**Therapeutics**

**Review: HbA1c has low accuracy for prediabetes; lifestyle programs and metformin reduce progression to T2DM**


**Clinical impact rating:** ★★★★★☆

### Questions

Do screening tests accurately identify prediabetes? In patients identified with prediabetes, what is the effectiveness of interventions to prevent type 2 diabetes?

### Review scope

Included studies compared the diagnostic accuracy of hemoglobin (Hb) A1c or fasting plasma glucose (FPG) tests with the oral glucose tolerance test as the gold standard, and the effectiveness of lifestyle programs or metformin compared with a control group in adults ≥18 years of age identified as being at risk for diabetes (impaired glucose tolerance, impaired fasting glucose, increased HbA1c, or history of gestational diabetes) in any setting. Outcomes included sensitivity, specificity, and progression to diabetes.

### Review methods

MEDLINE and EMBASE/Excerpta Medica were searched for diagnostic or prevalence studies and randomized controlled trials (RCTs) or interventional studies. Reference lists and citations to seminal papers were reviewed. 49 studies met selection criteria for diagnostic accuracy; in the pooled analysis, risk for bias was high for 5 of 23 studies for HbA1c and 8 of 19 for FPG. 50 studies of interventions (follow-up range 4 wk to 6 y) met selection criteria. 23 RCTs of lifestyle interventions were included in meta-analyses; risk for bias was low for randomization (14 RCTs), concealment (5 RCTs), blinding (23 RCTs), and attrition (12 RCTs). 4 RCTs of metformin were included in meta-analysis; risk for bias was low for randomization (2 RCTs), concealment (1 RCT), blinding (4 RCTs), and attrition (1 RCT). Only meta-analyses of RCTs are presented in this abstract.

### Main results

As screening tests for prediabetes, HbA1c had pooled sensitivity of 49% (95% CI 40 to 58) and pooled specificity of 79% (CI 73 to 84), and FPG had pooled sensitivity and specificity of 25% (CI 19 to 32) and 94% (CI 92 to 96), respectively. Meta-analyses of interventions to prevent type 2 diabetes in patients with prediabetes are in the Table.

### Conclusions

For detecting prediabetes, hemoglobin A1c has limited sensitivity and specificity, and FPG has high specificity but low sensitivity. In patients diagnosed with prediabetes, lifestyle interventions or metformin can reduce progression to type 2 diabetes.

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### References


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**Lifestyle interventions or metformin vs control for preventing type 2 diabetes in patients with prediabetes**

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Number of trials (n)</th>
<th>Weighted event rates</th>
<th>RRR (CI)</th>
<th>NNT (CI)</th>
<th>GRADE†</th>
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<tbody>
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<td>All</td>
<td>20 (10 593)</td>
<td>12%</td>
<td>19%</td>
<td>36% (28 to 43)</td>
<td>15 (13 to 19)</td>
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<td>6 mo to 2 y</td>
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<td>10%</td>
<td>31% (15 to 44)</td>
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<td>3 y to 6 y</td>
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<td>24%</td>
<td>37% (28 to 46)</td>
<td>12 (10 to 15)</td>
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<tr>
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<td>22%</td>
<td>29%</td>
<td>26% (16 to 35)</td>
<td>14 (10 to 22)</td>
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†GRADE rating. In all cases, because of variable study quality, the true RRR could differ substantially from the estimates.

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