

National Diabetes Program

CHALLENGES AND STRATEGIES

2023



TECHNICAL DATA SHEET

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Abbreviations and Acronyms

ACES	Agrupamentos de Centros de Saúde (Health Center Groups)
ACSS	Administração Central do Sistema de Saúde (Central Administration of the Health System)
AMI	Acute Myocardial Infarction
ANAFRE	Associação Nacional de Freguesias (National Association of Parishes)
APDP	Associação Protetora dos Diabéticos de Portugal (Portuguese Diabetics Protective Association)
ARS	Administração Regional de Saúde (Regional Health Administration)
BIMH	Business Intelligence for Hospital Morbidity
BMDH	Base de Dados da Morbilidade Hospitalar (Hospital Morbidity Database)
BP	Blood Pressure
CCF	Centro de Conferência de Faturas (Invoice Conference Center)
CKD	Chronic Kidney Disease
CSII	Continuous Subcutaneous Insulin Infusion
CSII-TC	Continuous Subcutaneous Insulin Infusion Treatment Centers
CSP	Cuidados de Saúde Primários (Primary Health Care)
DDD	Defined Daily Dose
DGS	Direção-Geral da Saúde (Directorate-General of Health)
DRS	Diabetic Retinopathy Screening
EHIS	European Health Interview Survey
FRAD	Frente Rotária Anti-Diabetes (Rotary Anti-Diabetes Front)
ICD	International Classification of Diseases
IDF	International Diabetes Federation
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
INE	Instituto Nacional de Estatística (National Institute of Statistics)
INEM	Instituto Nacional de Emergência Médica (Emergency Medical Services)
INFARMED	Autoridade Nacional do Medicamento e Produtos de Saúde (National Authority of Medicines and Health Products)
INSEF	Inquérito Nacional da Saúde com Exame Físico
ISBE	Instituto de Saúde Baseada na Evidência (Institute of Evidence-Based Health)
LDL	Low-density lipoproteins
LVT	Lisboa e Vale do Tejo (Lisbon and Tagus Valley)
M€	Millions of euros
ND	Não disponível (Unavailable)

OECD	Organization for Economic Cooperation and Development
PND	Programa Nacional para a Diabetes (National Diabetes Program)
PNPAF	Programa Nacional para a Promoção da Atividade Física (National Program for the Promotion of Physical Activity)
SHAAI	Sistemas Híbridos de Administração Automática de Insulina (Hybrid Systems for Automatic Insulin Administration)
SPMS	Serviços Partilhados do Ministério da Saúde (Shared Services of the Ministry of Health)
SPD	Sociedade Portuguesa de Diabetologia (Portuguese Society of Diabetology)
SPN	Sociedade Portuguesa de Nefrologia (Portuguese Society of Nephrology)
SNS	Serviço Nacional de Saúde (National Health Service)
SNS24	SNS Contact Center
T1D	Type 1 Diabetes
T2D	Type 2 Diabetes
UCFD	Unidade Coordenadora Funcional da Diabetes (Diabetic Functional Coordination Unit)
ULS	Unidade Local de Saúde (Local Health Unit)
WHO	World Health Organization

Summary in Plain Language

This report provides an overview of diabetes *mellitus* in Portugal for the years 2021-2022, including epidemiological data. It summarizes the key initiatives undertaken by the National Diabetes Program in 2022 and outlines the action plan for 2023-2024.

Situational assessment

- Portugal maintains a high prevalence of diabetes;
- The registry of new diabetes cases in Primary Health Care (CSP) has increased;
- The proportion of users with type 2 diabetes under medical and nursing surveillance increased;
- Recovery of the screening rate for diabetes complications, namely diabetic retinopathy, diabetic nephropathy and diabetic foot ulcer risk assessment, to values close to pre-pandemic rates;
- In 2021, 15% of the admissions and 20% of the National Health Service (SNS) hospitalizations corresponded to users with diabetes;
- In 2021, the total and premature mortality rate from diabetes reduced compared to the previous year;
- Consumption and costs of diabetes medication increased in 2022, following the trend of recent years.

Activities | 2022

- Monitoring and dissemination of epidemiological data on diabetes in Portugal;
- Coordination of efforts with the Diabetes Functional Coordinating Units;
- Promotion of early diagnosis of diabetes and its complications' screening;
- Development of the proposal for the Improvement and Consolidation Plan for Diabetic Retinopathy Screening;
- Management of the Treatment Program with Continuous Subcutaneous Insulin Infusion (CSII) and articulation with the respective Treatment Centers;
- Introduction of the advanced hybrid closed-loop systems for insulin delivery;
- Coordination of the working group for the development of the "Proposal on updating the strategy for access to treatment with Continuous Subcutaneous Insulin Infusion (CSII)";
- Development of a proposal for standard care management of type 1 diabetes;
- Development of the educational program content "Mais Saúde, Menos Diabetes" ("More Health, Less Diabetes");
- Restart of the "Diabetes em Movimento" ("Diabetes on the Move") program;
- Development of the National Contest "Diabetes e as Escolas 2022" ("Diabetes and Schools 2022");
- Start of the monthly item "Falar Abertamente da Diabetes" ("Talk Openly About Diabetes") with RTP (public television channel)

Objectives | 2023-24



Monitor and disseminate **epidemiological data on diabetes** in Portugal



Reduce the **prevalence of diabetes** in at-risk patients



Promote **early diagnosis and treatment** of diabetes



Increase diabetes **literacy**



Fight the diabetes **stigma**



Promote **access to new technologies** in the treatment of all individuals with type 1 diabetes



Promote **screening and early treatment of chronic diabetes complications**



Reduce diabetes **morbidity and mortality**

Chapter I – Epidemiology of diabetes in Portugal in 2021/2022

1. Prevalence of diabetes and intermediate hyperglycemia

Diabetes

The International Diabetes Federation (IDF) estimated, for 59 countries and territories in the European region, and projected a diabetes prevalence of 9.2% and a total of 61 million people with diabetes in that region. This number is expected to increase to 13% by 2045. This region has the highest number of children and adolescents with type 1 diabetes (295,000), as well as the highest annual incidence, with 31,000 new cases each year (1).

According to the Organisation for Economic Cooperation and Development (OECD), more than 7% of adults reported having diabetes in EU countries in 2019. Rates increased by 9% or more in Croatia, Portugal and Finland, based on data from three waves of the European Health Interview Survey (EHIS) (2).

According to the IDF, the prevalence of diabetes in the Portuguese population aged between 20 and 79 years in 2021 was 13.0%, which corresponds to a standardized prevalence of 9.1%, which corresponds to 994,000 people (2).

Considering the National Health Interview Survey with Physical Examination (INSEF 2015) (3), the standardized prevalence of diabetes in the resident population of Portugal aged between 25 and 74, in 2015, was 9.9%, with men having a prevalence of 12.1% and women 7.8%. According to this study, 13% of people with diabetes are unaware of their diagnosis.

In 2023, the Portuguese Society of Diabetology (SPD), based on the PREVADIAB study (4), estimated a prevalence of diabetes in the Portuguese population aged between 20 and 79 years at 14.1%, corresponding to 1.1 million people (5).

The differences between authors in the estimates presented are partly justified by the different methodologies adopted in the prevalence studies conducted. Regardless of the mentioned studies, it is important to emphasize that all estimates indicate a high number of people with diabetes in Portugal compared to other European countries, with a considerable number of people also unaware of the disease. Therefore, we consider early diagnosis and implementation of lifestyle changes in the general Portuguese population and particularly in those at risk of type 2 diabetes to be crucial.

Intermediate Hyperglycemia

Regarding intermediate hyperglycemia (impaired fasting glucose, impaired glucose tolerance or both), the IDF estimated that in the Portuguese population aged between 20 and 79 years, in 2021, 2.8% (270,800 Portuguese) had impaired fasting glucose (IFG) and 10.5% (1,064,900 Portuguese) had impaired glucose tolerance (IGT) (1).

Figure 1. Estimated prevalence of diabetes, impaired fasting glucose and impaired glucose tolerance in Portugal | 2021



Source: IDF Diabetes Atlas 10th Ed (1).

According to data published by the SPD for the year 2021 (based on the PREVADIAB study (4)), intermediate hyperglycemia in Portugal affected 28.6% of the Portuguese population aged between 20 and 79 years, corresponding to 10.8% of people with IFG, 14.9% with IGT, and 2.9% with both (5).

Type 1 diabetes

Regarding type 1 diabetes (T1D), the analysis of T1D records in the electronic health registry "SCLínico," at the primary health care and hospital care, reveals a total of 3,608 people identified with T1D up to 19 years old (prevalence of 201 per 100,000 inhabitants) and 12,445 people up to 39 years old (prevalence of 313 per 100,000 inhabitants).

The total number of people with T1D registered in the SCLínico may be overestimated above the age of 40. In these age groups, due to the coding system (an old classification where patients were classified as insulin-dependent and non-insulin-dependent), the numbers in the registry may include people with type 2 diabetes who are treated with insulin.

Table 1. Cases of T1D registered at the primary health care (CSP) level in the National Health Service (SNS), in Mainland Portugal | 2018 - 2022

	2018	2019	2020	2021	2022
Number of cases registered ≤14 years old	1,373	1,407	1,405	1,457	1,497
Female (No.)	642	661	653	675	699
Male (No.)	731	746	752	782	798
Number of cases registered ≤19 years old	2,811	2,875	2,867	2,963	2,982
Female (No.)	1,275	1,314	1,332	1,371	1,377

Male (No.)	1,536	1,561	1,535	1,592	1,605
Number of cases registered \leq 29 years old	6,071	6,225	6,365	6,660	6,758
Female (No.)	2,747	2,813	2,909	3,025	3,076
Male (No.)	3,324	3,412	3,456	3,635	3,682
Number of cases registered \leq 39 years old	10,407	10,462	10,620	10,922	11,104
Female (No.)	4,731	4,747	4,816	4,932	4,994
Male (No.)	5,676	5,715	5,804	5,990	6,650

Source: SIM@SNS (Hierarquia dos Locais 2015 / Meus relatórios); data extracted on 19/10/2023; Note: Number of distinct patients, T89 - Insulin dependent diabetes.

Table 2. T1D cases registered in Portugal (CSP and hospital care)

Age groups	No. of cases registered	Age groups	No. of cases registered	Prevalence rate (/100 000)
0 – 4 years	156			
5 – 9 years	516			
10 – 14 years	1,184	\leq 14 years	1,856	143,8
15 – 19 years	1,752	\leq 19 years	3,608	201,4
20 – 29 years	4,116	\leq 29 years	7,724	271,9
30 – 39 years	4,721	\leq 39 years	12,445	312,8
Total across all ages	79,700	Total across all ages	79,700	802,6

Source: SIM@SNS, 2023.

Gestational diabetes and pre-existing diabetes before pregnancy

In 2021, gestational diabetes was present in 8.8% of pregnancies, with a much higher prevalence in women over 40 years old. Most were treated with non-pharmacological therapy, and in percentage terms, cesarean deliveries were higher in women with gestational diabetes (37%) compared to women without gestational diabetes (31%).

In 2021, there were also 231 births in women with pre-existing diabetes before pregnancy.

Table 3. Proportion of cesarean deliveries in women with gestational diabetes in Portugal's SNS | 2018 – 2021

	2018	2019	2020	2021
No. of births from women with gestational diabetes	4,385	4,065	4,725	5,457
Total No. of births	68,070	68,088	65,260	62,322
No. of cesarean births in gestational diabetes	1,549	1,461	1,743	2,044

% of cesarean births in gestational diabetes	35	36	37	37
No. of cesarean sections in total births in the SNS	19,247	20,133	19,542	19,041
% of cesarean sections in total births in the SNS	28	30	30	31
Prevalence of gestational diabetes	6,4%	6,0%	7,2%	8,8%
No. of births with gestational diabetes in patients <20 years	35	37	28	34
No. of births with gestational diabetes in patients aged 20 - 29 years	1,060	1,006	1,170	1,378
No. of births with gestational diabetes in patients aged 30 - 39 years	2,717	2,470	2,929	3,298
No. of births with gestational diabetes in patients aged ≥40 years	573	552	598	747
Prevalence of gestational diabetes in patients <20 years	1,9	1,9	1,7	2,3
Prevalence of gestational diabetes in patients aged 20 - 29 years	4,4	4,2	5	6,3
Prevalence of gestational diabetes in patients aged 30 - 39 years	7,2	6,6	8,2	9,6
Prevalence of gestational diabetes in patients aged ≥40 years	12,9	11,7	13	16

Note: Main Diagnosis (MD) and Additional Diagnoses (AD) codes consulted: AD: V27.- (ICD 9 CM) and Z37.0- (ICD 10 CM); MD: 648.- (ICD 9 CM) and O24.42- (ICD 10 CM). Sources: Diabetes Dashboard, accessed on 09/26/2023 (The hospital morbidity data presented in the Diabetes Dashboard at the time of consultation were obtained from the version of the BDMH made available by ACSS on 05/18/2023). BIMH, accessed on 09/26/2023 (Data are loaded weekly, with all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) available at the time of consultation, from January 1, 2013, to September 20, 2023).

Table 4. Pre-existing diabetes in women giving birth in the SNS hospitals in Portugal | 2017 – 2021

	2017	2018	2019	2020	2021
Cases of pre-existing T1D before pregnancy	89	75	100	104	119
Cases of pre-existing T2D before pregnancy	54	56	60	80	101
Other cases of pre-existing diabetes	24	14	16	11	11
Total cases of pre-existing diabetes before pregnancy	167	145	176	195	231

T1D: type 1 diabetes; T2D: type 2 diabetes. Sources: Diabetes Dashboard, accessed on 09/26/2023 (The hospital morbidity data presented in the Diabetes Dashboard at the time of consultation were obtained from the version of the BDMH made available by ACSS on 05/18/2023). BIMH, accessed on 09/26/2023 (Data are loaded weekly, with all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) available at the time of consultation, from January 1, 2013, to September 20, 2023).

Table 5. Proportion (%) of therapeutic options for gestational diabetes in Portugal | 2017 – 2021

	2017	2018	2019	2020	2021
Non-pharmacological measures	58	59	58	60	55
Oral antidiabetics	15	20	22	20	23
Insulin	15	14	13	13	15
Not specified	13	9	9	7	8

Note: More than one therapeutic option may apply to each patient. Source: BIMH, accessed on 09/26/2023 (Data are loaded weekly, with all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) available at the time of the consultation, from January 1, 2013, to September 20, 2023).

2. Assistance at the primary health care level in mainland Portugal

In order to monitor the follow-up of people with diabetes, some of the monitoring indicators at the CSP level in mainland Portugal and by Regional Health Administration (ARS) will be presented.

2.1. Type 2 diabetes risk assessment

Between 2020 and 2022, there are 2.76 million patients with a T2D risk assessment carried out in the last 3 years at CSP level in mainland Portugal, corresponding globally to 46% of the target population. This risk assessment is conducted in the adult population without diabetes and should be repeated at least every 3 years. Significant regional asymmetries are observed, however, it is noteworthy the high number of T2D risk assessments on a national level.

In addition to the risk assessments for T2D, there were also assessments conducted through the SNS Health Portal, with 39,318 assessments carried out in 2022.

Systematic screening for the risk of developing T2D, conducted through the Finnish Diabetes Risk Score (FINDRISC) questionnaire (6), allows risk stratification, the performance of analytical evaluations for early diagnosis of diabetes in individuals at increased risk and the identification of a target population for the implementation of measures to prevent the progression to diabetes.

Table 6. Proportion of patients with recorded T2D risk assessment in CSP | 2016 – 2022

		2016/2018	2017/2019	2018/2020	2019/2021	2020/2022
ARS North	No.	1,056,620	1,290,736	1,239,197	1,210,347	1,365,322
	% of the target population	48	57	54	52	58
ARS Centre	No.	309,660	408,389	416,464	407,336	459,345
	% of the target population	30	39	39	38	42
ARS LVT	No.	430,042	616,683	629,413	619,821	731,488
	% of the target population	23	32	32	31	36
ARS Alentejo	No.	102,634	123,016	120,587	108,364	102,541
	% of the target population	36	42	41	37	34
ARS Algarve	No.	54,069	79,081	82,223	85,182	97,756
	% of the target population	23	32	33	32	36
Mainland Portugal	No.	1,953,025	2,517,905	2,487,884	2,431,050	2,756,452
	% of the target population	35	44	42	41	46

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI code 2013.262.01.

2.2. Diabetes registry at the CSP level

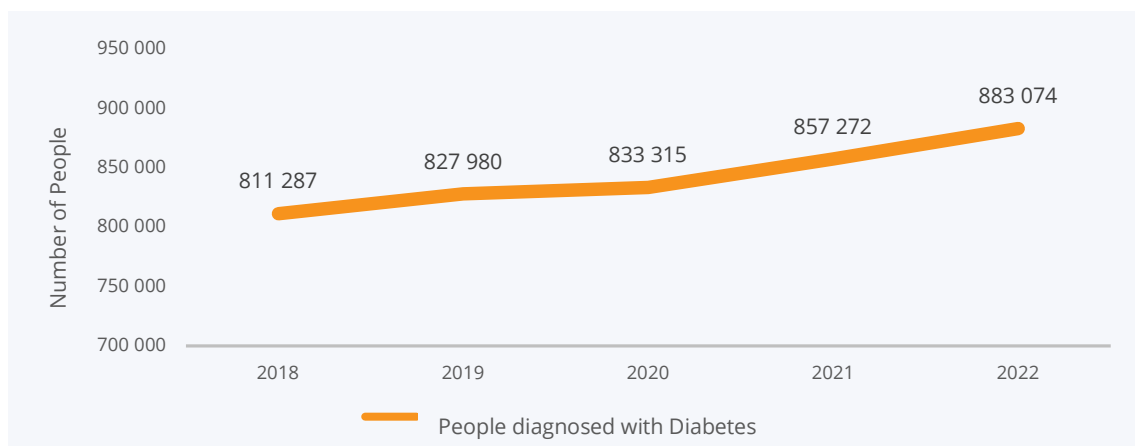
In 2022, there were 883,074 people registered with diabetes, corresponding to 8.4% of the patients enrolled at the CSP level in mainland Portugal. This represents a growing number of people identified with diabetes, both in absolute numbers and in percentage terms. In terms of health regions, in 2022, the proportion of people registered with diabetes varied from 7.2% in the ARS Algarve to 9.9% in the ARS Alentejo.

Table 7. Number of patients with a diabetes diagnosis registered in CSP | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	No.	304,651	311,778	314,845	326,666	340,139
	% of enrolled participants	8,2	8,3	8,4	8,7	9,0
ARS Centre	No.	155,983	157,758	159,585	163,409	166,944
	% of enrolled participants	8,8	8,8	8,9	9,0	9,1
ARS LVT	No.	269,095	275,116	275,386	281,086	287,097
	% of enrolled participants	7,2	7,3	7,3	7,3	7,3
ARS Alentejo	No.	48,426	48,757	48,612	49,442	50,727
	% of enrolled participants	9,7	9,7	9,6	9,7	9,9
ARS Algarve	No.	33,132	34,571	34,887	36,669	38,167
	% of enrolled participants	7,0	7,1	7,0	7,0	7,2
Mainland Portugal	No. of enrolled participants	811,287	827,980	833,315	857,272	883,074
	% of enrolled participants	8,0	8,0	8,1	8,2	8,4

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS code MORB.198.01.

