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JOURNAL OF SCIENCE
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ORIGINAL RESEARCH

# Prevalence of prediabetes and undiagnosed diabetes in Canada (2007-2011) according to fasting plasma glucose and HbA1c screening criteria - Evidence review

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## 1. ABSTRACT

The analyzed study used representative data from the Canadian population to estimate prediabetes and undiagnosed type 2 diabetes by applying both fasting plasma glucose and glycated hemoglobin (HbA1c, an indicator of average glucose exposure over the previous months). The sample included 3,494 non-pregnant adults. In the available material, however, the abstract is cut off before the full definition of prediabetes and before the quantitative results.In the "Choosing to Live in Health or Disease" section by Dr. A. Colonnese and R. Panzironi, the publication contributes to the narrative that HbA1c can identify people with undiagnosed diabetes who would not be detected using fasting glycemia alone. Independent evidence confirms that the two tests often identify only partially overlapping groups, but also shows that the direction and magnitude of the difference depend on the population and the comparison test. The most prudent conclusion is that HbA1c can complement, not automatically replace, fasting glycemia.

ONLINE ARTICLE

ARTICLE INFORMATION

**Published:** November 12, 2026
**Updated:** November 12, 2026

**DOI** 10.5281/zenodo.24160677

MISSION

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Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

## 2. ANALYZED STUDY

The research question was to quantify how many adults in the Canadian population had prediabetes or undiagnosed type 2 diabetes when screening was performed using fasting plasma glucose or HbA1c. The implicit hypothesis was that criteria based on a snapshot measurement of glycemia and criteria based on average glycemic exposure would not identify the exact same individuals.The relevance to the section "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi concerns the use of HbA1c in screening for unrecognized diabetes. The book specifically highlights the idea that this test could increase the number of people identified compared to fasting glucose alone, with organizational consequences for monitoring and prevention programs.As this is a prevalence study based on a population survey, the research can describe how many people fall within certain biochemical thresholds and compare the classification obtained with the two tests. However, it cannot demonstrate that the use of HbA1c, on its own, prevents diabetes or improves long-term clinical outcomes.

## 3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

The authors combined two subsamples of fasting blood draws from the Canadian Health Measures Survey. Non-pregnant adults aged 20 or older were included; the total sample size was 3,494 participants. The reference period mentioned in the title was 2007-2011.Undiagnosed type 2 diabetes was defined as the absence of self-reported type 2 diabetes and the presence of fasting plasma glycemia equal to or greater than 7.0 mmol/L, or HbA1c equal to or greater than 6.5% (48 mmol/mol), in accordance with the Canadian thresholds indicated in the abstract. In the available text, prediabetes began with fasting glycemia equal to or greater than 6.1 mmol/L, but the sentence containing the complete definition is cut off. This information is not provided in the available material.The available material does not fully report additional exclusion criteria, laboratory analytical procedures, statistical weighting, confidence intervals, P-values, secondary endpoints, or subgroup analyses.

## 4. RESULTS

From the available material, it can be verified that the study analyzed 3,494 non-pregnant adults and compared criteria based on fasting glycemia with criteria based on HbA1c to identify undiagnosed diabetes and prediabetes. The provided text cuts off before the numerical results: prevalence, absolute differences, estimates adjusted for the Canadian population, confidence intervals, and significance values are not reported in the available material.The book passage attributes to the study the finding that HbA1c identified more people with undiagnosed diabetes compared to fasting glycemia alone, and that these individuals tended to be younger and less obese. Since these quantitative data do not appear in the provided abstract fragment, it is not possible to report absolute values, percentage differences, or statistical precision here without going beyond the verifiable material.The relevant conceptual result remains clear, however: two tests that measure different aspects of glycemia can change the number and profile of people classified as potentially affected by undiagnosed diabetes.

## 5. INTERPRETATION

In simple terms, fasting glycemia is a snapshot of glucose concentration at a specific moment, while HbA1c reflects how much glucose has bound to hemoglobin in red blood cells over the preceding weeks. For this reason, it is plausible for a person to exceed a threshold with one test but not the other.The segment of the book's narrative supported by the publication subject to the Evidence Review is therefore: the introduction of HbA1c in screening can change the epidemiological estimate of undiagnosed diabetes and expand the population requiring diagnostic confirmation, monitoring, or preventive interventions. It is not, however, demonstrated that every person identified solely by HbA1c has the same prognosis as a person identified solely by fasting glycemia.This distinction is important. An increase in the number of people classified as positive in screening may indicate a better ability to detect persistent alterations in glycemia, but it may also reflect biological, ethnic, hematological, or methodological differences between the tests. Diagnostic confirmation and clinical interpretation

therefore require individual context.

