NATIONAL PROGRAM FOR DIABETES

CHALLENGES AND STRATEGIES

2019

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Abbreviations and Acronyms

ACES	Agrupamentos de Centros de Saúde (Healthcare Centre Group)		**LVT**	Lisboa e Vale do Tejo (Lisbon and Tagus Valley region)
ACSS	Administração Central do Sistema de Saúde (Central Health System Administration)		**MF**	Médico de Família (GP)
			MS	Ministério da Saúde (Ministry of Health)
			NA	Not Applicable
AHRQ	Agency for Healthcare Research and Quality		**NAD**	Not Available Data
AMI	Acute Myocardial Infarction		**NHS**	National Health Service - Portugal
ANAFRE	Associação Nacional de Freguesias (National Parish Association)		**OECD**	Organization for Economic Cooperation and Development
APDP	Associação Protetora dos Diabéticos de Portugal (Association for the Protection of Diabetics in Portugal)		**OGTT**	Oral Glucose Tolerance Test
			OND	Observatório Nacional da Diabetes (National Diabetes Observatory)
ARS	Administração Regional de Saúde (Regionall Health Administration)		**PND**	Programa Nacional para a Diabetes (National Program for Diabetes (NPD))
BDMH	Base de Dados da Morbilidade Hospitalar (Hospital Morbidity Database)		**R.A.**	Região Autónoma (Autonomous Region)
			SIARS	Sistema de Informação das ARS (Regional Health Administrations Information System)
BMI	Body Mass Index			
CCF	Centro de Conferência de Faturas (Invoice Control Centre)		**SIM@SNS**	Sistema de Informação e Monitorização (Information and Monitoring Syste - National Health Service)
CKD	Chronic Kidney Disease			
CSII	Continuous Subcutaneous Insulin Infusion		**SPMS**	Serviços Partilhados do Ministério da Saúde (Shared Services of the Ministry of Health)
CSP	Cuidados de Saúde Primários (Primary Health Care)			
CVA	Cerebrovascular Accident/Stroke		**SPN**	Sociedade Portuguesa de Nefrologia (Portuguese Society of Nephrology)
DGS	Direção-Geral da Saúde (General-Directorate of Health)		**T1DM**	Type 1 Diabetes
DR	Diabetic Retinopathy		**T2DM**	Type 2 Diabetes
DSIA	Direção de Serviços de Informação e Análise (Directorate of Information and Analytic Services)		**UCFD**	Unidade Coordenadora Funcional da Diabetes (Functional Coordinating Diabetes Unit)
FRAD	Frente Rotária Anti-Diabetes (Rotary Anti-Diabetes Front)		**UCSP**	Unidade de Cuidados de Saúde Personalizados (Personalized Healthcare Unit)
IDF	International Diabetes Federation			
INE	Instituto Nacional de Estatística (National Statistics Institute)		**ULS**	Unidade Local de Saúde (Local Health Unit)
INFARMED	Autoridade Nacional do Medicamento e Produtos de Saúde (National Authority for Medicines and Health Products)		**USF**	Unidade de Saúde Familiar (Family Health Unit)
			WHO	World Health Organization
INSA	Instituto Nacional de Saúde Doutor Ricardo Jorge (Doutor Ricardo Jorge - National Health Institute)			

Executive Summary

This document provides an overview of Diabetes *Mellitus* in Portugal. It contains statistical data for the years 2017 and 2018, a summary of the activities put in place by the National Program for Diabetes in 2019, and the action plan for 2019-2021.

Situational Assessment

- Diabetes prevalence in Portugal is very high;
- The majority of people with Diabetes are assisted at Primary Health Care level, however, prevention and control measures, screening for comorbidities and coordination with and responsiveness from Hospital Health Care must be strengthened.
- Many patients admitted in hospitals for other reasons also have Diabetes, and that number is rising;
- Diabetes mortality rate has decreased slightly in recent years, including that of Diabetes-related premature mortality;
- The overall costs of Diabetes are very high. Medication uptake and spending increased significantly in recent years, but most of the burden is due to hospital admissions and indirect costs.

