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Prediabetes: The Looming Burden for Australia

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ABSTRACT

Diabetes is fast becoming the key health concern for Australia, with a substantial national increase in prevalence and an estimated 10% or more of adults living with the disease. Evidence shows that over half of this disease burden can be prevented by identifying prediabetes and providing appropriate interventions early. However, Australia currently has no accurate estimates of prediabetes prevalence, and no clear strategy on how to act when prediabetes is identified in clinical practice. This article lays out the problem, with potential solutions for government and the community.

JEL Classification: Endocrine system diseases, Environment and public health, Health services administration, Nutritional and metabolic diseases

1 | Background

The diabetes prevalence rate has increased substantially in recent years. The estimated national prevalence in Australia based on registrations to the National Diabetes Services Scheme increased from 1 in 75 people in the 1990s to 1 in 15 in 2022 [1]. However, this is a known underestimate due to underdiagnosis and underregistration, and the true figure is likely closer to 1 in 10 Australian adults living with diabetes [2]. Diabetes is a costly disease, both to the healthcare system and to society more broadly due to disability and morbidity. In 2020, the New South Wales (NSW) state health service estimated that the cost of treating people with diabetes in NSW hospitals alone would exceed $21.8 billion in the following decade [3]. Despite decades of calls for action, diabetes rates have increased or plateaued in Australia, echoing international struggles with addressing the condition.

The increasing prevalence of prediabetes in Australia is linked to rising rates of overweight and obesity. As of 2022, 66% of Australian adults were living with either overweight or obesity [4]. This is a substantial increase from 56% in 1995. Excess bodyweight is a major contributor to insulin resistance and dysglycaemia, increasing the risk of developing prediabetes and its progression to type 2 diabetes. People with prediabetes have a substantially elevated risk of developing diabetes compared with individuals with normoglycemia, and form a large proportion of the future burden of diabetes [5].

Prediabetes is a condition characterised by dysglycaemia that has not yet reached the threshold for diagnosis of diabetes. The current primary diagnostic test is a glycated haemoglobin A1c (HbA_{1c}) test, with a diagnostic threshold of 5.7%–6.4% (39–47 mmol/mol) as per the American Diabetes Association [6] or 6.0%–6.4%

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(42–47 mmol/mol) as per the Australian Diabetes Society [7]. Other diagnostic criteria for prediabetes include impaired fasting glucose (IFG) with fasting glucose levels of 6.1–6.9 mmol/L and/or impaired glucose tolerance (IGT), with glucose levels of ≥ 7.8 but < 11.1 mmol/L 2 h after a 75 g oral glucose tolerance test [6, 7].

Prediabetes is internationally recognised as an important window of opportunity to prevent the progression to diabetes and is potentially reversible. Individuals who have dysglycaemia in the prediabetes range can reduce their risk of developing diabetes through a combination of interventions including weight loss, exercise and medication [8]. Newer medications such as glucagon-like peptide-1 (GLP1) receptor agonists and dual GLP1/glucose-dependent insulinotropic polypeptide (GIP) hormone receptor agonists may also provide opportunities to reduce the long-term risk of developing diabetes and associated complications, but are costly and not listed on the Pharmaceutical Benefits Scheme for this purpose [9].

2 | The Hidden Burden

Contrary to the perception of prediabetes as a benign precursor, emerging evidence confirms its role as an active contributor to cardiovascular harm. Even modest elevations in HbA_{1c} have been linked to increased arterial stiffness, inflammation and early end-organ damage.

There is increasing recognition that people with prediabetes face similar, albeit lower, risks of macro and microvascular damage as those with diabetes, such as cardiovascular disease and limb loss [10]. A 2023 large registry study from Taiwan suggested that prediabetes increases the risk of major adverse cardiac events by up to 50% [10]. This is supported by a range of national and international data demonstrating that prediabetes is linked, likely causally, to an increased risk of heart disease [11].