## 6. INDEPENDENT CONFIRMATORY EVIDENCE

A systematic review and meta-analysis of 37 studies evaluated the accuracy of various tests compared to the two-hour plasma glucose level after an oral glucose tolerance test. For the diagnosis of diabetes, an HbA1c of 6.5% showed an aggregate sensitivity of 50% and a specificity of 97.3%. In simple terms, when the value exceeds the threshold, it is rarely a false positive compared to the reference test, but approximately one in two people with diabetes may not be detected by HbA1c alone. This confirms that HbA1c plays a useful role but does not complete the screening process, consistent with the need to integrate tests as described in the book [1].In a cross-sectional study of 3,523 Vietnamese adults, diabetes defined as an HbA1c of at least 6.5% was more frequent than that defined by a fasting glycemia of at least 7.0 mmol/L: 9.7% versus 6.3%. The concordance between the classifications was moderate, with a kappa statistic of 0.55. This finding directly confirms the passage stating that HbA1c can identify additional individuals not detected by fasting glycemia alone; however, it does not prove that the same discrepancy would occur in Canada or every other population [2].An international analysis by the NCD Risk Factor Collaboration pooled data from 117 population-based studies. Among people with diabetes identified through screening using at least one of the two tests, only 29-39% had both values above their respective thresholds across different world regions; the others had an isolated increase in either fasting glycemia or HbA1c. In most low- and middle-income regions, an isolated increase in HbA1c was more common than an isolated increase in fasting glycemia. The research reinforces the idea that using a single marker may underestimate a portion of cases, but it also documents a strong dependence on geographical context [3].

## 7. CONFLICTING EVIDENCE

A non-overlapping result emerged in the Strong Heart Study, which analyzed a population of Native Americans with a high frequency of diabetes. In the initial screening of individuals without a known diagnosis, HbA1c used alone identified fewer prevalent cases of diabetes compared to fasting glycemia. In subsequent follow-ups, however, each test missed a portion of the cases identified by the other, while their combined use identified more people at risk [4].This evidence does not negate the correspondence between the Canadian study and the book's paragraph. It defines its limitation: the numerical advantage of HbA1c compared to fasting glycemia alone is not universal. It can change depending on the population studied, the prevalence of diabetes, hematological characteristics, diagnostic thresholds, and whether one is measuring prevalent disease or the onset of new cases over time.

## 8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the study covered by the review from the independent publications used to confirm or contextualize the passage in the book.

### Quadro comparativo

| Reference | Study type | Population or model | Main result | Direction of evidence | Strength of evidence |
|---|---|---|---|---|---|
| Original study | Cross-sectional population survey | 3,494 non-pregnant Canadian adults, at least 20 years old | Comparison between fasting glycemia and HbA1c for prediabetes and undiagnosed diabetes; quantitative results are not present in the available material | biologically consistent evidence | moderate |
| [1] | Systematic review and meta-analysis | 37 studies in adults without previously diagnosed diabetes | HbA1c at 6.5%: 50% sensitivity and 97.3% specificity compared to the reference test | indirect confirmation | high |
| [2] | Cross-sectional observational | 3,523 Vietnamese adults at least 30 years old | Diabetes identified more often with HbA1c compared to fasting glycemia: 9.7% vs 6.3% | direct confirmation | moderate |
| [3] | Pooled analysis of population studies | 117 population-based studies in different regions of the world | Wide discordance between HbA1c and fasting glycemia in cases identified by screening | direct confirmation | high |
| [4] | Population cohort with follow-up | Native Americans participating in the Strong Heart Study | In initial screening, HbA1c alone identified fewer prevalent cases than fasting glycemia | discordant evidence | moderate |

## 9. SINTESI EDITORIALE E CONCLUSIONI

### CONCLUSIONS

The Canadian study addresses a central point in metabolic screening: fasting glycemia and HbAIc are not equivalent tests, as they describe different dimensions of glucose exposure. While the full quantitative results of the original research are missing from the available material, its use in the book's paragraph is scientifically consistent with the question being studied.Independent evidence confirms that HbAIc and fasting glycemia often identify only partially overlapping groups of people. The claim that HbAIc may increase the number of detected cases compared to fasting glycemia alone is moderately supported, but requires contextual interpretation. The strongest evidence concerns the complementarity of the tests, not the universal superiority of one over the other.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

## 10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

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