Figure 2. Evolution in the number of patients with diabetes diagnosis registered in CSP | 2018 – 2022



Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS code MORB.198.01.

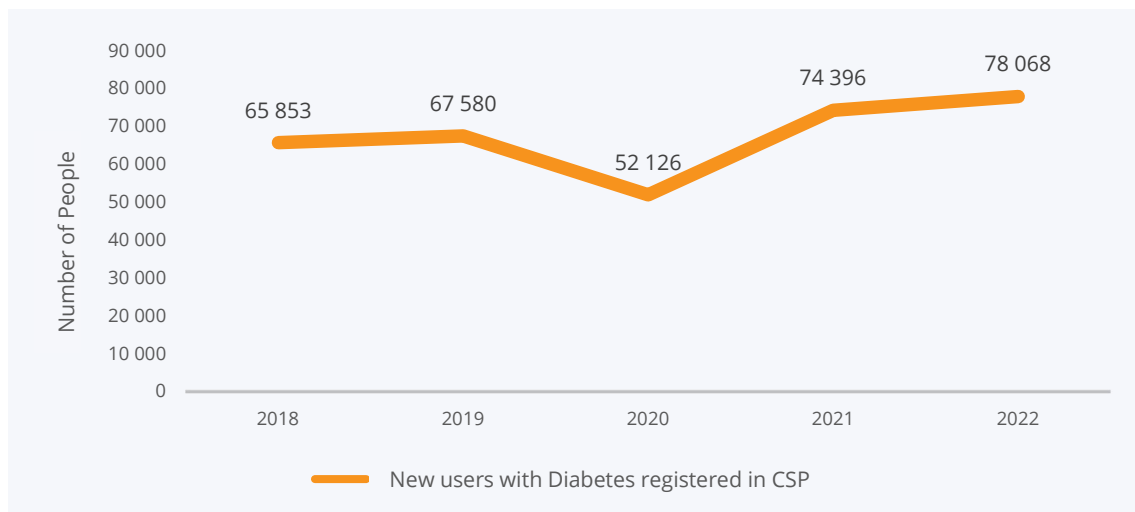
In 2022, there were 78,068 new diabetes registrations, corresponding to a rate of 7.4 per 1,000 enrolled patients in mainland Portugal. This rate was the highest in the last five years, possibly associated with constraints from the previous pandemic context.

Table 8. Rate of new diabetes registrations per 1,000 patients and number of new cases registered at the CSP level in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	‰	6,3	6,4	5,0	7,5	8,1
ARS Centre	‰	6,9	7,0	5,8	7,5	7,5
ARS LVT	‰	6,2	6,3	4,7	6,4	6,6
ARS Alentejo	‰	7,0	7,5	5,5	7,9	8,3
ARS Algarve	‰	6,9	7,1	5,4	6,8	7,1
Mainland Portugal	No.	65,853	67,580	52,126	74,396	78,068
	‰	6,5	6,6	5,1	7,1	7,4

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI code MORB.236.01.FL Diabetes incidence.

Figure 3. Evolution in the number of new patients with diabetes registered in CSP | 2018 – 2022



Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI code MORB.236.01.FL Diabetes incidence.

In 2022, there were 883,074 patients registered with diabetes, of which 92% (788,455) had T2D. The proportion of patients with T2D was similar (90-93%) across all health regions.

2.3. Medical and nursing surveillance

In terms of surveillance of patients with T2D in CSP, there was an increase in the proportion of patients under medical surveillance (enrolled patients with T2D monitored at the health unit) in the year 2022, compared to the last four years (89%).

Table 9. Proportion of patients with T2D under surveillance in the SNS at the CSP level in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	89	90	91	92	93
ARS Centre	%	85	86	87	87	89
ARS LVT	%	79	82	82	81	83
ARS Alentejo	%	92	92	92	92	92
ARS Algarve	%	78	81	81	81	84
Mainland Portugal	%	85	87	87	87	89
	No.	628,628	656,265	662,394	685,884	721,935

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS code 2013.075.01

Regarding nursing surveillance, the proportion of monitored patients increased in 2022, with 75% of patients with diabetes undergoing nursing surveillance consultations. These figures are approaching the pre-pandemic levels of 2019, with the ARS Norte even showing an increase compared to that year.

Table 10. Proportion of patients with diabetes who had a nursing surveillance consultation in the SNS at the CSP level in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	86	87	76	80	89
ARS Centre	%	76	78	72	69	77
ARS LVT	%	61	64	51	44	60
ARS Alentejo	%	75	77	63	54	66
ARS Algarve	%	68	70	63	61	68
Mainland Portugal	%	74	76	66	64	75
	No.	600,411	632,248	549,489	546,037	663,828

Source: SIM@SNS 2023, extracted on February 20. BI 2013.037.01FL Proportion of DM patients with nursing surveillance consultation for DM in the last year.

2.4. Glycemic control and other cardiovascular risk factors

Regarding glycemic control, in 2022, 58% of patients with a registered diagnosis of diabetes had at least one recorded result of HbA1c in the last six months. This value has decreased compared to 2021 and is lower than the years 2018 and 2019.

Table 11. Proportion of patients with diabetes who have registered HbA1c result in the last 6 months in CSP by health region in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	78	79	60	72	69
ARS Centre	%	69	72	61	65	61
ARS LVT	%	59	62	46	51	46
ARS Alentejo	%	68	68	52	55	46
ARS Algarve	%	60	63	48	52	49

Mainland Portugal	%	69	71	55	62	58
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Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI 2013.038.01.

Among patients under the age of 65, only 28% had an HbA1c level of 6.5% or lower. However, this value indicates a recovery of glycemic control in this age group to levels that are similar to or slightly higher than pre-pandemic values.

Table 12. Proportion of patients with diabetes under the age of 65, with the last registered HbA1c \leq 6.5% in CSP by health region in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	33	32	23	29	33
ARS Centre	%	30	30	24	26	30
ARS LVT	%	21	20	14	17	21
ARS Alentejo	%	24	23	16	18	20
ARS Algarve	%	23	25	18	22	25
Mainland Portugal	%	28	27	20	23	28

Source: SPMS – SIM@SNS 2023, extracted on February 20. BI 2013.091.01FL Proportion of DM patients <65 years old, with HbA1c \leq 6.5%.

There was an increase in the proportion of individuals with a registered HbA1c \leq 8% from 54% in 2021 to 59% in 2022, suggesting an improvement in glycemic control, although it has not yet reached pre-pandemic levels.

Table 13. Proportion of patients with diabetes with the last registered HbA1c \leq 8% in CSP by health region in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	69	69	52	63	69
ARS Centre	%	61	63	54	57	62
ARS LVT	%	51	53	39	44	49
ARS Alentejo	%	58	57	44	45	50
ARS Algarve	%	52	55	42	46	54
Mainland Portugal	%	60	61	47	54	59

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI 2013.039.01FL Proportion of DM patients with HbA1c \leq 8%.

The control of other cardiovascular risk factors is crucial in managing diabetes and preventing vascular complications. Regarding low-density lipoproteins (LDL) cholesterol control, only 47% of patients had LDL levels below 100mg/dl. However, this value represents an improvement compared to previous years across all health regions, although significant regional asymmetry remains. It is important to note that while the indicator available is the proportion of patients with LDL <100mg/dl, the current therapeutic target for people with diabetes is generally lower, meaning the proportion of patients achieving the therapeutic goal will be even smaller than that expressed by this indicator.

Table 14. Proportion of patients with diabetes and last LDL cholesterol result <100 mg/dl in the past 12 months, in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	45	48	42	51	55
ARS Centre	%	40	44	41	45	50
ARS LVT	%	27	33	30	35	39
ARS Alentejo	%	34	38	33	35	37
ARS Algarve	%	23	26	26	31	35
Mainland Portugal	%	36	41	37	43	47

Source: SPMS – SIM@SNS 2023, extracted on February 20. BI 2015.315.01 FL Proportion of DM patients with LDL-C <100 mg/dl.

High blood pressure (BP) is another important cardiovascular risk factor. In 2022, 70% of patients had a registered BP below 140/90mmHg, reflecting an improvement in the control of this cardiovascular risk factor compared to 2021, but still below pre-pandemic levels.

Table 15. Proportion of patients with diabetes and last registered BP <140/90mmHg in the last 12 months, in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	88	88	64	76	84
ARS Centre	%	82	85	58	64	70
ARS LVT	%	82	81	42	50	58
ARS Alentejo	%	83	82	52	56	64
ARS Algarve	%	83	82	50	53	61
Mainland Portugal	%	84	85	54	63	70

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI code 2015.314.02 FL Proportion of DM patients with BP >140/90 mmHg. The table values refer to the data of the indicator but in the positive, that is, the proportion of patients with BP <140/90 mmHg (e.g., 100 - 30 = 70 in the case of mainland Portugal).

Diet and physical activity/exercise are also essential in the management and control of diabetes. In 2022, 65% of people with diabetes had registered management of their therapeutic regimen, including dietary habits, exercise habits and medication regimen. This percentage varied from 46% in the ARS Algarve to 84% in the ARS Norte. These values represent an increase compared to 2021 and also compared to 2019.

Tabela 16. Proportion of patients with diabetes with registered management of therapeutic regimen (diet, physical activity and medication) in the last year over the past 12 months, in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	67	73	61	71	84
ARS Centre	%	37	43	44	46	62
ARS LVT	%	42	45	34	32	51
ARS Alentejo	%	43	42	35	31	43

ARS Algarve	%	22	24	27	37	46
Mainland Portugal	%	50	54	46	50	65

Source: SPMS – SIM@SNS 2023, extracted on February 20. Research method: SIARS BI code 2013.036.01FL Proportion of DM patients with register therapeutic regimen management.

2.5. Monitoring of diabetes complications

2.5.1. Diabetic Retinopathy Screening

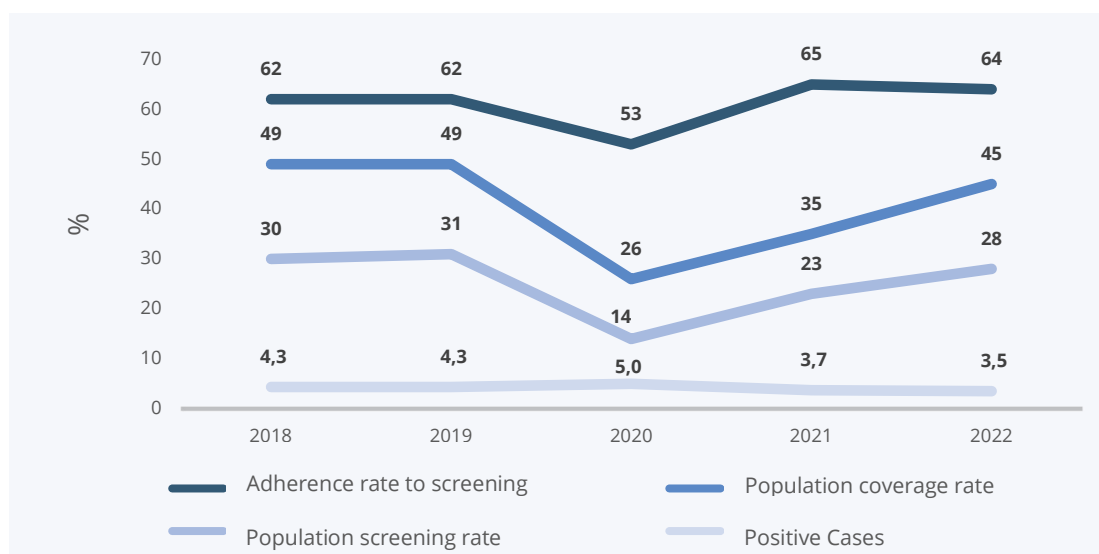
In the year 2022, of the patients with diabetes eligible for Diabetic Retinopathy Screening (DRS), 372,484 were invited for screening (corresponding to a coverage rate of 45% of the eligible population). Of those invited, 64% participated in the screening, resulting in a total of 237,487 patients screened (i.e., a population screening rate of 28% of the eligible population). The screening was positive in 8,281 individuals (3.5%). The geographic coverage by ACES was 93% in 2022.

Table 17. Activity of DRS in mainland Portugal | 2018 - 2022

		2018	2019	2020	2021	2022
Mainland Portugal	No. ACES/ULS with screening implemented	47	47	48	51	50
	Total ACES/ULS	54	54	54	54	54
	Geographic coverage / ACES/ULS	87%	87%	89%	94%	93%
	Eligible population	723,702	738,858	734,405	802,073	835,094
	No. Invitees	354,687	365,358	192,362	282,124	372,484
	No. Screened	218,223	225,743	102,487	185,404	237,487
	Screening adherence rate	62%	62%	53%	65%	64%
	Population coverage rate	49%	49%	26%	35%	45%
	Population screening rate	30%	31%	14%	23%	28%
	No. positive cases	9,364	9,627	5,118	6,945	8,281
Positive cases	4,3%	4,3%	5,0%	3,7%	3,5%	

Source: ARS – SiiMA Rastreios, 2023. Note: Geographic coverage rate in ACES with screening implemented: No. of ACES with screening implemented / Total No. of ACES; Eligible population: Target population - Excluded population, corresponding to the total No. of patients with a diabetes registry in the region (regardless of whether they have screening implemented or not) in the respective ACES indicated for screening; No. of invitees: No. of patients with an invitation sent for DRS; No. Screened: Total No. of eligible patients who underwent retinography as part of the population screening program; Screening adherence rate (%): No. of patients screened / No. of patients with diabetes registry invited for screening; Population coverage rate: No. of patients with diabetes registry invited / No. of patients eligible for screening; Population screening rate: No. of patients with diabetes registry screened / No. of patients with diabetes registry eligible for screening; Patients with positive retinography: No. of patients with a positive reading (R2,R3,V1,M1,P1); % positive cases: No. of positive cases / No. of patients screened.

Regarding the evolution of the coverage of DRS, we have observed that both the adherence rate and the population screening rate have been increasing following the decline experienced during the COVID-19 pandemic.

Figure 4. Evolution in the coverage of DRS in mainland Portugal | 2018 - 2022

Source: ARS-SiiMA Rastreios, 2023. Note: Population coverage rate: No. of patients with a diabetes diagnosis invited for screening / Eligible population of the region; Population screening rate: No. of patients with diabetes screened in the region / No. of patients with a diabetes diagnosis eligible for screening in the region.

2.5.2. Diabetic nephropathy

Diabetic nephropathy is a common complication of diabetes and one of the leading causes of kidney failure that leads to the need for replacement therapy (hemodialysis, peritoneal dialysis). Periodic screening and early treatment are essential to prevent the progression to more severe forms of diabetic nephropathy. In 2022, there was an increase in the proportion of patients with recorded microalbuminuria assessment (66%), suggesting an increase in the proportion of patients screened compared to 2021.

Table 18. Proportion of patients with diabetes with a registered microalbuminuria assessment in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	76	78	63	74	78
ARS Centre	%	63	66	60	63	66
ARS LVT	%	55	57	47	51	55
ARS Alentejo	%	57	57	48	50	54
ARS Algarve	%	45	49	45	48	52
Mainland Portugal	%	64	66	56	62	66

Source: SPMS - SIM@SNS 2023, extracted on February 20th. Research method: SIARS Code 2013.097.0.

2.5.3. Diabetic foot

In 2022, 74% of patients with a register of diabetes underwent annual foot examination to assess the risk of diabetic foot ulcer, matching pre-pandemic levels. Three health regions matched or increased foot assessments performed in 2019. The Alentejo and LVT regions still remain below 2019 levels.

Table 19. Proportion of patients with diabetes with a registered foot examination in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	85	87	72	80	89
ARS Centre	%	68	72	62	62	72
ARS LVT	%	58	62	45	44	59
ARS Alentejo	%	71	72	56	51	62
ARS Algarve	%	55	59	50	53	62
Mainland Portugal	%	71	74	59	62	74

Source: SPMS – SIM@SNS 2023, extracted on February 20th. Research method: SIARS BI 2013.035.01 FL Proportion DM with foot examination in the last year.

Out of the total foot ulcer risk assessments conducted, 1,111,542 (90%) were classified as low risk, 27,713 (2%) as medium risk, and 92,238 (8%) as high risk.

Figure 5. Total diabetic foot risk assessments by risk level conducted in CSP in mainland Portugal | 2018 – 2022



Source: SPMS - SIM@SNS 2023, extracted on February 2nd.

Overall, among the diabetes patients monitored in the SNS CSP in mainland Portugal, 2,020 (0.25%) had a register of active foot ulcer. The Alentejo region, although still above the national average, has shown positive progress in recent years.

Table 20. Proportion of patients with diabetes with an active foot ulcer registered in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	No.	803	734	679	750	840

	%	0,3	0,3	0,2	0,2	0,3
ARS Centre	No.	341	293	341	348	377
	%	0,3	0,2	0,2	0,2	0,2
ARS LVT	No.	470	539	515	501	613
	%	0,2	0,2	0,2	0,2	0,2
ARS Alentejo	No.	179	155	147	133	130
	%	0,4	0,3	0,3	0,3	0,3
ARS Algarve	No.	52	37	32	46	60
	%	0,2	0,2	0,1	0,2	0,2
Mainland Portugal	No.	1 845	1 758	1 714	1 778	2 020
	%	0,3	0,3	0,2	0,2	0,3

Source: SPMS - SIM@SNS, 2023, extracted on February 20th. Research method: SIARS Code 2011.005.02.

2.5.4. Therapeutics

Regarding patients with a register of newly diagnosed T2D in 2022 (diagnoses made/registered in 2022), monotherapy with metformin was prescribed to 63% of patients.

Table 21. Proportion of patients with a new register of T2D who started monotherapy with metformin in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	76	75	70	69	67
ARS Centre	%	73	72	69	66	63
ARS LVT	%	68	68	63	60	58
ARS Alentejo	%	74	70	62	59	59
ARS Algarve	%	63	65	59	59	59
Mainland Portugal	%	72	71	67	64	63

Source: SPMS – SIM@SNS 2022, extracted on February 20th. Research method: SIARS BI 2013.275.01FL Proportion of new T2D patients on monotherapy with metformin.

45% of T2D patients were medicated with metformin, a higher value than in the previous two years. In this type of diabetes, the use of DPP4 inhibitors decreased from 35% to 28% of non-insulin antidiabetic doses prescribed between 2019 and 2022. This evolution may be related to the introduction of new pharmacological classes (SGLT2 inhibitors, GLP-1 receptor analogs).

Table 22. Proportion of patients with a register of T2D on metformin therapy in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	53	52	49	45	53
ARS Centre	%	43	43	41	39	42
ARS LVT	%	43	41	38	35	40
ARS Alentejo	%	45	43	40	36	41
ARS Algarve	%	29	28	26	24	28
Mainland Portugal	%	46	45	42	39	45

Source: SPMS – SIM@SNS 2023, extracted on February 20th. Research method: SIARS Code 2013.042.01 FL Proportion of T2D on metformin therapy.

Table 23. Ratio of the sum of Defined Daily Doses (DDD) prescribed for DPP4 inhibitors to the sum of DDD prescribed for non-insulin antidiabetics in patients with T2D, mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	33	32	31	29	28
ARS Centre	%	40	39	38	36	31
ARS LVT	%	34	34	34	32	28
ARS Alentejo	%	37	38	38	36	32
ARS Algarve	%	38	41	39	36	31
Mainland Portugal	%	35	35	34	32	28

Source: SPMS – SIM@SNS 2023, extracted on February 20th. Research method: SIARS BI Code 2013.276.01 FL DDD prescribed ratio of DPP-4 and oral antidiabetic agents.