Activities | 2018-2019

- Collecting and disseminating epidemiological data on Diabetes in Portugal;
- Reinstating the Diabetes Coordinating Functional Units;
- Preparing a training manual and other materials to support type 1 Diabetes care in schools;
- Promoting early diagnosis of the disease and screening for complications;
- Preparing clinical practice recommendations/standards;
- Awareness-raising of and support to civil society.

Action plan | 2019-2021

- Epidemiological surveillance - prevalence of Diabetes in Portugal;
- Promoting type 2 Diabetes diagnosis and prevention;
- Reviewing type 2 Diabetes diagnosis, surveillance and treatment recommendations/standards;
- Developing online tools that facilitate surveillance, control and monitoring of Diabetes healthcare;
- Remodelling of National Program for Diabetes website.

Diabetes is a chronic disease with a high prevalence in Portugal. It can lead to several complications, including a deterioration in quality of life, and increases the risk of early death (under 70 years old) if not properly treated.

Prevention (whenever possible), diagnosis and early treatment are crucial to reduce the risk of type 2 Diabetes onset and its complications.

Foreword by the Director-General of Health

The growing prevalence of Diabetes in Portugal, like in most countries worldwide, has for long been a major concern of the Directorate-General of Health, whose efforts towards improving the prevention and treatment of this chronic disease and its complications have taken the shape of a priority program: National Program for Diabetes.

It is estimated that Diabetes currently affects more than one million Portuguese. The burden of this chronic disease becomes overwhelming when it is confirmed as one of the main causes of blindness, non-traumatic amputations and chronic kidney disease, as well as a major cause of premature mortality and reduced healthy life years. Apart from its consequences at a personal level, Diabetes also has an impact on family and social dynamics. Diabetes prevention is therefore a sustainable development goal, as established by the United Nations General Assembly, the World Health Organization and the European Parliament.

A proper knowledge of the epidemiology and healthcare indicators is essential to define strategies for prevention and control of the Diabetes epidemic and its consequences. In this report, the National Program for Diabetes presents a brief overview of Diabetes in Portugal, bringing together information collected through analysis of Primary Health, Pre-Hospital and Hospital care indicators, as well as of data on mortality rates and medication uptake.

A proactive approach being vital to control this epidemic, the 2019-2021 action plan is presented herein, as well as the main activities put in place in 2019.

November 2019

Graça Freitas, Director-General of Health

1. Epidemiology of Diabetes in Portugal in 2017 and 2018

The prevalence of Diabetes *Mellitus* is high worldwide and is on the rise. Portugal has one of the highest rates in Europe, mostly due to the large prevalence of type 2 Diabetes, for which prevention and screening measures can be put in place. Diabetes entails high personal, social and economic costs. In order to improve prevention and screening programs, the quality of healthcare and treatment cost-effectiveness, proper knowledge of the epidemiology of Diabetes in our country is required. This chapter presents some epidemiological data on Diabetes in Portugal for the years 2017 and 2018 (as well as the evolution since 2015).

1.1 Prevalence and Incidence

In 2009, the PREVADIAB Survey (1) found that Diabetes prevalence in the National territory, among individuals aged 20-79 years, was 11.7%, with approximately 44% of that population being unaware that they had the disease. The survey included the Oral Glucose Tolerance Test (OGTT) to draw the diagnosis. Based on PREVADIAB findings, the National Diabetes Observatory estimated, for 2015, a Diabetes prevalence of 13.3% and that 44% of those affected were unaware of such diagnosis (2).

In 2015, according to the Inquérito Nacional de Saúde com Exame Físico (National Health Examination Survey) (INSEF 2015) (3), the standardized prevalence of Diabetes among the resident population in Portugal aged 25-74 years was 9.9%, being higher in men, with a prevalence of 12.1%, compared to 7.8% in women. 13% of those found to have Diabetes in this survey were unaware of this diagnosis. The survey did not include OGTT to establish the diagnosis. This fact, added to slight differences in the surveyed age group, probably explains why the recorded prevalence differed from that estimated by the PREVADIAB survey.

In relation to 2017, the OECD (in its 2018 publication) pointed to a standardized prevalence of type 1 and type 2 Diabetes diagnosed in Portugal of 9.9% among the population aged 18-99 years (4).