Despite the key importance of prediabetes' contribution to the long-term picture of diabetes in Australia and its amenability to intervention, we have little data on the condition. The most recent national survey that included information about prediabetes was the AusDiab study, published in 2005, with data collection occurring between 1999 and 2000. This high-quality study recorded rates of IGT and IFG in Australian adults over the age of 25 years [12]. Nationally, 16.4% of those who participated in the survey 20 years ago had abnormal glucose tolerance [13].

Unfortunately, we do not have more recent national data examining prediabetes rates in Australia. A recent investigation published in 2022 using the national Bettering the Evaluation and Care of Health (BEACH) dataset of general practice showed increases in the rate of visits relating to prediabetes over time [14]; however, this dataset did not include information on prevalence or incidence of disease. A 2022 study looked at the MedicineInsight database to review general practice diagnoses and found a prevalence of 0.7% in this setting [15]. This extremely low rate is known to be unreliable but highlights that there are few options for recording prediabetes in general practice electronic software records, and thus diagnoses are rarely entered, even when a person meets diagnostic criteria. Additionally, testing is primarily driven by screening with the Australian Type 2 Diabetes Risk (AUSDRISK) score at a national level, which may not adequately address prediabetes risk.

To our knowledge, the most extensive testing scheme in Australia is an ongoing project at Blacktown and Mt. Druitt hospital emergency departments (EDs) in Western Sydney. All people who present to these EDs and have blood taken also have an HbA_{1c} test performed. This is primarily aimed at identifying diabetes in hospital but has also revealed the large burden of prediabetes in this patient population. The testing scheme was expanded in 2018 to include 11 local general practices and showed similarly high rates of prediabetes, with 27%–30% of people in this program having an HbA_{1c} result between 5.7% and 6.4% and 13%–15% having an HbA_{1c} result of 6.0%–6.4% [16].

A limitation of this study is that it is focused on the hospital and primary care population, and the sampling frame does not allow for any conclusions to be made about the general population. However, the high rate of prediabetes across both the hospital and community health settings suggests that there are likely high rates of prediabetes in the surrounding general population as well. In 2014, the Australian Federal government provided a diabetes screening option for high-risk people within the Medicare Benefits Scheme—a government-funded HbA_{1c} test once per year for anyone deemed at high risk by their medical provider—it is unclear whether this has improved the detection of prediabetes in the community.

3 | Evidence for Effectiveness of Intervention in Preventing Progression to Diabetes

There is extensive literature supporting behavioural management/motivational learning as an effective method of preventing progression from prediabetes to diabetes [8, 17]. Management principles have focused on bodyweight reduction of 5%–7%, reduction in dietary fat intake, particularly of saturated fat, achieving 150 min per week of physical activity and consuming adequate dietary fibre [18]. It has been shown consistently that up to 60% of cases of type 2 diabetes can be delayed or prevented by undertaking a lifestyle intervention [8]. In addition to this, long-term follow-up data support reduced diabetes-related complications and cardiovascular mortality some decades after completion of the intervention [19, 20]. However, a major issue has been successfully implementing clinical trial interventions into the real-world, with resource-intensive interventions limiting scalability and cost-effectiveness [21]. This, combined with the absence of clear screening and diagnosis options in general practice, has resulted in a lack of a national clinical care pathway specifically for people with prediabetes.

Currently available interventions for people diagnosed with prediabetes range from community-based approaches to more bespoke interventions, often based on motivational learning. The Get Healthy Service is a NSW government-funded telephone-based health coaching service that uses evidence-based behaviour change and goal-setting techniques to support people at risk of diabetes to eat more healthily, get active, and to achieve and maintain a healthy weight [22]. In Western Sydney, an area with higher than national average rates of diabetes, Western

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Sydney Diabetes has launched the 2 kg Challenge, a targeted intervention aimed primarily at people with prediabetes. The program encourages a modest weight loss of 2 kg, which can reduce diabetes risk by up to 30% [23]. It focuses on early detection using HbA_{1c} testing in general practice, engages vulnerable populations and is implemented through a wide network of community, government and health system partnerships. More individualised interventions include referrals to allied health professionals (such as dietitians, exercise physiologists or psychologists), very low energy diets, obesity management pharmacotherapy and bariatric surgery. These may be used alone or in combination. Metformin, in addition to intensive lifestyle modification, is an evidence-based and cost-effective option recommended by international guidelines such as the American Diabetes Association (ADA) Standards of Care in Diabetes 2024 [24]. However, metformin is not approved by the Therapeutic Goods Administration for management of prediabetes in Australia.

