolled in a prospective cohort study in Montreal, Canada, where B/F/TAF was being initiated free-of-charge and as soon as possible after linkage to multidisciplinary HIV care. To our knowledge, this is the first study that provides qualitative insights on the experiences of MLWH enrolled in such a model of primary HIV care.

Our framework analysis yielded 30 categories of shared experiences by MLWH throughout their journey across steps of the HIV care cascade.

### *Diagnosis: Dominated by Distress & Immigration-related Concerns*

When discussing diagnosis, the most common experience that MLWH described was "initially experiencing distress," followed by "questioning the impact of HIV diagnosis on immigration." Migrants, in general, often experience mental health issues (e.g., depression, anxiety, post-traumatic stress disorder) and immigration-related challenges (e.g., language barriers, difficulty with integration in a new country, issues with acquiring immigration status and health coverage) when moving away from their home countries [47-51]. In the context of Montreal, Canada, migrants are reported to experience substantially greater unmet healthcare needs compared to Canadian citizens with sufficient health coverage [52]. The intersectional burden of living with HIV and as a migrant has also been discussed as an element that potentially amplifies challenges such as obtaining support for mental health and social care [53, 55, 56], the experience of racialized discrimination and stigmatization [53-56], and adversities during resettlement [54-56]. Also, HIV and migrant co-status can lead to health coverage challenges (e.g., for international students) as not all insurance providers cover HIV care and treatment, and getting access to public health insurance can be a major challenge or not possible when migrants are waiting for or transitioning between immigration statuses in Canada. These findings stress the value of embedding mental health and immigration-related support in primary HIV care settings, as well as providing cost-covered treatment for all.

### *Linkage: A Time of Navigation Challenges and an Opportunity to Connect with Clinicians*

When discussing linkage to care, almost all MLWH spoke about "navigating the healthcare system with difficulty." This issue is a well-documented challenge for migrants in general [57-59]. Moreover, access to family doctors and primary care has been a historic challenge in the province of Québec (where Montreal resides) [60]. For many MLWH in Montreal, the Immigration Medical Exam is often the first experience these people have with the healthcare system. Embedding a patient navigator (or staff with similar responsibility) may be a viable solution to helping patients efficiently transition between where diagnosis occurs and their HIV care services [61, 62].

At this step, MLWH also expressed the importance of experiencing "humanizing clinical encounters" where they perceived care, kindness, acceptance, respect, and safety from their healthcare professionals. Most MLWH also noted "being reassured about living with HIV," "receiving personalized health information," and "quickly accessing care." Such experiences, MLWH explained, were necessary as they fostered a sense of relief, alleviated major fears (e.g., of death), heightened their willingness to initiate treatment, and partially motivated their sustained engagement in care and treatment. These findings support the importance of providing care with respect and empathy. Previous studies highlight that when clinicians adopt such approaches, they can better promote rapport-building, higher quality of care, and higher levels of medication self-efficacy [63-65].

### *Treatment Initiation: Rapid ART is Satisfying but Concerns Exist*

When discussing treatment initiation, almost all MLWH expressed "being satisfied with treatment" particularly due to a lack of side effects, improved health, an easy treatment regimen, and quick access to treatment. These findings support the provision of ART as soon as possible – an approach to care which is now possible due to major advancements in ART safety, ease-of-use, tolerance, and genetic barriers to resistance [35, 36]. A potential barrier to rapid ART initiation may be the belief that patient preparedness is critical to achieving ART, however, scholars discuss how this long-held belief may be potentially harmful and non-evidence-based [66]. Furthermore, humanizing clinical encounters across healthcare settings (e.g., at the site of diagnosis) and efficient linkage to care (e.g., via case coordinators) may assist with patient preparedness – though, this must be further studied.

While rapid ART initiation has been demonstrated in the literature as feasible and well received, our findings suggest that rapid initiation must be done with caution as most MLWH discussed "having concerns with starting treatment" particularly around side effects. Half the MLWH noted "needing reassurance about treatment safety" from their clinicians to feel comfortable with the treatment, especially if they experienced side effects. Providing reassurance about treatment safety at initiation may further contribute towards building trust with healthcare professionals, which is necessary for addressing feelings of anxiety and vulnerability that may be experienced by MLWH when first enrolling in care and treatment [67].

### *Retention in Care: The Burden of Challenges Beyond HIV and Importance of Patient-centered Care*

While being retained in care, all MLWH described “facing psychosocial or health-related challenges beyond HIV.” As found in other studies, people living with HIV encounter critical issues beyond their infection (such as lack of income, obtaining legal status, social isolation) that must be addressed [22, 68, 69]. However, most MLWH described “receiving holistic care,” where the multidisciplinary team of clinicians was able to assist the MLWH in addressing their bio-psycho-social concerns, both in relation to HIV and beyond. Social workers were particularly praised for their assistance with psycho-social challenges and some MLWH expressed “wanting more frequent contact” with these healthcare professionals. This finding supports previous work that highlights the importance of multidisciplinary models for primary HIV care with sufficient funding for care providers such as social workers [22, 70-76]. Although the act of embedding social workers into primary care services is becoming more common in Canada [76], specific training in HIV and immigration support may be necessary to ensure their comfort and capacity to work with this population [77, 78].

At this step, MLWH also expressed that they were “enjoying smooth operations in the clinic.” It seemed that the longer they were engaged, the more comfortable they felt with navigating the service. Essential though, for most MLWH, was experiencing “humanizing clinical encounters.” They expressed how beyond initial linkage to HIV care, warm encounters were important in sustaining motivation to remain engaged in care and were necessary for building a relationship based on trust with healthcare professionals, including non-clinician staff. Additionally, most MLWH explained that they were “sharing responsibility to manage HIV” with their healthcare professionals. Relatedly, almost all MLWH emphasized the importance of “feeling empowered to self-manage their HIV,” an experience which MLWH noted as being fostered by the increased comfort with and understanding of their treatment, its safety, and living with HIV, in addition to the resources and support systems available to them. These findings corroborate previous research that recommends “patient-centered” or “person-centered” approaches to HIV care [79-84]. Such approaches to care aim to ensure that patients have a functional and meaningful life and thus strive to incorporate empathy, respect, engagement, shared-decision-making, safety, trust, a holistic focus, and coordinated care as central tenants [84, 85].

### *Adherence to Treatment: The Heightened Importance of Taking Control Over HIV*

Beyond treatment initiation, MLWH continued to express "being satisfied with treatment." However, satisfaction at this step was attributed more to taking control of HIV and was much less focused on a lack of side effects. Additionally, most MLWH mentioned "feeling resilient and responsible" which was discussed as important in facilitating their sustained adherence to treatment. This feeling was most often identified as coming from a desire to control HIV and to protect others. These findings suggest the value of promoting HIV self-management strategies among MLWH. Previous studies highlight the importance of HIV self-management for maintaining and/or improving ART adherence, HrQoL, and self-efficacy [86-88]. However, for self-management to occur, patients must be empowered potentially via skills training and counselling [88]. Thus, promoting self-management approaches to care may be a secondary outcome of adopting patient- and person-centered care strategies.

### *Viral Suppression: Characterized by Peace of Mind and a Sense of Control*

The clinical and public health basis for the importance of HIV viral suppression has been strongly emphasized in the literature [89]. However, the experiences of people living with HIV who have achieved viral suppression have been less explored. Results of this study indicate that MLWH who achieved viral suppression expressed "finding more peace of mind since becoming undetectable." Indeed, by reaching this step, MLWH felt a sense of relief and control over their HIV infection. These feelings may encourage continued engagement with care and treatment. However, reaching this step may also present a shift in patients' priorities (e.g., from HIV control to addressing other life stressors). Further research understanding MLWH needs at this step, alongside barriers and facilitators experienced here, is necessary.

### *Perceived Health-related Quality of Life: Promoted by Social Networks and Personal Activities*

Little research has been published on the lived experiences of MLWH around HrQoL [90]. Calls for patient- and person-centered approaches in HIV are advancing care and research priorities beyond viral suppression and undetectability to include optimal HrQoL [91]. This element could thus be evaluated both quantitatively and qualitatively throughout each step of the HIV care cascade [91]. In this study, qualitative findings suggest that the largest contributor to HrQoL for MLWH was "being helped by a supportive social network." Informal social support networks have been well reported in the literature as important to improve the psychological wellbeing of people living with HIV [22, 92, 93]. Studies suggest that after being diagnosed with HIV, partners, family members, and friends can motivate individuals to get linked to care and treatment, as well as assist in the health system navigation process [22, 92]. These members can also provide emotional relief to MLWH, which in turn can positively impact their treatment adherence [22, 92]. Most MLWH in this study also discussed "deciding to improve lifestyle habits since diagnosis." It seemed that the more MLWH gained confidence and saw improvement in their health from engagement in care and treatment, the more careful many of them tried to be with their health and wellbeing. Lastly, MLWH highlighted the importance of "fostering quality of life through activities," such as work, higher education, and hobbies. However, several factors (e.g., lack of a work visa, lack of knowledge of opportunities and resources available to them, and lack of proficiency in their host country's language) can make engaging in such activities challenging for MLWH [22]. This further suggests the importance of multidisciplinary care and of embedding social workers or similar professionals in HIV primary care settings to support patients in these areas.

### *Strengths and Limitations*

A major strength of this study is the longitudinal nature of the data collection process. By conducting interviews at 1, 24, and 48 weeks after treatment initiation, a richer exploration of the experiences of MLWH over time was enabled. Further enriching the data was the sample's diversity, notably, in terms of age group, birth country, sexual orientation, health coverage, as well as employment and immigration statuses. Moreover, a stakeholder engagement approach was taken whereby the developed qualitative data matrix was validated with 2 patient partners, 1 research coordinator, and 1 research nurse. However, this study was conducted in one site (i.e., a quaternary hospital-based HIV clinic) in a high income country, which may hinder generalization of findings. Another limitation is the small number of female interviewees, as few women agreed to join the cohort. This is a frequently encountered challenge in HIV clinical research potentially due to patient distrust of researchers, competing family responsibilities, low education, linguistic barriers, HIV-related stigma and perceived discrimination, and transportation difficulties [94]. Since this study requires people to enter a research process right after diagnosis, a potential bias in this study may be that the population that agreed to participate is more prone to engage in care and more ready to adhere to medication. It is also necessary to note that healthcare utilization patterns and challenges encountered by migrant populations can vary based on the amount of time they have spent in their new country [95]. Although many participants in this study were newly arrived migrants (arriving to Canada approximately 2 months prior to enrolling in this study), their duration of stay in Canada was not explicitly assessed and was thus not considered in this analysis. A final limitation is that patient recruitment was severely hindered by the COVID-19 pandemic. Although data from 16 MLWH provided a solid exploration, more participants could have increased the depth of the findings (e.g., some specific experiences may not be represented). Nevertheless, the saturation of the main analytical categories, by number of contributing patients and interviews, was high (see Table 2).

## CONCLUSIONS

In conclusion, to our knowledge this is the first study to report a qualitative analysis in a longitudinal cohort study on the experiences of MLWH enrolled in multidisciplinary HIV care where treatment was being provided free-of-charge and initiated as soon as possible after linkage to care. In the earlier stages of the HIV care trajectory, MLWH experience more negative emotions as a result of HIV-related distress, psycho-social challenges beyond HIV, and health system navigation challenges. However, efficient, humanizing, and holistic approaches to care, coupled with rapid ART initiation, seemed to help alleviate patient concerns, address their bio-psycho-social challenges, encourage their initial and sustained engagement with care and treatment, and ultimately contribute to positive experiences. While this study provides qualitative evidence for the value of multidisciplinary HIV care with cost-covered ART and its rapid initiation for MLWH, our findings suggest that this model must be sufficiently resourced and accompanied with patient- and person-centered care approaches.

### Funding

This study is funded in part by the Gilead Investigator Sponsored Research Program (Grant # IN-US-380-4670) and by the Fonds de la Recherche Québec-Santé (FRQ-S), Réseau SIDA/Maladies infectieuses (Grant # 164064). Both grants were awarded to Dr. Bertrand Lebouché who holds a Canadian Institutes of Health Research (CIHR), Strategy for Patient-Oriented Research (SPOR) Mentorship Chair in Innovative Clinical Trials for HIV Care. He is supported by 2 career awards: a Senior Salary Award from Fonds de recherche du Québec–Santé (FRQS) (#311200) and the LE 250, from the Quebec’s Ministry of Health for researchers in Family

Medicine. AKA is supported by a Vanier Canada Graduate Scholarship from the Canadian Institutes of Health Research. J-PR is the holder of the Louis Lowenstein Chair in Hematology and Oncology, McGill University, and the William Turner award holder from the McGill University Health Centre. GS is supported by a Senior Salary Award from Fonds de recherche du Québec–Santé (FRQS) (#296306).

## Institutional Review Board Statement

This study was conducted in accordance with applicable Health Canada regulations, International Conference on Harmonisation guidelines on current Good Clinical Practice, and the Declaration of Helsinki. It was approved by the Research Ethics Board of the Research Institute of the McGill University Health Centre (reference #: MP-37-2020-4911).

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

## Data Availability Statement

Data can be accessed by contacting the first author upon reasonable request.

## Acknowledgments

The authors would like to thank the numerous clinicians, staff, community organizations, and patients that contributed to this research study.

## Conflicts of Interest

Dr. Bertrand Lebouché has received consultancy fees and/or honoraria and research funds from Gilead, ViiV Healthcare, and Merck. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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# Chapter 4: Exploring the Patient-Reported Experiences and Outcomes of MLWH Enrolled in the ASAP Study Quantitatively

## Preamble to Chapter 4

Through the qualitative investigation carried out in chapter 3, the range of experiences MLWH had while engaged in the ASAP study were thoroughly explored across each step of the HIV Care Cascade. The results ultimately suggested that efficient, humanizing, and holistic approaches to care in a multidisciplinary setting, coupled with rapid and free ART initiation, can help alleviate patients' concerns, address their bio-psycho-social challenges, encourage their initial and sustained engagement with HIV care and treatment, and ultimately contribute to positive experiences. Overall, the approach ASAP offers to MLWH was well received by participants. However, MLWH stressed that they continued to experience psycho-social challenges throughout their care experience. During the AIDS 2022 conference held in Montreal (which is one of the largest international forums for HIV scholars, policy makers, clinicians, and activists), I was selected to present these qualitative findings as part of the special 'Poster Exhibition' which includes only the top 300 posters accepted for presentation at the conference. The findings that I shared were incredibly well-received by stakeholders, but a major limitation of this work was that it was solely qualitative and lacked quantitative evidence – which many stakeholders at the conference expressed as necessary for health systems and organizations to actually begin adopting the ASAP approach to care.

At this point, all migrant patients had completed their 24-week follow-up as part of the ASAP cohort study, and 75% had completed their 48-week follow-up. As part of ASAP, participants completed eight previously validated patient-reported measures at weeks 4, 24, and 48 – measures which quantitatively explore patient perspectives on three thematic areas: (1) psychosocial vulnerabilities (i.e., perceived social support, HIV-related internalized stigma, and psychological distress); (2) experience with treatment (i.e., perceived treatment self-efficacy, compliance, and satisfaction); and (3) perceptions of healthcare providers (i.e., perceived clinician cultural competence and empathy). Thus, for the next phase of my doctoral thesis, I completed an interim analysis for ASAP focusing on analyzing these patient-reported measures through descriptive statistics and linear mixed modelling. This manuscript was submitted to *AIDS Research and Therapy* as a full original article and is currently under peer-review. As proof of submission, an email confirmation from the journal is provided in the Appendix.

## Chapter 4, Manuscript 4: Patient-reported Experiences and Outcomes of MLWH in the ASAP Study

### Title

Patient-Reported Outcomes and Experiences of Migrants Enrolled in a Multidisciplinary HIV Clinic with Rapid, Free, and Onsite Treatment Dispensation: The 'ASAP' Study

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### Keywords

Migrants; HIV; patient-reported outcomes; care experience; multidisciplinary

## Abstract

**Background:** Scholars recommend providing migrants living with HIV (MLWH) with free treatment, rapidly, once linked to care to optimize their HIV-related experiences and outcomes. Quantitative evaluations of patient-reported measures for MLWH in such models are necessary to explore these recommendations.

**Methods:** Within a 96-week prospective cohort study at a multidisciplinary HIV clinic, participants received bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) for free and rapidly following care linkage. Eight patient-reported measures were administered at weeks 4, 24, and 48: 1) mMOS-SS to measure perceived social support; 2) IA-RSS to measure internalized stigma; 3) K6 to measure psychological distress; 4) PROMIS to measure self-efficacy with treatment taking; 5) G-MISS to measure perceived compliance with clinicians' treatment plans; 6) HIVTSQ to measure treatment satisfaction; 7) CARE to measure perceived provider empathy; and 8) PRPCC to measure perceived clinician cultural competence. Linear mixed modelling with bootstrapping was conducted to identify significant differences by sociodemographics and time.