Regarding **type 1 Diabetes** in children up to the age of 14, the OECD estimate for the prevalence in Portugal in 2015 was 0.9/1000 (5). Possibly due to the retrospective entry of further records from previous years, the estimated prevalence for 2015 in children aged up to 14 is now 1.6/1000.

For 2017 and 2018, the analysis of the DOCE (**D**iabetes – rec**O**rd of **C**hildren and youngst**E**rs) register revealed a total of, respectively, 234 and 178 new cases of children and young people with type 1 Diabetes up to the age of 19. However, these data underestimate the true incidence and prevalence of type 1 Diabetes in Portugal, given that the records are very incomplete (22 of the 45 designated hospitals/hospital centres did not register new cases in those two years). It should be noted that the more recent the years under analysis, the more incomplete the data entry is. Analysis of the DOCE register suggests that the prevalence and incidence of type 1 Diabetes in this age group are higher than what was previously estimated. The data presented should be updated in the future. The incidence of Diabetes among children and young people has been higher in males. In both cases, the median age at diagnosis of type 1 Diabetes was 10±5 years.

Table 1. **Type 1 Diabetes cases registered in Portugal**

	2015	**2016**	**2017**	**2018**
No. of total cases registered <14 years	2 193	1 877	1 569	1 257
Prevalence rate < 14 years	0,16	0,14	0,12	0,09
Females (n)	1 021	879	751	604
Males (n)	1 172	998	818	653
No. of new T1DM cases registered <14 years	228	189	189	146
Incidence rate <14 years	16,3	13,8	13,9	10,8
Females (n)	98	87	92	52
Males (n)	130	102	99	94
No. of total cases registered <19 years	3 857	3 553	3 220	2 819
Prevalence rate <19 years	0,20	0,19	0,17	0,15
Females (n)	1 777	1 637	1 472	1 310
Males (n)	2 078	1 916	1 748	1 509
No. of new T1DM cases registered <19 years	270	225	234	178
Incidence rate <19 years	14,1	11,8	12,4	9,5
Females (n)	111	104	112	66
Males (n)	159	121	122	112

Note: Incidence and prevalence rates are underestimated due to very incomplete records. Rates were calculated based on DOCE register; prevalence rates per 100 population and incidence rates per 100,000 population
Source: DOCE (Diabetes – recOrd of Children and youngstErs) registry, in 24-10-2019.

Figure 1. **New cases of type 1 Diabetes registered each year (<21-year olds)**
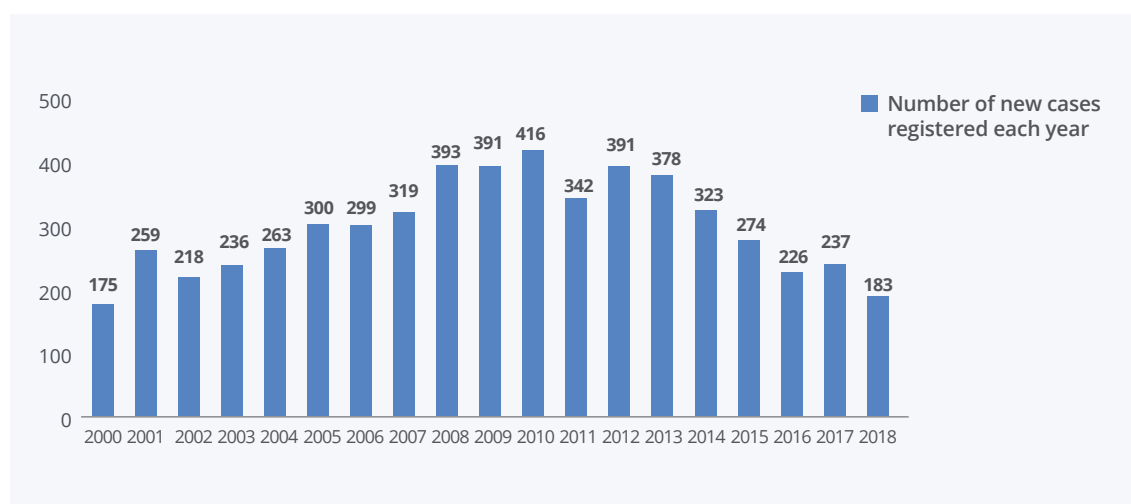
Source: DOCE (Diabetes – recOrd of Children and youngstErs) registry, in 24-10-2019.

