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Letter

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Epidemiological Characterization of Diabetes in Portugal 2024: Nationwide Trends and Public Health Implication Report of the National Program for Diabetes

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Dear Editor,

World Diabetes Day, celebrated on November 14th, was established in 1991 by the International Diabetes Federation (IDF) and the World Health Organization (WHO) to honor the 100th anniversary of the birth of Frederick Banting, the co-discoverer of insulin, along with Charles Best. As in previous years, the Directorate-General of Health will promote a commemorative event in the current year with a focus on *Innovation in Diabetes* [1]. The Portuguese National Program for Diabetes (PND), established in 1974, is one of the oldest Public Health Programs in Portugal and aims to promote epidemiological surveillance, prevent and control diabetes, promote the organization and articulation of healthcare services, promote access to technology and innovation in diabetes, promote health literacy and social participation in diseases' prevention and control, and promote the social integration, safety and quality of life of people with diabetes (PwD). On World Diabetes Day, PND will present its annual report on the current state of diabetes prevention, diagnosis, and treatment. This letter highlights key findings and offers a reflection on the effectiveness of current strategies to address one of the most pressing health challenges of the 21st century.

Almost all residents in Portugal are registered at the primary healthcare centers (PHC) within the National Health System (NHS). According to our data, by December 2023, these centers had registered over 900,000 people living with diabetes (Fig. 1a) – representing 8.6% of NHS users – and more than half of adult users had an updated diabetes risk evaluation. There were 75,661 new cases of diabetes in 2023, and most PwD received medical and nurses' follow-up care in the PHC. Attention to nutrition, physical activity, and pharmacologic therapy has increased, with most PwD having these aspects assessed and documented in their medical records.

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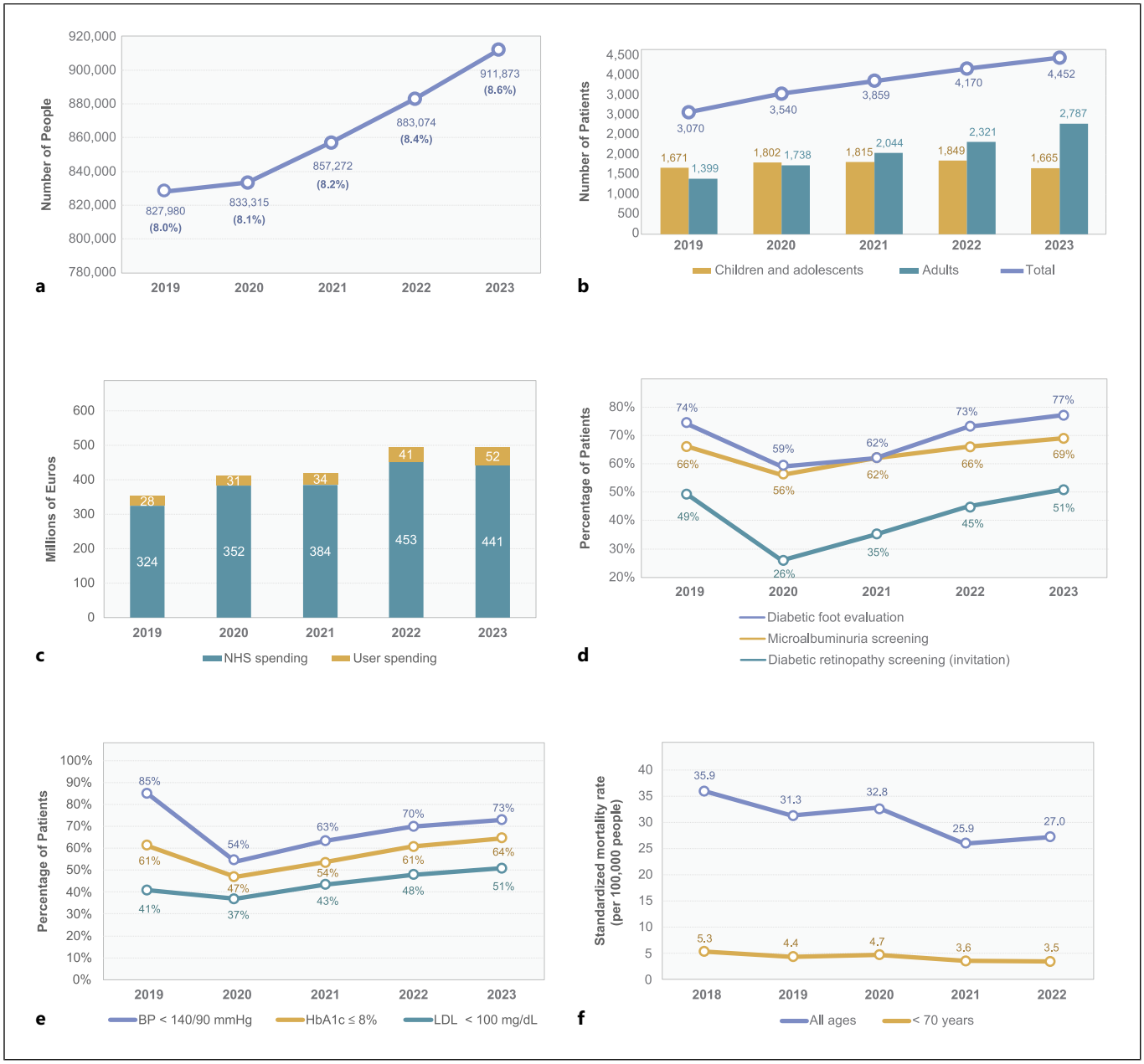