**Results:** Mean scores (and standard deviations) by weeks 4, 24, and 48 are: 1) mMOS-SS – 53.7 (34.7), 55.4 (26.1), and 54.1 (30.6) – suggesting moderate levels of social support; 2) IA-RSS – 4.4 (2.0), 3.9 (2.3), and 4.1 (2.3) – suggesting elevated levels of HIV-related stigma; 3) K6 – 23.0 (5.6), 23.6 (5.8), and 24.7 (6.1) – suggesting a potentially serious mental illness; 4) PROMIS – 16.7 (4.2), 17.3 (3.5), and 16.5 (3.7) – suggesting high self-efficacy with daily medication self-management; 5) G-MISS – 88.4 (23.0), 77.6 (28.4), and 81.6 (23.6) – suggesting great compliance with clinicians' treatment plans; 6) HIVTSQ – 62.3 (6.5), 63.9 (6.1), and 61.3 (6.8) – suggesting high treatment satisfaction; 7) CARE – 45.1 (6.1), 46.5 (7.0), and 47.5 (3.8) – suggesting high perceived empathy; and 8) PRPCC – 92.0 (10.5), 93.3 (9.9), and 89.1 (14.7) – suggesting high perceived cultural competence. IA-RSS scores differed significantly by birth region, age, and language. HIVTSQ differed significantly by birth region and age. No significant differences were identified by time for any measure.

**Conclusion:** Despite positive experiences of treatment and care, MLWH persistently showed concerning levels of psychological distress, underscoring a need to embed targeted, well-funded, and accessible mental health support within HIV care models.

## INTRODUCTION

The HIV field has been a champion in progressing global thought and action towards developing models of care that focus on the lived experiences, needs, and preferences of people and populations [1]. This, in turn, has encouraged the design and implementation of patient-centered health systems for people living with HIV (PLWH) [1-3] which: advance a holistic understanding of HIV and the multifaceted challenges PLWH present with; reorient the focus of HIV care and research efforts to go beyond simple survival, and instead strive to ensure that PLWH also thrive in their lives; and ultimately, to develop, scale-up, and optimize models of care which allow for sustained and meaningful engagement [1, 4, 5]. Alongside adopting patient-centric approaches, HIV scholars have called for an equity-focused approach to ending the HIV epidemic, whereby efforts are systematically targeted to specific populations with the heaviest burden of HIV [6, 7].

People who relocate temporarily or permanently across international borders for any reason (henceforth 'migrants'), particularly to member countries of the Organization for Economic Co-Operation and Development (OECD), require specific considerations from HIV specialists [8]. Migrants experience a high burden of HIV and account for a large proportion of new HIV incidence across OECD countries [9-12]. For example, in 2020, 44% of those diagnosed with HIV in Europe were migrants, many of which are suggested to have acquired HIV after arrival in the European Union / European Economic Area [12]. Similarly, in 2020, migrants accounted for 45% of new HIV diagnoses in Canada, of which over 46% were diagnosed prior to their arrival in Canada and 54% diagnosed after their arrival [13]. Migrants living with HIV (MLWH) encounter numerous intersectional barriers which hinder their access to and engagement with HIV care [8, 14]. For instance, MLWH can experience lack of secure and sufficient housing, food, income, legal status, social networks, knowledge around health system navigation, language proficiency, and mental health support [8]. Additionally, experiences and perceptions of stigma based on one's HIV and migrant statuses can potentially intersect and amplify the perceived vulnerability of MLWH, further hindering their engagement with HIV care and treatment [8].

To potentially alleviate challenges faced by MLWH at the clinical level, and thereby improve HIV-related health outcomes, previous work with MLWH suggests the importance of providing migrants with free antiretroviral therapy (ART) dispensed on-site, as well as free-of-charge HIV care (i.e., cost-covered blood tests and clinician visits), as soon as possible after HIV diagnosis [8]. This combination of factors can enable efficient access to care and treatment, particularly for migrant populations who may have just arrived in their host country, may not have immediate access to public health insurance, and may be unfamiliar with their new local health system [15]. Furthermore, rapid ART initiation has been shown to reduce loss-to-follow-up between HIV testing and treatment initiation, improve retention in care, and reduce time to HIV viral suppression, without compromising safety [15]. Additionally, previous research with MLWH suggests the importance of care provision for MLWH through a multidisciplinary team which adopts patient-centric values [8, 15]. In the context of HIV, multidisciplinary approaches to care have been associated with numerous clinical and patient-reported advantages relative to standard of care, including higher rates of retention in care, HIV treatment adherence, and improved CD4 counts [16, 17], and have been discussed as important by MLWH in meeting their bio-psycho-social needs [15].

While previous qualitative work indicates that ART, provided rapidly and within a patient-centered multidisciplinary clinic, is well received by MLWH and seems to encourage their initial and sustained engagement with HIV care and treatment [15], quantitative evidence supporting this approach to care is lacking. Quantitatively evaluating patient-reported outcomes and experiences at several timepoints throughout the HIV care continuum, including at the early retention phase (<6 months) and long-term retention phase (>6 months), has been previously reported as important for studies with vulnerable populations such as MLWH [5]. Furthermore, assessing variation in patient-reported outcomes and experiences over time and by sociodemographic factors may support the identification of certain profiles of migrants that may experience more challenges and thus require more support within HIV primary care settings. The specific concepts that have been previously suggested as important in exploring for MLWH are: perceived social support, HIV-related internalized stigma, and psychological distress; treatment self-efficacy, compliance, and satisfaction; and provider empathy and cultural competence through patient-reported measures administered over the course of care engagement [8, 15]. As such, in this study, we sought to explore patient-reported outcomes and experiences on these concepts among MLWH enrolled in a multidisciplinary program with free, rapid, and onsite ART dispensation.

## METHODS

### *Study objectives*

The objectives of this study are:

a) To measure participants' perceived social support, HIV-related internalized stigma, and psychological distress; treatment self-efficacy, compliance, and satisfaction; and provider empathy and cultural competence through patient-reported measures administered over the course of care engagement.
b) To determine whether differences exist for patient-reported outcomes and experiences by sociodemographic factors and time.

### *Study design & setting*

In January 2020, we initiated a 96-week prospective cohort study (the 'ASAP' Study) at the Chronic Viral Illness Service of the McGill University Health Centre (CVIS/MUHC). The CVIS/MUHC is a public quaternary hospital-based clinic in Montreal, Canada, and serves the largest proportion of MLWH in the city. The CVIS/MUHC offers multidisciplinary HIV care through a team of HIV-specialist physicians, nurses, pharmacists, a social worker, a psychologist, and a psychiatrist. In this study, all participants were initiated on bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) rapidly (i.e., within a median of 7 days) after linkage to our clinic.

### *Sample size*

The ASAP Study's target population consisted of new treatment-naïve PLWH at the CVIS/MUHC. Notably, the CVIS/MUHC received an average of 30 new ART-naïve MLWH annually between 2016-2022. Thus, as of August 2023, 39 MLWH were enrolled in ASAP. As a non-probabilistic sampling method was used, no formal sample size calculation based on power considerations and effect sizes was done. This small sample of participants does not compromise comparisons between groups of interest. In general, a minimum of 5-10 units per group in longitudinal studies is recommended for group comparisons to avoid convergence problems that can bias parameter estimates [18-20].

### *Data collection*

Participants' sociodemographic characteristics were captured at enrollment and were updated at Week 48. Sociodemographic factors include: birth region, birth year, sex, sexual orientation, living status (i.e., living alone or with others), educational level, occupational status, fluency with French (i.e., the official language of the province), health coverage, and time in Canada before being linked to the CVIS/MUHC. Data was also collected on participants' usage of SIDEP+, which is a public integrated screening and prevention service for HIV and other sexually transmitted blood-borne infections, for conducting blood test between ASAP study visits. This is because blood tests at the CVIS/MUHC are only covered for those who have access to the provincial medicare system (RAMQ) or a collective insurance plan which covers the cost of HIV care, whereas SIDEP+ provides lab tests free of charge for all residents and visitors of Quebec.

Four patient-reported outcome measures (PROMs) and four patient-reported experienced measures (PREMs) were administered at weeks 4, 24, and 48 of the study. PROMs are defined as "any report of the status of a patient's health condition that comes directly from the patient, without interpretation of the patient's response by a clinician or anyone else" [21]. Alternatively, PREMs provide information on "patients' perceptions of their experience while receiving care" [22]. They concern impacts of the *process* of care, not its outcomes and indirectly inform on care *quality*, not its effectiveness. The eight previously validated patient-reported measures utilized in this study focus on three thematic areas: (1) psychosocial vulnerabilities (i.e., perceived social support, HIV-related internalized stigma, and psychological distress); (2) experience with treatment (i.e., perceived treatment self-efficacy, compliance, and satisfaction); and (3) perceptions of healthcare providers (i.e., perceived clinician cultural competence and empathy). Descriptions for the eight measures, including the way they are scored and details around their validation follow.

*Psychosocial vulnerabilities*

- PROM 1 – Perceived social support was measured with the modified 8-item Medical Outcomes Study Social Support Survey (mMOS-SS) [23, 24]. For this PROM, a global score was calculated as the average score of all items, transformed to a 0 to 100 scale [24]. Higher scores suggest more perceived support. Cronbach's alpha for the complete scale ranges from 0.88 to 0.93 [23].
- PROM 2 – Perceived HIV-related internalized stigma was measured with the 6-item Internalized AIDS-Related Stigma Scale (IA-RSS) [25]. A seventh item ("I feel

uncomfortable taking my medication in front of someone else") was added to this PROM to further explore internalized stigma. To simplify administration, the items were dichotomized (1 = Agree, 0 = Disagree). A global score was calculated as the sum of all items (range 0 to 7). Higher scores suggest more internalized stigma. Cronbach's alpha for the original 6-item scale ranges from 0.73 to 0.76 [25].

- PROM 3 – Psychological distress in the past 30 days was examined with the 6-item Kessler Psychological Distress Scale (K6) [26]. The 5-point response scale for this PROM ranges from "None of the time" (=1) to "All of the time" (=5). Responses are summed to provide a global score, ranging from 6 to 30. Scores of 19 to 30 suggest 'a probable serious mental illness' and scores of 6 to 18, 'a probable absence of serious mental illness' [26]. A recent calculation of Cronbach's alpha is 0.86 [27, 28].

*Treatment self-efficacy, compliance, and satisfaction*

- PROM 4 – Treatment self-efficacy (i.e., daily medication self-management) was measured with the PROMIS Self-efficacy for Managing Chronic Conditions – Managing Medications and Treatment – Short Form 4a [29]. This PROM contains 4-items answered on a 5-point Likert scale from "I am not at all confident" (=1) to "I am very confident" (=5). The global score is calculated by summing responses to all items (score range: 4 to 20). Higher scores suggest better self-efficacy. Cronbach's alpha is between 0.85 and 0.92 [29].
- PREM 1 – Perceived compliance with their clinicians' treatment plans was measured with a subscale of the Generic Medical Interview Satisfaction Scale (G-MISS) [30]. The 2 items of the compliance subscale are scored on a 6-point Likert scale from 1 to 6 (i.e., "strongly disagree" to "strongly agree"). A score is obtained for this PREM by calculating the mean of the two items and then transforming the scores into a 0 to 100 scale. Higher sores suggest greater compliance. The subscale has a Cronbach's alpha of 0.84.
- PREM 2 – Treatment satisfaction was measured with the 10-item HIV Treatment Satisfaction Questionnaire (HIVTSQ) – status version [31]. Items for this PREM are rated from 1 to 7 (1=least satisfied; 7=most satisfied), with response options adjusted to the item. The sum of the 10 item scores produces the global scale score (range: 10 to 70). Higher scores suggest greater satisfaction. The measure has a Cronbach's alpha of 0.91.

*Perceptions of healthcare providers*

- PREM 3 – Perceived provider empathy was measured with the 10-item Consultation and Relational Empathy measure (CARE) [32]. Items for this PREM are scored on a 5-point rating scale from ‘poor’ (=1) to ‘excellent’ (=5). The item ratings are summed to produce the global score (range: 10 to 50). Higher scores suggest greater perceived empathy. The measure has a Cronbach’s alpha of 0.93.
- PREM 4 – Perceived cultural competence of clinicians by patients was measured with the ‘Explaining’ subscale of the Physician Cultural Competency measure (PRPCC) [33-35]. This PREM includes 8 items which are rated on a 5-point Likert scale (1 = Never to 5 = Always). The global score is computed with the mean score for all 8-item, transformed to 0 to 100. Higher scores suggest greater perceived cultural competence. The complete scale has a Cronbach’s alpha of 0.89.

### ***Data analysis***

All quantitative analyses were conducted using *R Statistical Software*. Means and standard deviations were calculated for each self-reported measure by timepoint and sociodemographic factor. Following descriptive analyses, linear mixed models were fitted to the data [36]. Linear mixed models are well suited for analyzing longitudinal data with small sample sizes [37]. Sociodemographic characteristics at enrollment were used for analyses at Weeks 4 and 24, and the updated sociodemographic characteristics were used for analysis at Week 48. The following characteristics were considered to have a fixed effect (i.e., these variables have a constant and consistent influence on the patient-reported measures for all individuals within a particular group): birth region, birth year, sex, sexual orientation, and time in Canada before first visit to the CVIS/MUHC. The other characteristics (i.e., living status, education level, occupational status, fluency with French, health coverage, and SIDEP+ usage for blood tests) were considered to have a mixed effect (i.e., these variables may have both a constant and varying influence on the outcome across individuals within groups). To identify the most appropriate analytical model, the Maximum Likelihood Estimation approach was utilized [38-41]. The model with the lowest Akaike Information Criterion score for each self-reported measure was chosen and subjected to the Restricted Maximum Likelihood (REML) approach [38-41]. To reduce bias introduced by the non-probabilistic sampling method and to enhance generalizability of the results, REML parameters were estimated using a non-parametric bootstrap resampling approach for computing p-values [43, 44]. The bootstrap method is particularly useful when the sample size is insufficient for accurate statistical inference or when selection bias is a concern [41-44]. Specifically, we bootstrapped 10,000 samples. Bootstrapped p-values are reported, with a significance level set at <0.05.

### *Patient and stakeholder engagement*

This study is grounded in patient-oriented research which focuses on: engaging patients and relevant stakeholders as partners, responding to patient-identified priorities, and ultimately improving patient outcomes [45]. During the ASAP Study, an advisory committee (the ASAP Migrant Advisory Committee), was developed [8, 14, 15]. Members of the ASAP Migrant Advisory Committee contributed to the revision and editing of this manuscript.

### *Ethics*

This study was conducted in accordance with applicable Health Canada regulations, International Conference on Harmonisation guidelines on current Good Clinical Practice, and the Declaration of Helsinki. It was approved by the Research Ethics Board of the Research Institute of the McGill University Health Centre (reference #: MP-37-2020-4911).

## RESULTS

### *Sociodemographic characteristics*

This manuscript presents an analysis of patient-reported outcome and experience measures completed by MLWH enrolled in 'ASAP' up to August 2023. At the time of analysis, all participants had been enrolled in the study for at least 24 weeks and 75% had been enrolled for 48 weeks. Out of the 39 migrants enrolled in this study, 4 were either lost-to-follow-up or left the study. Analyses were therefore completed with 35 participants. At enrollment, more than half of the participants: came from Africa and/or the Caribbean (n=20, 57%); were 35 or older (n=20, 57%); were male (n=28, 80%); identified as gay, lesbian, or bisexual with respect to their sexual orientation (n=22, 63%); lived with others (n=27, 77%); had university-level education (n=20, 57%); were unemployed (n=24, 69%); did not speak French (n=20, 57%); had sufficient health coverage for HIV-related needs through public health insurance (n=20, 57%); used SIDEP+ for at least one blood test (n=13, 37%); and spent less than 1 year in Canada before being linked to the

CVIS/MUHC (n=20, 57%). These values remained relatively consistent at Week 48. Descriptive statistics by sociodemographic factor at enrolment and at Week 48 are provided in Table 1.

**Manuscript 4, Table 1:** Participant characteristics by study week.

| | **Enrolment** | **Week 48** |
|---|---|---|
| | n=35 | n=26 |
| **Birth region** | | |
| African, Caribbean | 20 (57%) | 17 (65%) |
| Other | 15 (43%) | 9 (35%) |
| **Age** | | |
| Less than 35 | 15 (43%) | 13 (50%) |
| 35 or more | 20 (57%) | 13 (50%) |
| **Sex** | | |
| Female | 7 (20%) | 6 (23%) |
| Male | 28 (80%) | 20 (77%) |
| **Sexual orientation** | | |
| Heterosexual | 13 (37%) | 10 (38%) |
| Lesbian, gay, bisexual | 22 (63%) | 16 (62%) |
| **Living status** | | |
| Alone | 7 (20%) | 9 (35%) |
| With others | 27 (77%) | 17 (65%) |
| Not reported | 1 (3%) | - |
| **Educational Level** | | |
| Less than university | 15 (43%) | 12 (46%) |
| University | 20 (57%) | 14 (54%) |
| **Occupational Status** | | |
| Unemployed | 24 (69%) | 9 (35%) |
| Paid employment or Student | 11 (31%) | 17 (65%) |
| **French Fluency** | | |
| No | 20 (57%) | 14 (54%) |
| Yes | 15 (43%) | 12 (46%) |
| **Health Coverage** | | |
| Private or none | 15 (43%) | 10 (38%) |
| Public | 20 (57%) | 16 (62%) |
| **Used SIDEP+ for at least one Blood Test** | | |
| No | 22 (63%) | 20 (77%) |
| Yes | 13 (37%) | 6 (23%) |
| **Time from Arriving in Canada to First Visit at the CVIS/MUHC** | | |
| Less than 1 year | 20 (57%) | 16 (62%) |
| 1 year or more | 13 (37%) | 9 (35%) |
| Not reported | 2 (6%) | 1 (4%) |

## ***Psychosocial vulnerabilities***

### *Social support*

The mMOS-SS mean scores (and standard deviations) for the entire sample were 53.7 (34.7), 55.4 (26.1), and 54.1 (30.6) at weeks 4, 24, and 48 respectively (Table 2). These scores suggest that on average, throughout the 48 weeks, participants perceived having moderate levels of social support. No significant differences were identified by sociodemographic characteristics or time (Table 3).