During 2017-2018, the prevalence of Gestational Diabetes appears to have decreased slightly (5.8-6.5%). The 2018 data are still provisional (as coding of hospital morbidity data is not yet completed). However, the reduced prevalence appears to be on account of less young women. In more than half of the cases, therapy for glycaemic control was non-pharmacological (and consisted mainly of a dietary plan).

In 2017, 95 deliveries were registered in pregnant women with previous T1DM and 60 deliveries in pregnant women with previous T2DM.

Table 2. **Prevalence and treatment of Gestational Diabetes in the portuguese NHS | 2015-2018**

	2015	2016	2017	2018*
No. of deliveries in women with Gestational Diabetes	4 849	5 156	4 085	4 119
Total no. of deliveries	67 341	68 846	70 013	63 747
No. (%) of caesarean sections in women with Gestational Diabetes	1712 (35%)	1799 (35%)	1389 (34%)	1449 (35%)
No. (%) of caesarean sections in total deliveries on the NHS Hospitals	NAD	28%**	NAD	NAD
Prevalence of Gestational Diabetes (GD)	7,20%	7,50%	5,80%	6,50%
No. of deliveries in women with GD aged < 20 years	33	39	30	35
No. of deliveries in women with GD aged 20-29 years	1097	1 135	948	979
No. of deliveries in women with GD aged 30-39 years	3193	3 325	2623	2560
No. of deliveries in women with GD aged ≥40 years	526	657	484	535
Prevalence of GD in women aged < 20 years	1,60%	1,90%	1,40%	2,00%
Prevalence of GD in women aged 20-29 years	4,60%	4,70%	3,80%	4,40%
Prevalence of GD in women aged 30-39 years	8,40%	8,60%	6,80%	7,20%
Prevalence of GD in women aged ≥40 years	15,90%	16,50%	11,30%	13,00%
Therapy for Gestational Diabetes				
Non-pharmacological measures	NAD	NAD	58%	59%
Oral antidiabetic drugs	NAD	NAD	14%	20%
Insulin	NAD	NAD	15%	14%
Not specified	NAD	NAD	13%	9%

* Provisional data (as coding not yet completed).
** Saúde Infantil e Juvenil (Child and Youth Health) - Portugal 2018   (6). NAD – Not Available Data. GD – Gestational Diabetes.
Note: Main Diagnosis (MD) and Additional Diagnosis (AD) codes consulted: DA: V27.- (CID 9 MC) and Z37.0- (CID 10 MC); MD: 648.- (CID 9 MC) and O24.42- (CID 10 MC). Data prepared by DSIA/DGS, 2019.
Source: BDMH/ACSS, 2019

Table 3. **Prevalence of Pregestational Diabetes in women giving birth in hospitals, Portugal**

		2015	2016	2017	2018**
Total deliveries on NHS Hospitals		67 341	68 846	70 013	63 747
Total cases of Pregestational Diabetes	T1DM	159	NAD	95	62
	T2DM			60	61

Note: T1DM: type 1 Diabetes; T2DM: type 2 Diabetes.
* Provisional data (as coding not yet completed).
Source: BDMH/ACSS, 2019.

1.2 Primary Health Care

Primary Health Care indicators for Mainland Portugal are presented herein, by Regional Health Administration. Proper knowledge of the situation in Mainland Portugal and identification of regional asymmetries are important steps in the search for improved solutions and to reduce asymmetries.

DIABETES RISK ASSESSMENT

Between 2016 and 2018, approximately 1.95 million type 2 Diabetes risk scores were performed and registered at Primary Health Care level in Mainland Portugal, corresponding globally to 35% of the target population. Although there are large regional asymmetries, it is at Primary Health Care level that most risk assessments

of type 2 Diabetes are carried out. In 2018, 32,379 risk scores were recorded in the community, via the NHS Portal, at National level. Of these, 53.58% are at moderate, high and very high risk (17,349), with only 18.43% (3,198) having requested appointments to be scheduled in Primary Health Care.