Among users classified as having T2D, 5.4% were being treated with insulin. However, there remains the possibility that some users classified as having T1D may actually correspond to T2D users treated with insulin, but still to be reclassified.

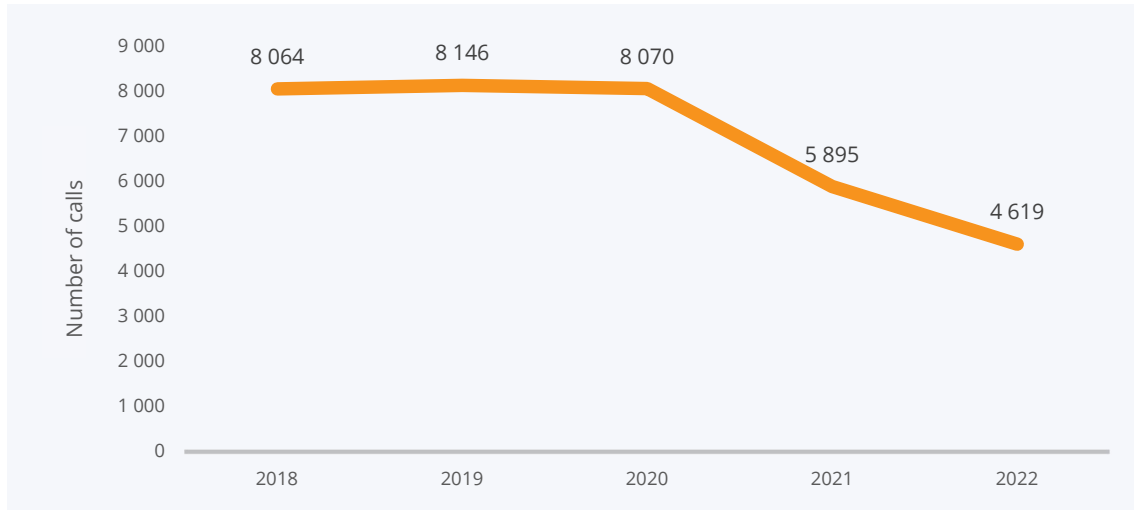
Table 24. Proportion of patients with a register of T2D on insulin therapy in CSP in mainland Portugal | 2018 – 2022

		2018	2019	2020	2021	2022
ARS North	%	6,1	6,0	5,4	4,8	6,1
ARS Centre	%	6,2	6,3	5,9	5,4	6,0
ARS LVT	%	5,0	4,8	4,3	3,8	4,7
ARS Alentejo	%	5,1	5,0	4,4	3,9	4,6
ARS Algarve	%	3,0	2,8	2,8	2,4	3,2
Mainland Portugal	%	5,6	5,5	5,0	4,5	5,4

Source: SPMS – SIM@SNS 2022, extracted on February 20th. Research method: SIARS BI 2013.041.01 FL Proportion of T2D on insulin therapy.

3. Pre-hospital care – Rede SNS 24

The SNS Contact Center, SNS24, is a telephone and digital service that allows users to ask questions and immediately address some of their issues, reducing unnecessary traffic to health centers and emergency services. Between 2018 and 2022, SNS24 received approximately 34,794 calls related to diabetes. In 2022, the number of calls (4,619) continued to decline compared to the previous year. It is important to analyze this trend, as this service facilitates access to healthcare.

Figure 6. Annual number of calls to the SNS24 line for issues related to diabetes in Portugal | 2018 – 2022

Source: SNS24, 2023.

As in previous years, it was mainly women (about 59% of total calls) and individuals aged 60 or older (about 76% of total calls) who used this support line the most.

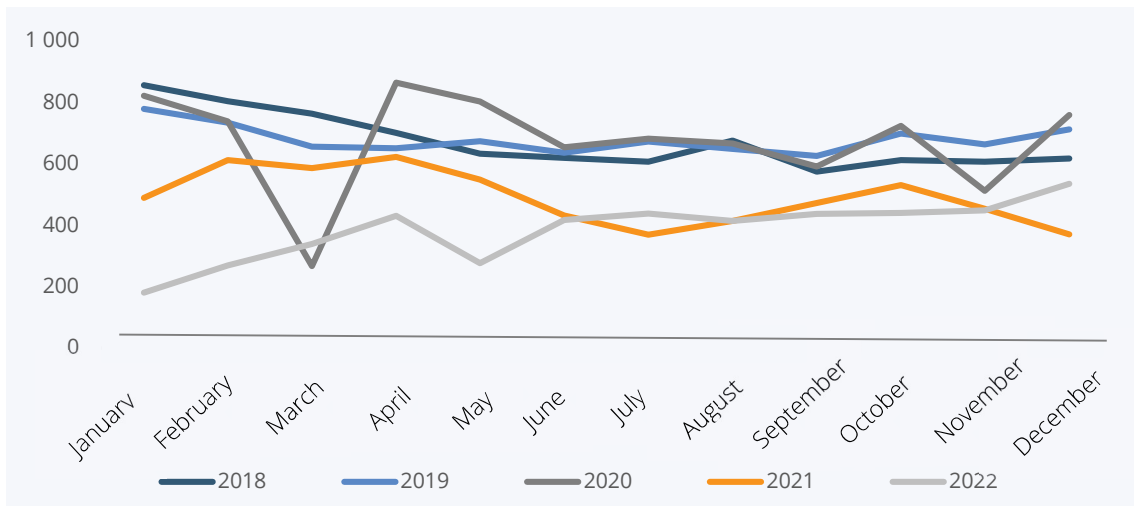
Table 24. Age group distribution of calls to the SNS24 line for issues related to diabetes | 2018 – 2022

	2018	2019	2020	2021	2022
≤29 years	235	263	269	219	197
	3%	3%	3%	4%	4%
30 – 59 years	1,553	1,579	1,690	1,294	901
	19%	19%	21%	22%	20%
≥60 years	6,276	6,034	6,111	4,382	3,521
	78%	74%	74%	74%	76%
Total	8,064	8,146	8,070	5,895	4,619

Source: SNS24, 2023.

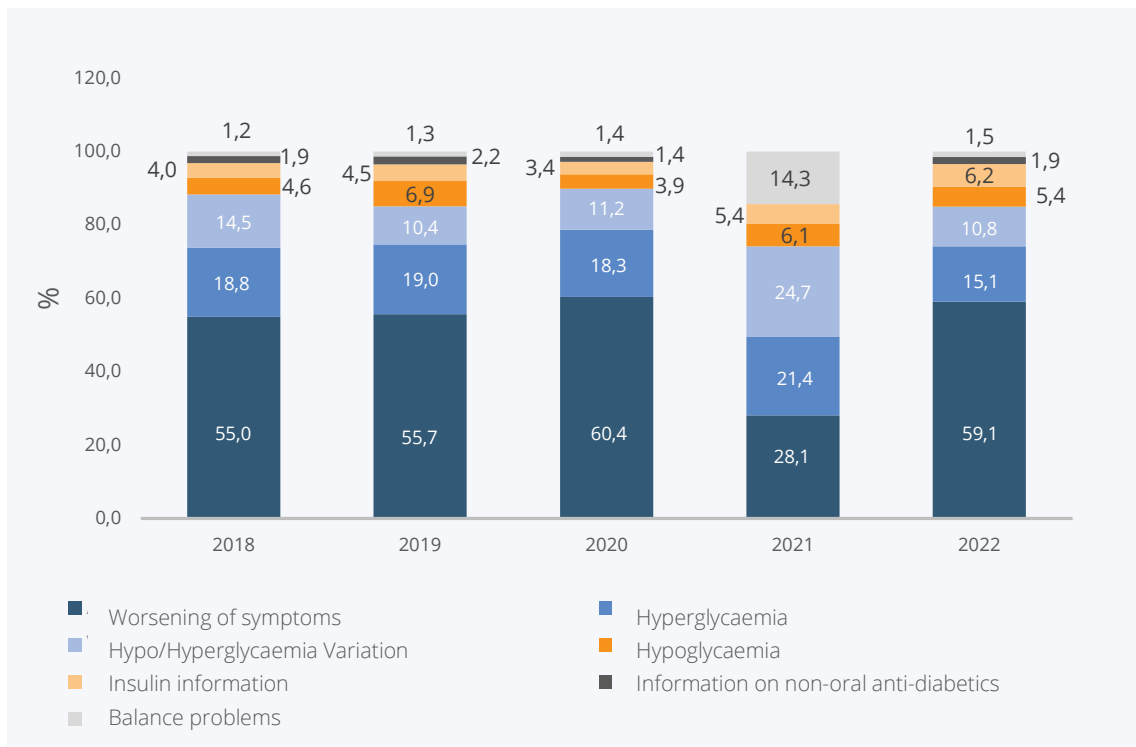
In 2022, call volume was higher in November and December. The main reasons for contact were symptom change/worsening (59%), followed by hyperglycemia (15%). Overall, 45% of contacts resulted in referral to urgent medical care, 7% to the emergency medical services (INEM), self-care was suggested in 21% of cases and 27% were referred to non-urgent medical care.

Figure 7. Monthly distribution of calls to the SNS24 line for issues related to diabetes | 2018 – 2022



Source: SNS24, 2023.

Figure 8. Reason for contact and outcome of calls made to the SNS24 line for issues related to diabetes | 2018 – 2022



Fonte: SNS24, 2023.

4. Hospital-level diabetes care in the National Health Service in mainland Portugal

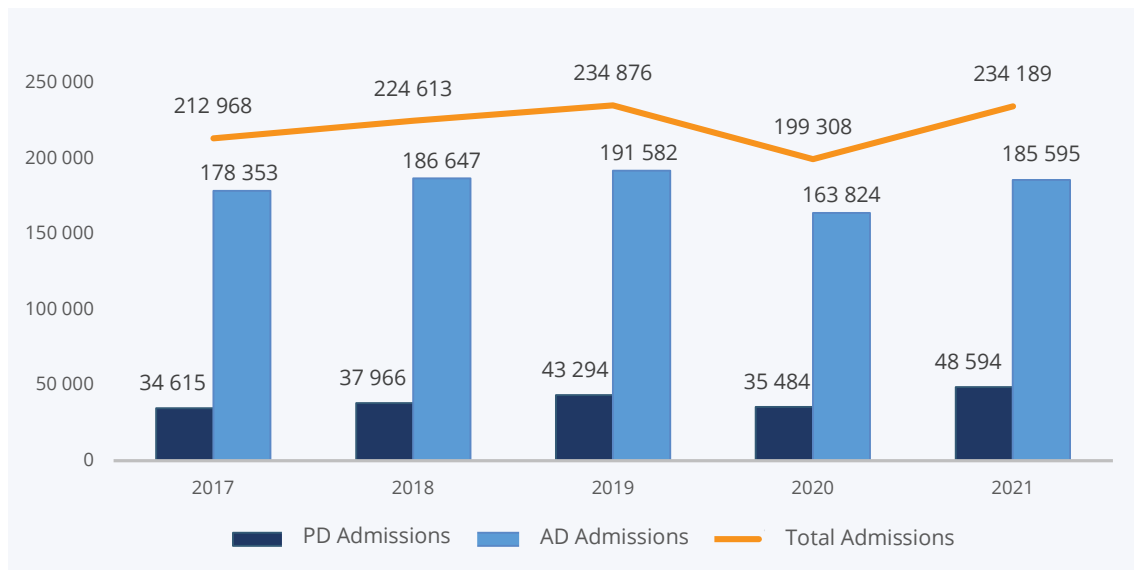
The data presented in this chapter were extracted from the Hospital Morbidity Databases provided by the Central Administration of the Health System (ACSS). These records rely on the coding of admissions.

The classification used changed during the period for which data are presented, resulting in some breaks in series in the results: from 2017 onwards, the ICD-10 (International Classification of Diseases of the WHO) hospital morbidity classification was adopted, with the years 2016 and 2017 being transition years in the adoption of the new classification.

4.1. Admissions of patients with diabetes

In 2021, there were 234,189 hospital admissions of individuals diagnosed with diabetes, with diabetes being the primary diagnosis in 20.8% of them.

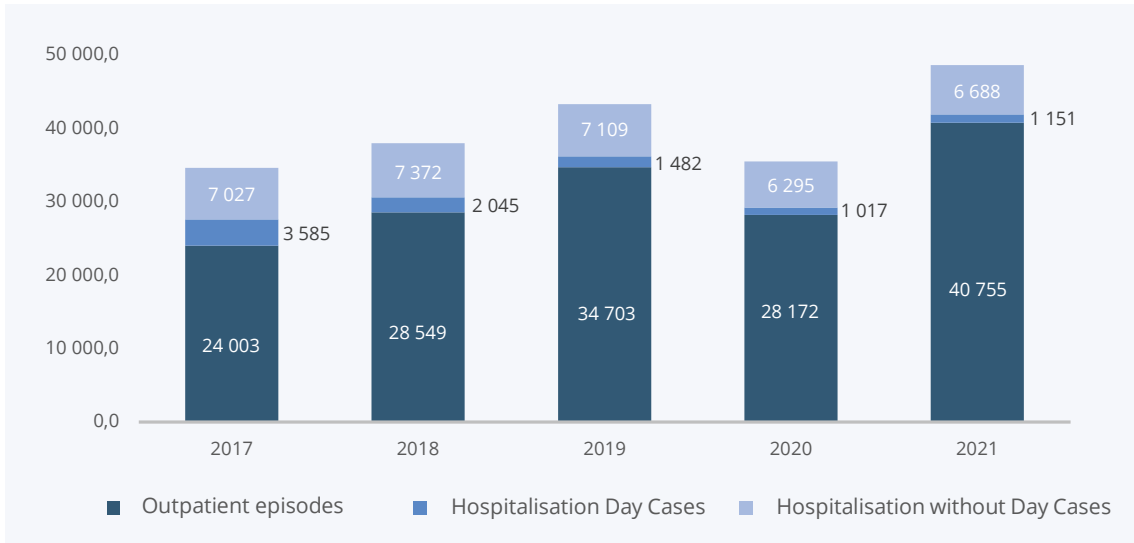
Figure 9. Total admissions to SNS hospitals with a diagnosis of diabetes, either as a PD or AD | 2017 – 2021



Source: BDMH/ACSS, 2023. PD: Primary diagnosis; AD: Associated diagnosis.

Regarding admissions with a primary diagnosis of diabetes, hospitalizations lasting more than 24 hours approached pre-pandemic levels and outpatient episodes increased, reaching levels higher than those in 2019.

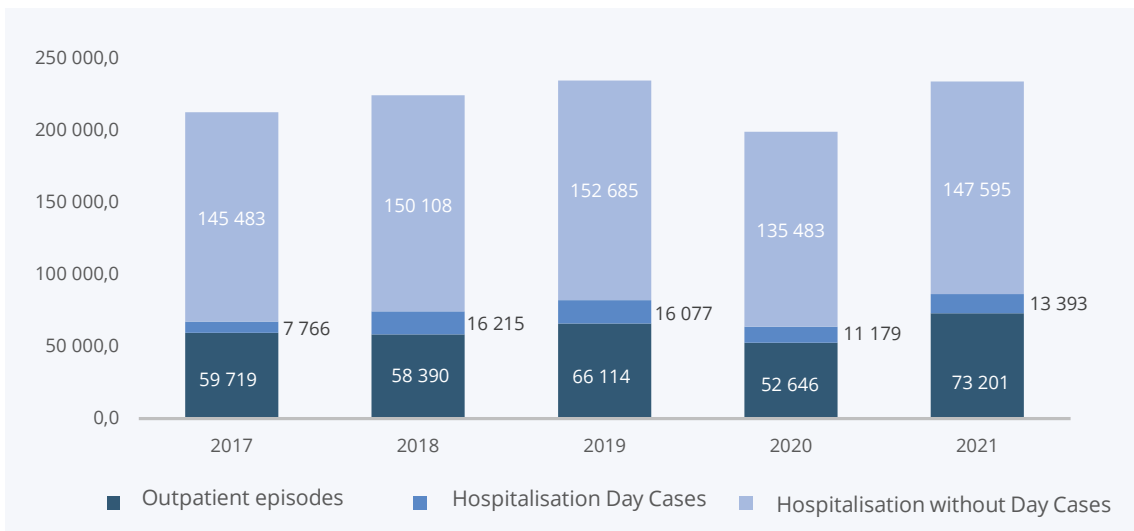
Figure 10. Total admissions in SNS hospitals with diabetes as the PD | 2017 – 2021



Source: BDMH/ACSS, 2023. Day cases: number of hospitalization episodes lasting less than one day, excluding those who were hospitalized and died during the first day of hospitalization.

In cases where hospitalization is not primarily due to diabetes but rather as an associated diagnosis, there is a trend of growth, interrupted in 2020 due to COVID-19 pandemic constraints, and showing new growth in 2021, yet still below pre-pandemic levels. Among individuals with diabetes, approximately 95% of hospitalizations occur for other reasons, with diabetes being an associated diagnosis.

Figure 11. Total admissions in SNS hospitals with diabetes as either a PD or AD | 2017 – 2021



Source: BDMH/ACSS, 2023. Day cases: number of hospitalization episodes lasting less than one day, excluding those who, having been admitted, died during the first day of hospitalization.

In 2021, 15% of admissions to SNS hospitals were for patients with diabetes, and among those admitted, 20% had diabetes. For patients with diabetes admitted to SNS hospitals, the average number of admissions in 2021 was 1.6 per patient.

Table 25. Proportion of admissions in SNS hospitals with a diagnosis of diabetes | 2017 - 2021

		2017	2018	2019	2020	2021
Total admissions with a diagnosis of diabetes	No.	212,968	224,613	234,876	199,308	234,189
	%	13,7%	14,4%	14,6%	14,2%	15,0%
Total hospitalizations with a diagnosis of diabetes	No.	153,249	166,223	168,762	146,662	160,988
	%	17,6%	19,4%	19,7%	19,7%	20,2%
Admissions (Total SNS)	No.	1,555,923	1,564,507	1,604,286	1,399,915	1,560,511
Hospitalizations (Total SNS)	No.	871,473	856,524	858,075	743,659	795,290
Total of patients diagnosed with diabetes	No.	134,236	139,496	145,051	130,705	150,122
Average number of admissions	No.	1,6	1,6	1,6	1,5	1,6

Source: BIMH, consulted on 09/26/2023 (Data is loaded weekly, and as of the consultation date, all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) from January 1, 2013, to September 20, 2023, are available).

Among patients admitted with diabetes (with primary or associated diagnosis), as in previous years, ketoacidosis was the most frequent acute complication, with a growing trend in recent years.