### *Internalized HIV-related stigma*

The IA-RSS mean scores (and standard deviations) for the entire sample were 4.4 (2.0), 3.9 (2.3), and 4.1 (2.3) at weeks 4, 24, and 48 respectively (Table 2). These scores suggest that on average, throughout the 48-weeks, participants experienced elevated levels of internalized HIV-related stigma. Significant differences were identified by: birth region, where those from Africa and/or the Caribbeans perceived higher levels of internalized stigma compared to people from other regions (p-value = 0.002); age, where those less than 35 perceived higher levels of internalized stigma compared to those 35 and older (p-value = 0.002); and French fluency, where those not fluent in French perceived higher levels of internalized stigma compared to those fluent in French (p-value = 0.003). No significant differences were identified by the remaining sociodemographic characteristics and time (Table 3).

### *Psychological distress*

The K6 mean scores (and standard deviations) for the entire sample were 23.0 (5.6), 23.6 (5.8), and 24.7 (6.1) at weeks 4, 24, and 48 respectively (Table 2). These scores suggest that on average, throughout the 48 weeks, participants potentially had a serious mental illness. No significant differences were identified by sociodemographic characteristics or time (Table 3).

## ***Treatment self-efficacy, compliance, and satisfaction***

### *Treatment-self-efficacy*

The PROMIS Self-efficacy mean scores (and standard deviations) for the entire sample were 16.7 (4.2), 17.3 (3.5), and 16.5 (3.7) at weeks 4, 24, and 48 respectively (Table 4). These scores suggest that on average, throughout the 48 weeks, participants felt high self-efficacy with respect to daily medication self-management. No significant differences were identified by sociodemographic characteristics or time (Table 3).

#### *Compliance*

The G-MISS compliance subscale mean scores (and standard deviations) for the entire sample were 88.4 (23.0), 77.6 (28.4), and 81.6 (23.6) at weeks 4, 24, and 48 respectively (Table 4). These scores suggest that on average, throughout the 48 weeks, participants perceived great compliance with their clinicians' treatment plans. No significant differences were identified by sociodemographic characteristics or time (Table 3).

#### *Treatment satisfaction*

The HIVTSQ mean scores (and standard deviations) for the entire sample were 62.3 (6.5), 63.9 (6.1), and 61.3 (6.8) at weeks 4, 24, and 48 respectively (Table 4). These scores suggest that on average, throughout the 48 weeks, participants felt high satisfaction with their treatment. Significant differences were identified by: birth region, where those from Africa and/or the Caribbeans had lower treatment satisfaction compared to those from other regions (p-value = 0.001); and age, where those less than 35 had lower treatment satisfaction compared to those 35 and older (p-value = 0.007). No significant differences were identified by the remaining sociodemographic characteristics and time (Table 3).

### ***Perceptions around healthcare providers***

#### *Provider empathy*

The CARE mean scores (and standard deviations) for the entire sample were 45.1 (6.1), 46.5 (7.0), and 47.5 (3.8) at weeks 4, 24, and 48 respectively (Table 5). These scores suggest that on average, throughout the 48 weeks, participants perceived high levels of empathy from their healthcare providers. No significant differences were identified by sociodemographic characteristics or time (Table 3).

#### *Provider cultural competence*

The PRPCC explaining subscale mean scores (and standard deviations) for the entire sample were 92.0 (10.5), 93.3 (9.9), and 89.1 (14.7) at weeks 4, 24, and 48 respectively (Table 5). These scores suggest that on average, throughout the 48 weeks, participants perceived high levels of cultural competence from their clinicians. No significant differences were identified by sociodemographic characteristics or time (Table 3).

**Manuscript 4, Table 2:** Mean scores (with standard deviations) by week and sociodemographic characteristics for self-reported measures associated with psychosocial vulnerabilities.

| | **MOS-SSS** | | | **IA-IRSS** | | | **K6** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Week 4** | **Week 24** | **Week 48** | **Week 4** | **Week 24** | **Week 48** | **Week 4** | **Week 24** | **Week 48** |
| All participants | 53.7 (34.7) | 55.4 (26.1) | 54.1 (30.6) | 4.43 (2.0) | 3.91 (2.3) | 4.08 (2.3) | 23.0 (5.6) | 23.6 (5.8) | 24.7 (6.1) |
| **Birth region** | | | | | | | | | |
| African and/or Caribbean | 58.1 (38.8) | 55.9 (24.9) | 43.6 (26.5) | 4.71 (1.7) | 4.35 (2.3) | 4.38 (2.1) | 24.2 (5.6) | 23.9 (4.6) | 24.2 (6.8) |
| Other | 48.4 (29.6) | 54.8 (28.3) | 72.9 (29.5) | 4.08 (2.4) | 3.40 (2.3) | 3.56 (2.8) | 21.4 (5.5) | 23.1 (7.2) | 25.6 (4.9) |
| **Age** | | | | | | | | | |
| Less than 35 | 62.3 (26.6) | 66.3 (26.7) | 54.8 (31.8) | 4.43 (2.2) | 4.54 (2.2) | 4.38 (2.5) | 23.3 (5.2) | 24.1 (5.0) | 24.7 (4.5) |
| 35 or more | 47.6 (39.2) | 48.3 (23.6) | 53.4 (30.6) | 4.44 (2.0) | 3.47 (2.4) | 3.75 (2.2) | 22.7 (6.0) | 23.3 (6.4) | 24.7 (7.6) |
| **Sex** | | | | | | | | | |
| Female | 62.5 (39.4) | 44.8 (27.7) | 49.0 (33.1) | 4.00 (0.7) | 4.50 (1.4) | 4.17 (2.0) | 22.0 (9.1) | 24.0 (7.5) | 27.5 (3.4) |
| Male | 51.6 (34.1) | 57.8 (25.6) | 55.8 (30.5) | 4.54 (2.3) | 3.77 (2.5) | 4.05 (2.5) | 23.2 (4.8) | 23.5 (5.5) | 23.9 (6.6) |
| **Sexual orientation** | | | | | | | | | |
| Heterosexual | 57.7 (33.1) | 54.8 (27.8) | 50.7 (33.0) | 4.36 (1.3) | 4.45 (1.8) | 4.22 (1.9) | 22.3 (7.0) | 24.1 (5.9) | 26.4 (3.9) |
| Lesbian, gay, bisexual | 51.6 (36.3) | 55.7 (25.8) | 56.1 (30.1) | 4.47 (2.4) | 3.62 (2.6) | 4.00 (2.6) | 23.4 (4.8) | 23.3 (5.9) | 23.6 (7.1) |
| **Living status** | | | | | | | | | |
| Alone | 62.9 (36.3) | 56.3 (27.9) | 61.1 (24.0) | 5.50 (1.6) | 4.29 (2.6) | 3.89 (2.6) | 22.9 (4.9) | 25.6 (6.5) | 25.3 (6.4) |
| With others | 51.8 (35.2) | 56.9 (25.1) | 50.2 (33.8) | 4.22 (2.1) | 3.79 (2.4) | 4.19 (2.3) | 23.4 (5.8) | 23.7 (4.9) | 24.4 (6.1) |
| **Educational level** | | | | | | | | | |
| Less than university | 58.9 (33.5) | 58.4 (29.0) | 63.5 (28.9) | 4.77 (1.5) | 4.00 (2.2) | 4.17 (2.2) | 24.0 (5.3) | 25.2 (5.1) | 26.2 (3.8) |
| University | 50.5 (36.0) | 53.4 (24.5) | 45.4 (30.5) | 4.18 (2.4) | 3.84 (2.5) | 4.00 (2.6) | 22.3 (5.9) | 22.5 (6.1) | 23.4 (7.5) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Occupational status** | | | | | | | | | |
| Unemployed | 60.6 (30.0) | 62.9 (23.9) | 56.3 (30.1) | 4.10 (2.1) | 3.67 (2.2) | 4.56 (2.4) | 23.8 (4.8) | 23.6 (5.4) | 23.7 (5.1) |
| Paid employment or Student | 41.2 (40.6) | 40.3 (24.4) | 52.9 (31.7) | 5.10 (1.9) | 4.36 (2.5) | 3.81 (2.4) | 21.5 (7.0) | 23.5 (6.8) | 25.2 (6.7) |
| **French fluency** | | | | | | | | | |
| No | 48.2 (36.4) | 45.2 (23.6) | 51.8 (32.5) | 4.67 (1.9) | 3.95 (2.5) | 4.43 (2.5) | 21.4 (6.2) | 23.6 (6.9) | 25.4 (4.7) |
| Yes | 60.5 (32.6) | 69.2 (23.3) | 57.1 (29.2) | 4.08 (2.3) | 3.85 (2.2) | 3.64 (2.2) | 25.3 (3.9) | 23.6 (4.4) | 23.9 (7.7) |
| **Health coverage** | | | | | | | | | |
| Private or none | 45.8 (37.9) | 54.5 (29.5) | 62.5 (34.0) | 4.57 (2.1) | 3.86 (2.4) | 3.80 (2.4) | 24.0 (5.3) | 22.1 (5.9) | 22.6 (8.6) |
| Public | 61.1 (30.9) | 56.1 (24.0) | 48.5 (27.8) | 4.31 (2.0) | 3.94 (2.4) | 4.27 (2.3) | 22.1 (6.0) | 24.7 (5.6) | 26.0 (3.7) |
| **Used SIDEP+ for at least one blood test since last appointment** | | | | | | | | | |
| No | 54.9 (37.8) | 53.3 (24.9) | 56.3 (29.5) | 3.83 (2.2) | 3.58 (2.6) | 3.89 (2.5) | 22.6 (5.8) | 22.9 (6.0) | 26.4 (3.4) |
| Yes | 52.2 (31.4) | 58.7 (28.4) | 47.4 (35.9) | 5.33 (1.5) | 4.38 (1.9) | 4.67 (2.1) | 23.5 (5.5) | 24.7 (5.6) | 19.0 (9.6) |
| **Time in Canada before first CVIS/MUHC visit** | | | | | | | | | |
| Less than 1 year | 62.5 (33.8) | 63.7 (24.2) | 54.8 (29.5) | 4.07 (1.9) | 3.81 (2.4) | 3.33 (2.1) | 23.1 (6.4) | 25.7 (4.3) | 25.4 (6.0) |
| 1 year or more | 52.9 (36.4) | 53.8 (26.3) | 48.6 (32.4) | 5.17 (1.9) | 4.08 (2.3) | 5.78 (1.5) | 22.8 (4.5) | 25.2 (5.6) | 22.9 (6.5) |

**Manuscript 4, Table 3:** Boot-strapped p-values using the REML approach for all self-reported measures.

| | **MOS-SSS** | **IA-IRSS** | **K6** | **PROMIS** | **G-MISS** | **HIVTSQ** | **CARE** | **PRPCC** |
|---|---|---|---|---|---|---|---|---|
| W4 | 0.92 | 0.57 | 0.31 | 0.68 | 0.49 | 0.47 | 0.61 | 0.88 |
| W48 | 0.79 | 0.78 | 0.82 | 0.65 | 0.94 | 0.27 | 0.73 | 0.30 |
| Birthreg (Other) | - | **0.002** | - | - | - | **0.001** | - | - |
| EnrolmentAge (Lessthan35) | - | **0.002** | - | - | - | **0.007** | - | - |
| Sex (Male) | - | 0.17 | 0.13 | - | - | 0.13 | - | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SexuOrien (LGB) | - | 0.83 | - | - | - | 0.23 | - | - |
| Educationlevel (University) | - | 0.69 | - | - | - | 0.35 | - | 0.24 |
| HealthCov (Public) | - | 0.77 | - | - | - | 0.06 | - | - |
| Occupationalstat (Unemployed) | 0.17 | 0.32 | - | - | 0.22 | 0.87 | - | - |
| Livingstat (With others) | - | 0.82 | - | - | - | 0.24 | - | - |
| FrenchFluency (Yes) | - | **0.003** | - | - | - | 0.84 | - | - |
| BloodtestatSIDEP (Yes) | - | 0.14 | - | - | - | 0.07 | 0.35 | - |
| TimeinCADbefore 1stCVISVisit (Lessthan1year) | 0.12 | 0.07 | 0.22 | 0.05 | 0.26 | 0.11 | 0.29 | 0.44 |

Note: ‘-‘ means that the factor was not identified as being part of the chosen model using the Maximum Likelihood approach and is therefore considered insignificant.

**Manuscript 4, Table 4:** Mean scores (with standard deviations) by week and sociodemographic characteristics for self-reported measures associated with treatment adherence and satisfaction.

| | PROMIS | | | G-MISS | | | HIVTSQ | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Week 4** | **Week 24** | **Week 48** | **Week 4** | **Week 24** | **Week 48** | **Week 4** | **Week 24** | **Week 48** |
| All participants | 16.7 (4.2) | 17.3 (3.5) | 16.5 (3.7) | 88.4 (23.0) | 77.6 (28.4) | 81.6 (23.6) | 62.3 (6.5) | 63.9 (6.1) | 61.3 (6.8) |
| **Birth region** | | | | | | | | | |
| African and/or Caribbean | 16.4 (4.7) | 16.6 (3.9) | 15.8 (4.0) | 92.2 (13.5) | 71.1 (32.8) | 80.6 (25.4) | 61.5 (7.5) | 62.3 (7.2) | 59.5 (7.5) |
| Other | 17.3 (3.4) | 18.3 (2.8) | 17.9 (2.6) | 83.6 (31.3) | 86.0 (19.6) | 83.3 (21.2) | 63.4 (5.0) | 66.0 (3.3) | 64.8 (3.7) |
| **Age** | | | | | | | | | |
| Less than 35 | 16.0 (4.6) | 17.3 (2.6) | 15.2 (4.4) | 92.0 (17.8) | 65.7 (36.7) | 4.2 (23.9) | 61.8 (7.2) | 62.4 (7.3) | 60.0 (6.7) |
| 35 or more | 17.3 (3.9) | 17.4 (4.1) | 17.8 (2.3) | 85.3 (27.0) | 86.0 (17.3) | 88.5 (21.9) | 62.6 (6.1) | 65.0 (4.9) | 62.7 (6.9) |
| **Sex** | | | | | | | | | |
| Female | 17.4 (2.7) | 16.3 (4.0) | 14.8 (4.8) | 100 (0) | 68.6 (34.8) | 85.0 (17.6) | 59.3 (8.8) | 64.4 (5.4) | 61.3 (6.1) |
| Male | 16.6 (4.5) | 17.6 (3.4) | 17.0 (3.2) | 85.2 (25.2) | 80.0 (26.7) | 80.5 (25.5) | 63.1 (5.7) | 63.8 (6.3) | 61.4 (7.2) |
| **Sexual orientation** | | | | | | | | | |
| Heterosexual | 16.9 (4.4) | 16.8 (3.4) | 15.1 (4.7) | 95.8 (14.4) | 71.7 (36.9) | 86.7 (16.6) | 61.4 (7.1) | 63.9 (5.3) | 59.9 (5.9) |
| Lesbian, gay, bisexual | 16.6 (4.2) | 17.6 (3.6) | 17.4 (2.7) | 84.0 (26.2) | 80.9 (22.9) | 78.8 (26.8) | 62.8 (6.3) | 63.9 (6.5) | 62.3 (7.4) |
| **Living status** | | | | | | | | | |
| Alone | 15.6 (3.8) | 18.7 (0.8) | 18.1 (2.4) | 75.7 (23.0) | 80.0 (16.3) | 83.3 (25.0) | 59.3 (6.4) | 63.1 (6.6) | 62.3 (8.1) |
| With others | 17.2 (4.3) | 17.2 (3.7) | 15.6 (4.0) | 91.7 (22.6) | 76.9 (31.6) | 80.6 (23.5) | 63.4 (6.4) | 64.1 (6.1) | 60.8 (6.3) |
| **Educational level** | | | | | | | | | |
| Less than university | 16.3 (4.0) | 17.3 (2.4) | 15.0 (3.9) | 93.8 (17.1) | 72.1 (30.4) | 85.8 (14.4) | 62.1 (6.7) | 62.1 (7.1) | 60.4 (5.3) |
| University | 17.1 (4.4) | 17.4 (4.2) | 17.8 (3.0) | 84.7 (26.1) | 81.5 (27.0) | 77.7 (29.8) | 62.4 (6.5) | 65.2 (5.0) | 62.1 (8.0) |