Table 4. **Percentage of registered users assessed as at risk of developing type 2 Diabetes in Primary Health Care**

		2016/2018
ARS North	Nº	1 056 620
	% of registered users	48
ARS Centre	Nº	309 660
	% of registered users	30
ARS LVT	Nº	430 042
	% of registered users	23
ARS Alentejo	Nº	102 634
	% of registered users	36
ARS Algarve	Nº	54 069
	% of registered users	23
Mainland Portugal	**Nº**	**1 953 025**
	% of registered users	**35**

Source: SPMS, 2019.

Figure 2. **Number of users with type 2 Diabetes risk self-assessment, registered via NHS Portal - citizens' area**
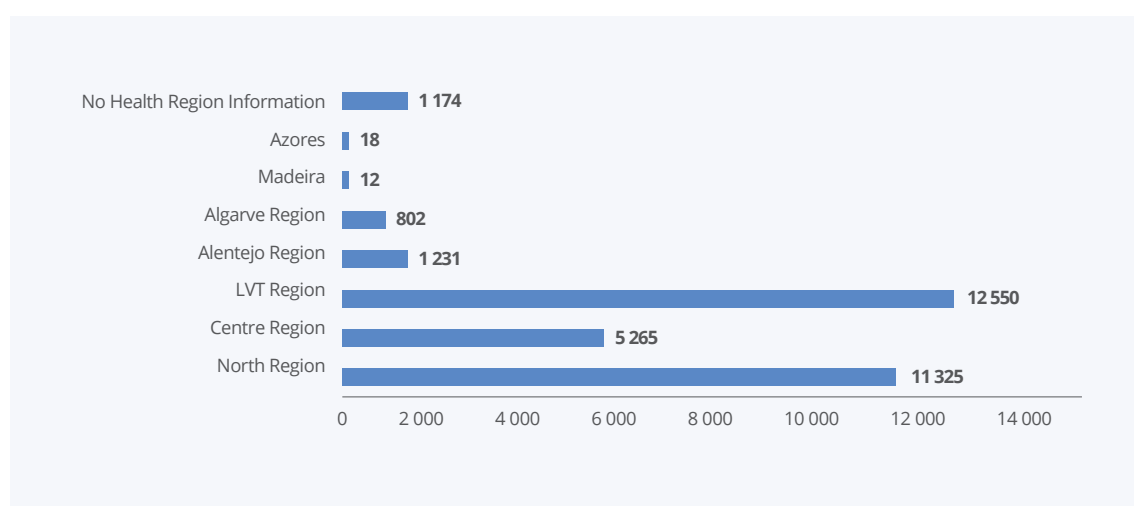
Note: Self-assessment registered via NHS Portal, Citizen's area.
Source: SPMS, 2019

Figure 3. **Risk stratification of users with self-assessed risk of type 2 diabetes, registered via NHS Portal - citizens' area**
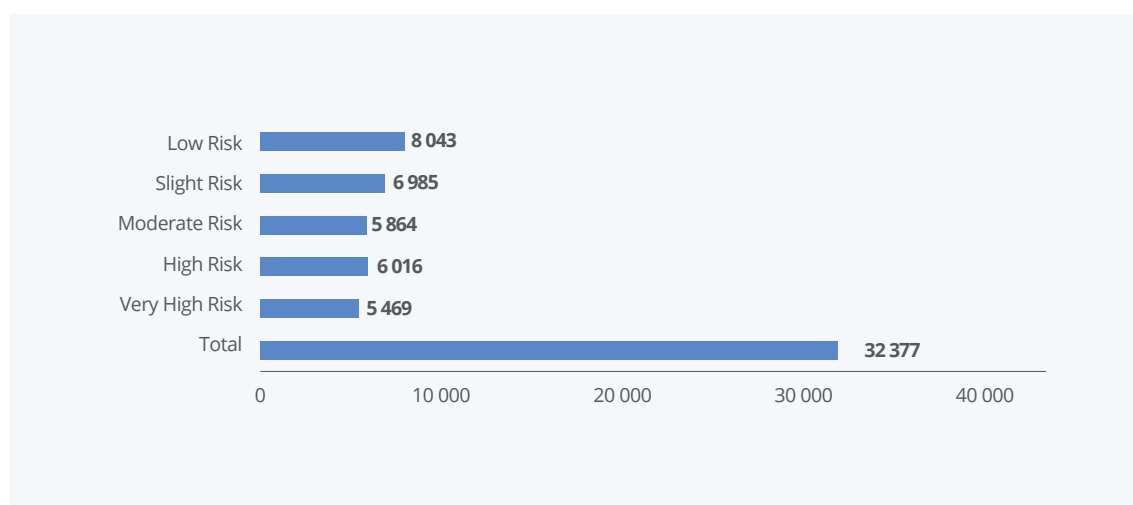
Note: Records entered via the website, Citizens' area
Source: SPMS, 2019

