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Examining the rapid initiation of B/F/TAF strategy through a Canadian lens: an HIV transmission modelling approach

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Presented at HIV Drug Therapy Glasgow 2024, November 10-13, 2024, Scottish Events Campus, Glasgow, Scotland, UK

INTRODUCTION

- Sexually transmitted and blood borne infections, such as the human immunodeficiency virus (**HIV**) remain a significant health concern in Canada. Even if HIV is preventable and treatable in many cases, HIV imposes a significant physical, emotional, and economic cost.[1]
- Antiretroviral therapy (**ART**) is the standard of care to treat HIV.[2] While it is recommended to begin ART promptly following an HIV diagnosis to lower viral load, clinical practice often faces delays, which can increase the risk of virus transmission.
- Bictegravir/emtricitabine/tenofovir alafenamide (**B/F/TAF**) is a combination of three ARTs that has the attributes to support rapid treatment initiation compared to the actual clinical practice.[3]
- Immediate treatment initiation at diagnosis can help patients achieve and maintain virological suppression earlier in their infection and prevent new HIV infections.[4,5]
- Rapid treatment initiation may also be beneficial for difficult-to-treat patients, such as people who inject drugs (**PWID**), where delays in starting treatment may result in the patient disengaged with care.[5]
- Although multiple benefits have been demonstrated with rapid ART treatment initiation, there is still a delay in initiating the treatment in Canada after HIV diagnosis, thus impacting the disease burden.

OBJECTIVE

- The objective of this study was to estimate, from a Canadian healthcare system perspective, the epidemiological and economic impact of the rapid initiation of bictegravir/emtricitabine/tenofovir alafenamide (B/F/TAF) compared to a standard initiation.

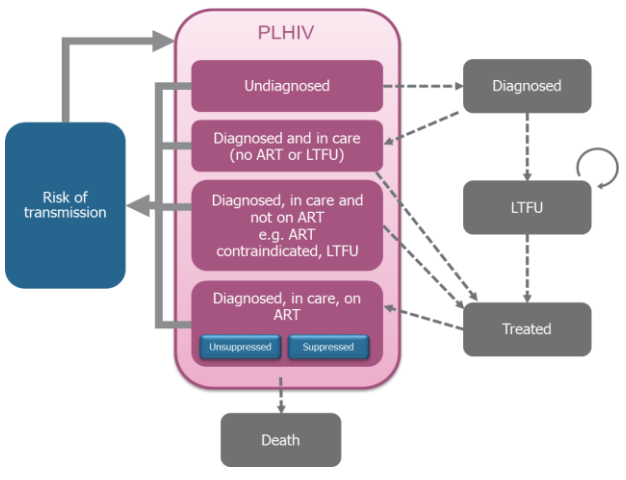
METHODS

- A dynamic transmission model for HIV was adapted to the Canadian setting to assess the impact of rapid treatment initiation with B/F/TAF compared to standard initiation.

Rapid treatment initiation with B/F/TAF (**7 days** from diagnosis to treatment)[6] **VS.** Standard B/F/TAF initiation (**45 days** from diagnosis to treatment)[2]

- A Markov tree was developed. Three key subgroups were considered:
  - Heterosexual men and women (**Het**)
  - Men who have sex with men (**MSM**)
  - PWID
- The prevalent HIV population was divided by health states, each with different risks of transmission, by subgroup (**Figure 1**).

Figure 1. Markov Model Structure



Abbreviations: ART: antiretroviral therapy; **LTFU:** lost to follow-up; **PLHIV:** people living with HIV

- Infectious individuals contributed to the incidence of new infections in that year.
- Lifetime direct health care costs of HIV were applied to HIV patients. Productivity costs were added in a scenario analysis.[7]
- Analyses were conducted from a public healthcare perspective for a time horizon of 20 years (year 2020 to 2040).
- The robustness of the results was assessed using one-way sensitivity analyses (**OWSA**).

RESULTS

- The model predicts an average annual decline in HIV incidence in both strategies, estimated at 0.93% and 0.81%, in rapid B/F/TAF initiation and standard initiation, respectively (**Figure 2**).
- Rapid B/F/TAF initiation has the potential to result in 415 fewer Canadian HIV infections over a 20-year period, compared to standard B/F/TAF initiation (**Figure 3**).