|  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|
| **Occupational status** |  |  |  |  |  |  |  |  |  |
| Unemployed | 17.0 (4.0) | 17.7 (2.4) | 14.6 (3.8) | 88.6 (25.6) | 71.3 (32.2) | 70.0 (17.7) | 62.6 (6.3) | 63.9 (6.2) | 59.2 (4.6) |
| Paid employment or Student | 16.1 (4.7) | 16.5 (5.2) | 17.5 (3.3) | 88.2 (18.3) | 90.9 (9.4) | 87.1 (24.4) | 61.6 (7.2) | 64.0 (6.1) | 62.5 (7.6) |
| **French fluency** |  |  |  |  |  |  |  |  |  |
| No | 16.5 (4.3) | 17.4 (4.1) | 17.9 (2.3) | 85.0 (27.9) | 78.9 (25.8) | 81.4 (25.1) | 63.0 (6.1) | 64.3 (5.0) | 62.1 (6.5) |
| Yes | 17.0 (4.2) | 17.3 (2.6) | 14.8 (4.3) | 92.9 (14.4) | 76.0 (32.2) | 81.8 (22.7) | 61.4 (7.1) | 63.5 (7.4) | 60.4 (7.3) |
| **Health coverage** |  |  |  |  |  |  |  |  |  |
| Private or none | 17.2 (4.2) | 18.4 (2.0) | 17.6 (2.9) | 87.3 (25.8) | 90.7 (11.0) | 90.0 (11.5) | 62.2 (6.0) | 64.9 (5.0) | 64.4 (4.8) |
| Public | 16.4 (4.3) | 16.5 (4.2) | 15.8 (4.0) | 89.4 (21.1) | 67.4 (33.6) | 76.0 (28.0) | 62.3 (7.0) | 63.1 (6.8) | 59.4 (7.3) |
| **Used SIDEP+ for at least one blood test since last appointment** |  |  |  |  |  |  |  |  |  |
| No | 17.1 (3.8) | 16.8 (4.1) | 15.9 (3.8) | 94.2 (13.0) | 74.3 (33.1) | 78.9 (26.0) | 63.5 (6.4) | 64.1 (6.7) | 60.7 (7.2) |
| Yes | 16.1 (4.8) | 18.2 (2.2) | 18.5 (2.5) | 80.0 (31.4) | 83.1 (18.4) | 90.0 (11.0) | 60.4 (6.5) | 63.6 (5.2) | 63.7 (5.2) |
| **Time in Canada before first CVIS/MUHC visit** |  |  |  |  |  |  |  |  |  |
| Less than 1 year | 15.6 (5.0) | 16.5 (4.1) | 15.8 (3.7) | 95.0 (14.0) | 76.5 (30.0) | 81.3 (22.6) | 63.4 (6.5) | 62.2 (7.2) | 60.4 (6.8) |
| 1 year or more | 17.8 (3.3) | 18.9 (1.4) | 17.4 (3.6) | 80.0 (30.1) | 76.9 (31.2) | 80.0 (26.9) | 60.9 (6.8) | 66.5 (4.1) | 62.1 (6.9) |

**Manuscript 4, Table 5:** Mean scores (with standard deviations) by week and sociodemographic characteristics for self-reported measures associated with perceptions around heath care providers.

|  | CARE |  |  | PRPCC |  |  |
|---|---|---|---|---|---|---|
|  | **Week 4** | **Week 24** | **Week 48** | **Week 4** | **Week 24** | **Week 48** |

| | | | | | | |
|---|---|---|---|---|---|---|
| All participants | 45.1 (6.1) | 46.5 (7.0) | 47.5 (3.8) | 92.0 (10.5) | 93.3 (9.9) | 89.1 (14.7) |
| **Birth region** | | | | | | |
| African and/or Caribbean | 45.7 (6.5) | 46.0 (7.5) | 47.5 (3.9) | 90.3 (11.7) | 89.8 (12.2) | 87.7 (16.5) |
| Other | 44.3 (5.5) | 47.1 (6.5) | 47.5 (3.9) | 94.2 (8.7) | 96.9 (5.3) | 91.3 (11.8) |
| **Age** | | | | | | |
| Less than 35 | 46.0 (5.6) | 46.9 (5.6) | 47.6 (4.0) | 92.3 (10.8) | 92.4 (11.3) | 84.4 (17.3) |
| 35 or more | 44.4 (6.5) | 46.2 (7.9) | 47.3 (3.8) | 91.7 (10.6) | 93.9 (9.2) | 93.8 (10.3) |
| **Sex** | | | | | | |
| Female | 43.2 (6.5) | 44.8 (7.0) | 47.2 (3.9) | 89.3 (12.7) | 90.6 (11.7) | 81.9 (17.7) |
| Male | 45.7 (6.0) | 46.8 (7.1) | 47.6 (3.9) | 92.8 (10.0) | 93.9 (9.7) | 91.0 (13.8) |
| **Sexual orientation** | | | | | | |
| Heterosexual | 44.7 (5.8) | 46.9 (5.6) | 48.4 (3.1) | 91.7 (11.9) | 92.5 (11.6) | 85.1 (18.7) |
| Lesbian, gay, bisexual | 45.4 (6.4) | 46.2 (7.8) | 46.9 (4.2) | 92.2 (9.9) | 93.8 (9.3) | 91.5 (11.8) |
| **Living status** | | | | | | |
| Alone | 44.8 (6.5) | 45.2 (7.3) | 47.1 (4.6) | 90.2 (9.6) | 95.5 (7.2) | 94.1 (10.1) |
| With others | 45.5 (6.1) | 47.3 (6.6) | 47.7 (3.3) | 93.2 (10.5) | 92.6 (10.9) | 86.5 (16.3) |
| **Educational level** | | | | | | |
| Less than university | 43.9 (6.6) | 46.5 (6.3) | 46.6 (4.3) | 93.0 (10.2) | 91.1 (11.8) | 80.7 (15.8) |
| University | 45.9 (5.7) | 46.4 (7.7) | 48.3 (3.2) | 91.3 (11.0) | 94.8 (8.6) | 96.2 (9.5) |
| **Occupational status** | | | | | | |
| Unemployed | 46.8 (5.0) | 47.4 (5.1) | 47.5 (4.4) | 92.9 (10.3) | 92.5 (11.3) | 81.3 (15.9) |
| Paid employment or Student | 42.3 (7.0) | 44.5 (10.0) | 47.5 (3.6) | 90.3 (11.2) | 95.0 (6.6) | 93.0 (12.9) |

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **French fluency** |  |  |  |  |  |  |
| No | 46.0 (5.2) | 46.6 (6.4) | 46.4 (4.1) | 94.1 (8.7) | 94.9 (7.4) | 91.1 (11.7) |
| Yes | 43.8 (7.2) | 46.3 (8.0) | 49.1 (2.7) | 89.3 (12.3) | 90.6 (13.3) | 86.3 (18.5) |
| **Health coverage** |  |  |  |  |  |  |
| Private or none | 45.2 (5.9) | 45.2 (9.0) | 46.6 (4.0) | 91.0 (11.4) | 95.6 (8.4) | 91.3 (11.6) |
| Public | 45.0 (6.4) | 47.3 (5.3) | 47.9 (3.7) | 92.8 (9.9) | 91.8 (10.8) | 87.7 (16.6) |
| **Used SIDEP+ for at least one blood test since last appointment** |  |  |  |  |  |  |
| No | 46.7 (4.2) | 47.5 (5.1) | 47.9 (3.6) | 93.3 (10.4) | 93.3 (9.6) | 88.8 (15.6) |
| Yes | 43.2 (7.5) | 44.6 (9.7) | 45.8 (4.6) | 90.1 (10.8) | 93.5 (11.0) | 90.0 (12.4) |
| **Time in Canada before first CVIS/MUHC visit** |  |  |  |  |  |  |
| Less than 1 year | 45.8 (5.5) | 44.1 (9.4) | 47.6 (3.7) | 93.3 (10.8) | 91.6 (11.4) | 86.5 (16.0) |
| 1 year or more | 44.3 (7.1) | 48.3 (4.2) | 47.2 (4.2) | 91.5 (10.8) | 95.9 (9.0) | 93.3 (11.5) |

## DISCUSSION

This study explores the patient-reported outcomes and experiences of MLWH enrolled in a prospective cohort study in Montreal, Canada, where B/F/TAF was being dispensed free-of-charge, onsite, and rapidly after linkage to multidisciplinary HIV care. Specifically, across weeks 4, 24, and 48, self-reported measures were used to assess perceived social support, internalized HIV-related stigma, and psychological distress; treatment compliance, self-efficacy, and satisfaction; and participant perceptions around their healthcare providers' cultural competence and empathy. To our knowledge, this is the first study that provides quantitative insights on these concepts through self-reported measures among MLWH enrolled in such a model of primary HIV care.

### *Psychosocial vulnerabilities*

Throughout follow-up, there was a high probability that MLWH experienced a serious mental illness based on their K6 psychological distress scores. Furthermore, MLWH expressed elevated levels of internalized HIV-related stigma and moderate levels of social support. Notably, those who were from Africa or the Caribbean, were less than 35, and those who were not fluent in French experienced a significantly higher degree of internalized stigma. These findings are consistent with those of other studies conducted in Canada and other regions among MLWH, PLWH, and general populations of international migrants [46-55]. It is well recognized that migrants often experience higher levels of stigma, mental illness, and challenges with accessing, building, and maintaining social support [50]. The further burden of living with HIV amplifies these challenges [8, 15, 49, 51, 52]. Moreover, when additional intersectional burdens are experienced, such as discrimination and stigma due to skin colour or race, or when self-perceived limitations are identified (e.g., lack of ability to speak proficiently in the host nation's language), levels of internalized stigma among PLWH can increase [8, 53]. Also, several studies have previously noted that younger PLWH may experience higher levels of stigma compared to older PLWH [49, 54, 55]. The relationship between age and stigma among MLWH may be attributed to the different life-stages people occupy (e.g., international student versus an established professional), the social networks people have established at different ages, and the coping mechanisms that people have developed and strengthened over time [49]. While engaged in this cohort study, psychosocial vulnerabilities were not found to decrease significantly over time. This may be linked to idea that the first year of moving to a new country, learning about one's HIV diagnosis, and engaging in care and treatment, can be a very challenging time across the emotional, mental, and social levels for individuals [15, 56, 57]. Additionally, perhaps more time (e.g., over 1 to 2 years) is needed to see a change in these aspects of participants' lives. Though self-reported measures, like those used in this study, may be helpful in identifying patient perspectives, long time lags are noted to exist for health effects to manifest when dealing with changes to upstream social determinants of health [58].

### *Treatment self-efficacy, compliance, and satisfaction*

Despite most MLWH in the sample potentially experiencing a serious mental illness throughout the 48-weeks, participants reported a high degree of treatment self-efficacy, compliance, and satisfaction. Given that some scholars suggest that treatment self-efficacy can be significantly affected by mental health challenges, this finding is unique and important [59]. In previous qualitative work with MLWH enrolled in the 'ASAP' study, MLWH expressed high satisfaction with B/F/TAF, and noted the importance of feeling control over their HIV, as well as a strong sense of responsibility for managing their HIV [15]. Alongside these individual characteristics, the adoption of person-centered approaches to care may be central to enabling a high degree of daily medication self-management [15]. Importantly, while levels of treatment self-efficacy, compliance, and satisfaction where high overall in this study, it was also found that those born in Africa and/or the Caribbean and those who were less than 35 years of age had a significantly lower level of satisfaction. The relationship between social factors and treatment satisfaction is complex and not well explored, particularly in the context of HIV among migrant populations. One study describes that racial and ethnic differences in satisfaction may occur based on differences in attitudes and expectations, particularly around patients' trust with medical care systems [60]. Another study suggests that older patients may be more satisfied with their healthcare potentially due to generational factors (e.g., those raised during certain periods, such as the early days of the HIV pandemic, may be more experienced with significant hardships, and thus more accepting of inadequacies in healthcare systems) [61]. Furthermore, findings in this study may be associated with the intersectional challenges that affect these sub-populations' psychosocial vulnerabilities [8], but a thorough qualitative exploration is warranted to better understand these phenomena.

### *Perceptions around healthcare providers*

Throughout the 48-week period, MLWH perceived high empathy and cultural competence from their clinical team at the CVIS/MUHC. MLWH encompass a diverse group of people, from different ethnicities, cultures, and regions. Despite this, no significant difference was identified by birth region or any other sociodemographic factor with respect to these variables. This finding is interesting given that previous studies have reported poorer satisfaction with healthcare services among migrant populations compared to native-born populations [62, 63]. Perhaps this reflects the CVIS/MUHC staff's experience with working with MLWH. Indeed, these results validate earlier qualitative findings in which MLWH that were receiving care at the CVIS/MUHC discussed their experience of humanizing clinical encounters [15]. These encounters were characterized by feelings of kindness, acceptance, respect, safety, and trust from and with their clinicians [15]. Literature suggests that when clinicians adopt such qualities with their patients, they can help promote better rapport-building, higher quality of care, and higher levels of medication self-efficacy [15, 64-66]. Additionally, these humanizing qualities are considered essential to develop and sustain people-centered health systems [67]. However, despite rating their clinical team highly in empathy and cultural competence, MLWH's psychosocial challenges persisted across the analysis period. This suggests that humanizing care must be coupled with specific interventions to thoroughly understand and address the complex psychosocial challenges MLWH present with.

### *Strengths and Limitations*

A major limitation in this study is the small sample size. As a result of the limited sample, migrants originating from Africa and the Caribbean were grouped together in the linear mixed modelling analysis. Though previous work in the HIV field has grouped African, Caribbean, and Black populations based on ethnicity and other intersectional challenges experienced by these groups, it is important to acknowledge that Africa and the Caribbean are geographically separate areas of the world, and there can often be large heterogeneity within populations coming from these regions. Another limitation in this study is the use of interim data (i.e., the analysis presented in this study pertains to the halfway point of the 96 week-long ASAP cohort study). However, interim analyses in longitudinal clinical studies, as presented here, are reliable and rational approaches to report findings without comprising validity or integrity [68]. Such analyses are important for making data and summarized findings available to target audiences in a timely manner, as well as guiding the potential termination or appropriate modifications in sample size or study design [68]. Given that the objectives of this study were to measure participants' self-reported outcomes and experiences, and explore differences by sociodemographic factors and time, the actual utilization of healthcare services (e.g., the number of times patients accessed social worker services) were not examined. Additionally, only a small number of female MLWH agreed to join this cohort study. This is a frequently encountered challenge in HIV clinical research [69] and has been previously reported by our team [15]. However, linear mixed modelling analysis is well suited for small samples, and bootstrapping further helps attenuate the small sample size's effect. Furthermore, the repeated measurement approach (i.e., conducting evaluations at week 4, 24, and 48) and consideration of changes in sociodemographic factors at week 48 allowed for a more rigorous data analysis.

## CONCLUSION

To our knowledge, this is the first study that longitudinally explores the perspectives of MLWH around their perceived social support, internalized HIV-related stigma, and psychological distress; treatment compliance, self-efficacy, and satisfaction; and participant perceptions around their healthcare providers' cultural competence and empathy. Importantly, findings suggest that most MLWH enrolled in this study potentially experienced a serious mental health illness, irrespective of time engaged in care. Despite this, MLWH expressed high self-efficacy, compliance, and satisfaction with their treatment, and concurrently perceived high cultural competency and empathy from their clinical care providers. This underscores the need to embed targeted, well-funded, and accessible mental health support within HIV care models, and that further research is required to better understand how to meet the complex and multifaceted psychosocial needs of MLWH in clinical settings.

### Funding

This study is funded in part by the Gilead Investigator Sponsored Research Program (Grant # IN-US-380-4670). This grant was awarded to Dr. Bertrand Lebouché, who holds a Canadian Institutes of Health Research (CIHR), Strategy for Patient-Oriented Research (SPOR) Mentorship Chair in Innovative Clinical Trials for HIV Care. He is supported by two career awards: a Senior Salary Award from Fonds de la Recherche du Québec–Santé (FRQ-S) (#311200) and the LE 250 from

Quebec's Ministry of Health for researchers in Family Medicine. Anish K. Arora is supported by a Vanier Canada Graduate Scholarship from the Canadian Institutes of Health Research.

## Conflicts of Interest

Dr. Bertrand Lebouché has received consultancy fees and/or honoraria and research funds from Gilead, ViiV Healthcare, and Merck. The organizations and the above funders had no role in the design of the study; in the collection, analyses, or interpretation of data; or in the decision to publish the results.

## Data Availability Statement

Data can be accessed upon reasonable request by contacting the corresponding author.

## Acknowledgments

The authors would like to thank the numerous patients, staff, community organizations, and clinicians who contributed to this research study.