Table 26. Number of admissions or acute complications of diabetes (patients with diabetes as a PD or AD) | 2017 - 2021

		2017	2018	2019	2020	2021
DM with ketoacidosis without coma	Hospitalizations (n)	1,585	1,936	1,922	2,000	2,411
	Outpatient (n)	5	6	4	3	4
	%	0,75%	0,86%	0,82%	0,94%	1,03%
DM with ketoacidosis with coma	Hospitalizations (n)	86	103	119	113	140
	Outpatient (n)	7	5	2	2	2
	%	0,04%	0,05%	0,05%	0,05%	0,06%
DM with hyperosmolarity without coma	Hospitalizations (n)	1,442	1,567	1,668	1,517	1,198
	Outpatient (n)	53	71	42	29	4
	%	0,70%	0,73%	0,73%	0,72%	0,51%
DM with hyperosmolarity with coma	Hospitalizations (n)	167	160	119	163	136
	Outpatient (n)	1	0	0	0	0
	%	0,08%	0,07%	0,05%	0,08%	0,06%
DM with hypoglycemia without coma	Hospitalizations (n)	1,591	1,665	1,682	1,606	1,733
	Outpatient (n)	2	13	8	2	8
	%	0,75%	0,75%	0,72%	0,75%	0,74%
DM with hypoglycemia with coma	Hospitalizations (n)	121	126	149	129	126
	Outpatient (n)	0	0	0	0	0
	%	0,06%	0,06%	0,06%	0,06%	0,05%

Total	212,968	224,613	234,876	213,625	234,189
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Source: BDMH/ACSS, 2023, extracted in April. Note: The total refers to the sum of all admissions of people with diabetes. Search method in BDMH: ICD9-CM DP: 249.1, 250.1, 249.2, 250.2, 249.3, 250, 249.8, 250.8; ICD 10-CM DP: E08.10, E09.10, E10.10, E11.10, E12.10, E13.10, E08.11, E09.11, E10.11, E11.11, E12.11, E13.11, E08.00, E09.00, E10.00, E11.00, E12.00, E13.00, E08.01, E09.01, E10.01, E11.01, E12.01, E13.01, E08.641, E09.641, E10.641, E11.641, E12.641, E13.641, E08.649, E09.649, E10.649, E11.649, E12.649, E13.649.

Ophthalmic manifestations remained the primary cause of admission for patients with diabetes, as previously observed. Most of these admissions for diabetes with ophthalmic manifestations were outpatient episodes.

Table 27. Number of admissions in patients with diabetes (as a PD or AD), for ophthalmic, renal, peripheral circulatory, neurological, arthropathy and skin manifestations | 2017 – 2021

		2017	2018	2019	2020	2021
DM with ophthalmic manifestations	Hospitalizations (n)	11,962	11,918	12,146	9,958	11,100
	Outpatient (n)	25,612	29,532	35,977	29,589	42,857
	Subtotal (%)	17,6%	18,5%	20,5%	18,5%	23,0%
DM with renal manifestations	Hospitalizations (n)	14,847	27,284	30,317	26,867	30,146
	Outpatient (n)	9,171	3,062	2,673	2,371	2,748
	Subtotal (%)	11,3%	13,5%	14,0%	13,7%	14,0%
DM with peripheral circulatory disorders	Hospitalizations (n)	3,809	4,919	4,901	4,771	5,674
	Outpatient (n)	349	146	142	129	287
	Subtotal (%)	2,0%	2,3%	2,1%	2,3%	2,5%
DM with neurological manifestations	Hospitalizations (n)	3,335	3,983	4,322	3,646	4,013
	Outpatient (n)	279	162	179	142	324
	Subtotal (%)	1,7%	1,8%	1,9%	1,8%	1,9%
DM with diabetic arthropathy	Hospitalizations (n)	167	153	166	168	161
	Outpatient (n)	4	8	13	2	8
	Subtotal (%)	0,1%	0,1%	0,1%	0,1%	0,1%
DM with cutaneous complications (dermatitis, ulcer)	Hospitalizations (n)	1 666	2 087	2 356	2 177	2 184
	Outpatient (n)	16	39	22	56	45
	Subtotal (%)	0,8%	0,9%	1,0%	1,0%	1,0%
Total		212,968	224,613	234,876	213,625	234,189

Source: BDMH/ACSS, 2023, extracted in April. Note: The total refers to the sum of all admissions of people with diabetes. Note: Research method in BDMH: ICD9-CM DP: 249.4, 250.4, 249.5, 250.5, 249.6, 250.6, 249.7, 250.7; ICD 10-CM DP: E08.2, E09.2, E10.2, E11.2, E12.2, E13.2, E08.3, E09.3, E10.3, E11.3, E12.3, E13.3, E08.4, E09.4, E10.4, E11.4, E12.4, E13.4, E08.51, E08.52, E09.51, E09.52, E10.51, E10.52, E11.51, E11.52, E12.51, E12.52, E13.51, E13.52.

Table 28. Number of admissions (hospitalizations, including day cases and outpatient episodes) for acute complications of diabetes, in patients with diabetes as the PD | 2017 – 2021

		2017	2018	2019	2020	2021
DM with ketoacidosis without coma	Hospitalizations (n)	1,225	1,390	1,402	1,368	1,556
	Outpatient (n)	0	1	1	0	0
	Subtotal (%)	3,5%	3,7%	3,2%	3,9%	3,2%
Hospitalizations (n)		54	66	78	69	72

DM with ketoacidosis with coma	Outpatient (n)	6	5	2	1	2
	Subtotal (%)	0,2%	0,2%	0,2%	0,2%	0,2%
DM with hyperosmolarity without coma	Hospitalizations (n)	489	573	535	586	633
	Outpatient (n)	9	24	19	6	1
	Subtotal (%)	1,4%	1,6%	1,3%	1,7%	1,3%
DM with hyperosmolarity with coma	Hospitalizations (n)	99	98	65	93	75
	Outpatient (n)	0	0	0	0	0
	Subtotal (%)	0,3%	0,3%	0,2%	0,3%	0,2%
DM with hypoglycemia without coma	Hospitalizations (n)	520	504	447	344	333
	Outpatient (n)	0	0	0	0	0
	Subtotal (%)	1,5%	1,3%	1,0%	1,0%	0,7%
DM with hypoglycemia with coma	Hospitalizations (n)	72	81	78	71	65
	Outpatient (n)	0	0	0	0	0
	Subtotal (%)	0,2%	0,2%	0,2%	0,2%	0,1%
Total		34,615	37,966	43,294	35,421	48,594

Source: BDMH/ACSS, 2023, extracted in April. Search method in BDMH: ICD9-CM DP: 249.1, 250.1, 249.2, 250.2, 249.3, 250, 249.8, 250.8; ICD 10-CM DP: E08.10, E09.10, E10.10, E11.10, E12.10, E13.10, E08.11, E09.11, E10.11, E11.11, E12.11, E13.11, E08.00, E09.00, E10.00, E11.00, E12.00, E13.00, E08.01, E09.01, E10.01, E11.01, E12.01, E13.01, E08.641, E09.641, E10.641, E11.641, E12.641, E13.641, E08.649, E09.649, E10.649, E11.649, E12.649, E13.649.

Table 29. Number of admissions (hospitalizations including day cases and outpatient episodes) for ophthalmic, renal, peripheral circulatory, neurological, skin and arthropathy manifestations in patients with diabetes as the PD | 2017 – 2021

		2017	2018	2019	2020	2021
Ophthalmic manifestations	Hospitalizations (n)	3,669	2,123	1,488	994	1,087
	Outpatient (n)	23,398	27,759	34,240	27,854	40,295
	Subtotal (%)	78,2%	78,7%	82,5%	81,4%	85,2%
Renal manifestations	Hospitalizations (n)	703	503	550	479	469
	Outpatient (n)	572	731	397	285	417
	Subtotal (%)	3,7%	3,3%	2,2%	2,2%	1,8%
Peripheral circulatory alterations	Hospitalizations (n)	1,093	1,236	1,246	1,324	1,518
	Outpatient (n)	3	14	30	10	27
	Subtotal (%)	3,2%	3,3%	2,9%	3,8%	3,2%
Neurological manifestations	Hospitalizations (n)	111	93	108	64	65
	Outpatient (n)	0	1	1	2	1
	Subtotal (%)	0,3%	0,2%	0,3%	0,2%	0,1%
Skin complications (dermatitis, ulcer)	Hospitalizations (n)	718	952	843	715	736
	Outpatient (n)	5	9	6	7	10
	Subtotal (%)	2,1%	2,5%	2,0%	2,0%	1,5%
Diabetic arthropathy	Hospitalizations (n)	26	22	23	24	21
	Outpatient (n)	1	1	1	0	1
	Subtotal (%)	0,1%	0,1%	0,1%	0,1%	0,0%
Total		34,615	37,966	43,294	35,421	48,594

Source: BDMH/ACSS, 2023. Research method in BDMH: ICD9-CM DP: 249.4, 250.4, 249.5, 250.5, 249.6, 250.6, 249.7, 250.7; ICD 10-CM DP: E08.2, E09.2, E10.2, E11.2, E12.2, E13.2, E08.3, E09.3, E10.3, E11.3, E12.3, E13.3, E08.4, E09.4, E10.4, E11.4, E12.4, E13.4, E08.51, E08.52, E09.51, E09.52, E10.51, E10.52, E11.51, E11.52, E12.51, E12.52, E13.51, E13.52.

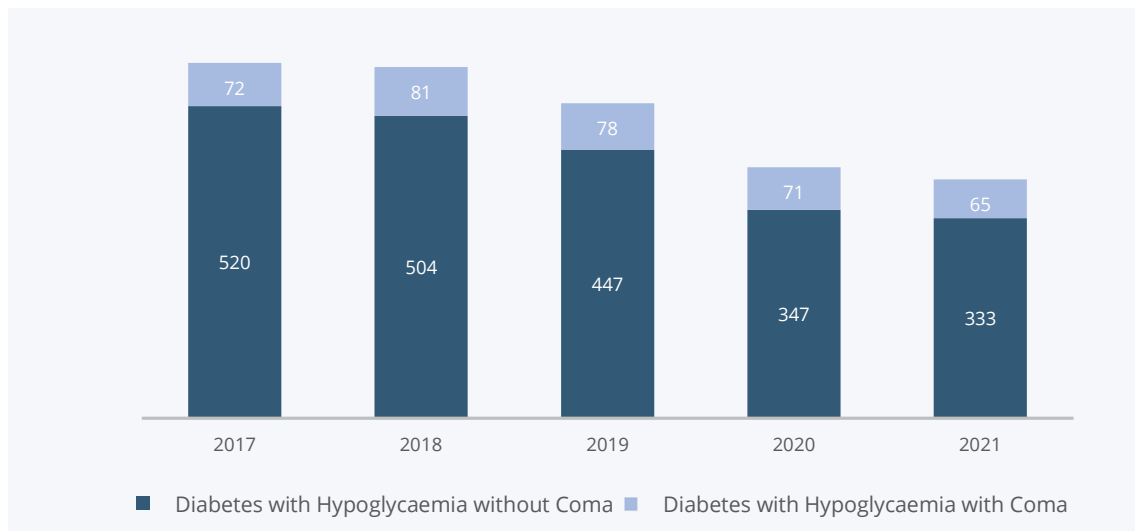
Among patients admitted with a primary diagnosis of diabetes, it was observed that in 2021, 398 patients were admitted for hypoglycemia with and without coma in SNS hospitals. The decreasing trend in the number of admissions for hypoglycemia with and without coma continues. Consistent with the higher prevalence of T2D, a greater number of patients with T2D and this complication were admitted compared to patients with T1D and this complication.

Table 30. Admissions for hypoglycemia in patients with T1D and T2D (patients admitted with diabetes as the PD) | 2017 - 2021

		2017	2018	2019	2020	2021
Diabetes with hypoglycemia without coma	T1D	61 (12%)	63 (13%)	54 (12%)	37 (10%)	44 (13%)
	T2D	451 (87%)	426 (85%)	389 (87%)	296 (86%)	278 (83%)
	Others	8 (2%)	15 (3%)	4 (1%)	11 (3%)	11 (3%)
	Total	520	504	447	347	333
Diabetes with hypoglycemia with coma	T1D	17 (24%)	6 (7%)	11 (14%)	9 (13%)	12 (18%)
	T2D	51 (71%)	68 (84%)	67 (86%)	61 (86%)	53 (82%)
	Others	4 (6%)	7 (9%)	0	1 (1%)	0
	Total	72	81	78	71	65

Source: BDMH/ACSS, 2023. Search method in BDMH: ICD 10-CM DP: E08.641, E09.641, E10.641, E11.641, E12.641, E13.641, E08.649, E09.649, E10.649, E11.649, E12.649, E13.649.

Figure 12. Admissions for hypoglycemia in patients admitted with diabetes as the PD | 2017 - 2021



Source: BDMH/ACSS, 2023. Search method in BDMH: ICD 10-CM DP: E08.641, E09.641, E10.641, E11.641, E12.641, E13.641, E08.649, E09.649, E10.649, E11.649, E12.649, E13.649.

4.2. Duration of hospital stays

Hospitalizations of individuals with diabetes as the primary diagnosis in 2021 had an average duration of stay of 10.7 days, higher than the SNS average of 8.4 days. Those with diabetes hospitalized for other primary causes in 2021 had a duration of 10.0 days, also higher than the SNS average duration of stay.

Table 31. Duration of hospitalizations (including day cases) for diabetes and total stays in SNS hospitals | 2017 – 2021

	2017 Average (median)	2018 Average (median)	2019 Average (median)	2020 Average (median)	2021 Average (median)
Diabetes as primary diagnosis	8,1 (3,0)	8,2 (4,0)	10,6 (5,0)	11,6 (6,0)	10,7 (6,0)
Diabetes as secondary diagnosis	10,4 (7,0)	10,4 (7,0)	9,9 (6,0)	10,6 (6,0)	10,0 (6,0)
Hospitalizations in the SNS (with and without diabetes)	8,1	8,1	8,2	8,6	8,4

Source: BIMH, consulted on September 26, 2023 (Data is uploaded weekly, with episodes coded by hospitals (using valid ICD9CM or ICD10CM/PCS codes) from January 1, 2013, to September 20, 2023).

4.3. In-hospital lethality

The in-hospital lethality among individuals with diabetes is higher than the lethality for all causes. The in-hospital lethality in 2021 was 7.4% for individuals admitted with a primary diagnosis of diabetes and 14.6% for individuals with at least one diagnosis of diabetes (either as a primary or secondary diagnosis). These values are higher than the 7.3% observed in the overall population of patients (with or without Diabetes) admitted to hospitals in the SNS.

Table 32. In-hospital lethality of patients admitted with diabetes (as the PD) | 2017 – 2021

	2017	2018	2019	2020	2021
No. of patients hospitalized (PD of diabetes and discharged as deceased)	368	456	427	466	486
No. of patients hospitalized (PD of diabetes)	8,019	7,459	7,189	6,234	6,573
In-hospital lethality of hospitalized patients (PD of diabetes)	4,6%	6,1%	5,9%	7,5%	7,4%

Source: BIMH, consulted on September 26, 2023. (Data is uploaded weekly and is available up to the date of the consultation, including all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) from January 1, 2013, to September 20, 2023).

Table 33. In-hospital lethality of patients admitted with diabetes (as a primary or secondary diagnosis) | 2017 – 2021

	2017	2018	2019	2020	2021
No. of patients hospitalized with diabetes and discharged as deceased	13,736	14,645	14,747	16,178	17,150
No. of patients hospitalized with diabetes	110,900	113,358	115,098	106,406	117,551
In-hospital lethality of hospitalized patients with diabetes	12,4%	12,9%	12,8%	15,2%	14,6%

Source: BIMH, consulted on September 26, 2023. (Data is uploaded weekly and is available up to the date of the consultation, including all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) from January 1, 2013, to September 20, 2023).

Table 34. In-hospital lethality of all patients admitted to SNS hospitals (with any diagnosis) | 2017 – 2021

	2017	2018	2019	2020	2021
No. of patients hospitalized with discharged as deceased	52,946	53,732	52,958	55,336	57,954
No. of patients hospitalized	871,473	856,524	858,075	743,659	795,290
In-hospital lethality of hospitalized patients	6,1%	6,3%	6,2%	7,4%	7,3%

Source: BIMH, consulted on September 26, 2023. (Data is uploaded weekly and is available up to the date of the consultation, including all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) from January 1, 2013, to September 20, 2023).

4.4. Renal complications

In 2021, according to data from the Portuguese Society of Nephrology (SPN), 28% of people with chronic kidney disease (CKD) and 33.2% of new cases of CKD had diabetes.

Table 35. Prevalence of diabetes in individuals with CKD | 2017 – 2021

	2017	2018	2019	2020	2021
Prevalence of diabetes in people with CKD – Global	28,0	27,8	28,0	27,7	28,0
Prevalence of diabetes in people with CKD on Hemodialysis	28,7	28,1	28,6	28,6	29,0
Prevalence of diabetes in people with CKD on Peritoneal Dialysis	16,4	15,5	16,9	15,8	14,6
Prevalence of diabetes in new cases of CKD - Global	32,2	31,5	33,2	33,1	33,2
Prevalence of diabetes in new cases of CKD on Hemodialysis	33,4	32,5	34,6	34,5	35,1
Prevalence of diabetes in new cases of CKD on Peritoneal Dialysis	21,3	19,2	21,8	21,3	16,5

Source: Annual Reports of the Portuguese Society of Nephrology 2018-2022.

4.5. Macrovascular disease

Macrovascular disease remains a significant cause of morbidity and mortality in the context of diabetes. Diabetes was present in 28% of individuals hospitalized for acute myocardial infarction (AMI) and 29% of those hospitalized for stroke in 2021. Regarding stroke, these patients have a similar in-hospital lethality compared to those without diabetes; regarding AMI, there was a higher lethality in patients with diabetes (8.7% vs. 7.0%).

Table 36. Number of patients admitted and lethality from AMI in SNS hospitals | 2017 – 2021

	2017	2018	2019	2020	2021
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Patients hospitalized with AMI (primary diagnosis)	with DM as an associated diagnosis	N	3,768	3,677	3,766	3,108	3,310
	With any associated diagnosis	N	12,233	12,376	12,495	11,109	11,856
	Proportion of DM in individuals with AMI	%	30,8%	29,7%	30,1%	28,0%	27,9%
In-hospital lethality in patients hospitalized with AMI (primary diagnosis)	with DM as an associated diagnosis	N	318	266	267	247	288
		%	8,4%	7,2%	7,1%	7,9%	8,7%
	with any associated diagnosis	N	985	974	891	826	834
		%	8,1%	7,9%	7,1%	7,4%	7,0%

Sources: Diabetes Dashboard, consulted on September 26, 2023 (Hospital morbidity data presented on the Diabetes Dashboard at the time of consultation were obtained from the BDMH version provided by ACSS on May 18, 2023). BIMH, consulted on September 26, 2023 (Data is loaded weekly, with all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) from January 1, 2013, to September 20, 2023, available at the time of consultation). In-hospital lethality: number of deaths/number of patients. Search method in BDMH: ICD9-CM DP: 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.81, 410.91, 410.71; ICD9-CM DA: 249.-, 250.-; ICD 10-CM DP: I21.01, I21.02, I21.09, I21.11, I21.19, I21.21, I21.29, I21.4; ICD10-CM DA: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-.