Figure 2. Predicted Overall Annual HIV Incidence by Strategy

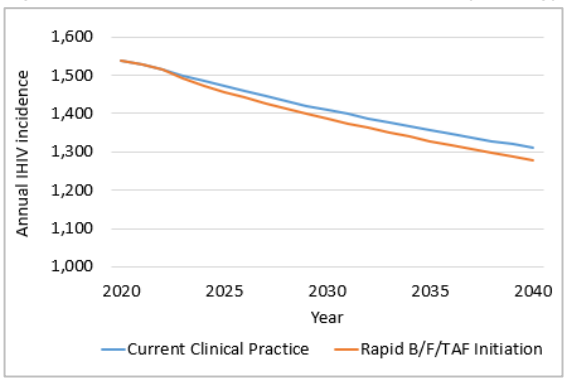
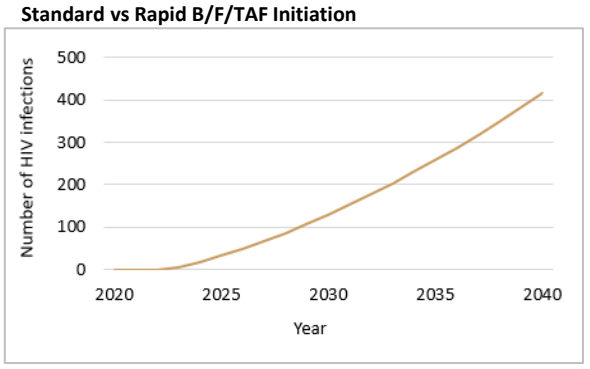


Figure 3. Overall Difference in Cumulative Incidence: Standard vs Rapid B/F/TAF Initiation



- Nearly half (42%) of new infections avoided would be from MSM, while 33% would be from heterosexuals, and 25% from PWID (**Figure 4**).
- Of note, all provinces show similar distributions among each subgroup except for the provinces of Alberta, Saskatchewan, and Manitoba. In Alberta and Manitoba, approximately half of the new HIV infections come from the Het subgroup. In contrast, mostly all new HIV infections (82%) in Saskatchewan come from the PWID subgroup, therefore showing social disparities between provinces.
- Over the 20-year projection period, rapid B/F/TAF initiation is expected to result in savings of $139M to the Canadian healthcare system (**Figure 5**); When considering productivity costs, expected savings increased to $510M.

Figure 4. HIV Incidence Avoided, by Subgroup (2020–2040)

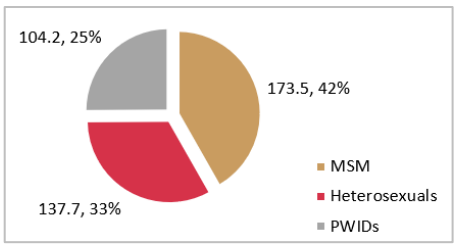
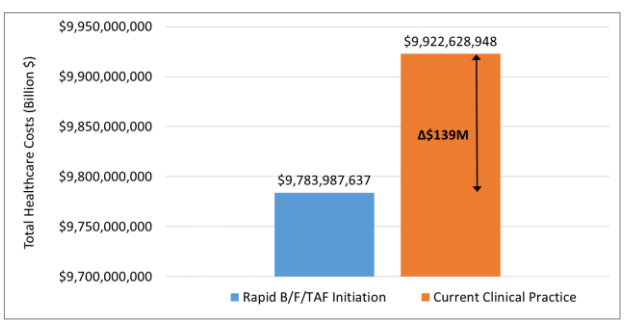


Figure 5. Estimated Savings to the Healthcare Provider from Avoided HIV Infections over 20 years



- The OWSAs demonstrate that rapid B/F/TAF initiation may be associated with avoided HIV infections ranging from 325 to 693 and estimated lifetime cost savings ranging from $103 million to $510 million dollars over the 20-year projection period.
- Varying the time to ART initiation by ±7 days in standard B/F/TAF initiation results in savings ranging from $115M to $162M over the 20-year projection period.

CONCLUSIONS

- This study suggests that rapid B/F/TAF initiation represents an advantageous therapeutic strategy to reduce HIV incidence and provide substantial costs savings for the Canadian healthcare system.
- Consequently, efforts should be made country-wide to adopt this strategy as the standard of care.

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DISCLOSURES

- Jean Lachaine is a partner at PeriPharm, a company that has served as a consultant to Gilead and has received funding from Gilead.
- Jean Lachaine, Kimberly Guinan, and Karine Mathurin, from PeriPharm, have participated in the study conduct, data interpretation and the approval of the abstract.
- Bertrand Lebouche has served as a clinician scientist consultant for Gilead.
- The authors would like to thank Mathieu Pelletier for his support in the model development and for the writing of the abstract. Mathieu Pelletier is an employee of PeriPharm and has received funding from PeriPharm for supporting the economic modelling and abstract development.
- No author has received funding for developing the abstract. Gilead participated in the design and provided financial support for the study. Gilead reviewed and approved this publication.

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