PREVALENCE AND INCIDENCE OF DIABETES RECORDED IN PRIMARY HEALTH CARE

In 2017, there were 793,197 documented cases of diabetes in Primary Health Care (7.9% of all NHS users), and 811,287 cases in 2018 (8.0% of all NHS users). At regional level, in 2018 the percentage of people recorded as having Diabetes varied between 7.0% in ARS Algarve and 9.7% in ARS Alentejo.

Table 5. **Percentage of registered users diagnosed with Diabetes in Primary Health Care**

		2015	2016	2017	2018
ARS North	N	284 454	290 596	297 435	304 651
	% of registered users	7,6	7,9	8,0	8,2
ARS Centre	N	140 820	146 747	152 371	155 983
	% of registered users	7,9	8,4	8,6	8,8
ARS LVT	N	251 266	257 973	263 512	269 095
	% of registered users	6,9	7,0	7,2	7,2
ARS Alentejo	N	46 438	46 952	47 936	48 426
	% of registered users	9,2	9,5	9,6	9,7
ARS Algarve	N	25 996	30 751	31 883	33 132
	% of registered users	5,8	7,0	7,0	7,0
Mainland Portugal	n	**681 997**	**773 019**	**793 137**	**811 287**
	% of registered users	**6,8**	**7,7**	**7,9**	**8,0**

Source: SPMS@SIM SNS.

In 2017 and 2018, the rate of new Diabetes cases recorded in Primary Health Care in Mainland Portugal was 0.62% and 0.65%, respectively. These rates were lower than those observed in the previous two years (2015 and 2016).

Table 6. **Rate of new Diabetes cases per 1000 users registered in Primary Health Care, Mainland Portugal**

		2015	2016	2017	2018
ARS North	‰	7,1	6,3	5,9	6,3
ARS Centre	‰	7,5	8,4	7,1	6,9
ARS LVT	‰	7,9	6,9	5,9	6,2
ARS Alentejo	‰	9,0	7,8	7,6	7,0
ARS Algarve	‰	11,7	7,6	6,5	6,9
Mainland Portugal	n	78 460	70 526	62 611	65 853
	‰	**7,8**	**7,0**	**6,2**	**6,5**

Source: SPMS@SIM SNS.

In 2018, there were 741,697 individuals where recorded as having type 2 Diabetes in Primary Health Care in Mainland Portugal, corresponding to 91% of all Diabetes registered users. The percentage of users with type 2 Diabetes was similar (90-92%) in all Regional Health Administrations.

Table 7. **Number of NHS users recorded as having type 2 Diabetes and percentage of users with type 2 Diabetes among the total diabetic population registered in Primary Health Care, Mainland Portugal**

		2015	2016	2017	2018
ARS North	N (%)	NAD	NAD	NAD	278 110 (91%)
ARS Centre	N (%)	NAD	NAD	NAD	141 695 (91%)
ARS LVT	N (%)	NAD	NAD	NAD	247 978 (92%)
ARS Alentejo	N (%)	NAD	NAD	NAD	44 232 (91%)
ARS Algarve	N (%)	NAD	NAD	NAD	29 691 (90%)
Mainland Portugal	n (%)	**NAD**	**NAD**	**NAD**	**741 697 (91%)**

Source: SPMS@SIM SNS.

MEDICAL AND NURSING SURVEILLANCE

In 2018, Primary Health Care services were responsible for assisting 85% of users with type 2 Diabetes, meaning that only 15% of users with type 2 Diabetes were assisted outside of Primary Health Care or by a doctor from a private institution.

