The Projected Impact of Post-ART BMI Maintenance on Diabetes Risk: A Modeling Study.

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BACKGROUND

Among people with HIV (PWH), weight gain within the first two years after ART initiation is associated with a higher risk of developing type 2 diabetes mellitus. Addressing the rising burden of diabetes is essential in decreasing long-term complications.

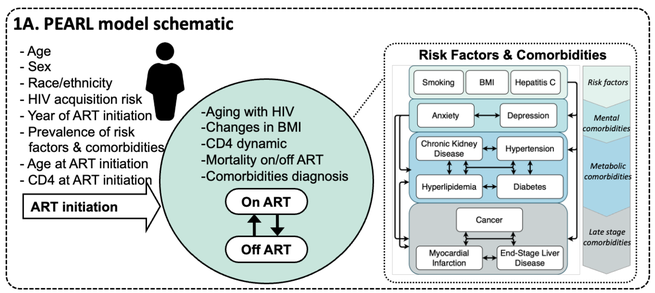
Objective:

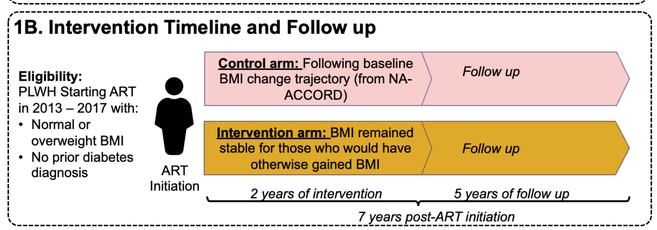
- Projecting the potential impact of a hypothetical BMI maintenance intervention, implemented in the first 2 years after ART initiation, on reducing the cumulative seven-year diabetes risk among PWH in the US.

METHODS

PEARL is an agent-based simulation of HIV aging and comorbidities in PWH receiving ART in the US (**1A**), using data from the NA-ACCORD (2010-2017).

We simulated the impact of a two-year BMI maintenance intervention, preventing weight gain in individuals starting ART (2013–2017) with normal or overweight BMI (18.5–30) and no prior diabetes diagnosis. Diabetes risk was calculated as new diagnoses per 1,000 person-years over seven years post-ART (**1B**).

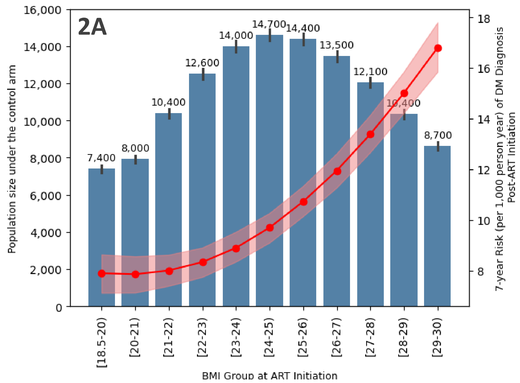


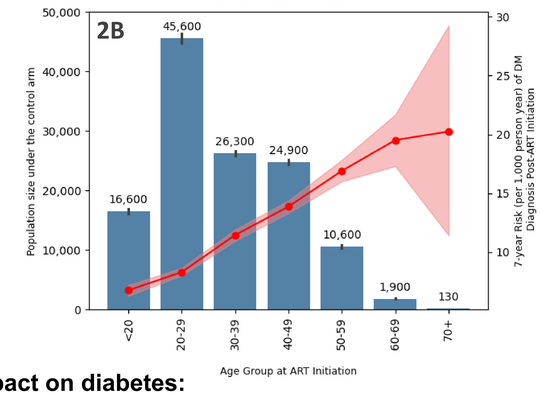


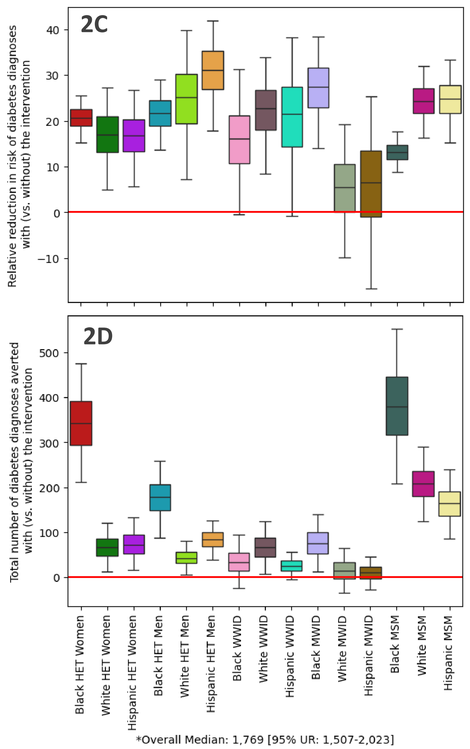
The groups likely to have the largest reduction in incident diabetes with a weight maintenance intervention at ART initiation (vs. no intervention) include people who inject drugs, women, and people of color (greatest relative risk reduction), with Black MSM representing a substantial portion of averted diabetes diagnoses.

RESULTS

- PEARL projected 171,000 PWH initiating ART in the US between 2013–17, with 73% eligible for the intervention.
- **Without the intervention:**
  - 66% were expected to experience BMI increase, and 12% become obese within two years.
  - Over seven years post-ART initiation, a median of 9,460 participants were diagnosed with diabetes (10.7 per 1,000 person-years). This risk increased with age and BMI at ART initiation (**2A & 2B**).







*Overall Median: 1,769 [95% UR: 1,507-2,023]

Intervention impact on diabetes:

- The intervention is projected to reduce the risk of incident diabetes by 19%, preventing an estimated 1,769 new diagnoses over seven years post-ART initiation.
- The number needed to treat (NNT) to avert one diabetes diagnosis is projected at 71 cases.
- The greatest relative risk reductions were projected among women who inject drugs (WWID) and Hispanic heterosexual men (**2C**).
- The largest number of new diabetes averted was found among Black/African American MSM and heterosexual women (**2D**).

CONCLUSIONS

- Our findings emphasize the potential of BMI maintenance interventions at ART initiation to reduce diabetes risk in PWH.
- The variation in outcomes highlights the need for tailored interventions for different subgroups.
- Despite obesity's serious health risks, few weight loss programs have been tested in PWH. GLP-1 receptor agonists show promise, but further research is needed to assess safety, efficacy, and address access disparities.
- Key limitations include limited BMI data beyond two years post-ART and the exclusion of newer ART regimen (such as INSTI).
- High-fidelity models like PEARL provide valuable insights and lay the groundwork for future clinical trials and identifying data gaps.

ADDITIONAL KEY INFORMATION

Further information can be found on PEARL website: https://pearlhivmodel.org

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