Table 37. Number of patients admitted and lethality from stroke in SNS hospitals | 2017 – 2021

			2017	2018	2019	2020	2021
Patients hospitalized with stroke (primary diagnosis)	with DM as an associated diagnosis	N	6,820	7,067	7,150	6,566	6,939
	with any associated diagnosis	N	24,860	24,835	24,602	23,064	23,694
	Proportion of DM in individuals with stroke	%	27,4%	28,5%	29,1%	28,5%	29,3%
In-hospital lethality in patients hospitalized with stroke (primary diagnosis)	with DM as an associated diagnosis	N	1,015	1,007	1,002	1,085	1,020
		%	14,9%	14,2%	14,0%	16,5%	14,7%
	with any associated diagnosis	N	3,678	3,659	3,555	3,558	3,399
		%	14,8%	14,7%	14,5%	15,4%	14,3%

Sources: Diabetes Dashboard, consulted on September 26, 2023 (Hospital morbidity data presented on the Diabetes Dashboard at the time of consultation were obtained from the BDMH version provided by ACSS on May 18, 2023). BIMH, consulted on September 26, 2023 (Data is loaded weekly, with all episodes coded by hospitals (in ICD9CM or ICD10CM/PCS, with valid codes) from January 1, 2013, to September 20, 2023, available at the time of consultation). In-hospital lethality: number of deaths/number of patients. Search method in BDMH: ICD9-CM DP: 430, 431, 432, 433, 434; ICD9-CM DA: 249.-, 250.-; ICD 10-CM DP: I60.-, I61.-, I62.-, I63.-; ICD10-CM DA: E08.-, E09.-, E10.-, E11.-, E12.-, E13.

4.6. Diabetic foot

Diabetic foot complications represent one of the main causes of morbidity in people with diabetes. If not prevented or treated promptly, they can progress to amputations, categorized as minor (involving part of the foot) or major (involving the ankle, leg or thigh). In 2021, there were 3,342 admissions due to diabetic foot, a higher number compared to previous years, with a slightly lower in-hospital lethality of 5.7%. These are typically prolonged hospitalizations, with an average length of stay of 15.2 days in 2021, which is lower than in previous years.

Table 38. Admissions to SNS hospitals for diabetic foot | 2017 – 2021

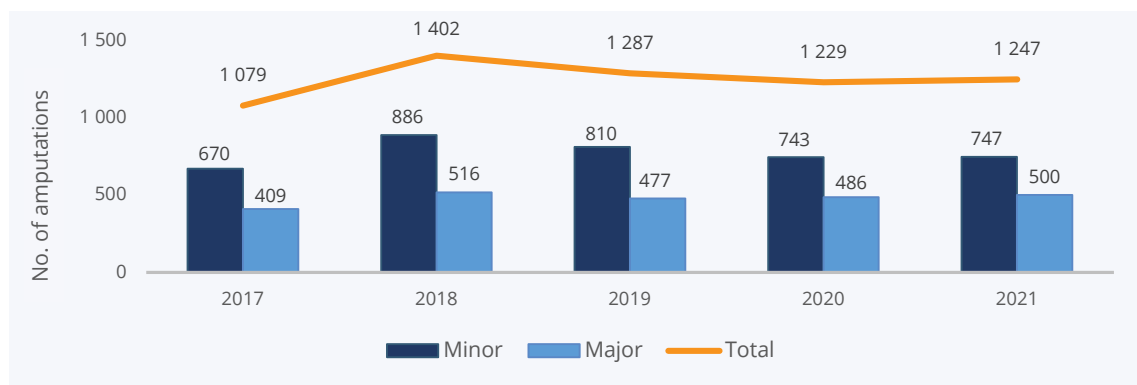
	2017	2018	2019	2020	2021
No. Hospitalizations	2,385	2,654	2,807	2,786	3,342

Lethality	6,3%	7,1%	6,6%	6,9%	5,7%
Average length (days)	18,6	18,0	17,8	17,2	15,2

Source: Diabetes Dashboard, consulted on 26/09/2023 (The hospital morbidity data presented in the Diabetes Dashboard as of the consultation date were obtained from the version of BDMH made available by ACSS on 18/05/2023). Search method in BDMH: ICD9-CM PD: 440.23, 440.24, 785.4, 707.1-; ICD9-CM DA: 249.-, 250.-; ICD 10-CM PD: E08.52, E09.52, E10.52, E11.52, E12.52, E13.52, I70.233, I70.234, I70.235, I70.243, I70.244, I70.245; ICD10-DA: E08.-, E09.-, E10.-, E11.-, E12.-, E13.

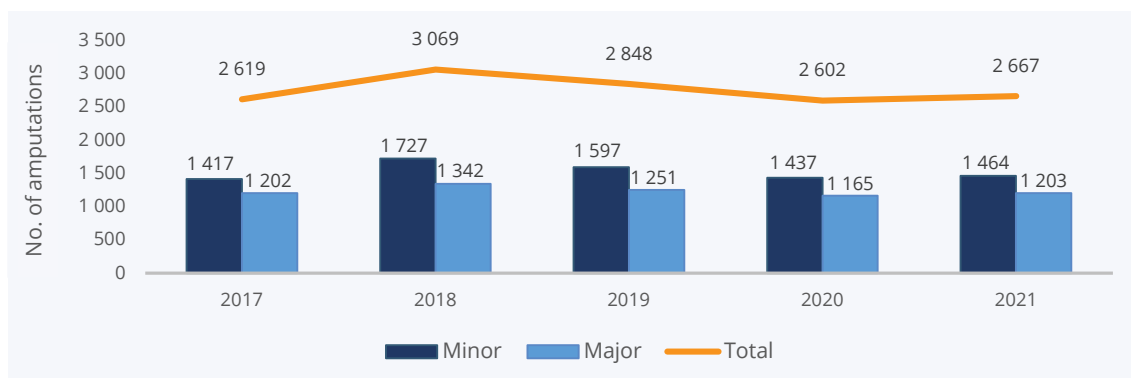
The number of lower limb amputations slightly increased in 2021 among individuals admitted with diabetes as the principal diagnosis. Although this figure remained below the level observed in 2019, the number of major amputations increased.

Figure 13. Evolution in the number of amputations for diabetic foot (diabetes as the PD) | 2017 – 2021



Source: BDMH/ACSS, 2023. Search method in BDMH: ICD9-CM DP: 249.-, 250.-; ICD9-PCS: 84.1-84.19; ICD 10-CM DP: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-; ICD10-PCS: 0Y6M0Z0, 0Y6M0Z4, 0Y6M0Z5, 0Y6M0Z6, 0Y6M0Z7, 0Y6M0Z8, 0Y6M0Z9, 0Y6M0ZB, 0Y6M0ZC, 0Y6M0ZD, 0Y6M0ZF, 0Y6N0Z0, 0Y6N0Z4, 0Y6N0Z5, 0Y6N0Z6, 0Y6N0Z7, 0Y6N0Z8, 0Y6N0Z9, 0Y6N0ZB, 0Y6N0ZC, 0Y6N0ZD, 0Y6N0ZF, 0Y6P0Z0, 0Y6P0Z1, 0Y6P0Z2, 0Y6P0Z3, 0Y6Q0Z0, 0Y6Q0Z1, 0Y6Q0Z2, 0Y6Q0Z3, 0Y6R0Z0, 0Y6R0Z1, 0Y6R0Z2, 0Y6R0Z3, 0Y6S0Z0, 0Y6S0Z1, 0Y6S0Z2, 0Y6S0Z3, 0Y6T0Z0, 0Y6T0Z1, 0Y6T0Z2, 0Y6T0Z3, 0Y6U0Z0, 0Y6U0Z1, 0Y6U0Z2, 0Y6U0Z3, 0Y6V0Z0, 0Y6V0Z1, 0Y6V0Z2, 0Y6V0Z3, 0Y6W0Z0, 0Y6W0Z1, 0Y6W0Z2, 0Y6W0Z3, 0Y6X0Z0, 0Y6X0Z1, 0Y6X0Z2, 0Y6X0Z3, 0Y6Y0Z0, 0Y6Y0Z1, 0Y6Y0Z2, 0Y6Y0Z3, 0Y620ZZ, 0Y630ZZ, 0Y640ZZ, 0Y670ZZ, 0Y680ZZ, 0Y6F0ZZ, 0Y6G0ZZ, 0Y6C0Z1, 0Y6C0Z2, 0Y6C0Z3, 0Y6D0Z1, 0Y6D0Z2, 0Y6D0Z3, 0Y6H0Z1, 0Y6H0Z2, 0Y6H0Z3, 0Y6J0Z1, 0Y6J0Z2, 0Y6J0Z3.

Considering all patients with diabetes (primary and associated diagnosis), the total number of recorded amputations (whether attributed to diabetes or not) has remained relatively stable over the past five years, with only slightly higher values in 2018 and 2019. Most of these amputations may not have been attributed to diabetes; however, given their number, they underscore the importance of controlling various cardiovascular risk factors.

Figure 14. Evolution in the total number of amputations in people with diabetes (diabetes as both primary and associated diagnosis) | 2017 – 2021

Source: BDMH/ACSS, 2023. Research method in BDMH: ICD9-CM DP/DA: 249.-, 250.-; ICD9-PCS: 84.10-84.19; ICD 10-CM DP/DA: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-; ICD10-PCS: 0Y6M0Z0, 0Y6M0Z4, 0Y6M0Z5, 0Y6M0Z6, 0Y6M0Z7, 0Y6M0Z8, 0Y6M0Z9, 0Y6M0ZB, 0Y6M0ZC, 0Y6M0ZD, 0Y6M0ZF, 0Y6N0Z0, 0Y6N0Z4, 0Y6N0Z5, 0Y6N0Z6, 0Y6N0Z7, 0Y6N0Z8, 0Y6N0Z9, 0Y6N0ZB, 0Y6N0ZC, 0Y6N0ZD, 0Y6N0ZF, 0Y6P0Z0, 0Y6P0Z1, 0Y6P0Z2, 0Y6P0Z3, 0Y6Q0Z0, 0Y6Q0Z1, 0Y6Q0Z2, 0Y6Q0Z3, 0Y6R0Z0, 0Y6R0Z1, 0Y6R0Z2, 0Y6R0Z3, 0Y6S0Z0, 0Y6S0Z1, 0Y6S0Z2, 0Y6S0Z3, 0Y6T0Z0, 0Y6T0Z1, 0Y6T0Z2, 0Y6T0Z3, 0Y6U0Z0, 0Y6U0Z1, 0Y6U0Z2, 0Y6U0Z3, 0Y6V0Z0, 0Y6V0Z1, 0Y6V0Z2, 0Y6V0Z3, 0Y6W0Z0, 0Y6W0Z1, 0Y6W0Z2, 0Y6W0Z3, 0Y6X0Z0, 0Y6X0Z1, 0Y6X0Z2, 0Y6X0Z3, 0Y6Y0Z0, 0Y6Y0Z1, 0Y6Y0Z2, 0Y6Y0Z3, 0Y6Z0Z2, 0Y6Z0Z3, 0Y6Z0Z4, 0Y6Z0Z5, 0Y6Z0Z6, 0Y6Z0Z7, 0Y6Z0Z8, 0Y6Z0Z9, 0Y6Z0ZB, 0Y6Z0ZC, 0Y6Z0ZD, 0Y6Z0ZF, 0Y6Z0ZG, 0Y6Z0ZH, 0Y6Z0ZI, 0Y6Z0ZJ, 0Y6Z0ZK, 0Y6Z0ZL, 0Y6Z0ZM, 0Y6Z0ZN, 0Y6Z0ZO, 0Y6Z0ZP, 0Y6Z0ZQ, 0Y6Z0ZR, 0Y6Z0ZS, 0Y6Z0ZT, 0Y6Z0ZU, 0Y6Z0ZV, 0Y6Z0ZW, 0Y6Z0ZX, 0Y6Z0ZY, 0Y6Z0ZZ.

Regarding the indicator of hospitalization rates for lower limb amputation recorded at the CSP, it was once again available in 2022. This indicator takes into account the location where the person is registered at the CSP, regardless of where the hospitalization leading to amputation occurs. This allows for the observation of significant differences between the regions of mainland Portugal in terms of amputation rates, which in 2022 were higher than in previous years (12.8).

Table 39. Rate of hospital admissions for lower limb amputation in people with diabetes (adjusted), registered at CSP level by health regions in mainland Portugal | 2018 – 2022

	2018	2019	2020	2021	2022
ARS Norte	11,7	11,4	ND	ND	12,2
ARS Centro	7,8	5,2	ND	ND	9,6
ARS LVT	12,8	12,7	ND	ND	14,4
ARS Alentejo	17,0	11,1	ND	ND	13,7
ARS Algarve	15,8	13,4	ND	ND	16,5
Mainland Portugal	11,7	10,6	ND	ND	12,8

Source: SPMS – SIM@SNS 2023, extracted on February 2nd.

4.7. Continuous subcutaneous insulin infusion therapy

Under the PND, since 2020, all eligible individuals with T1D have had access to treatment with Continuous Subcutaneous Insulin Infusion (CSII) devices.

In 2022, the first hybrid insulin delivery systems and adhesive devices were acquired under the CSII PND of the DGS. These hybrid systems allow for better glycemic control and an improvement in quality of life.

Between 2020 and 2022, there was a growth of 18% in the number of patients undergoing CSII treatment under the PND (3,540 patients at the end of 2020, 3,859 patients at the end of 2021 and 4,170 in 2022).

Increasing rates of patients using this treatment are observed. Considering the records of T1D at the CSP level, by the end of 2022, about 62% of individuals up to 18 years old and 30% of those with this condition up to 39 years old were undergoing treatment with CSII. However, it is worth noting that these proportions are overestimated since the records of T1D in CSP settings in these age groups are incomplete.

Table 40. Patients with T1D treated with CSII systems | 2018 – 2022

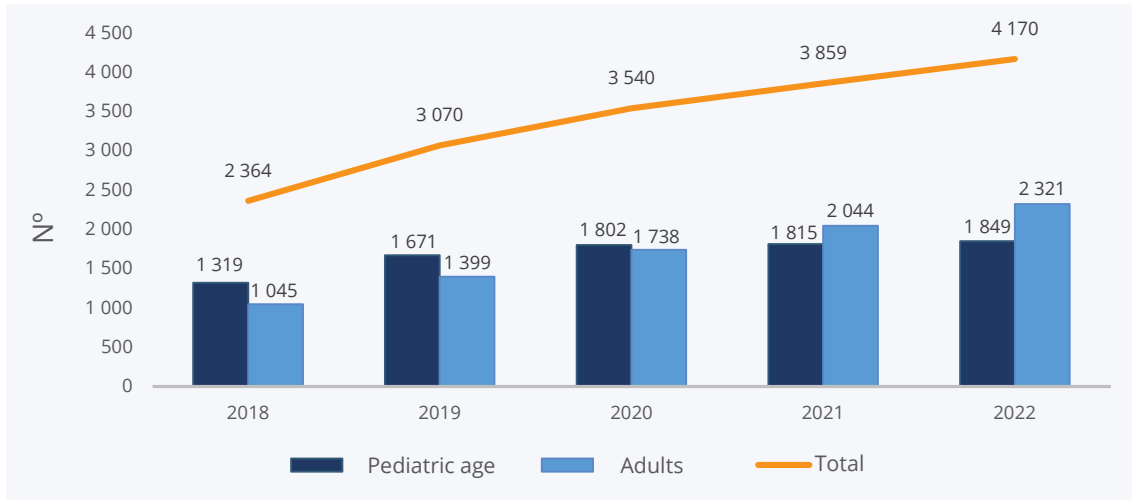
	2018	2019	2020	2021	2022
0-5 years	102	119	118	117	132
6-10 years	412	404	375	361	387
11-14 years	440	564	612	632	609
15-18 years	365	584	697	705	721
19-39 years	657	903	1,139	1,356	1,523
40-64 years	371	475	574	654	754
≥65 years	17	21	25	34	44
Total	2,364	3,070	3,540	3,859	4,170
Pediatric age	1,319	1,671	1,802	1,815	1,849
Adult age	1,045	1,399	1,738	2,044	2,321

Source: PSCI/DGS Plataforma, 2023.

Table 41. Patients with T1D treated with CSII systems, by age group and proportion relative to patients with a register of T1D in CSP | 2018 – 2022

	2018	2019	2020	2021	2022
Patients receiving CSII treatment ≤14 years (No.)	954	1,087	1,105	1,110	1,128
Patients on CSII treatment/Patients with recorded type 1 diabetes in CSP, ≤14 years (%)	70	77	79	76	75
Patients receiving CSII treatment <19 years (No.)	1,319	1,671	1,802	1,815	1,849
Patients on CSII treatment/Patients with recorded type 1 diabetes in CSP, ≤19 years (%)	47	58	63	61	62
Patients receiving CSII treatment ≤39 years (No.)	1,976	2,574	2,941	3,171	3,372
Patients on CSII treatment/Patients with recorded type 1 diabetes in CSP, ≤39 years (%)	19	25	28	29	30

Source: PSCI/DGS Plataforma, 2023; Population data INE, 2023 - Resident population (No.) by place of residence (NUTS - 2013), sex, and age group; Annual - INE, Annual estimates of resident population.

Figure 15. Evolution in the number of patients with T1D undergoing CSII treatment | 2018 – 2022

Source: PSCI/DGS Plataform, 2023.

5. Mortality from diabetes

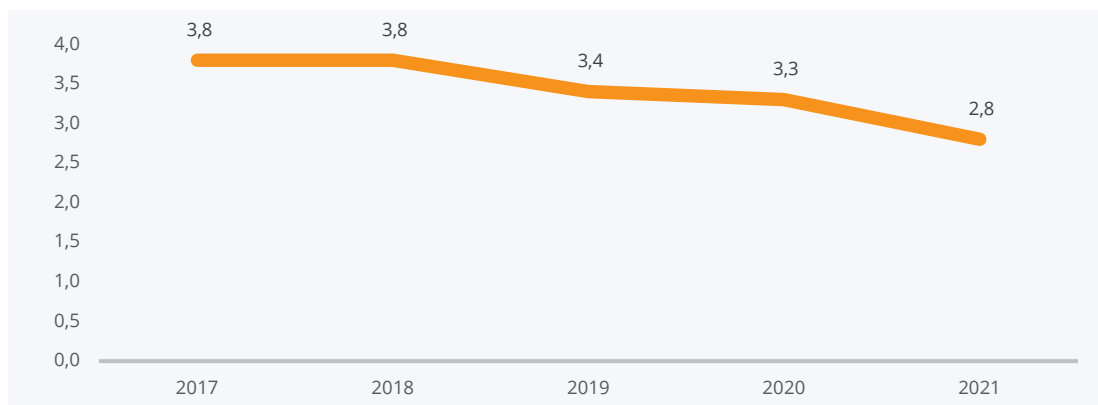
In the year 2021, diabetes was responsible for 3,474 deaths, corresponding to 2.8% of deaths in Portugal. Approximately 10.5% of these deaths occurred in people under 70 years old.

Table 42. Deaths from diabetes by age group in Portugal | 2017 – 2021

	2017		2018		2019		2020		2021	
	No.	%	No.	%	No.	%	No.	%	No.	%
<70 years	475	11,5	504	11,7	423	11,0	459	11,2	365	10,5
70-74 years	363	8,8	363	8,5	395	10,3	356	8,7	317	9,1
75-79 years	656	15,8	675	15,7	515	13,4	566	13,8	453	13,1
≥80 years	2,650	63,9	2,750	64,1	2,501	65,2	2,729	66,4	2,339	67,3
Total	4,144	100,0	4,292	100,0	3,834	100,0	4,110	100,0	3,474	100,0

Source: Deaths by cause of death, INE and SICO/DGS (2023).