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# Chapter 5: Exploring the Effect of Social Determinants of Health on Time to Treatment Initiation and Viral Undetectability for MLWH in the ASAP Study

## Preamble to Chapter 5

The quantitative results in chapter 4 provide support for the qualitative findings in chapter 3. Specifically, the descriptive analyses suggest that MLWH had exceptionally positive experiences of their care and treatment. However, most MLWH enrolled in the study continued to show concerning levels of psychological distress, with self-reported scores indicating a serious mental illness among almost all participants throughout the 48-week study period. This work suggests that while the ASAP approach to care may be well received by MLWH, it may be insufficient to fully address their psychosocial burdens. This potentially underscores the need for HIV care models to embed dedicated, accessible, and well-funded mental health support for MLWH.

This quantitative exploration using linear mixed modelling provided further support for the ASAP approach to care. However, what remained unclear to me was if patients enrolled in the ASAP study were (a) truly receiving care rapidly (i.e., within 7 days of being linked to care); and (b) if the social determinants of health experienced by MLWH effected their HIV-related health outcomes (i.e., the third and final aim of my doctoral thesis). At this point in the ASAP study, all enrolled MLWH had received their initial ART and 97% had reached HIV viral undetectability. After consulting with Dr. Serge Vicente, a statistician working closely with Dr. Bertrand Lebouché, it was confirmed that the data we have available were sufficient to perform descriptive statistics and survival analyses, which would allow us to understand the time-to-ART initiation and time-to-HIV viral undetectability, and the effect social factors have on these clinical outcomes. I published this work in *HIV Medicine*, which has a current impact factor of 3.09. The electronic version of this article can be found at: https://onlinelibrary.wiley.com/doi/full/10.1111/hiv.13608. This manuscript went through a rigorous peer-review process.

# Chapter 5, Manuscript 5: The Effect of Social Determinants of Health on Clinical Outcomes for MLWH in the ASAP Study

## Title

The Impact of Social Determinants of Health on Time to Antiretroviral Therapy Initiation and HIV Viral Undetectability for Migrants enrolled in a Multidisciplinary HIV Clinic with Rapid, Free, and Onsite B/F/TAF: “The ASAP Study"

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## Keywords

Migrants; HIV; Treatment initiation; viral undetectability; social determinants of health

## Abstract

### Objective

Multidisciplinary care with free, rapid, and on-site bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) dispensation may improve health outcomes among migrants living with HIV (MLWH). However, models for rapid B/F/TAF initiation are not well studied among MLWH, and there is limited understanding of how social determinants of health (SDH) may affect HIV-related health outcomes for migrants enrolled in such care models.

### Methods

Within a 96-week pilot feasibility prospective cohort study at a multidisciplinary HIV clinic, participants received B/F/TAF for free and rapidly following care linkage. The effect of SDH (i.e., birth region, sexual orientation, living status, education, employment, French proficiency, health coverage, use of a public health facility outside our clinic for free blood tests, and time in Canada) and other covariates (i.e., age, sex) on median time to ART initiation and HIV viral undetectability from care linkage were calculated via survival analyses.

### Results

Thirty-five migrants were enrolled in this study. Median time to ART initiation and HIV undetectability was 5 (range: 0-50) and 57 days (range: 5-365), respectively. Those who took significantly longer to initiate ART: were less than 35 years old; identified as heterosexual; had less than university-level education; or were unemployed. No factor was found to significantly affect time to undetectability.

### Conclusion

Despite cost-covered B/F/TAF, several SDH were linked to delays in ART initiation. However, once initiated and engaged, MLWH were able to reach HIV undetectability efficiently. Findings provide preliminary support for adopting this care model with MLWH, but concurrently suggest that SDH should be considered when designing clinical interventions for more equitable outcomes.

## INTRODUCTION

Social determinants of health (SDH), which are defined as “the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life” [1], have tremendous implications for the health outcomes of international migrants living with HIV (MLWH) [2,3]. Housing instability, lack of health insurance for HIV-related needs, and health systems built on racial injustice, are all examples of SDH which may potentially lead to poorer health outcomes for MLWH [2,3]. In Organization for Economic Co-operation and Development (OECD) countries, the number of MLWH are increasing substantially [2]. In the Canadian context, migrants accounted for 45% of new HIV diagnoses in 2019 [4]. Specifically, in Montreal, Canada, 310 new HIV cases were reported in 2022, which is the highest number reported annually in 10 years and an increase of 120% since 2021 [5], mostly attributed to migrants from countries where HIV infection is highly endemic [5]. In fact, HIV cases among migrants in Montreal have increased from 32 to 158 between 2021 and 2022 (an increase of 394%) [5]. Across these countries, MLWH often experience delayed entry into HIV care, late antiretroviral therapy (ART) initiation, higher rates of care drop-out, poorer adherence to ART, and variable rates of viral suppression when compared to native-born populations living with HIV [2,5].

A potential strategy to mitigate the negative effects of SDH among MLWH is to provide these often highly vulnerable populations with access to patient-centered care in multidisciplinary settings, coupled with free and rapid ART dispensation [6]. Starting ART rapidly, in particular, has been endorsed as a key strategy for achieving international HIV elimination targets, through increasing access to treatment for those most marginalized and vulnerable in an equitable manner [6-8]. Research suggests that receiving ART on the same day as HIV diagnosis, or within 7 days according to the World Health Organization [7], can shorten time to viral suppression, prevent onward HIV transmission, and reduce rates of loss-to-follow-up [7,8]. Notably, bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) has been endorsed as a preferred regimen for rapid start among those with HIV-1 infection, given its few potential drug–drug interactions, small pill size, no food in-take requirements, and no baseline viral load or CD4 cell count restrictions [6,9]. However, models for delivery of rapid ART initiation are not well studied [8], especially with respect to B/F/TAF initiation among MLWH. Additionally, an understanding of how SDH may impact rapid ART initiation and the achievement of undetectability among MLWH is lacking. As such, among MLWH enrolled in a multidisciplinary care program with free, rapid and onsite B/F/TAF dispensation, we examined: (a) time to first B/F/TAF dispensation and HIV viral undetectability, and (b) the effect of SDH on these times.

## METHODS

### *Design & study setting*

In January 2020, we initiated a 96-week pilot feasibility study with a prospective cohort design (the 'ASAP' Study) at the Chronic Viral Illness Service of the McGill University Health Centre (CVIS/MUHC), which is a public hospital-based clinic in Montreal, Canada. The CVIS/MUHC is the primary referral site in the city for MLWH. The CVIS/MUHC adopts a multidisciplinary care model, whereby patients can access HIV-specialist physicians, nurses, pharmacists, a social worker, a psychologist, and a psychiatrist. For this cohort study, all participants received B/F/TAF for free after linkage to our clinic. Clinicians aimed to provide B/F/TAF to all participants as soon as possible once linked to care, with adjustments in start time based on the situation of each patient (with an ideal goal of initiating B/F/TAF for all participants within 7 days of care linkage).  This manuscript presents an analysis of ASAP's clinical quantitative data collected from MLWH up to August 2023.

### *Sample size*

This study included new ART-naïve people living with HIV (PLWH) who were referred to the CVIS/MUHC after receiving a positive HIV test result. Notably, the CVIS/MUHC received an average of 30 new ART-naïve MLWH annually between 2016-2022. In 2023 specifically, we received approximately 66 new ART-naïve migrant patients.  Pilot feasibility studies, like the ASAP Study, generally have a median sample size of approximately 30 participants per intervention arm [10]. However, this small sample does not compromise comparisons between groups of interest because a minimum of 5-10 units per group in longitudinal studies is often sufficient for avoiding convergence problems that can bias parameter estimates [11,12].

### *Social Determinants of Health and Other Covariates*

The following SDH, all of which are recognized to influence health equity both in general populations and MLWH specifically, were available for analysis [1-3,6]: birth region, sexual orientation, living status, educational level, occupational status, fluency with French (i.e., the official language of the province of Quebec), health coverage, and time in Canada before linkage to care. Two covariates, age and sex, were also available for analysis. Use of SIDEP+, which is a public screening and prevention service for HIV and other sexually transmitted blood-borne infections, was also considered a SDH. Patients who do not have public health coverage or sufficient HIV-related private health insurance must access SIDEP+ for free blood tests. This fragmentation of health services was deemed capable of impacting the studied health outcomes. Participants' SDH and covariate characteristics were captured at enrolment.

### *Data analysis*

All quantitative analyses were conducted using R Statistical Software. To reflect real-life care trajectories for MLWH, median time to B/F/TAF initiation (i.e., date of B/F/TAF dispensation) and HIV viral undetectability (i.e., HIV viral load of <50 copies/ml) were calculated starting from the date of participants' first CVIS/MUHC visit. However, for one participant, analysis was completed from their date of first ASAP screening, as they were previously lost-to-follow-up for over a year, and did not start ART during this time. Medians, minimum values, maximum values, and median absolute deviations are reported by SDH.

Following descriptive analyses, survival analyses were conducted as they are appropriate for calculating significant differences for time-to-events among sub-groups [13,14]. Survival curves were constructed for time to B/F/TAF initiation and HIV viral undetectability using the Kaplan-Meier estimator and the log-minus-log approach [13]. To test if there was a significant difference between survival curves, the log-rank test was used if the assumption of proportional hazards was met. Otherwise, we considered the Breslow and Tarone-Ware tests. To confirm if results are sensitive to different methods, univariate Cox regressions were also conducted [13,14]. To reduce bias introduced by the non-probabilistic sampling method and enhance generalizability of the results with the Cox regressions, parameters of interest were estimated with non-parametric bootstrap resampling [15]. Specifically, we extracted 10,000 samples of HIV patients with replacement.

### *Patient and stakeholder engagement*

This study is grounded in patient-oriented research which focuses on engaging patients and relevant stakeholders as partners, respond to patient-identified priorities, and ultimately improve patient outcomes. During the ASAP study, an advisory committee was developed [2,6]. Members of this committee contributed to revising and editing this manuscript.

### *Ethics*

This study was conducted in accordance with applicable Health Canada regulations, International Conference on Harmonisation guidelines on current Good Clinical Practice, and the Declaration of Helsinki. It was approved by the Research Ethics Board of the Research Institute of the McGill University Health Centre (reference #: MP-37-2020-4911).

## RESULTS

### *Descriptive statistics*

Out of the 39 migrants enrolled in this study, 4 were either lost-to-follow-up or left the study prior to initiating B/F/TAF and beginning data collection. As no data were available for these migrants, analyses were completed with 35 participants. At study initiation, more than half: identified as coming from Africa and/or the Caribbean (n=20, 57%); were 35 or older (n=20, 57%); were male (n=28, 80%); identified as lesbian, gay, or bisexual with respect to their sexual orientation (n=22, 63%); lived with others (n=27, 77%); had university-level education (n=20, 57%); were unemployed (n=24, 69%); did not speak French (n=20, 57%); had public health insurance through either provincial or federal health programs (n=20, 57%); used SIDEP+ for at least one blood test (n=13, 37%); and spent less than 1 year in Canada before being linked to the CVIS/MUHC (n=20, 57%).

At baseline, median CD4 T cell count for the cohort was 381.5, with 15 participants below 350 indicating late diagnosis and 6 participants below 200 indicating advanced HIV. Furthermore, at baseline, median HIV viral load for the cohort was 52,261 copies/ml, with 12 patients above 100,000 copies/ml indicating a high HIV viral load. At the time of analysis, all migrants had been enrolled in the research program for at least 24 weeks, all had received their initial B/F/TAF, and 97% reached HIV viral undetectability (i.e., one participant did not meet the HIV viral load of <50 copies/ml requirement to be considered undetectable). The median times for participants to initiate B/F/TAF was 5 days (range: 0-50), with 37% (n=13) initiating on the same day as their first visit, 9 (26%) initiating within 1-7 days, and 13 (37%) taking more than 7 days to initiate B/F/TAF.

Median time to reach undetectability was 57 days (range: 5-365). Descriptive statistics by SDH for each of the time-to-events are provided in Tables 1 and 2 respectively.

*Survival analyses*

Several SDH were significantly linked to participants' time to B/F/TAF initiation: age, sexual orientation, educational level, and occupational status. Based on Kaplan-Meier estimations (KM) and bootstrapped Cox regressions (BCr), those who took longer to initiate B/F/TAF: were less than 35 years of age (KM p-value = 0.004, BCr p-value = 0.002, BCr 95% CI = -1.98 to -0.44); identified as heterosexual (KM p-value = <0.001, BCr p-value = <0.001, BCr 95% CI = 0.90 to 2.74); had less than a university-level education (KM p-value = 0.003, B-r p-value = 0.003, BCr 95% CI = 0.43 to 2.09); or were unemployed (KM p-value = 0.049, BCr p-value = 0.021, BCr 95% CI = -1.69 to -0.11). No SDH was linked to participants' time to HIV viral suppression. P-values for the survival analyses for both time-to-events are presented in Tables 1 and 2 respectively.

**Manuscript 5, Table 1:** Descriptive and survival statistics for time to B/F/TAF initiation.

| | **n (%)** | **Median days** | **Minimum days** | **Maximum days** | **Median absolute deviation** | **Kaplan-Meier P-Value** | **Bootstrap Cox Regression P-Value** |
|---|---|---|---|---|---|---|---|
| **Overall Sample** | 35 (100%) | 5.00 | 0.00 | 50.00 | 7.41 | NA | NA |
| **Birth region** | | | | | | | |
| African, Caribbean | 20 (57%) | 7.00 | 0.00 | 50.00 | 10.38 | 0.19 | 0.15 |
| Other | 15 (43%) | 1.00 | 0.00 | 42.00 | 1.48 | | |
| **Age** | | | | | | | |
| Less than 35 | 15 (43%) | 12.00 | 0.00 | 50.00 | 16.31 | **0.004** | **0.002** |
| 35 or more | 20 (57%) | 0.00 | 0.00 | 23.00 | 0.00 | | |
| **Sex** | | | | | | | |
| Female | 7 (20%) | 7.00 | 0.00 | 50.00 | 10.38 | 0.13 | 0.15 |
| Male | 28 (80%) | 1.00 | 0.00 | 48.00 | 1.48 | | |
| **Sexual orientation** | | | | | | | |
| Heterosexual | 13 (37%) | 14.00 | 0.00 | 50.00 | 13.34 | **<0.001** | **<0.001** |
| Lesbian, gay, bisexual | 22 (63%) | 0.00 | 0.00 | 15.00 | 0.00 | | |
| **Living status** | | | | | | | |
| Alone | 7 (20%) | 1.00 | 0.00 | 13.00 | 1.48 | 0.22 | 0.13 |
| With others | 27 (77%) | 5.00 | 0.00 | 50.00 | 7.41 | | |
| Not reported | 1 (3%) | 23.00 | 23.00 | 23.00 | 0.00 | | |
| **Educational Level** | | | | | | | |
| Less than university | 15 (43%) | 12.00 | 0.00 | 50.00 | 17.79 | **0.003** | **0.003** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| University | 20 (57%) | 1.00 | 0.00 | 23.00 | 1.48 | | |
| **Occupational Status** | | | | | | | |
| Unemployed | 24 (69%) | 6.50 | 0.00 | 50.00 | 9.64 | **0.049** | **0.021** |
| Paid employment or Student | 11 (31%) | 0.00 | 0.00 | 23.00 | 0.00 | | |
| **French Fluency** | | | | | | | |
| No | 20 (57%) | 3.00 | 0.00 | 42.00 | 4.45 | 0.26 | 0.26 |
| Yes | 15 (43%) | 7.00 | 0.00 | 50.00 | 10.38 | | |
| **Health Coverage** | | | | | | | |
| Inadequate/No HIV coverage | 15 (43%) | 0.00 | 0.00 | 48.00 | 0.00 | 0.16 | 0.13 |
| Full HIV coverage | 20 (57%) | 6.50 | 0.00 | 50.00 | 9.64 | | |
| **Used SIDEP+ for at least one Blood Test** | | | | | | | |
| No | 22 (63%) | 5.50 | 0.00 | 50.00 | 8.15 | 0.70 | NA |
| Yes | 13 (37%) | 1.00 | 0.00 | 48.00 | 1.48 | | |
| **Time from Arriving in Canada to First Visit at the CVIS/MUHC** | | | | | | | |
| Less than 1 year | 20 (57%) | 6.50 | 0.00 | 50.00 | 9.64 | 0.12 | 0.11 |
| 1 year or more | 13 (37%) | 5.00 | 0.00 | 28.00 | 7.41 | | |
| Not reported | 2 (6%) | 0.50 | 0.00 | 1.00 | 0.74 | | |

**Note:** NA = not applicable. For Cox regressions, an NA means that the assumption for proportional hazard was not met and therefore the cox regression could not be conducted.