With the increasing burden of prediabetes, there is greater emphasis on the need to develop cost-effective, scalable solutions. Recent efforts have been made to leverage digital technology solutions, such as through artificial intelligence, smartphone apps and continuous glucose monitoring, but it is yet to be seen whether these are effective or if they can be broadly implemented across the Australian healthcare landscape. Any successful intervention will need to promote clearly defined diagnostic criteria, engagement and access to care, particularly for our most disadvantaged groups, while minimising cost and resource requirements.

Despite its clinical significance, prediabetes is easy to overlook, partly due to the absence of financial incentives such as Medicare Benefits Scheme rebates for intervention, diagnostic and clinician inertia and limited awareness of effective lifestyle and pharmacological strategies. This contributes to a missed opportunity to prevent diabetes and its complications.

4 | A Call to Action

The Australian Federal government recently published their national inquiry into diabetes, calling for more action on the condition across a range of healthcare areas [25]. One key focus of the strategy is prevention of diabetes, including the recommendation to enhance screening and treatment options for people with prediabetes.

This is clearly important. The first step to addressing a problem is knowing that it exists and what will improve early detection and intervention in the primary care setting. There is an urgent need in Australia for a new national survey measuring diabetes and prediabetes rates across the country. Although national screening is expensive, a targeted, randomised survey could be run for a fraction of the current Australian yearly budget spent on HbA_{1c} tests. This would address concerns with underestimates of prevalence and provide the first rigorous estimate of our prediabetes problem in over a quarter of a century.

This prediabetes detection program call to action should also be linked to lifestyle intervention programs. National modelling suggests that diabetes prevention initiatives for people with prediabetes are likely cost-effective or even cost-saving at realistic cost levels [26]. The Sydney Diabetes Prevention Program demonstrated the feasibility and effectiveness of developing and implementing a community-based lifestyle modification diabetes prevention program with participants screened and referred in the primary care setting [21]. Moreover, international data show that enrolling in programs with interventions targeting people with prediabetes is cost-effective in practice [27]. Large-scale national type 2 diabetes prevention programs are currently underway in some countries to assess whether the benefits of interventions for prediabetes can be translated to the community setting [28]. Recent data, albeit small scale, in Asia have shown that preventing cases of diabetes in individuals with prediabetes through digital health community solutions focusing on lifestyle intervention can result in improved quality-adjusted life years (QALYS), with affordable savings to the healthcare system, as well as additional positive impacts on society [29]. By linking detection to lifestyle intervention, we can determine the size of the problem while providing solutions for the individual and saving money for the Australian taxpayer.

There are a range of state and national weight loss and exercise programs to which people with prediabetes could be referred. Another useful aspect of a randomised testing program would be providing not only estimates of disease prevalence but strong indications of the most effective and cost-effective method or methods of preventing diabetes nationally.

Although national prevention may require investment, it is clearly necessary, as dealing with the ensuing diabetes and its complications requires a far greater investment. The total cost of diabetes has increased enormously in the last decade and, without action, is only set to continue to rise in the future [3]. We must prevent this rising tide of disease, but to do so we require effective estimates of the magnitude of the problem and the most cost-effective measures that can be used to defeat it. Therefore, early detection and intervention for prediabetes offers a key opportunity to enhance the secondary prevention of diabetes in the primary care clinical setting.

Author Contributions

Gideon Meyerowitz-Katz, Sarah N. Parry and Stephen Twigg were involved in conceptualization of the paper, writing of the original draft, and reviewing and editing. Tien-Ming Hng, N. Wah Cheung, Glen Maberly and Louise A. Baur were involved with writing of the original draft and reviewing and editing. Alice A. Gibson, Emily J. Hibbert, Kean-Seng Lim and Eugen Molodysky were involved with reviewing and editing the drafts and final versions of the manuscript.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

There are no data in this manuscript.

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