Figure 16. Evolution of diabetes as a cause of death (%) in Portugal | 2017 - 2021



Source: Deaths by cause of death, INE and SICO/DGS (2023).

The mortality rate attributed to diabetes has been gradually decreasing since 2017, with the 2021 value being the lowest in recent years.

In 2021, diabetes was responsible for 2,770 potential years of life lost below the age of 70, with an average of 7.6 years of life lost per death occurring below that age.

Although the total number of deaths is higher in women than in men, the premature mortality rate due to diabetes (<70 years) is significantly higher in men. However, there is a reduction in the premature mortality rate in both genders.

Table 43. Evolution in total and premature mortality indicators for diabetes in Portugal | 2017 – 2021

	2017	2018	2019	2020	2021
Both genders					
Deaths at all ages	4,144	4,291	3,834	4,110	3,474
Deaths at age <70 years	475	504	423	459	365
Potential life lost years	3,893	4,200	3,303	3,488	2,770
Potential life lost years per death at age <70 years	8,2	8,3	7,8	7,6	7,6
Crude mortality rate at all ages	40,2	41,7	37,3	39,9	33,4
Crude mortality rate at age <70 years	5,4	5,8	4,9	5,3	4,2
Standardized mortality rate at all ages	35,4	35,9	31,3	32,8	25,9
Standardized mortality rate at age <70 years	5,0	5,3	4,4	4,7	3,6
Male					
Deaths at all ages	1,725	1,828	1,655	1,796	1,526
Deaths at age <70 years	286	325	271	302	233
Potential life lost years	2,330	2,738	2,313	2,255	1,783
Potential life lost years per death <70 years	8,1	8,4	8,5	7,5	7,7
Crude mortality rate at all ages	35,4	37,6	34,1	37,0	30,8
Crude mortality rate at age <70 years	6,7	7,7	6,5	7,2	5,5
Standardized mortality rate at all ages	38,5	39,8	35,4	37,6	29,2
Standardized mortality rate at age <70 years	6,5	7,3	6,1	6,7	5
Female					
Deaths at all ages	2,419	2,463	2,179	2,314	1,948
Deaths at age <70 years	189	179	152	157	132
Potential life lost years	1,563	1,463	990	1 233	988
Potential life lost years per death <70 years	8,3	8,2	6,5	7,9	7,5
Crude mortality rate at all ages	44,6	45,4	40,1	42,6	35,7
Crude mortality rate at age <70 years	4,2	4,0	3,4	3,5	3
Standardized mortality rate at all ages	32,8	32,6	28,2	29,2	23,3
Standardized mortality rate at age <70 years	3,7	3,5	2,9	3,0	2,5

Source: Deaths by cause of death, INE and SICO/DGS (2023). Note: Rates per 100,000 inhabitants. The European Standard Population (2013 version) defined by EUROSTAT was used for calculating the age-standardized mortality rate.

In 2021, renal complications were responsible for 14.2% of deaths attributed to diabetes, while peripheral circulatory complications were responsible for 5.6% of deaths. However, deaths from other specific complications and from multiple complications combined represented more than 52.5% of all deaths attributed to diabetes. When it comes to deaths attributed to diabetes under the age of 70, a similar situation is observed, where 11.2% of deaths were due to renal complications, 7.4% were due to peripheral circulatory complications and 57.8% were due to other specific complications or multiple complications.

Although it may not be evident from the records of cause of death attributed to diabetes presented, diabetes is an important cardiovascular risk factor. This is evidenced by the 1,308 deaths of people with diabetes who were previously hospitalized for AMI or stroke.

Table 44. Registry of causes of death from diabetes in Portugal | 2017 – 2021

	2017		2018		2019		2020		2021	
	No.	%	No.	%	No.	%	No.	%	No.	%
DM without mention of complications	1,498	36,2	1,346	31,4	551	14,4	675	16,4	770	22,2
DM with renal complications	923	22,3	897	20,9	662	17,3	568	13,8	493	14,2
DM with other specified complications	716	17,3	845	19,7	1,450	37,8	1,465	35,6	1,226	35,3
DM with peripheral circulatory complications	365	8,8	367	8,6	247	6,4	253	6,2	193	5,6
DM with multiple complications	332	8,0	520	12,1	710	18,5	896	21,8	596	17,2
DM with ketoacidosis	137	3,3	144	3,4	98	2,6	124	3,0	128	3,7
DM with coma	103	2,5	113	2,6	55	1,4	90	2,2	39	1,1
DM with unspecified complications	56	1,4	50	1,2	43	1,1	28	0,7	21	0,6
DM with ophthalmic complications	6	0,1	7	0,2	6	0,2	3	0,1	5	0,1
DM with neurological complications	7	0,2	3	0,1	12	0,3	8	0,2	3	0,1
Total	4,143	100,0	4,292	100,0	3,834	100,0	4,110	100,0	3,474	100,0

Source: Deaths by cause of death, SICO/DGS (2022). Search method: Diabetes E10-E14 (ICD 10 codes, diabetes with coma E100, E110, E120, E130, E140; with ketoacidosis E101, E111, E121, E131, E141; with renal complications E102, E112, E122, E132, E142; with ophthalmic complications E103, E113, E123, E133, E143; with neurological complications E104, E114, E124, E134, E144; with peripheral circulatory complications E105, E115, E125, E135, E145; with other specified complications E106, E116, E126, E136, E146; with multiple complications E107, E117, E127, E137, E147; with unspecified complications E108, E118, E128, E138, E148; without mention of complications E109, E119, E129, E139, E149).

Table 45. Registry of causes of premature death (<70 years) from diabetes in Portugal | 2017 – 2021

	2017		2018		2019		2020		2021	
	No.	%	No.	%	No.	%	No.	%	No.	%
DM without mention of complications	157	33,1	122	24,2	45	10,6	79	17,4	63	17,3
DM with renal complications	98	20,6	99	19,6	56	13,2	55	12,1	41	11,2
DM with other specified complications	81	17,1	85	16,8	134	31,6	133	29,2	130	35,6
DM with peripheral circulatory complications	42	8,8	58	11,5	35	8,3	32	7,0	27	7,4
DM with multiple complications	50	10,5	105	20,8	118	27,8	122	26,8	81	22,2

DM with ketoacidosis	19	4,0	22	4,4	19	4,5	21	4,6	21	5,8
DM with coma	17	3,6	10	2,0	7	1,7	7	1,5	0	0,0
DM with unspecified complications	6	1,3	4	0,8	5	1,2	5	1,1	2	0,5
DM with ophthalmic complications	3	0,6	0	0,0	1	0,2	0	0,0	0	0,0
DM with neurological complications	2	0,4	0	0,0	4	0,9	1	0,2	0	0,0
Total	475	100,0	505	100,0	424	100,0	455	100,0	365	100,0

Source: Deaths by cause of death, SICO/DGS (2022). Search method: Diabetes E10-E14 (ICD 10 codes, diabetes with coma E100, E110, E120, E130, E140; with ketoacidosis E101, E111, E121, E131, E141; with renal complications E102, E112, E122, E132, E142; with ophthalmic complications E103, E113, E123, E133, E143; with neurological complications E104, E114, E124, E134, E144; with peripheral circulatory complications E105, E115, E125, E135, E145; with other specified complications E106, E116, E126, E136, E146; with multiple complications E107, E117, E127, E137, E147; with unspecified complications E108, E118, E128, E138, E148; without mention of complications E109, E119, E129, E139, E149).

In 2021, there were 128 deaths due to ketoacidosis, 21 of which were below the age of 70. Once again, it is important to emphasize that the careful selection of therapy, taking into account the risk of complications, and structured therapeutic education for individuals with diabetes and their caregivers and family members should assume increasing importance in the care provided, in order to reduce these deaths.

Table 46. Discrimination of the type of diabetes in cases of death by diabetic ketoacidosis | 2017 - 2021

	2017		2018		2019		2020		2021	
	Total deaths No.	Deaths <70 years No.	Total deaths No.	Deaths <70 years No.	Total deaths No.	Deaths <70 years No.	Total deaths No.	Deaths <70 years No.	Total deaths No.	Deaths <70 years No.
T1D	2	0	0	0	0	0	1	1	0	0
T2D	53	8	53	4	32	4	49	7	34	3
Diabetes of unspecified cause	82	11	91	18	66	15	74	13	94	18
Total	137	19	144	22	98	19	124	21	128	21

Source: Deaths by cause of death, SICO/DGS (2022). Search method: Diabetes E10-E14 (ICD 10 codes; E101; E111; E121; E141).

6. Consumption of medications and devices in outpatient care

6.1. Consumption of medications and devices in outpatient care

The consumption and costs of medication for diabetes continued to show an increasing trend in 2022. This rise is mainly attributed to the growing number of diagnosed and treated individuals with diabetes, as well as the use of newer medications.

The consumption of insulin increased primarily due to the greater use of long-acting analogs, which in 2022 accounted for about 839,598 packages, representing more than half of the total number of insulin packages consumed and more than half of the expenses on insulin. Between 2018 and 2022, the total consumption of insulin, assessed by the number of packages consumed, increased by approximately 5%, while the costs increased by about 6%.

During the same period (between 2018 and 2022), the consumption of non-insulin antidiabetic drugs increased by 31% in terms of the number of packages, and the costs increased by 72%. In this group, in 2022, DPP4 inhibitors (either alone or in combination) accounted for approximately 26% of the packages consumed and 34% of the expenses on non-insulin antidiabetic drugs. However, these figures reflect a decrease of approximately 4% and 6% in the consumption of packages and expenses on DPP4 inhibitors, respectively, compared to the previous year, 2021 (or 4% and 11%, respectively, compared to 2018).

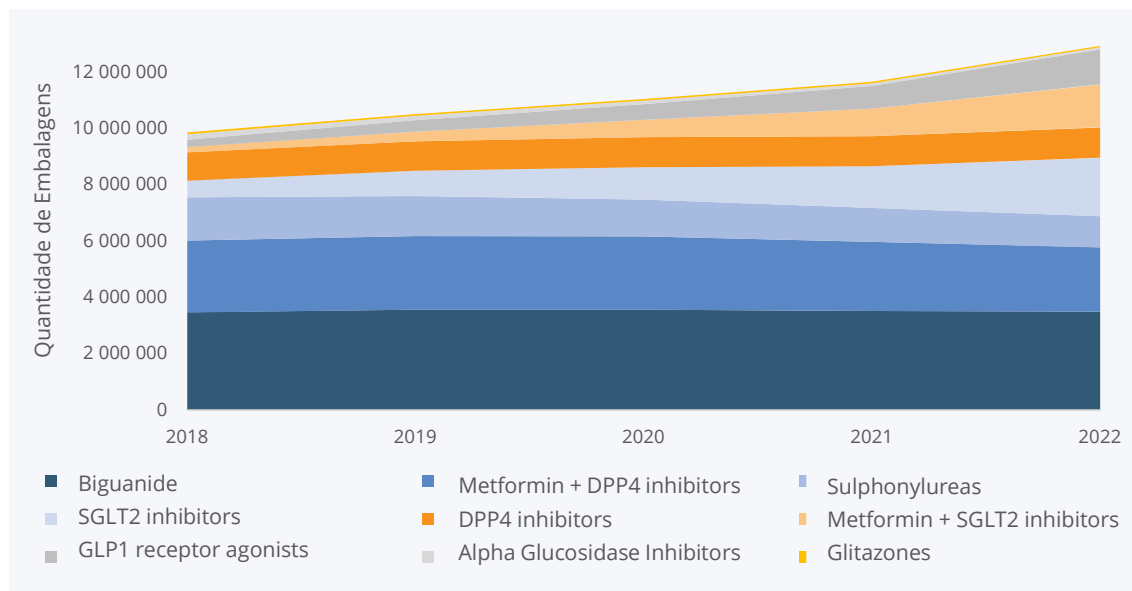
On the other hand, in 2022, both the consumption of packages and the expenses on SGLT2 inhibitors (either alone or in combination) have been increasing in the period between 2018 and 2022. Specifically, during the period under analysis, the consumption of packages increased from 789,800 to 3,644,676 packages, representing a growth of approximately 361%. Similarly, the costs associated with SGLT2 inhibitors also increased by approximately 353%.

Table 47. Consumption of outpatient medications in the SNS (non-insulin antidiabetics, insulin and glucagon, excluding drug combinations) in mainland Portugal - DDD dispensed in one year | 2018 - 2022

	2018	2019	2020	2021	2022
DDD	246,516,118	253,982,552	259,099,741	263,563,433	286,087,748

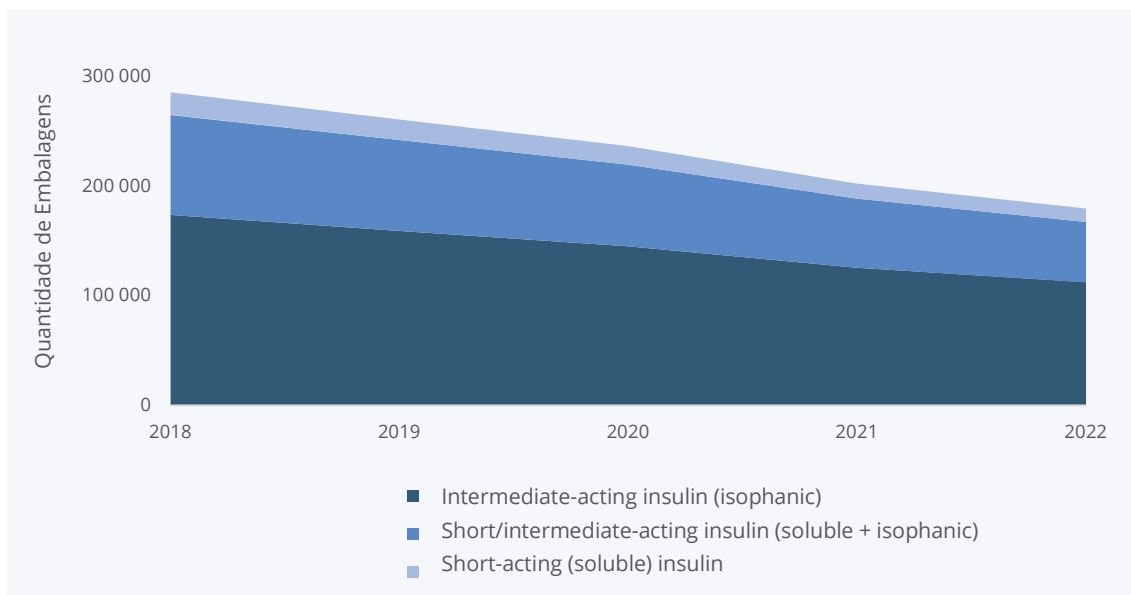
Source: INFARMED 2023, CCF (Invoice Conference Center). Note: DDD dispensed annually on an outpatient basis, in mainland Portugal, within the SNS.

Figure 17. Consumption of non-insulin antidiabetic packages in the SNS in mainland Portugal | 2018 - 2022



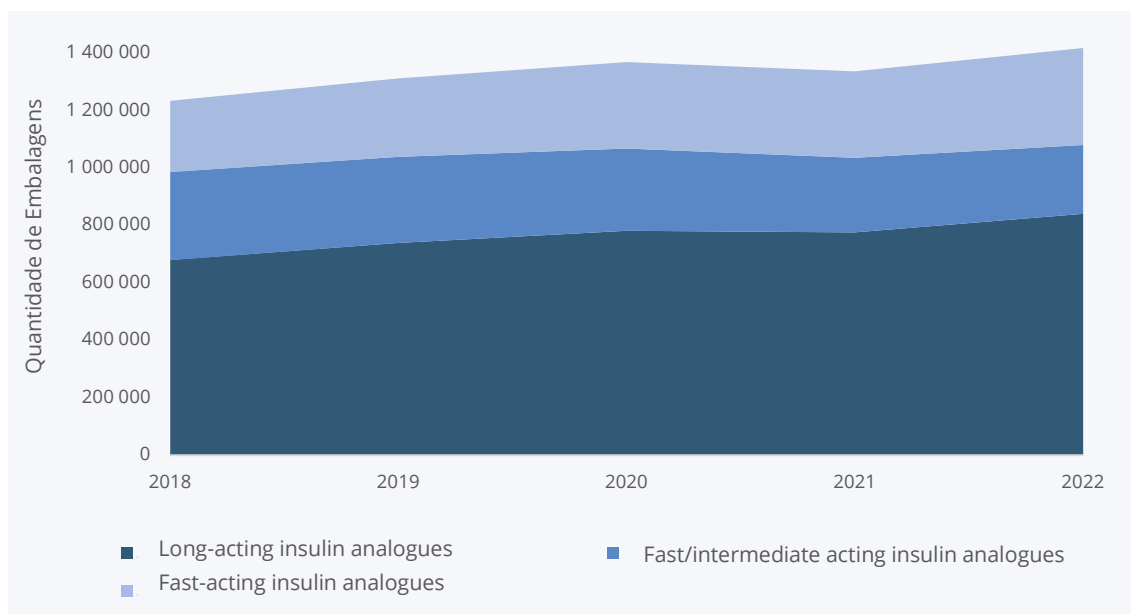
Source: INFARMED 2023, CCF (Invoice Conference Center).

Figure 18. Consumption of human insulin packages in the SNS in mainland Portugal | 2018 – 2022



Source: INFARMED 2023, CCF (Invoice Conference Center).

Figure 19. Consumption of insulin analog packages in the SNS in mainland Portugal | 2018 – 2022



Source: INFARMED 2023, CCF (Invoice Conference Center).