**Manuscript 5, Table 2:** Descriptive and survival statistics for time to HIV viral undetectability.

|  | **n (%)** | **Median days** | **Minimum days** | **Maximum days** | **Median absolute deviation** | **Kaplan-Meier P-Value** |
|---|---|---|---|---|---|---|
| **Overall Sample** | 34 (100%)* | 57.00 | 5.00 | 365.00 | 40.77 | NA |
| **Birth region** |  |  |  |  |  |  |
| African, Caribbean | 19 (56%) | 56.00 | 14.00 | 365.00 | 40.03 | 0.19 |
| Other | 15 (44%) | 58.00 | 5.00 | 176.00 | 38.55 |  |
| **Age** |  |  |  |  |  |  |
| Less than 35 | 14 (41%) | 64.50 | 5.00 | 365.00 | 49.67 | 0.24 |
| 35 or more | 20 (59%) | 50.00 | 7.00 | 350.00 | 32.62 |  |
| **Sex** |  |  |  |  |  |  |
| Female | 7 (21%) | 113.00 | 14.00 | 365.00 | 100.82 | 0.12 |
| Male | 27 (79%) | 56.00 | 5.00 | 350.00 | 31.13 |  |
| **Sexual orientation** |  |  |  |  |  |  |
| Heterosexual | 12 (35%) | 63.50 | 14.00 | 365.00 | 62.27 | 0.22 |
| Lesbian, gay, bisexual | 22 (65%) | 57.00 | 5.00 | 350.00 | 36.32 |  |
| **Living status** |  |  |  |  |  |  |
| Alone | 7 (21%) | 58.00 | 28.00 | 350.00 | 44.48 | 0.66 |
| With others | 26 (76%) | 59.50 | 5.00 | 365.00 | 40.03 |  |
| Not reported | 1 (3%) | 52.00 | 52.00 | 52.00 | 0.00 |  |
| **Educational Level** |  |  |  |  |  |  |
| Less than university | 14 (41%) | 52.00 | 7.00 | 365.00 | 34.84 | 0.96 |
| University | 20 (59%) | 65.00 | 5.00 | 350.00 | 43.74 |  |
| **Occupational Status** |  |  |  |  |  |  |
| Unemployed | 23 (68%) | 58.00 | 5.00 | 365.00 | 40.03 | 0.96 |
| Paid employment or Student | 11 (32%) | 52.00 | 7.00 | 350.00 | 35.58 |  |
| **French Fluency** |  |  |  |  |  |  |
| No | 20 (59%) | 54.00 | 7.00 | 181.00 | 31.13 | 0.23 |
| Yes | 14 (41%) | 70.00 | 5.00 | 365.00 | 63.01 |  |
| **Health Coverage** |  |  |  |  |  |  |
| Inadequate/No HIV coverage | 14 (41%) | 55.50 | 5.00 | 365.00 | 41.51 | 0.62 |
| Full HIV coverage | 20 (59%) | 57.00 | 14.00 | 181.00 | 35.58 |  |
| **Used SIDEP+ for at least one Blood Test** |  |  |  |  |  |  |
| No | 22 (65%) | 56.00 | 5.00 | 365.00 | 34.10 | 0.83 |
| Yes | 12 (35%) | 65.50 | 7.00 | 350.00 | 42.25 |  |
| **Time from Arriving in Canada to First Visit at the CVIS/MUHC** | 19 (56%) | 56.00 | 14.00 | 176.00 | 22.24 | 0.11 |
| Less than 1 year | 13 (38%) | 73.00 | 5.00 | 365.00 | 66.72 |  |

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| 1 year or more<br>Not reported | 2 (6%) | 232.00 | 114.00 | 350.00 | 174.95 |  |

**Note:** * = one participant did not reach undetectability within the first 24 weeks (as reported in the methods section), and therefore, their data was not reported in this table. **Note:** Cox regressions could not be computed for undetectability as the assumption for proportional hazard was not met.

## DISCUSSION

This study assesses time to B/F/TAF initiation and HIV undetectability among migrants enrolled in a prospective cohort study in Montreal, Canada, and the impacts of SDH and covariates on these times. Median times for participants to initiate B/F/TAF and reach undetectability were 5 and 57 days, respectively. Our findings are similar to those identified in: a study conducted by Hoenigl et al., which included a general population of PLWH in the United States, and reported a median time of 8 days to ART initiation from first clinic intake, and a median time of approximately 84 days to viral suppression – both of which were interpreted by Hoenigl et al. as "rapid" [16]; and another study conducted by Kronfli et al., which included asylum seekers in Canada, and reported a median time of 11 days from care linkage to provision of an ART prescription, and a median of 42 days from provision of an ART prescription to viral suppression [17]. Thus, the findings of this study suggest the feasibility of rapidly initiating B/F/TAF with MLWH within a multidisciplinary clinic with cost-covered treatment. However, we note that some SDH and covariates appear to impact time to B/F/TAF initiation.

Specifically, participants who initiated treatment significantly earlier were those: aged 35 years or older; identifying as lesbian, gay, or bisexual; with university level education; or with paid employment or a student status. These findings are consistent with the results of other studies conducted with general populations of PLWH [18-20], as well as with findings from a 2021 systematic review on the barriers and facilitators MLWH experience with respect to initial linkage to care and treatment provision across 17 OECD countries [2]. Regarding time to undetectability, no studied SDH appeared to have influence. This potentially indicates that once participants are enrolled in this model of care and initiate B/F/TAF, they can reach viral suppression efficiently and effectively. The use of B/F/TAF as the primary line of treatment may also have contributed to this finding, given its high efficacy, tolerability, and simplicity [21].

As global efforts to eliminate HIV as a public health threat by 2030 ramp up and begin focusing on MLWH and other key and vulnerable populations at an increasing rate, it is imperative that the effect of SDH on HIV-related health outcomes be evaluated [22]. A more nuanced understanding of the challenges experienced by populations most heavily burdened with HIV can thus be achieved. For example, through this study, an increased need to focus on MLWH who are younger (e.g., international students), heterosexual, have less education, and have no occupation is suggested. Subsequently, more research must be done to design, implement, and scale approaches to care which seek to reduce health disparities among these MLWH-focused target populations.

A major limitation with this study is the small sample size. Due to the small sample, only univariate (i.e., as opposed to multivariate) Cox regressions could be performed. Confounders could therefore not be adjusted for in the analysis and only dichotomous variables could be included (e.g., people from Africa and/or the Caribbean were grouped together and compared with people from other regions). However, the two analytical strategies used (i.e., Kaplan-Meier and Cox regressions) helped ensure sensitivity of the results, and bootstrapping approaches served to increase generalizability. Additionally, given that the bulk of study recruitment took place during the COVID-19 pandemic, this may have negatively influenced our results, particularly because many physicians from our clinic were redeployed to COVID-19 wards or units. Further research, potentially through retrospective comparisons across several clinical sites and using multivariate approaches, may be necessary to better capture sub-group differences and account for pandemic-related challenges.

In conclusion, providing MLWH with cost-covered B/F/TAF rapidly upon linkage to care can help them efficiently reach HIV undetectability. However, SDH, including age, sexual orientation, educational level, and occupational status, appear to influence time to B/F/TAF initiation and should be considered when designing clinical interventions for MLWH

## Funding

This study is funded in part by the Gilead Investigator Sponsored Research Program (Grant # IN-US-380-4670). This grant was awarded to Dr. Bertrand Lebouché, who holds a Canadian Institutes of Health Research (CIHR), Strategy for Patient- Oriented Re-search (SPOR) Mentorship Chair in Innovative Clinical Trials for HIV Care. He is supported by two career awards: a Senior Salary

Award from Fonds de la Recherche du Québec–Santé (FRQ-S) (#311200) and the LE 250 from Quebec's Ministry of Health for researchers in Family Medicine. Anish K. Arora is supported by a Vanier Canada Graduate Scholarship from the Canadian Institutes of Health Research. Dr. Giada Sebastiani is supported by a Senior Salary Award from Fonds de Recherche du Quebec – Santé (FRQS) (#296306)

## Conflicts of Interest

Dr. Bertrand Lebouché has received consultancy fees and/or honoraria and research funds from Gilead, ViiV Healthcare, and Merck. The funders had no role in the: design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results. Dr. Giada Sebastiani has acted as speaker for Merck, Gilead, Abbvie, Novo Nordisk, Pfizer, served as an advisory board member for Pfizer, Merck, Novo Nordisk, Gilead, and has received unrestricted research funding from Theratecnologies Inc. And Merck.

## Data Availability Statement

Data can be accessed upon reasonable request by contacting the corresponding author.

## Acknowledgments

The authors would like to thank the numerous patients, staff, community organizations, and clinicians who contributed to this research study.

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# Chapter 6: Discussion of the Thesis

## Overview

In this manuscript-based doctoral thesis I sought to: (1) comprehensively review the barriers and facilitators MLWH experience along the steps of the HIV Care Cascade beyond diagnosis; (2) qualitatively and quantitatively explore the experiences of MLWH enrolled in the ASAP study; and (3) explore the effect of social determinants of health on time to ART initiation and HIV viral suppression among MLWH enrolled in the ASAP study. Five complementary studies were conducted in partnership with migrants living with HIV, clinicians, and HIV researchers to respond to these aims. The findings of this dissertation indicate the importance of patient-centered approaches to care within a multidisciplinary care setting, alongside rapid, free, and on-site ART dispensation for MLWH, specifically focusing on B/F/TAF. However, despite feeling satisfied with this care approach, results suggest that the mental health needs of MLWH remain inadequately addressed at the CVIS/MUHC, and that social determinants of health continue to impact time to ART initiation despite the ASAP team's efforts to deliver ART as soon as possible to all MLWH once linked to care. In this chapter, I provide: a final overarching summary of the key results stemming from this dissertation; the contributions of this dissertation to evolving the HIV Care Cascade framework; the contributions of this dissertation to family medicine and primary care; the implications of this dissertation for research, care, and policy; and the strengths and limitations of this dissertation.

## Summary of the Main Findings

Through the systematic review (chapter 2, manuscripts 1 and 2), the numerous, complex, and multifaceted challenges that MLWH experience were categorized and subsequently cross-mapped across the linkage, retention, and HIV viral suppression steps of the HIV Care Cascade and the individual, interpersonal, organizational, community, and policy levels of the Socio-Ecological Model. Through this review it was identified that most barriers reported in the literature for MLWH were attributed to the individual level (64%) and organizational level (20%) of the Socio-Ecological Model, and centred primarily on the retention (68%) step of the Cascade. One of the most important findings in the review was that over 60% of the studies retained in the review reported barriers that were directly associated with the concept of social determinants of health. For example, 31% of the retained studies expressed how not meeting basic needs such as housing, food security, financial stability, and occupational security can often lead to disengagement with

HIV care and treatment. Furthermore, 27% of the retained studies discussed how language barriers can impede initial access to HIV care and treatment for MLWH.

As compared to the 19 categories of barriers, only 10 categories of facilitators were identified through the review. The most prevalent (42%) facilitator category that was reported was having an adaptive clinical environment available for MLWH (e.g., a clinical environment that (a) centres around concepts of approachability, supportiveness, and ensuring the availability of staff; (b) provides both HIV and non-HIV specific health services; (c) links care between clinical and community health services; and (d) specializes in providing care for vulnerable populations). Such clinical environments were discussed as foundational for facilitating initial linkage to and sustained engagement with HIV care and treatment for MLWH. Furthermore, 19% of the retained studies expressed how adopting multidisciplinary teams with a designated community health worker, case manager, social worker, or health advisor can support physicians in better addressing the complex bio-psycho-social needs that MLWH present with. This provided preliminary support for the ‘ASAP’ approach to care which is embedded within a multidisciplinary clinic with experience in working with MLWH.

Through results of the qualitative study presented in chapter 3 (manuscript 3), which examined the longitudinal experiences of MLWH enrolled in the ASAP study (i.e., where they received B/F/TAF for free, rapidly, and within a multidisciplinary care environment), it was clear that the earlier phases in their HIV care trajectory were marked with negative emotions as a result of: HIV-related psychological distress; concern about the impact their HIV status will have on their immigration status; and the challenges of navigating the Canadian health system. However, as MLWH continued to engage in care, while some expressed their gratitude towards receiving ART for free and rapidly, the vast majority were more focused on: not experiencing side effects when taking ART; seeing improvement in their health from taking ART; feeling empowered to self-manage their HIV; gaining control over their HIV through treatment-taking; receiving humanizing care (which MLWH expressed as feeling supported, feeling cared for, feeling kindness and respect from healthcare professionals, and feeling safe and comfortable within the clinical setting); and receiving holistic care from a multidisciplinary team (where different professionals are able to support them for different bio-psycho-social issues). Despite these positive feelings, MLWH also expressed continued concerns about: obtaining legal status in Canada and navigating the immigration process; figuring out how to access healthcare for issues beyond HIV; obtaining a source of stable income; building a social network; and wanting more frequent contact with the social worker.

In sum, this qualitative study provided preliminary support for the value of providing MLWH with care through multidisciplinary teams which hire clinicians who are truly considerate of the patients they serve and seek to provide MLWH with holistic and empowering services. Furthermore, the interviews supported the importance of providing cost-covered B/F/TAF rapidly. However, the findings of this work also suggest that MLWH continue to experience psycho-social challenges beyond their HIV-related needs, that they need addressed and would like increased support from dedicated clinicians such as social workers. Notably, while the ASAP study was ongoing, the clinical team at the CVIS/MUHC underwent significant staffing changes. The clinic went from having two full-time social workers to one part-time social worker. Furthermore, at first there was a psychologist on-site, but this individual eventually left the team and a psychiatrist replaced them. The new psychiatrist, however, only provided clinical evaluations for ASAP study patients, if needed, and did not provide follow-up support for these patients. These results suggest that the ‘real world’ clinical setting in which the ASAP study operated (including clinician turnover and staffing challenges) influenced the patient experience for MLWH.

Interestingly, the quantitative analysis of patient-reported outcome and experience measures among MLWH enrolled in the ASAP study (chapter 4, manuscript 4) confirmed the trends identified in the qualitative analysis (manuscript 3). Specifically, throughout a 48-week period, MLWH consistently reported: a high degree of HIV treatment self-efficacy, compliance, and satisfaction; high perceived empathy and cultural competence from their HIV clinical team; elevated levels of internalized HIV-related stigma, moderate levels of social support, and a high probability of living with a serious mental illness. Thus, MLWH truly seemed to have positive perceptions regarding their HIV care and treatment, but irrespective of time engaged, continued to experience significant mental health related challenges. This suggests that the multidisciplinary team at CVIS/MUHC was unable to thoroughly address the mental health needs of MLWH, and that dedicated, well-funded, and accessible mental health support must be embedded within care settings for MLWH.

In the final quantitative study exploring the time to ART initiation and HIV viral undetectability among MLWH enrolled in ASAP, and the effect of social determinants of health on these clinical outcomes (chapter 5, manuscript 5), additional evidence supporting the ASAP approach to care was identified. Specifically, in this study, median time to initiate treatment was 5 days, with 37% of the sample initiating on the same day as their first visit, and 63% within the first 7 days. Median time to reach undetectability was 57 days. These times are comparable to a similar study conducted by Hoenigl et al., which concluded that a median time of 8 days to ART initiation from first clinical intake and a median time of approximately 84 days to viral suppression are considered rapid [31]. This further provides support for the ASAP approach to care, and is highly pertinent given the numerous studies that suggest MLWH often have delays with respect to steps of the HIV Care Cascade (i.e., that they have lived a substantial amount of time with HIV, to the extent that their disease has often progressed to AIDS, before being tested for HIV and/or initiating treatment) [14, 21, 32, 33]. However, several social determinants of health significantly impacted time to treatment initiation (i.e., immigration status, age, sexual orientation, education, occupational status), but no factor significantly affected time to undetectability. Considering the entire thesis, this finding suggests that while social factors may impede the initial uptake of ART, engagement in an approach to care that provides MLWH with humanizing and holistic care, alongside free treatment that is dispensed rapidly and on-site, may allow MLWH to achieve excellent clinical outcomes – despite their persistent experience of mental health problems.

## Contributions to improve the HIV Care Cascade for MLWH

The HIV Care Cascade was an instrumental model that I used to guide the analysis and discussion sections for most manuscripts presented in this doctoral thesis. As I progressed in my doctoral studies and in my application of this widely used public health model, I began to see tremendous failures in its utility for monitoring health progress among MLWH. While writing manuscripts 1 and 2, I adopted the most commonly used perspective of the HIV Care Cascade, which considers the trajectory of HIV care to have 5 main steps – HIV diagnosis, linkage to care, ART initiation, long-term adherence to ART and sustained engagement in HIV care, and HIV viral suppression – which patients are considered to move through in a linear and uni-directional manner [34, 35]. However, as I completed my analysis and writing for manuscript 2, I realized that many MLWH may not progress through these steps in this fashion. The results of manuscript 2 exemplify that numerous barriers which can affect MLWH's experiences and can delay any step of the cascade or lead to disengagement from HIV care. Additionally, the findings presented in manuscript 2 suggest that the linear approach to the cascade conceals the pathways by which MLWH re-engage with care and treatment, for instance, after moving to a new jurisdiction.