Table 8. **Percentage of NHS users with type 2 Diabetes assisted in Primary Health Care, Mainland Portugal**

		2015	2016	2017	2018
ARS North	%	NAD	87	88	89
ARS Centre	%	NAD	83	84	85
ARS LVT	%	NAD	77	77	79
ARS Alentejo	%	NAD	91	92	92
ARS Algarve	%	NAD	75	77	78
Mainland Portugal	n	NAD	581 821	602 742	628 628
	%	**NAD**	**83**	**83**	**85**

Note: Only users with confirmed follow-up outside the are excluded.
Source: SPMS – SIM@SNS

In 2018, 74% of users with Diabetes assisted in Primary Health Care attended a nursing follow-up appointment.

Table 9. **Percentage of NHS users with Diabetes who attended nursing follow-up appointments in Primary Health Care, Mainland Portugal**

		2015	2016	2017	2018
ARS North	%	NAD	85	85	86
ARS Centre	%	NAD	76	77	76
ARS LVT	%	NAD	59	58	61
ARS Alentejo	%	NAD	78	76	75
ARS Algarve	%	NAD	68	68	68
Mainland Portugal	n	NAD	566 169	579 719	613 630
	%	NAD	73	73	74

Source: SPMS – SIM@SNS

GLYCAEMIC CONTROL AND CARDIOVASCULAR RISK FACTORS

In 2018, 69% of users with Diabetes and active enrolment in Primary Health Care had at least one HbA1c test recorded over the previous semester. This percentage has remained stable since 2015. Among users aged 65 or less, only 28% had an HbA1c level equal to or below 6.5%. This figure was 30% in 2015, so there has been no improvement in the control of the disease in this age group. In 2018, 60% of users scored a last HbA1c ≤8%, a level identical to that found in 2015. A general reinforcement of glycaemic surveillance and control is therefore necessary

Table 10. **Percentage of NHS users with Diabetes and HbA1c test records over the last 6 months, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	76	77	76	78
ARS Centre	65	67	68	69
ARS LVT	58	58	57	59
ARS Alentejo	67	68	67	68
ARS Algarve	55	55	57	60
Mainland Portugal	**67**	**67**	**67**	**69**

Source: SPMS – SIM@SNS

Table 11. **Percentage of NHS users with Diabetes aged 65 or less whose last HbA1c score was ≤6,5%, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	34	35	34	33
ARS Centre	30	31	31	30
ARS LVT	20	21	21	21
ARS Alentejo	23	23	23	24
ARS Algarve	20	20	21	23
Mainland Portugal	**30**	**29**	**28**	**28**

Source: SPMS – SIM@SNS

Table 12. **Percentage of NHS users with Diabetes whose last HbA1c score was ≤8%, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	67	68	67	69
ARS Centre	57	60	60	61
ARS LVT	49	50	49	51
ARS Alentejo	56	57	57	58
ARS Algarve	47	47	49	52
Mainland Portugal	**58**	**59**	**58**	**60**

Source: SPMS – SIM@SNS

The correct management of Diabetes *Mellitus* requires control of other cardiovascular risk factors. Although a slight improvement was observed in LDL cholesterol control between 2015 and 2018, only approximately 1/3 of users had an LDL cholesterol level <100mg/dL, and significant regional asymmetries in the control of this risk factor were noticeable. It is further noted that, while our available indicator is the percentage of users with LDL <100mg/dL, the current therapeutic target for many people with Diabetes is at least an LDL cholesterol level below 70mg/dL, so the percentage of people with Diabetes reaching the therapeutic target will be even lower than that expressed by said indicator. These outcomes point to the need for much improvement in the control of this important risk factor among the population with Diabetes.

Most people with Diabetes recorded a blood pressure below 140/90mmHg, suggesting an adequate control of this cardiovascular risk factor.

Table 13. **Percentage of NHS users with Diabetes and last LDL measurement <100mg/dl over the last 12 months, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	NAD	40	41	45
ARS Centre	NAD	37	38	40
ARS LVT	NAD	22	24	27
ARS Alentejo	NAD	32	33	34
ARS Algarve	NAD	22	23	23
Mainland Portugal	**28***	**32**	**34**	**36**

* INSEF 2015 (3)
Source: SPMS – SIM@SNS

Table 14. **Percentage of NHS users with Diabetes and last BP reading <140/90mmHg over the last 12 months, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	87	87	87	88
ARS Centre	75	79	84	82
ARS LVT	81	80	81	82
ARS Alentejo	82	82	82	83
ARS Algarve	NAD	80	80	83
Mainland Portugal	82*	83	84	84

*ARS Algarve not included
Source: SPMS – SIM@SNS

Nutrition and physical activity are also important factors in the management/control of Diabetes. In 2018, only half of the people with Diabetes were recorded for effective therapeutic regimen management in terms of eating habits, physical exercise and medication.