Table 48. Expenditure on non-insulin antidiabetics: Retail price value and SNS charges in mainland Portugal (in thousands of euros) | 2018 – 2022

	Retail price value (in thousands of €)					SNS charges (in thousands of €)				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Non-insulin antidiabetics										

Biguanide	12,788	13,029	13,040	12,821	12,723	8,770	9,068	9,210	9,066	9,092
Sulfonylureas	8,855	8,053	7,271	6,505	5,961	6,812	6,156	5,645	5,192	4,869
Alpha-glucosidase inhibitors	1,224	974	749	605	477	1,044	776	624	505	396
Meglitinides	724	604	521	411	212	664	555	478	376	193
Glitazonas	1,075	986	933	892	868	752	677	628	623	625
DPP-4 inhibitors	41,203	42,598	43,249	43,087	41,786	37,996	39,279	39,838	39,673	37,758
GLP-1 receptor agonists	22,951	33,523	43,471	61,946	96,490	20,863	30,477	39,482	56,261	87,596
Thiazolidinediones	27,370	41,302	51,934	66,444	92,310	24,993	37,719	47,419	60,714	84,459
Total non-insulin antidiabetic agents	116,190	141,069	161,168	192,711	250,827	101,894	124,707	143,324	172,410	224,988
Combination non-insulin antidiabetic agents										
Glimepiride + Pioglitazone	411	379	323	228	224	377	347	688	208	205
Metformin + Pioglitazone	993	854	751	624	341	912	794	295	571	312
Glibenclamide + Metformin	278	150	135	116	97	255	138	124	106	88
Metformin + DPP4 inhibitors	118,932	119,989	118,074	108,473	96,525	108,983	109,906	108,066	99,478	87,485
Metformin + gliflozine	8,842	15,681	27,208	43,862	68,081	8,056	14,286	24,778	39,966	62,060
Pioglitazone + DPP4 inhibitors	121	144	162	181	233	111	132	149	166	213
Gliflozine + DPP4 inhibitors	-	-	213	140	3,640	-	-	196	128	3,346
Total non-insulin antidiabetic agents combinations	129,577	137,197	146,866	153,624	169,141	118,694	125,603	134,296	140,623	153,709
Total	245,767	278,266	308,034	346,335	419,968	220,588	250,310	277,620	313,033	378,697

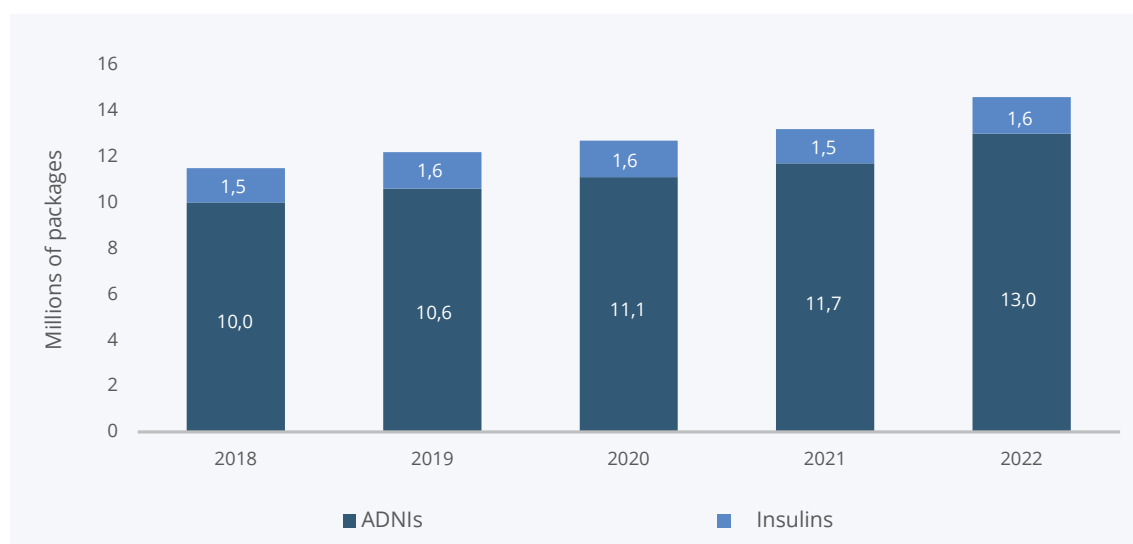
Source: INFARMED, 2023, CCF (Invoice Conference Center). Retail price value (total cost of the medication or device, including charges by the patient and the SNS).

In 2022, expenses for insulin were approximately €74M and expenses for non-insulin antidiabetic drugs were about €420M. More than 99% of insulin costs and 90% of non-insulin antidiabetic drug costs were covered by the SNS.

Tabela 49. Expenditure on non-insulin antidiabetics: Retail price value and SNS charges in mainland Portugal (in thousands of euros) | 2018 – 2022

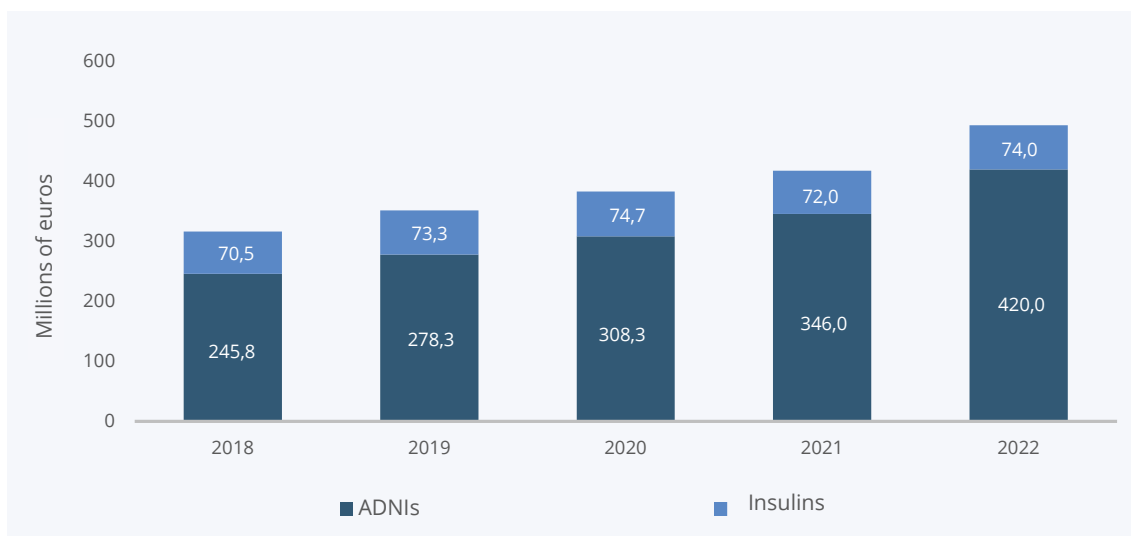
	Retail price value (in thousands of €)					SNS charges (in thousands of €)				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Human insulin										
Short-acting insulin (soluble)	673	605	558	447	395	674	605	557	446	395
Intermediate-acting insulin (isophane)	5,746	5,261	4,802	4,154	3,710	5,743	5,260	4,794	4,151	3,708
Short/intermediate-acting insulin (soluble + isophane)	2,930	2,666	2,396	2,030	1,777	2,929	2,665	2,394	2,029	1,776
Human insulin total	9,349	8,532	7,756	6,631	5,882	9,346	8,530	7,745	6,626	5,879
Insulin analogs										
Rapid-acting insulin analogs	9,960	10,905	11,944	11,864	13,377	9,956	10,901	11,930	11,487	13,371
Long-acting insulin analogs	38,598	41,678	43,411	42,632	45,494	38,585	41,666	43,371	42,605	45,476
Rapid/intermediate-acting insulin analogs	12,611	12,200	11,654	10,584	9,721	12,205	12,197	11,642	10,578	9,718
Insulin analogs total	61,169	64,783	67,009	65,080	68,592	60,746	64,764	66,943	64,670	68,565
Total Insulin	70,518	73,315	74,765	71,711	74,474	70,092	73,294	74,688	71,296	74,444

Source: INFARMED 2023, CCF (Invoice Conference Center). Retail price value (total cost of the medication or device, including charges borne by the patient and the SNS).

Figure 20. Evolution in the consumption of non-insulin antidiabetics and insulin in the SNS - No. of packages - in mainland Portugal | 2018 – 2022

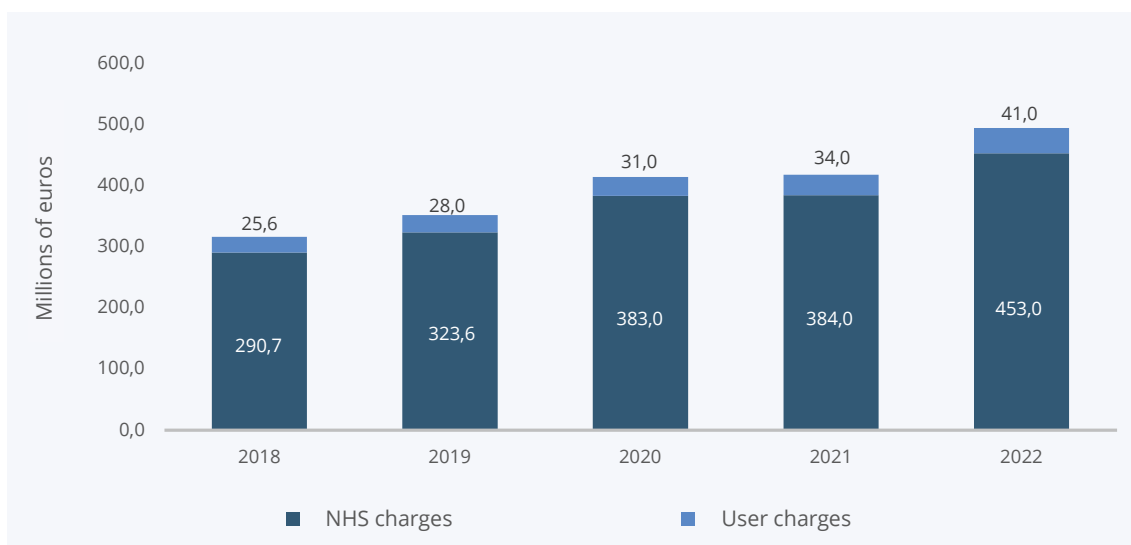
Source: INFARMED 2023, CCF (Invoice Conference Center).

Figure 21. Evolution in costs for non-insulin antidiabetics and insulin: Retail price value in mainland Portugal | 2018 – 2022



Source: INFARMED 2023, CCF (Invoice Conference Center). Retail Price Value (total cost of the medication or device, including charges by the user and by the SNS).

Figure 22. Evolution in SNS costs and direct user charges for non-insulin antidiabetics and insulin in mainland Portugal | 2018 – 2022



Source: INFARMED 2023, CCF (Invoice Conference Center).

The consumption and expenses on glucagon remained at similar levels to previous years.

Table 50. Consumption of glucagon in the SNS in mainland Portugal | 2018 – 2022

Quantity of packages				
2018	2019	2020	2021	2022

Total glucagon	6,102	6,876	5,971	5,752	6,187
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Source: INFARMED 2023, CCF (Invoice Conference Center).

Table 51. Expenditure on glucagon: Retail price value and SNS charges | 2018 – 2022

Retail price value (in thousands of €)					SNS charges (in thousands of €)				
2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
120	135	117	113	122	46	53	46	44	48

Source: INFARMED 2023, CCF (Invoice Conference Center). Retail price value (total cost of medication or device, including charges by the user and by the SNS).

The number of consumed packages and the charges for capillary blood glucose test strips continued to decline between 2018 and 2022, while sales of ketone test strips increased. Charges for monitoring glycemic control on an outpatient basis have increased since 2018, mainly due to the increased consumption of sensors for continuous interstitial glucose monitoring (partially covered by the SNS from that year onwards).

Table 52. Consumption of test strips and sensors in the SNS | 2018 – 2022

	Quantity of packages				
	2018	2019	2020	2021	2022
Glucose test strips	2,627,511	2,551,450	2,444,122	2,338,450	2,190,404
Interstitial glucose sensors	242,124	406,646	541,177	668,035	821,678
Strips for determining glycosuria and ketonuria	487	623	752	809	714
β-Ketone test strips	20,578	25,599	27,783	29,084	30,239
Total	2,890,700	2,984,318	3,013,834	3,036,378	3,043,035

Source: INFARMED 2023, CCF (Invoice Conference Center). Retail price value (total cost of medication or device, including charges by the user and by the SNS).

Table 53. Expenditure on test strips and sensors: Retail price value and SNS charges in mainland Portugal | 2018 – 2022

	Retail price value (in thousands of €)					SNS charges (in thousands of €)				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Glucose test strips	47,688	45,733	43,234	41,337	38,781	40,525	38,864	36,707	35,117	32,956
Interstitial glucose sensors	12,838	21,557	28,722	35,436	43,638	10,908	18,319	24,380	30,094	37,077
Strips for determining glycosuria and ketonuria	1,9	2,4	2,9	3	3	1,6	2	2,4	2	2
β-Ketone test strips	270	336	365	382	397	230	286	310	325	337
Total	60,798	67,628	72,324	77,158	82,819	51,665	57,471	61,399	65,538	70,372

Source: INFARMED 2023, CCF (Invoice Conference Center). Retail price value (total cost of medication or device, including charges by the user and by the SNS).

6.2. Continuous subcutaneous insulin infusion systems (insulin pumps)

In 2022, there was an increase in the acquisition of CSII devices and their consumables under the PND. This was also the first year of acquisition of hybrid closed-loop insulin delivery systems (SHAAI) and adhesive devices: 503 regular infusion devices, 337 SHAAI and 150 adhesive devices were acquired (along with their consumables for the first year of treatment), as well as 3,215 consumable kits for one year of treatment (for patients under follow-up).

Table 54. Consumption and expenditure on CSII devices in the SNS in mainland Portugal | 2018 – 2022

	2018	2019	2020	2021	2022
New devices (No.)	852	854	768	264	990
Consumable sets for 1 year of treatment (No.)	3,017	3,488	2,535	2,984	3,215
Charges (milhares de €)	2,720	2,965	3,303	3,222	6,274

Source: DGS/PND 2023.

The SHAAI devices offer clinical advantages and international guidelines recommend their use in all motivated and capable individuals with T1D. The introduction of the new adhesive devices and SHAAI led to a significant increase in costs in 2022.

7. Costs of diabetes in Portugal

In recent years, there has been a noticeable increase in expenses associated with medications and devices for the treatment and monitoring of diabetes, along with costs related to hospitalizations, totaling €532.2 million in 2021. These expenses do not include costs where diabetes is an associated diagnosis. Medications were responsible for 79% of these expenses, while test strips and glucose sensors represented about 15% of the expenditure. Hospitalizations with a primary diagnosis of diabetes represented approximately 6% of the identified expenses, with outpatient episode costs not included in this figure. It is expected that in the coming years, costs related to medications and devices will continue to increase significantly due to the incorporation of innovative medications and more sophisticated CSII devices in the healthcare activity of the SNS.

Additionally, the costs of hospitalizations where diabetes was an associated diagnosis amounted to approximately €478 million. As mentioned, individuals with diabetes hospitalized with another primary diagnosis exhibit higher morbidity and longer hospital stays, so a portion of these costs can also be attributed to diabetes.

Indirect and intangible costs related to diabetes were not accounted for here.

Table 55. Identified costs of diabetes in mainland Portugal (M€) | 2017 – 2021

	2017	2018	2019	2020	2021
Medications and devices					
Non-insulin antidiabetic medications and insulin in outpatient settings – total patient + SNS	286,4	316,3	351,6	413,9	418
Glucagon	0,1	0,1	0,1	0,1	0,1
Test strips and glucose sensors – total patient + SNS	50,6	60,8	67,6	72,3	77,2
CSII systems	2,1	2,7	3	3,3	3,2
Subtotal	339,2	379,9	422,3	489,6	498,5
Hospitalizations					
Hospitalizations with diabetes as the principal diagnosis	27,6	29,7	30,2	31,6	33,7
Hospitalizations for decompensated diabetes	3,2	3,6	3,6	3,5	3,9
Hospitalizations for acute complications of diabetes	4,9	4,8	4,5	4,9	5,2
Hospitalizations for chronic complications of diabetes	11,6	12,2	12,7	13,6	14,6
Lower limb amputation in patients with diabetes	7,9	9,1	9,4	9,6	10
Total	366,8	409,6	453,5	521,2	532,2

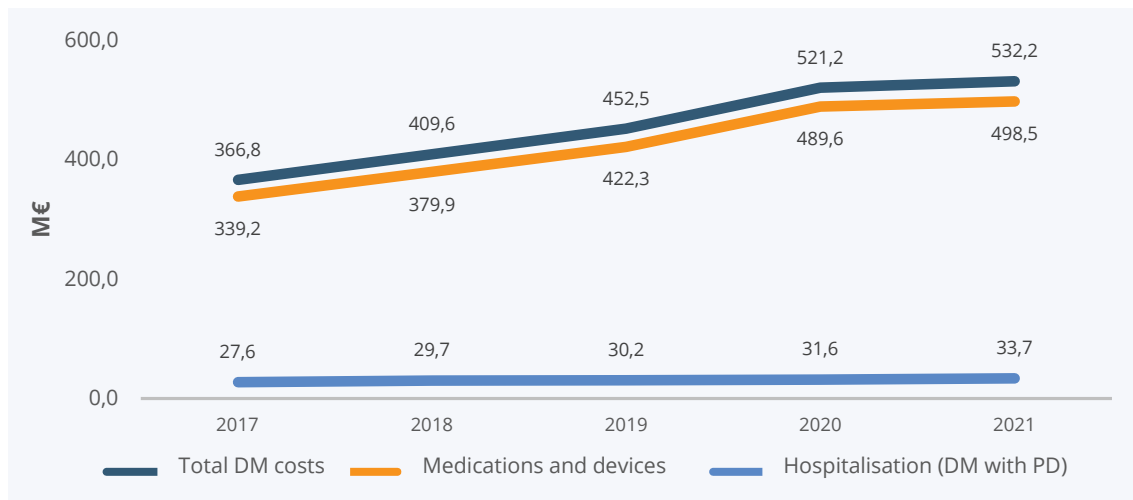
Source: ACSS, DPS, BDMH, 2023, extraction on 24.04. Note: CSII (insulin pumps); Drugs: insulin and non-insulin antidiabetic drugs; Monitoring: test strips and glucose sensors. Indicator specifications according to document 2019.03.18. Specification of ICD-10-CM/PCS diabetes indicators and inclusion, in all indicators, patients under 18 years old and diagnoses E08xxx and E09xxxx (E12 does not exist in ICD-10-CM/PCS).

Table 56. Identified costs of hospitalizations with an associated diagnosis of diabetes | 2017 – 2021

Source: ACSS, DPS, BDMH, 2023, extraction on April 24th. Note: Costs of hospitalizations in which diabetes is an associated diagnosis;

	2017	2018	2019	2020	2021
Hospitalizations with an associated diagnosis of diabetes	398,3	388,9	413,2	425,0	478,0

it should be noted that the total estimated costs of these hospitalizations are presented, however, these costs are not entirely attributable to diabetes. This indicator corresponds to all episodes with records of any of the diabetes codes considered in other indicators, as an additional diagnosis. Includes patients under 18 years old and diagnoses E08xxx and E09xxxx (E12 does not exist in ICD-10-CM/PCS).

Figure 23. Evolution in identified costs of diabetes in mainland Portugal (M€) | 2017 - 2021

Source: ACSS, DPS, BDMH, e DGS 2023.

8. Risk factors for the development of diabetes

Poor dietary habits, physical inactivity, excessive weight, and smoking are risk factors for the development of type 2 diabetes.

According to the OECD report (2), in Portugal, fruit and vegetable consumption is higher than the European Union average. However, physical activity is significantly lower, and pre-obesity and obesity are more prevalent than the average among the countries analyzed.

The rate of avoidable hospitalizations due to diabetes is one of the lowest in the European Union, indicating the effectiveness of outpatient care, particularly in CSP. On the other hand, Portugal still has a higher rate of lower limb amputations among people with diabetes compared to other OECD countries (9), highlighting an area requiring intervention.

Tabela 57. Risk factors: Comparative data between Portugal and the European Union (EU)

	Portugal	EU average
Proportion of adults consuming 1 to 4 servings of fruits and vegetables daily (%)	58	55
Proportion of adults consuming 5 or more servings of fruits and vegetables daily (%)	15	13
Proportion of adults who do not engage in any physical activity weekly (%)	68	48
Proportion of adults who engage in less than 150 minutes of physical activity per week (%)	17	20
Proportion of adults who engage in at least 150 minutes of physical activity per week (%)	15,7	31,7
Proportion of overweight and obesity in adults (%)	56	53
Proportion of adults with daily smoking habits (%)	14,2	19

Source: Health at a Glance: Europe 2022 - © OECD 2022. (2)

Chapter II – Activities developed in 2022

A summary of the activities carried out by the PND in 2022 is presented. Three main operational objectives are considered: monitoring and epidemiological surveillance; health promotion and disease prevention; and promotion of good practices, quality and safety. The COVID-19 pandemic posed particular constraints and challenges regarding the provision of healthcare and the implementation of the PND activity plan in the three aforementioned areas.

