Intervention Scenarios

- Hypothetical percent weight-loss interventions in overweight and obese individuals were modelled for each ethical criterion, increasing until inequities were eliminated (Table 1).
- Educational inequities in diabetes were measured on the relative scale by comparing the lowest to the highest education categories.

Table 1: Modelling ethical criteria of health equity

<table>
<thead>
<tr>
<th>Principles of equity</th>
<th>Equity of diabetes outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple equality:</td>
<td>equal diabetes risk by targeting education categories disproportionately according to baseline diabetes risk</td>
</tr>
<tr>
<td>‘Equality of health’</td>
<td>reduce risk below the DPoRT high-risk threshold (≥16.5%) in high-risk individuals, beyond which remaining inequities are not considered ethically important</td>
</tr>
<tr>
<td>‘Sufficiency of health’</td>
<td>reduce risk below the DPoRT high-risk threshold (≥16.5%) in high-risk individuals, beyond which remaining inequities are not considered ethically important</td>
</tr>
</tbody>
</table>

Table: Ten-year predicted number of diabetes cases and diabetes risk by categories of education

- Total diabetes risk was classified into five education categories: primary level, low secondary, some secondary, secondary, and bachelor level or higher.
- Average baseline risk (DPoRT risk) was reduced by diabetes interventions with increasing hypothetical weight-loss interventions.

Results (continued)

- Projected Diabetes Burden in Baseline Scenario (Figure 1):
  - 1.81 million new diabetes cases were predicted by 2026, with diabetes incidence higher in men than women.
  - An inverse gradient in 10-year diabetes risk was observed across education categories in women and men.
  - Education inequities in diabetes were higher in women (risk ratio (RR)=1.79, 95% confidence interval (CI): 1.73, 1.85) than men (RR=1.59, 95%CI: 1.52, 1.65) comparing low to high education categories.

Achieving Simple Equality (Figure 2):

- Implementing 30% and 22% weight-loss interventions in low and medium education categories respectively eliminated relative educational inequities in diabetes.
- The level of intervention required to eliminate diabetes inequities was higher in women than men.
- In total, 308,485 diabetes cases were prevented or delayed.

Achieving Sufficiency of Health (Figure 3):

- ‘Sufficiency’ was achieved by a 14% weight-loss intervention in high-risk individuals.
- Large educational inequities in diabetes remained at this level of intervention in both women and men (women: RR=1.65, 95%CI: 1.60-1.70; men: RR=1.41, 95%CI: 1.36-1.46 comparing low to high education categories).
- In total, 267,690 diabetes cases were prevented or delayed.

Strengths and Limitations

Strengths:

- This study quantifies intervention benefits of achieving ethical criteria for health equity, a noted gap in bridging ethics and epidemiology.
- Baseline diabetes risk and intervention impacts estimated with a well validated risk prediction tool (DPoRT).

Limitations:

- Intervention benefits may be overestimated if high-risk individuals are already receiving preventive interventions.
- Next steps of this work will more directly link hypothetical to real-world diabetes interventions.

Key Messages:

- Using the case study of diabetes in Canada, the choice of ethical criteria of health equity was demonstrated to have a significant impact on: intervention scope and target population, intervention benefit, remaining differences (inequalities) in diabetes across education groups, and achieving ethical criteria of health equity.
- An explicit definition of ethical criteria of health equity is essential to informing interventions that aim to reduce health inequities.