In the midst of reflecting on these issues and within 4 months of my review's publication (manuscript 2), an international consensus statement pushing for the adoption of health-related quality of life (HrQoL) as the final step of the HIV Care Cascade was published in *Nature Communications* by Lazarus et al [36]. In this piece it is explained that although life expectancy for PLWH who are virally suppressed is near normal to people without HIV, their HrQoL is significantly lower than those without HIV. This reflects the global focus, thus far, on achieving HIV viral undetectability. As we have achieved tremendous success in keeping PLWH alive, it is time we begin ensuring that PLWH feel alive [37]. In so doing, we may help establish a positive cycle whereby the better one's HrQoL is, the stronger their commitment to care and treatment could be, and vice versa. Given this advancement in collective thought, in my longitudinal qualitative investigation (manuscript 3), I adopted HrQoL as the final step of the HIV Care Cascade. Thus, one of the major contributions of manuscript 3 is its provision of a rigorous exploration of the experiences of MLWH vis-à-vis their HrQoL, perhaps among the first papers of its kind worldwide. This may help guide global thought and action as we move towards the next era of managing HIV, beyond simply addressing viral suppression.

At this point, the bi-directionality issue (i.e., that not all MLWH move through the HIV Care Cascade in a linear, streamlined manner) remained on my mind. Interestingly, while wrapping up manuscript 2, I found an editorial which presented a new way of conceptualizing the Cascade [38]. Specifically, Ehrenkranz et al. introduced the "Cyclical Cascade framework" in which they introduced three new innovations to the traditional Cascade: (1) they explicitly integrated the concept of disengagement at each step of the cascade and highlighted that re-engagement can occur by re-diagnosis or re-linkage; (2) the fourth step of the cascade (i.e., retention in care and treatment) was split into early retention (i.e., up to 6 months) and long-term retention (i.e., beyond 6 months); and (3) the fifth and final step of the traditional cascade (i.e., HIV viral suppression) was removed because long-term retention in HIV care is highly correlated with suppressed viral loads [38]. According to the authors, this "cyclical cascade" could effectively improve the identification, follow-up, and general understanding of PLWH who disengage from care or treatment or are lost to follow-up, ultimately enabling the development of clinical, context-specific, interventions to improve retention in those populations [38].

While I thoroughly appreciated the ideas Ehrenkranz and colleagues brought to the table, my findings from manuscripts 2 and 3 made me want to push their "Cyclical Cascade" framework further. Specifically, I had two propositions for stakeholders across the global HIV landscape. First, I proposed the addition of HrQoL measurement at each step of the cyclical cascade (rather than simply at the end of the cascade as Lazarus et al. proposed with respect to the traditional cascade in their consensus statement). Second, to fully benefit from the addition of HrQoL evaluations, patient-oriented research programs should be implemented broadly and transparently across HIV settings. The synergy of HrQoL data and of dialogues made possible by the engagement of patients and other stakeholders in patient-oriented research would create the conditions necessary to truly empower MLWH and general populations of PLWH to champion their health care and guide meaningful, respectful, and relevant research. I posit that these two suggestions could drive the development of new approaches to improving care engagement at all levels, particularly for marginalized and vulnerable populations. I decided, thus, to publish a brief report sharing these perspectives with the global HIV community [39]. Thus, a large portion of the work conducted in this doctoral thesis has sought to evolve conceptualizations of the HIV Care Cascade towards a patient-centered cyclical framework.

## Contribution to Family Medicine & Primary Care

The World Health Organization defines primary care as "a model of care that supports first-contact, accessible, continuous, comprehensive and coordinated person-focused care. It aims to optimize population health and reduce disparities across the population by ensuring that subgroups have equal access to services" [40]. The OECD promotes a similar definition of primary care, with the addition that such an approach to care seeks to "[bring] healthcare as close as possible to where people live and work" and that "It addresses the main health problems in the community, providing preventive, curative and rehabilitative services. Primary care goes beyond services provided by primary care physicians to encompass other health professionals such as nurses, pharmacists, auxiliaries, and community health workers" [41].

When a physician and/or team of healthcare professionals provide ‘primary care’ (i.e., first-contact, continuous, comprehensive, and person-focused care) to HIV patients, this is generally referred to as ‘primary HIV care’ or ‘HIV primary care’ [42]. This approach to caring for MLWH has garnered increasing momentum across the United States [43-47] and, more recently, in Canada [48, 49]. Given that the CVIS/MUHC employs HIV-specialist clinicians that provide accessible, continuous, and comprehensive care with a person-focused approach, this centre, despite being in a quaternary hospital-based clinic, is considered to be a HIV primary care site. Additionally, from the interviews conducted in manuscript 2, as well as the numerous discussions I have had with patient and clinician stakeholders involved in the ASAP study over the last 5 years, it is understood that for many MLWH, the CVIS/MUHC was the first healthcare facility they contacted (aside from the centre they conducted their HIV test at) and the main healthcare facility they frequent.

However, it must be expressed that my work seeks to improve the healthcare for MLWH, particularly at the clinical level. While the results from manuscripts 3-5 come from MLWH enrolled in care at a HIV primary care site, the results can inform family practices and community health settings that serve MLWH. Understanding that MLWH require humanizing, holistic, and empowering care, coupled with access to free treatment and care as soon as possible, are elements that should be adopted across clinical sites – though of course the implementation process may be tricky given various barriers to change including health policies that may not enable access to free ART for all. Future work will need to: (a) further test the effectiveness of the ASAP approach to care, understand which components of the model are most integral for the improved health outcomes of MLWH, potentially through randomized controlled trials to better examine causality; and (b) develop strategies for scaling and implementing optimal elements of the ASAP approach across clinical sites, including family practices, community health settings, and designated HIV primary care centres.

## Implications and Future Directions for Research, Practice, and Policy

On 30 October 2023, the World Health Organization (WHO) published its “Global research agenda on health, migration, and displacement” which they conceptualized as a foundation for developing regional and national research and policy agendas vis-à-vis migrant health [50, 51]. In their report, the WHO express several priority areas including: generating evidence on inclusive universal healthcare and primary healthcare for migrant populations, and generating research on addressing the determinants of health of migrant populations [50, 51]. Notably, my doctoral dissertation responds to these priority areas, and particularly provides several implications and directions for future research, practice, and policy with respect to MLWH in Canada. Specifically, my research provides preliminary evidence for adopting an approach to care which centres around patient-centred principles within multidisciplinary settings with free, on-site, and rapid ART dispensation. However, to scale, embed this intervention sustainably across Canada, and establish equitable health outcomes across all migrant populations, several aspects need to be reflected on nationally.

Within the ASAP study, MLWH had varying immigration and health coverage statuses. Those that were refugees or asylum seekers had full coverage for their health needs through the Interim Federal Health Program (IFHP). Those that had been in Quebec for over three months qualified for public health coverage through the Régie de l'assurance maladie du Québec (RAMQ) system. However, those with precarious immigration statuses (e.g., undocumented residents, temporary workers, and international students) often had private health insurance with incomplete or no coverage for sextually transmitted infection/HIV-related health needs, or had no health insurance at all for any health needs. Regardless of their status, all participants in the ASAP study were provided with cost-covered ART as soon as possible once they were linked to the CVIS/MUHC. This was made possible through grants that Dr. Bertrand Lebouché obtained. As MLWH progressed through the ASAP study, they would ideally obtain public health insurance through RAMQ, IFHP, or private insurance, lifting the burden of cost from this grant support. This model, however, is challenging to scale and requires constant commitment from funders. One recommendation that my research thus promotes is to either expand universal health coverage to all migrants regardless of their immigration status in Canada, or revise the IFHP to include all MLWH without sufficient HIV-related health coverage until they become eligible for health coverage through the RAMQ system. These approaches would follow in the pathway that other nations (e.g., France) have adopted, as presented in my systematic review.

Alongside the provision of government-funded healthcare to MLWH, my doctoral thesis identifies two other areas of research and action. As the results in manuscript five suggest that even when ART is provided for free, social determinants of health continue to impact time to ART initiation, further research is necessary to better understand how clinical interventions for MLWH can improve health outcomes equitably. Concurrently, a running theme across manuscripts 3-5 was that current healthcare services do not seem to adequately address the mental health challenges experienced by MLWH. Thus, a need to improve multidisciplinary services through embedding targeted, well-staffed, well-funded, and accessible mental health services seems necessary.

## Strengths and Limitations of the Thesis

One of the biggest strengths of this thesis is the large multidisciplinary team involved in each of the conducted studies. I have had the pleasure of working with numerous HIV-specialist clinicians (including physicians, nurses, and pharmacists), researchers from various domains (including sociology, epidemiology, statistics, and public health), and patients themselves. This large team of stakeholders has guided the conduct of my doctoral work throughout the last five years. These stakeholders have contributed immensely to interpreting findings, as well as reviewing, editing, and providing feedback for each manuscript I have written. Their comments and suggestions have been instrumental in ensuring that multiples perspectives are heard and considered when analyzing data and discussing results.

Furthermore, in this thesis, both qualitative and quantitative approaches are adopted. Results from quantitative studies (manuscripts 4 and 5) provide support for earlier qualitative results (manuscript 3), which strengthens the validity of the findings discussed in this thesis. However, a limitation in this thesis is that it is exploratory and not explanatory in nature. ASAP is a pilot feasibility study which adopts a 96-week prospective cohort approach. This research design leads to observational data which is appropriate for capturing the complexity of real-world clinical healthcare delivery and improving the understanding of how a drug or innovation actually works in clinical practice within a particular setting or with a specific patient population [52, 53]. Observational studies are thus complimentary to randomized controlled trials which are held as the gold standard for assessing causality and intervention effectiveness, but often fail to capture regional and population-specific differences as they adopt very structured programs with tightly defined patient samples [52, 53]. Another limitation is that the results of manuscripts 4 and 5 are limited by the number of participants enrolled in ASAP. The COVID-19 pandemic significantly delayed patient enrollment and data collection. Thus, only interim analyses could be conducted for manuscripts 4 and 5. These limitations have been thoroughly discussed in manuscripts 4 and 5.

## Conclusion

In conclusion, MLWH are a growing and diverse population across OECD countries. This population experiences tremendous barriers that prevent them from engaging in care and treatment across their HIV care trajectory. Many of the barriers MLWH encounter are centred around social determinants of health (e.g., lack of housing, legal status, occupation, and education) which ultimately affect their capacity to remain engaged in HIV care in the long-term. To address these challenges, adopting innovative care models which incorporate teams that provide multidisciplinary services, alongside free, rapid, and on-site treatment dispensation, are considered necessary. When engaging with the ASAP cohort study, which provides these facilitators to care for MLWH, participants: (a) expressed positive experiences with this model, particularly as a result of receiving humanizing, holistic, and empowering care, and free and efficient access to treatment and care; (b) had a high degree of treatment self-efficacy, compliance, and satisfaction, as well as high perceived empathy and cultural competence from their HIV clinical team; (c) and were able to start ART and reach HIV viral undetectability efficiently. However, through both qualitative and quantitative studies, MLWH expressed mental health as a long-standing challenge that seemed to not be sufficiently addressed within the ASAP approach to care. Furthermore, age, sexual orientation, educational level, and occupational status were found to significantly impact time to ART initiation. Thus, while preliminary evidence supports the ASAP approach to care for MLWH, the results of this study underscore the need to embed targeted, well-funded, and accessible mental health support in HIV clinical settings. And finally, this doctoral thesis suggests the importance of further considering the impact of social determinants of health when designing clinical interventions for more equitable outcomes among MLWH.

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# Appendix of the Thesis

## Appendix 1, Manuscript 1, Literature Database Search Strategies

**Appendix 1, Manuscript 1, Table 1:** Medline (Ovid) Search Strategy.

| Ovid MEDLINE(R) ALL 1946 to March 24, 2020 | | |
|---|---|---|
| # | Searches | Results |
| 1 | "emigrants and immigrants"/ or undocumented immigrants/ or refugees/ or "transients and migrants"/ | 31455 |
| 2 | "Emigration and Immigration"/ | 25055 |
| 3 | (migrant* or migration* or immigrant* or emigrant* or inmigrant* or inmigration* or outmigrant* or outmigration* or refugee* or transient* or nomad* or alien* or (asylum adj2 seek*) or (displace* adj3 (people or person or individual*)) or foreigner* or (foreign* adj2 born) or (new* adj2 (arriv* or comer*)) or newcomer* or visitor* or tourist* or traveler* or passer?by or ((permanent* or temporar*) adj3 resident*) or (international adj2 stud*) or (permit* adj2 hold*) or ((foreign* or temporar* or seasonal* or undocument*) adj3 worker*) or ((Non-naturali* or undocument* or non*) adj2 citizen*) or ((no or non) adj2 status*)).tw,kw. | 671304 |
| 4 | 1 or 2 or 3 | 685727 |
| 5 | exp HIV Infections/ | 279098 |
| 6 | ((Human adj2 immunodeficiency adj2 virus) or HIV).tw,kf. | 328145 |
| 7 | (acquir* adj2 (immun?-deficiency or immun?deficiency) adj3 syndrom*).tw,kf. | 25611 |
| 8 | 5 or 6 or 7 | 399273 |
| 9 | exp Health Services Accessibility/ | 108826 |
| 10 | exp "Treatment Adherence and Compliance"/ | 239082 |
| 11 | ((Access* or link* or availab* or refer*) adj5 (treat* or therap* or screen* or test* or care* or program* or service*)).tw,kf. | 339131 |
| 12 | ((adher* or compliance* or nonadher* or noncompliance*) adj4 (treat* or therap* or care* or program*)).tw,kf. | 49761 |
| 13 | ((initat* or uptake* or start* or begin* or continu*) adj4 (treat* or therap*)).tw,kf. | 139868 |
| 14 | ((treat* or therap*) adj5 (uptake* or start* or initiat* or begin* or access* or link* or referr*)).tw,kf. | 202976 |
| 15 | 9 or 10 or 11 or 12 or 13 or 14 | 860012 |
| 16 | 4 and 8 and 15 | 1617 |

**Appendix 1, Manuscript 1, Table 2:** Embase (Ovid) Search Strategy.

| Embase Classic+Embase 1947 to 2020 Week 12 | | |
|---|---|---|
| Searches | Results | Type |

| | | |
|---|---|---|
| 1 | exp migrant/ or exp emigrant/ or exp immigrant/ or exp migrant worker/ or exp refugee/ | 37138 |
| 2 | exp undocumented immigrant/ | 394 |
| 3 | (migrant* or migration* or immigrant* or emigrant* or inmigrant* or inmigration* or outmigrant* or outmigration* or refugee* or transient* or nomad* or alien* or (asylum adj2 seek*) or (displace* adj3 (people or person or individual*)) or foreigner* or (foreign* adj2 born) or (new* adj2 (arriv* or comer*)) or newcomer* or visitor* or tourist* or traveler* or passer?by or ((permanent* or temporar*) adj3 resident*) or (international adj2 stud*) or (permit* adj2 hold*) or ((foreign* or temporar* or seasonal* or undocument*) adj3 worker*) or ((Non-naturali* or undocument* or non*) adj2 citizen*) or ((no or non) adj2 status*)).tw,kw. | 865809 |
| 4 | 1 or 2 or 3 | 871927 |
| 5 | exp Human immunodeficiency virus/ | 193064 |
| 6 | exp acquired immune deficiency syndrome/ | 140155 |
| 7 | ((Human adj2 immunodeficiency adj2 virus) or HIV).tw,kw. | 415138 |
| 8 | (acquir* adj2 (immun?-deficiency or immun?deficiency) adj3 syndrom*).tw,kw. | 25507 |
| 9 | 5 or 6 or 7 or 8 | 503340 |
| 10 | exp health care access/ | 59807 |
| 11 | exp patient compliance/ | 155165 |
| 12 | ((Access* or link* or availab* or refer*) adj5 (treat* or therap* or screen* or test* or care* or program* or service*)).tw,kw. | 495654 |
| 13 | ((adher* or compliance* or nonadher* or noncompliance*) adj4 (treat* or therap* or care* or program*)).tw,kw. | 81978 |
| 14 | ((initat* or uptake* or start* or begin* or continu*) adj4 (treat* or therap*)).tw,kw. | 249313 |
| 15 | ((treat* or therap*) adj5 (uptake* or start* or initiat* or begin* or access* or link* or referr*)).tw,kw. | 349552 |
| 16 | 10 or 11 or 12 or 13 or 14 or 15 | 1065953 |
| 17 | 4 and 9 and 16 | 2123 |