1. Monitoring and epidemiological surveillance

Understanding the epidemiology of diabetes and monitoring diabetes-related care is fundamental for defining appropriate health strategies and improving outcomes. Several activities were developed with this objective:

- Report development: **Relatório do Programa Nacional para a Diabetes 2020: Desafios e Estratégias** (10) e **Relatório do Programa Nacional para a Diabetes 2021: Desafios e Estratégias** (11). These reports include data on the epidemiological monitoring of diabetes in Portugal for the years 2019, 2020, and 2021 (at the CSP, pre-hospital care, hospital care, mortality, medication and device consumption, costs);
- Report development “**Monitorização e avaliação do Rastreio da Retinopatia Diabética em 2021. Relatório de 2022**” (12);
- Presentation at a public event of the epidemiological monitoring data of diabetes up to 2022, the report and the action plan of the PND;
- Development of a proposal to revise the diabetes module in the hospital's SClínico system;
- Development of a proposal to create diabetes indicators for hospital care;
- Monitoring the evolution of diabetic foot amputations;
- Publication of an article on monitoring the outcomes of CSII treatment; (13);
- Development of materials and update of all sections on the PND page on the DGS website.

2. Health promotion and disease prevention

Portugal has a very high prevalence of diabetes. Most cases are of T2D, many of which can be prevented or delayed through the adoption of a healthy lifestyle. Therefore, it is important to promote literacy and the adoption of a healthy lifestyle, as well as promote screening and early diagnosis of diabetes.

Several activities have been developed for this purpose:

- Development and conclusion of all materials for the implementation of the pilot program for the prevention of diabetes "Mais Saúde, Menos Diabetes" in its online version. This project, promoted by the PND, has the collaboration of the National Program for the Promotion of Healthy Eating, National Program for the Promotion of Physical Activity and the Literacy Division of the DGS. The program includes a screening component through the calculation of the risk of T2D and a prevention program for individuals identified with increased risk (moderate, high and very high) of developing diabetes in the next 10 years. The national program management will be centralized in the PND/DGS, while local management will be the responsibility of the UCFD implementing it;
- Conducting 2 training sessions for the health teams of the ARS LVT on the pilot program "Mais Saúde, Menos Diabetes" in its in-person version;
- Conducting awareness-raising actions for the prevention and control of T2D and combating the stigma of T1D through a partnership with RTP, in a monthly segment on the "Praça da Alegria" program, titled "Falar Abertamente da Diabetes", starting in November 2022. This monthly segment entails the production of 12 editions over the course of a year, featuring videos to promote diabetes literacy along with the participation of members of the PND team, followed by the subsequent dissemination of the videos on DGS social media channels;
- Hosting the "1º Encontro a Correr e Caminhar pela Diabetes" by the PND in partnership with Câmara Municipal de Leiria;
- As part of the World Diabetes Day celebrations, the buildings of the DGS and Ministério da Saúde were illuminated in blue;
- Dissemination of the video "Barómetro da Diabetes" through the DGS website and its social media networks;
- In 2022, the 3rd edition of the National Contest "Diabetes nas Escolas 2022" took place, aimed at creating films by schools to stimulate creativity and promote knowledge about diabetes, the prevention of T2D and the full integration and well-being of young students with T1D. This contest, organized by the PND of the DGS, in collaboration with the UCFD, the National School Health Program and the Direção-Geral da Educação, had the theme "A Diabetes e o Acesso aos Cuidados de Saúde", aligning the contest with the celebrations of Diabetes Month. The contest had three levels of participation (1st cycle; 2nd and 3rd cycle; and high school), with the awarding of a 1st prize and an honorable mention at each level.

3. Promotion of best practices, quality and safety

In recent years, we have witnessed a rapid evolution in methods of monitoring, pharmacological treatment, and technologies in the field of diabetes. This evolution should improve disease control, reduce complications and enhance the quality of life for people with diabetes. Alongside these developments, the promotion of a healthy lifestyle, therapeutic education and screenings remain fundamental for adequate disease control and the prevention of its complications. To enable the effective transfer of best clinical practices in the healthcare provided to people with diabetes in Portugal, it is also essential to promote continuous sharing, discussion and innovation within the network, with the collaboration of all healthcare professionals and relevant entities of civil society. To achieve this goal, several activities have been developed:

- Coordination with the UCFD, which implement the PND at the local level, either directly or through the Regional Coordinators for Diabetes:
 - The 6th National Meeting of the UCFD was held in a virtual format;
 - Monitoring of the 2021 Activity Report from 34 UCFD out of a total of 54 UCFD in mainland Portugal.
- **CSII Treatment Program.** This type of treatment for T1D allows for better glycemic control, fewer complications and improved quality of life. In 2022, the management of the CSII Treatment Program involved several activities of the PND:
 - Coordination with the CSII Treatment Centers (CSII-TC) and structures of the Ministério da Saúde;
 - Management of the CSII Platform;
 - Quarterly monitoring reports on the activity records of the CSII Platform;
 - Accounting for the acquisition needs of CSII devices and their respective consumables, considering all eligible T1D patients identified by the CSII-TC;
 - **Three new treatment centers were established in 2022** (two in the ARS LVT - ULS Amadora/Sinta, Hospital Fernando Fonseca and ULS da Lesíria, Hospital de Santarém; one in the ARS Norte - ULS Trás-os-Montes e Alto Douro), bringing mainland Portugal to a total of 27 treatment centers distributed throughout the country;
 - There is a growing number of individuals undergoing treatment with CSII under this Program: 4,170 people by the end of 2022;
 - Due to the clinical benefits, PND considered it important to promote the introduction of new types of devices (**SHAAI and adhesive devices**), thus becoming reimbursable by the SNS under this CSII Treatment Program. These new types of devices offer advantages in disease control, complication reduction and improvement in satisfaction and quality of life. The introduction of new devices occurred during 2022 (337 SHAAI and 150 adhesive devices/micro-pumps), according to the distribution by treatment centers planned at the end of 2021;
 - Information No. 002/2017 of 6/2/2017, regarding the **Protocolo de Cuidados a Utentes com Dispositivos de Perfusão Subcutânea Contínua de Insulina e Respetivos Consumíveis**, was updated on 9/11/2021 and came into effect on January 1, 2022;
 - With the aim of improving the quality of care provided to people with T1D, PND proposed the revision of normative circular 15/DSCS/DGID from 2008, concerning "Gestão Integrada da Diabetes - Candidatura a Centros de Tratamento para Perfusão Subcutânea Contínua de Insulina". The topic was discussed in working meetings of

the PND with a group of experts and in the Scientific Council of the Program, with the goal of drafting a new proposal for **integrated management of T1D** for individuals with T1D undergoing treatment with and without CSII;

- The Dispatch 13339/2022 of November 17 established a working group for updating the strategy for access to treatment with CSII devices, aiming for equitable utilization of next-generation devices. This working group was coordinated by the Director of PND and comprised representatives from DGS, ACSS, SPMS, INFARMED, patient associations and scientific societies, among others.
- The PND collaborates with the National Program for the Promotion of Physical Activity (PNPAF) in coordinating the **Diabetes on the Move** (14). This is a community-based exercise program for people with T2D. The program was interrupted at the beginning of the COVID-19 pandemic and was reactivated at the end of 2022. In 2022, this program was recognized as the "Best Practice" for promoting health and controlling non-communicable chronic diseases, voted as such by the European Commission during the Marketplace event held in this area in February 2022, organized by the Directorate-General for Health and Food Safety of the European Commission.
- DGS, through PND, is participating in the European project "Care4Diabetes" (15). In 2022, the PND participated in several meetings and contributed to the preparation of documents for this Joint Action, which aims to promote the adoption of healthy lifestyles by people with diabetes, making them central to managing their own disease. This project involves a total of 30 partners from twelve countries - Belgium, Bulgaria, Spain, Slovakia, Slovenia, Finland, Greece, Hungary, Italy, Malta, Poland and Portugal, and will last for three years with a budget that is 80% co-financed by the European Commission.

The Joint Action "Care4Diabetes" aims to implement the "Reverse Diabetes2Now" initiative in the European Union, a best practice developed over a decade by the Dutch NGO Voeding Leef. In Portugal, under the coordination of the DGS through the PND, we have the collaboration of several institutions from the SNS in implementing this project: the ULS Santo António in the ARS Norte; the ACES do Estuário do Tejo in the ARS LVT; the ULS Baixo Alentejo in the ARS Alentejo; and the ACES do Sotavento in the ARS Algarve. Additionally, the Portuguese Diabetics Protective Association (APDP) will also participate as an affiliated entity of the project.

- **Diabetic Retinopathy Screening** is essential for the early diagnosis and treatment of diabetic retinopathy, which can prevent over 90% of severe vision loss and blindness cases.
 - In 2022, 237,487 people with diabetes were screened, corresponding to a population coverage rate of 45% and a population screening rate of 28%. In 2022, the activity of population-based diabetic retinopathy screening increased, approaching pre-pandemic levels;
 - Following a project proposal developed in previous years, the **Recovery and Resilience Plan** approved for Portugal included the screening of diabetic retinopathy, aiming to achieve a geographic coverage of 100%. In this context, in 2022, the PND drafted a more comprehensive proposal for the **Improvement and Consolidation Plan of Diabetic Retinopathy Screening**, aiming to enhance the screening activity of diabetic retinopathy and enable the achievement of the targets set in the Recovery and Resilience Plan.

- Portugal has a high rate of lower limb amputations due to diabetes, particularly major amputations. It is crucial to prevent, detect, and treat **diabetic foot** lesions early.
 - Systematic foot examination in people with diabetes allows for the assessment of risk levels, guiding the prevention and early treatment of diabetic foot lesions. In 2022, foot examination was conducted in 74% of people with diabetes under surveillance at the CSP;
 - The **Recovery and Resilience Plan** approved for Portugal, whose implementation is the responsibility of the ARS, includes the expansion of level 1 diabetic foot consultations to all Health Centers.

- DGS regularly promotes competitions for the allocation of financial support to private non-profit entities, under Decree-Law No. 186/2006, of September 12, and Order No. 418/2007, of April 13.
 - On September 7, 2022, the opening of two application processes for public project funding under the PND was announced (notice No. 28/2022 and notice No. 29/2022 by the Financial Support Programs Management Office). These competitions aim to promote access to and improvement of healthcare for adult individuals with diabetes who are users and/or residents in Social Support Services or Facilities. The competition envisages the creation of a pilot project to promote the empowerment of people with diabetes who attend Social Support Services or Facilities and their caregivers, in managing the disease and preventing complications. The aim is to create or improve links between social support responses and healthcare services (primary, secondary and with the UCFD). Three projects were admitted to the competition in the ARS Algarve and one project in the ARS Alentejo, with the applications presented by APDP being selected.
 - The project submitted in 2020 (notice No. 26/2020 by the Financial Support Programs Management Office), which envisioned the creation of an interactive digital platform (eDiabetes) for people with diabetes and their formal and informal caregivers, managed by APDP, is still in the implementation phase. An extension for its completion has been requested, with its conclusion now expected in 2024. Ultimately, the platform will be made available for use by the DGS, with the aim of integrating it into the tools of the SNS, thus enhancing its future use by people with T2D and their caregivers.

4. Interinstitutional collaboration and with civil society

PND participated in the following initiatives promoted by other entities:

- **Central Administration of the Health System.** "Relatório Anual. Acesso a cuidados de saúde nos estabelecimentos do SNS e entidades convencionadas 2021." As in previous years, in 2022, PND contributed to the respective chapter of the access report (16).
- **Rotary Anti-Diabetes Front (FRAD).** Collaboration on dissemination materials, presentations and virtual sessions promoted in collaboration with the National Association of Parishes (ANAFRE), with the participation of healthcare professionals, including UCFD.
- **Institute of Evidence-Based Health (ISBE), Faculty of Medicine, University of Lisbon.** "Iniciativa D-Way – um novo caminho para a Diabetes." In 2022, participation in conferences and discussion panels.
- Opinions on proposals from parliamentary groups and petitions to the **Assembleia da República** regarding treatment with CSII.

Chapter III – Action plan for 2023-2024

The action plan for 2023-2024 continues the tasks described in the previous chapter and is based on the general objectives established by the program, which are:

- A.** Reduce the development of diabetes in at-risk individuals;
- B.** Increase the number of diabetes diagnoses through early detection to reduce the number of people unaware of having the disease;
- C.** Reduce morbidity and mortality from diabetes.

1. Monitoring and epidemiological surveillance

Monitoring and tracking the evolution of diabetes epidemiology in Portugal is crucial for adopting more suitable health programs and policies. Additionally, crucial aspects for decision-making have been identified, and it's important to improve understanding of them. The quality of records, the information systems used and their interoperability, as well as the sharing or provision of surveillance data, are fundamental aspects of this surveillance.

Activities to develop:

- a. Compile annual reports of PND;
- b. Prepare annual reports of DRS;
- c. Promote the update of the Diabetes Dashboard;
- d. Encourage the registration of T1D/diabetes type diagnosis;
- e. Support SPMS in implementing a new treatment registration system for CSII;
- f. Promote the availability of the Diabetes Prevention Module in SClinico CSP and monitor the results of the MSMD prevention program;
- g. Advocate for the revision of the Diabetes Module in SClinico Hospital;
- h. Promote the implementation of diabetes indicators for hospital care;
- i. Propose conducting a study on the prevalence of diabetes in Portugal;
- j. Keep information on the PND microsite updated.

2. Health promotion and disease prevention – prevention and diagnosis

Estimates from the IDF indicate a growing prevalence of diabetes in Portugal in the coming years (1). Promoting the adoption of a healthy lifestyle, identifying individuals at risk of developing diabetes, and promoting prevention programs, as well as early diagnosis, are measures with the potential to reduce the incidence and associated morbidity of the disease.

Activities to develop:

- a. Promote diabetes literacy, particularly regarding its prevention, diagnosis and combating stigma, as well as the control of other cardiovascular risk factors;
- b. Promote the assessment of T2D risk in the adult population:
 - i. At the CSP level;
 - ii. In the community, through awareness campaigns and partnerships with municipalities and civil society;
- c. T2D diagnosis and prevention program “Mais Saúde, Menos Diabetes”:
 - i. Conduct pilot educational programs, both online and in-person;
 - ii. Evaluate the results and potential implementation by UCFD/CSP;
 - iii. Design an exercise program to add to “Mais Saúde Menos Diabetes” and test its implementation;
- d. Promote the annual 2023/2024 competition for students from schools across Portugal to create films about Diabetes, with the theme “Diabetes: Educação para proteger o amanhã”;
- e. Foster partnerships with municipalities and civil society in promoting healthy lifestyles;
- f. Promote therapeutic education for individuals at risk;
- g. Encourage early diagnosis through the assessment of the risk calculation for developing T2D.

3. Promotion of best practices, quality and safety – reducing morbidity and mortality from diabetes

The chronic complications of diabetes are associated with high morbidity, costs and reduced quality of life. Good control of diabetes and other cardiovascular risk factors reduces the incidence and progression of diabetes-related complications and mortality, particularly premature mortality due to diabetes.

Activities to develop:

- a. Promote the systematization of therapeutic education and monitor its implementation;
- b. Regarding T2D:
 - i. Monitor the creation of the T2D management platform for individuals with the disease and their formal and informal caregivers (eDiabetes) and promote its availability within the tools of the SNS;
 - ii. Participation in the Joint Action "Reverse Diabetes2 Now/Care4Diabetes" to implement a project for remission/improvement of T2D control;
 - iii. Promote the expansion of coverage of the "Diabetes em Movimento" Program and the inclusion of educational content in its sessions;
 - iv. Promote the publication by DQS of standards on:
 - a) "Prevenção, Diagnóstico, Tratamento, Seguimento e Referência do Pé Diabético no Adulto e Idoso";
 - b) "Prevenção, Diagnóstico e Tratamento da Doença Renal Diabética no Adulto";
- c. In the context of T1D:
 - i. Management of CSII treatment through PND and coordination with various entities involved;
 - ii. Coordinate the development of the "Proposta sobre atualização da estratégia de acesso a tratamento com dispositivos de CSII" (17) by the working group appointed by Order No. 13,339/2022 of November 17 (18) and amended by Order No. 3584/2023 of March 21 (19);
 - iii. Promote the development of standards on "Gestão integrada do tratamento das pessoas com diabetes tipo 1";
 - iv. Establish a working group for the analysis and discussion of screening and prevention of T1D;
 - v. Revision of the manual for health and education professionals on "Crianças e Jovens com diabetes tipo 1";
 - vi. Promote the training of school health and school community teams on T1D;
- d. Increase the coverage of DRS at the population level and provide treatment for identified positive cases. Promote and monitor the implementation of the Recovery and Resilience Plan for DRS and the Improvement and Consolidation Plan of the National Diabetic Retinopathy Screening Program at the population level;
- e. Develop a plan for the improvement and consolidation of screening and treatment for diabetic foot;
- f. Support the implementation of a diabetes telemonitoring program;
- g. Promote the quality of care provided to individuals with diabetes who use social support equipment;

- h. Conduct the National Meeting of UCFD; monitor the activities carried out by UCFD;
- i. Adapt the operation of PND to the new organization of SNS.

Final notes

Portugal has a high prevalence of diabetes among the European Union countries, with nearly 900,000 individuals registered in CSP diagnosed with diabetes and a growing number of new case registrations annually. This condition is associated with acute and chronic complications, resulting in high costs, both personal and familial, as well as societal costs in general.

The Portuguese population exhibits a high prevalence, compared to other European Union countries, of overweight and obesity, as well as sedentary behavior, both in young people and adults. Additionally, there is a considerable percentage of the Portuguese population with low income. Despite positive progress in recent years, there is still a low level of education among a significant portion of the population. These are important risk factors in the development of diabetes.

At CSP level, there has been an increase in the number of individuals with diabetes under medical and nursing surveillance. Regarding glycemic control, data from CSP indicate an improvement, with values similar to pre-pandemic levels.

Medication consumption and costs for diabetes continued to trend upwards in 2022. The increased number of diagnosed individuals with diabetes and the use of new drugs may have contributed to this trend. In recent years, there has been a reduction in both total and premature mortality rates due to diabetes.

The main objectives of PND include promoting prevention programs, early diagnosis and treatment of diabetes, defining technical conditions for the provision of quality healthcare, promoting policies and partnerships involving various sectors of society, in order to limit the growth of the disease and to provide equitable access to the best healthcare for all individuals.

It is necessary to continue providing, in accordance with recommendations, access to new methods of monitoring, pharmacological treatment, and new technologies, which allow for improved disease control, reduced complications and enhanced quality of life for individuals with diabetes.

In this context, the aim is to promote universal access to insulin pump therapy for all individuals with T1D, increase the coverage of screening and early treatment for diabetic retinopathy, as well as access to quality diabetic foot care and structured therapeutic education. Finally, continuous investment in projects and programs in the field of prevention is absolutely necessary.

Diabetes management requires an organized and systematic approach and the involvement of a coordinated team of healthcare professionals dedicated to providing person-centered care where quality service is a priority.

Therefore, PND is committed to continuing its work with the aim of promoting health and preventing diabetes, enhancing the quality of care provided, and preventing or minimizing the complications of the disease.

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