Fig. 1. a Number of people living with diabetes mellitus registered in PHCs in Portugal. **b** Insulin pump users. **c** NHS and user spending. **d** Chronic diabetes complications screening. **e** Risk factor control. **f** Standardized mortality rate (all ages and before the age of 70 years).

It is estimated that 35,000–40,000 people in Portugal have type 1 diabetes mellitus (T1D) [2]. Despite several issues concerning registers, the prevalence of PwD under 20 years old is higher than previously thought (3,678 users, corresponding to 166/100,000 inhabitants). The NHS's insulin pump program, launched in 2009, has seen significant, incremental improvements in the last few years (Fig. 1b) [1]. Hybrid closed-loop systems were included in the National Diabetes Program, starting only in 2022 [1]. However, in 2023, new legislation was published that is expected to open access to hybrid closed-loop systems to all eligible people living with T1D, over the next years. Regarding gestational diabetes, the number of cases registered in the NHS was similar to

previous years (*n* 5,436 in 2022, corresponding to 8.1% of pregnancies), with 55% of women treated with lifestyle measures only.

In 2023, total spending on antidiabetic medication stabilized (494 million EUR in 2022 vs. 493 million EUR in 2023), in contrast to the sharp increases of the previous years (Fig. 1c) [1]. Since 2020, insulin's share of total expenditure has remained below 20%, with a reduction in the use of both human insulins and biphasic analogs. Copayments by PwD are increasing, accounting for 10% of medication expenses. Since NHS coverage began in 2018, the use of interstitial glucose sensors has been increasing steadily, aiding over 35,000 PwD to improve their glucose control and quality of life, particularly those with T1D.

The number of diabetic ketoacidosis episodes, with and without coma, has been steadily increasing over the past 5 years – 2,700 episodes in 2022 vs. 2,001 episodes in 2018 – in NHS hospitals. In contrast, admissions for hyperosmolar coma have decreased – 143 episodes in 2022 vs. 162 episodes in 2018 – while admissions due to level 3 hypoglycemia have remained steady in the past years – 212 episodes in 2022 [1]. Notably, the mortality rate associated with ketoacidosis has remained stable (118 deaths in 2022), despite a relevant increase in the use of SGLT-2 inhibitors during the same period (789,800 boxes in 2018 vs. 3,644,676 boxes in 2022).

Screening for long-term complications of diabetes has returned to pre-pandemic levels (Fig. 1d), though significant challenges remain in the quality of care, as suggested by indirect indicators. Despite improvements in risk factor control in the last years (Fig. 1e), significant challenges remain, particularly in glucose, lipid, and blood pressure control. Although most PwD are screened for diabetic foot ulcer risk, major amputation rates remain high, underscoring the urgent need for broader access to preventive care.

The number of hospitalizations due to diabetes complications reached its highest level since 2018 across all categories, including ophthalmic, kidney, peripheral vascular disease, neurologic, diabetic arthropathy, and cutaneous complications. Nevertheless, the rate of hospital admissions for more than 24 h, due to diabetes remains low. Although diabetes accounted for 3% of all deaths in 2022 (Fig. 1f), the mortality rate due to diabetes before the age of 70 showed a decline (349 in 2022 vs. 504 in 2018, corresponding to 3.5/100,000 in 2022 vs. 5.3/100,000 in 2018).

In recent years, the increase in costs associated with diabetes medications, monitoring devices, and hospital admissions has been significant. In 2021, the global costs of diabetes in Portugal were estimated to represent 1.0% of the Portuguese GDP and 9% of national health expenditure [3, 4].

Diabetes remains one of the most prevalent health conditions worldwide, with high morbidity and socioeconomic impact. Portugal has one of the highest diabetes prevalence rates in Europe, underscoring the urgent need to intensify preventive strategies. Strategies to improve the prevention and treatment of diabetes need to be tailored to the specific characteristics of the NHS and actively involve the public, social, and private sectors. These strategies should be patient-centered, focused on promoting equitable access to quality healthcare and enhancing both health and social value for patients and the community.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

C.E., I.D., and S.V. wrote the letter. J.D. and E.P. contributed to analysis and interpretation of data. I.A. contributed to data acquisition. All authors provided critical review and contributed to the final version of the letter.

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