**Appendix 1, Manuscript 1, Table 3:** CINAHL Search Strategy.

| **EBSCO*host* Wednesday, March 25, 2020 11:22:47 AM** | | |
|---|---|---|
| **#** | **Query** | **Results** |
| S15 | S3 AND S7 AND S14 | 751 |
| S14 | S8 OR S9 OR S10 OR S11 OR S12 OR S13 | 329,026 |
| S13 | TI ( ((treat* or therap*) N5 (uptake* or start* or initiat* or begin* or access* or link* or referr*)) ) OR AB ( ((treat* or therap*) N5 (uptake* or start* or initiat* or begin* or access* or link* or referr*)) ) | 61,467 |
| S12 | TI ( ((initat* or uptake* or start* or begin* or continu*) N4 (treat* or therap*)) ) OR AB ( ((initat* or uptake* or start* or begin* or continu*) N4 (treat* or therap*)) ) | 36,011 |

|  |  |  |
|---|---|---|
| S11 | TI ( ((adher* or compliance* or nonadher* or noncompliance*) N4 (treat* or therap* or care* or program*)) ) OR AB ( ((adher* or compliance* or nonadher* or noncompliance*) N4 (treat* or therap* or care* or program*)) ) | 26,217 |
| S10 | TI ( ((Access* or link* or availab* or refer*) N5 (treat* or therap* or screen* or test* or care* or program* or service*)) ) OR AB ( ((Access* or link* or availab* or refer*) N5 (treat* or therap* or screen* or test* or care* or program* or service*)) ) | 151,461 |
| S9 | (MH "Patient Compliance+") | 53,789 |
| S8 | (MH "Health Services Accessibility+") | 90,919 |
| S7 | S4 OR S5 OR S6 | 127,297 |
| S6 | TI ((acquir* N2 (immun?-deficiency or immun?deficiency) N3 syndrom*) OR AB ((acquir* N2 (immun?-deficiency or immun?deficiency) N3 syndrom*) | 2,709 |
| S5 | TI ( ((Human N2 immunodeficiency N2 virus) or HIV) ) OR AB ( ((Human N2 immunodeficiency N2 virus) or HIV) ) | 98,907 |
| S4 | (MH "HIV-Infected Patients+") OR (MH "HIV Infections+") OR (MH "Human Immunodeficiency Virus+") | 102,687 |
| S3 | S1 OR S2 | 114,620 |
| S2 | TI ( (migrant* or migration* or immigrant* or emigrant* or inmigrant* or inmigration* or outmigrant* or outmigration* or refugee* or transient* or nomad* or alien* or (asylum N2 seek*) or (displace* N3 (people or person or individual*)) or foreigner* or (foreign* N2 born) or (new* adj2 (arriv* or comer*)) or newcomer* or visitor* or tourist* or traveler* or passer?by or ((permanent* or temporar*) N3 resident*) or (international N2 stud*) or (permit* N2 hold*) or ((foreign* or temporar* or seasonal* or undocument*) N3 worker*) or ((Non-naturali* or undocument* or non*) N2 citizen*) or ((no or non) N2 status*)) ) OR AB ( (migrant* or migration* or immigrant* or emigrant* or inmigrant* or inmigration* or outmigrant* or outmigration* or refugee* or transient* or nomad* or alien* or (asylum N2 seek*) or (displace* N3 (people or person or individual*)) or foreigner* or (foreign* N2 born) or (new* adj2 (arriv* or comer*)) or newcomer* or visitor* or tourist* or traveler*or passer?by or ((permanent* or temporar*) N3 resident*) or (international N2 stud*) or (permit* N2 hold*) or ((foreign* or temporar* or seasonal* or undocument*) N3 worker*) or ((Non-naturali* or undocument* or non*) N2 citizen*) or ((no or non) N2 status*)) ) | 101,880 |
| S1 | (MH "Residential Mobility+") OR (MH "Transients and Migrants") OR (MH "Relocation") OR (MH "Emigration and Immigration") OR (MH "Refugees") OR (MH "Immigrants+") | 35,504 |

**Appendix 1, Manuscript 1, Table 4:** Scopus Search Strategy.

| **Scopus – March 25, 2020 11:45 AM** |  |  |
|---|---|---|
| Search | Strategy | Results |

| | | |
|---|---|---|
| 4 | ( TITLE-ABS-KEY ( migrant* OR migration* OR immigrant* OR emigrant* OR inmigrant* OR inmigration* OR outmigrant* OR outmigration* OR refugee* OR transient* OR nomad* OR alien* OR ( asylum W/2 seek* ) OR ( displace* W/3 ( people OR person OR individual* ) ) OR foreigner* OR ( foreign* W/2 born ) OR ( new* W/2 ( arriv* OR comer* ) ) OR newcomer* OR visitor* OR tourist* OR traveler*or AND passer?by OR ( ( permanent* OR temporar* ) W/3 resident* ) OR ( international W/2 stud* ) OR ( permit* W/2 hold* ) OR ( ( foreign* OR temporar* OR seasonal* OR undocument* ) W/3 worker* ) OR ( ( non-naturali* OR undocument* OR non* ) W/2 citizen* ) OR ( ( no OR non ) W/2 status* ) ) ) AND ( ( TITLE-ABS-KEY ( ( ( human W/2 immunodeficiency W/2 virus ) OR hiv ) ) OR TITLE-ABS-KEY ( ( acquir* W/2 ( immun?-deficiency OR immun?deficiency ) W/3 syndrom* ) ) ) ) AND ( ( TITLE-ABS-KEY ( ( ( access* OR link* OR availab* OR refer* ) W/5 ( treat* OR therap* OR screen* OR test* OR care* OR program* OR service* ) ) ) OR TITLE-ABS-KEY ( ( ( adher* OR compliance* OR nonadher* OR noncompliance* ) W/4 ( treat* OR therap* OR care* OR program* ) ) ) OR TITLE-ABS-KEY ( ( ( initat* OR uptake* OR start* OR begin* OR continu* ) W/4 ( treat* OR therap* ) ) ) OR TITLE-ABS-KEY ( ( ( treat* OR therap* ) W/5 ( uptake* OR start* OR initiat* OR begin* OR access* OR link* OR referr* ) ) ) ) ) ) | 44 |
| 3 | ( TITLE-ABS-KEY ( ( ( access* OR link* OR availab* OR refer* ) W/5 ( treat* OR therap* OR screen* OR test* OR care* OR program* OR service* ) ) ) OR TITLE-ABS-KEY ( ( ( adher* OR compliance* OR nonadher* OR noncompliance* ) W/4 ( treat* OR therap* OR care* OR program* ) ) ) OR TITLE-ABS-KEY ( ( ( initat* OR uptake* OR start* OR begin* OR continu* ) W/4 ( treat* OR therap* ) ) ) OR TITLE-ABS-KEY ( ( ( treat* OR therap* ) W/5 ( uptake* OR start* OR initiat* OR begin* OR access* OR link* OR referr* ) ) ) ) | 1,091,191 |
| 2 | ( TITLE-ABS-KEY ( ( ( human W/2 immunodeficiency W/2 virus ) OR hiv ) ) OR TITLE-ABS-KEY ( ( acquir* W/2 ( immun?-deficiency OR immun?deficiency ) W/3 syndrom* ) ) ) | 511,398 |
| 1 | TITLE-ABS-KEY ( migrant* OR migration* OR immigrant* OR emigrant* OR inmigrant* OR inmigration* OR outmigrant* OR outmigration* OR refugee* OR transient* OR nomad* OR alien* OR ( asylum W/2 seek* ) OR ( displace* W/3 ( people OR person OR individual* ) ) OR foreigner* OR ( foreign* W/2 born ) OR ( new* W/2 ( arriv* OR comer* ) ) OR newcomer* OR visitor* OR tourist* OR traveler* OR passerby OR passersby by OR ( ( permanent* OR temporar* ) W/3 resident* ) OR ( international W/2 stud* ) OR ( permit* W/2 hold* ) OR ( ( foreign* OR temporar* OR seasonal* OR undocument* ) W/3 worker* ) OR ( ( non-naturali* OR undocument* OR non* ) W/2 citizen* ) OR ( ( no OR non ) W/2 status* ) ) | 9,053 |

**Appendix 1, Manuscript 1, Table 5:** Cochrane Library Search Strategy.

| **Cochrane Library - March 25, 2020 12:10 PM** |
|---|

| Search | Strategy | Results |
|---|---|---|
| 4 | (migrant* OR migration* OR immigrant* OR emigrant* OR inmigrant* OR inmigration* OR outmigrant* OR outmigration* OR refugee* OR transient* OR nomad* OR alien* OR ( asylum NEAR/2 seek* ) OR ( displace* NEAR/3 ( people OR person OR individual* ) ) OR foreigner* OR ( foreign* NEAR/2 born ) OR ( new* NEAR/2 ( arriv* OR comer* ) ) OR newcomer* OR visitor* OR tourist* OR traveler* OR passerby OR passersby OR ( ( permanent* OR temporar* ) NEAR/3 resident* ) OR ( international NEAR/2 stud* ) OR ( permit* NEAR/2 hold* ) OR ( ( foreign* OR temporar* OR seasonal* OR undocument* ) NEAR/3 worker* ) OR ( ( non-naturali* OR undocument* OR non* ) NEAR/2 citizen* ) OR ( ( no OR non ) NEAR/2 status* )):ti,ab,kw AND ((human NEAR/2 immunodeficiency NEAR/2 virus) OR HIV OR (acquir* NEAR/2 (immunodeficiency) NEAR/3 syndrom*)):ti,ab,kw AND (((access* OR link* OR availab* OR refer* ) NEAR/5 ( treat* OR therap* OR screen* OR test* OR care* OR program* OR service* ) ) OR ( ( adher* OR compliance* OR nonadher* OR noncompliance* ) NEAR/4 ( treat* OR therap* OR care* OR program* ) ) OR ( ( initat* OR uptake* OR start* OR begin* OR continu* ) NEAR/4 ( treat* OR therap* ) ) OR ( ( treat* OR therap* ) NEAR/5 ( uptake* OR start* OR initiat* OR begin* OR access* OR link* OR referr* ) )):ti,ab,kw | 123 Trials, 2 Reviews (reviews not included) |
| 3 | ((access* OR link* OR availab* OR refer* ) NEAR/5 ( treat* OR therap* OR screen* OR test* OR care* OR program* OR service* ) ) OR ( ( adher* OR compliance* OR nonadher* OR noncompliance* ) NEAR/4 ( treat* OR therap* OR care* OR program* ) ) OR ( ( initat* OR uptake* OR start* OR begin* OR continu* ) NEAR/4 ( treat* OR therap* ) ) | 154875 |
| 2 | (human NEAR/2 immunodeficiency NEAR/2 virus) OR HIV OR (acquir* NEAR/2 (immunodeficiency) NEAR/3 syndrom*) | 27172 |
| 1 | migrant* OR migration* OR immigrant* OR emigrant* OR inmigrant* OR inmigration* OR outmigrant* OR outmigration* OR refugee* OR transient* OR nomad* OR alien* OR ( asylum NEAR/2 seek* ) OR ( displace* NEAR/3 ( people OR person OR individual* ) ) OR foreigner* OR ( foreign* NEAR/2 born ) OR ( new* NEAR/2 ( arriv* OR comer* ) ) OR newcomer* OR visitor* OR tourist* OR traveler* OR passerby OR passersby OR ( ( permanent* OR temporar* ) NEAR/3 resident* ) OR ( international NEAR/2 stud* ) OR ( permit* NEAR/2 hold* ) OR ( ( foreign* OR temporar* OR seasonal* OR undocument* ) NEAR/3 worker* ) OR ( ( non-naturali* OR undocument* OR non* ) NEAR/2 citizen* ) OR ( ( no OR non ) NEAR/2 status* ) | 28365 |

## Appendix 2, Manuscript 3, Interview Guides

### Interview Week 1

1. What is your experience of beginning HIV treatment?
2. Currently, how satisfied are you with your:
    a. HIV treatment ?
    b. HIV care ?
3. How can we improve the HIV care you are receiving ?
4. What worries do you have about your:
    a. HIV treatment ?
    b. HIV care?
5. What benefits do you expect from your:
    a. HIV treatment ?
    b. HIV care?

### Interview Week 24

1. Tell me about your first visits at the clinic; and about your first weeks on your current HIV treatment.

Prompt questions:

- a. How did you feel?
- b. What barriers and difficulties did you face when came for the first times at the clinic? When taking the treatment?
- c. What made it easier for you to come at the clinic? To take the treatment?
- d. If the participant recently immigrated to Canada:
    - i. What procedures did you follow relative to immigration?
    - ii. How do you think your HIV status may impact your integration process in the future?

2. How did your general situation evolve since you began receiving care at the clinic? Since you initiated your HIV treatment?

Prompt questions:

   a. At this moment, to which extent do you feel similar to how you felt at the time? To which extent do you feel different?
   b. What is different or similar in terms of… ?
      i. … social connexions, networks, status
      ii. … lifestyle, organization, daily activities
      iii. … quality of life, wellbeing, personal fulfilment
      iv. … access to social services, to health care
      v. … your emotional/physical/social health, ability to function

3. What service or staff at the clinic contributed to positive or negative changes in your situation? What service or staff at the clinic made it easier or more difficult for you to take the treatment? How?
4. What do you think about the care and treatment that you are taking?
   a. What are the negative aspects? What are the positive aspects? What could be improved?
   b. If the participant recently immigrated to Canada:
      i. What are the positive aspects of the immigration process? What are the negative, or difficult aspects of the immigration process?
      ii. How did this process impact the care that you receive and your uptake of the treatment?
   c. What kind of services could be provided at your HIV clinic, to facilitate this process?

### Interview Week 48

1. To which extent are you responsible of managing your care and treatment? To which extent are your care providers responsible?

Prompts:

   a. How do you define your responsibilities? How do you define theirs?
   b. What actions can you take to improve your experience of care and of the treatment? What actions can they take?

2. To which extent do you feel you can talk to your care providers about the positive aspects of the care that you receive and of the treatment? About their negative aspects?

Prompts:

  a. To which extent can you ask them for assistance when you face a problem?
  b. To which extent can you manage problems yourself?
  c. What solutions did you find to problems with care and treatment? What solutions were provided by care providers?

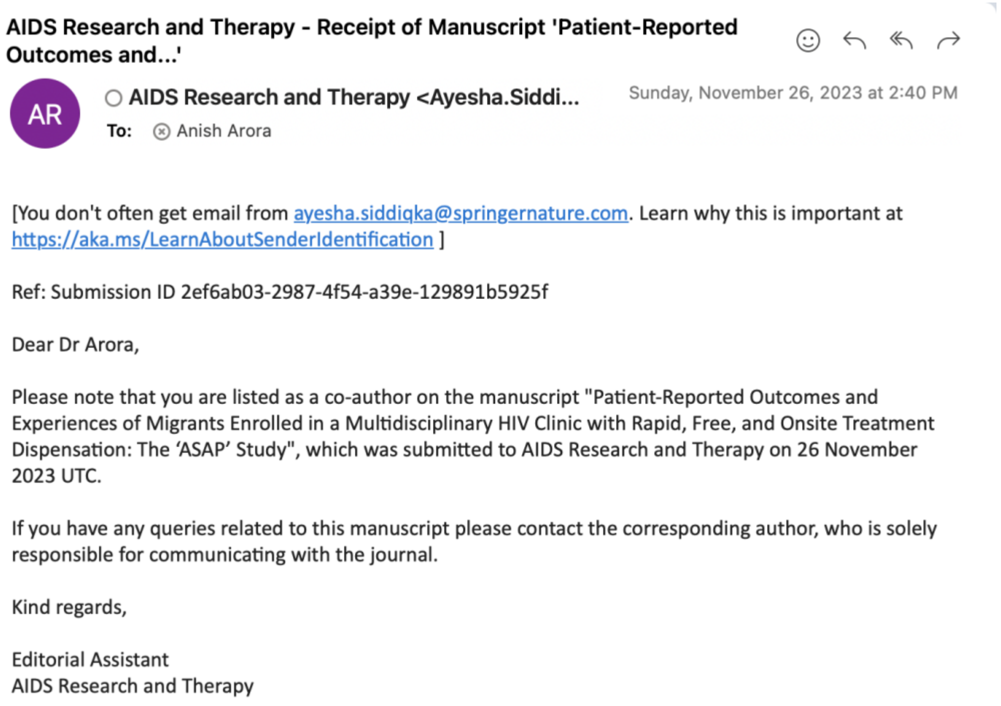
3. To which extent have you maintained a health condition and lifestyle similar to when you initiated care and treatment? To which extent are your health condition and lifestyle different?

Prompts:

  a. How did your health condition and lifestyle change? How did your treatment impact them?

4. How could the services that you receive at the clinic be improved? What should change in the clinic? What should be kept?

## Appendix 3, Manuscript 4, Journal Submission Confirmation



**AIDS Research and Therapy - Receipt of Manuscript 'Patient-Reported Outcomes and...'**

○ **AIDS Research and Therapy <Ayesha.Siddi...** Sunday, November 26, 2023 at 2:40 PM

**To:** ⊗ Anish Arora

[You don't often get email from ayesha.siddiqka@springernature.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification ]

Ref: Submission ID 2ef6ab03-2987-4f54-a39e-129891b5925f

Dear Dr Arora,

Please note that you are listed as a co-author on the manuscript "Patient-Reported Outcomes and Experiences of Migrants Enrolled in a Multidisciplinary HIV Clinic with Rapid, Free, and Onsite Treatment Dispensation: The 'ASAP' Study", which was submitted to AIDS Research and Therapy on 26 November 2023 UTC.

If you have any queries related to this manuscript please contact the corresponding author, who is solely responsible for communicating with the journal.

Kind regards,

Editorial Assistant
AIDS Research and Therapy