The monitoring of users in said year included the following requirements in 40% of cases: 1) attendance at least two Diabetes follow-up medical appointments over the preceding 12 months, one in each semester; 2) blood pressure recorded at least twice in the preceding 12 months, once in each semester; 3) at least one weight record and one body mass index (BMI) record over the preceding year; 4) at least one stature record as from the age of 20 or over the 12 months preceding the last appointment; 5) at least two HbA1c records in the preceding 12 months, one in each semester; 6) the last HbA1c score should be ≤8%; 6) at least one albuminuria test record over the preceding 12 months; 7) at least one reading of total cholesterol, one of HDL cholesterol and one of triglycerides recorded over the preceding 24 months; 8) at least one foot check recorded in the preceding 12 months.

Table 15. **Percentage of NHS users with Diabetes with a record of effective therapeutic (nutrition, physical exercise and medication) and monitoring of the 8 selected items in 2018, Mainland Portugal**

2019	Management of therapeutic regimen*(%)	Monitoring of 8 selected items** (%)
ARS North	67	51
ARS Centre	37	41
ARS LVT	42	29
ARS Alentejo	43	32
ARS Algarve	22	25
Mainland Portugal	**50**	**40**

* nutrition, physical exercise and medication;
** 1) attendance at least two Diabetes follow-up medical appointments over the preceding 12 months, one in each semester; 2) blood pressure recorded at least twice in the preceding 12 months, once in each semester; 3) at least one weight record and one body mass index (BMI) record over the preceding year; 4) at least one stature record as from the age of 20 or over the 12 months preceding the last appointment; 5) at least two HbA1c records in the preceding 12 months, one in each semester; 6) the last HbA1c score should be ≤8%; 6) at least one albuminuria test record over the preceding 12 months; 7) at least one reading of total cholesterol, one of HDL cholesterol and one of triglycerides recorded over the preceding 24 months; 8) at least one foot check recorded in the preceding 12 months.
Source: SPMS – SIM@SNS

MONITORING OF DIABETES COMPLICATIONS

The population screening for Diabetic Retinopathy is implemented in 43 of the 54 Healthcare Centre Groups (ACES) operating in mainland Portugal. In 2018, the percentage of people with Diabetes who underwent screening for diabetic retinopathy in these ACES was 30%, of which 4.3% tested positive. Screening coverage has been increasing in recent years (113,443 and 218,223 users were screened in 2015 and 2018, respectively). Although the number of users who tested positive has increased (6,239 in 2015 and 9,364 in 2018), as expected, the percentage of positive cases has decreased as the screening coverage has progressively increased (5% in 2015 and 4.3% in 2018). All users who tested positive were referred for ophthalmic evaluation.

The rate of population screening must be increased in every region of the country. In fact, the number of users screened in recent years has increased in the ARS North and ARS Lisbon and Tagus Valley, but not in the other regions.

Table 16. **Percentage of NHS users who underwent diabetic retinopathy screening, Mainland Portugal**

		2015(%)	2016(%)	2017(%)	2018(%)
ARS North	No. of ACES/ULS with DR screening facilities	-	17	21	21
	Total ACES/ULS	-	24	24	24
	Geographic coverage / ACES	-	71%	88%	88%
	Eligible population (n)	-	262 821	249 908	285 455
	No. of patients summoned (n)	-	106 565	175 780	184 730
	No. of patients screened (n)	45 121	68 309	105 462	121 363
	Rate of adherence to DR screening	-	64%	60%	66%
	Population coverage rate	-	41%	70%	65%
	Population screening rate	-	26%	42%	43%
	No. Positive Cases (n)	-	2121	4 370	4 329
	% Positive Cases	5,0%	3,0%	4,1%	3,6%
ARS Centre	No. of ACES/ULS with DR screening facilities	-	7	6	6
	Total ACES/ULS	-	8	8	8
	Geographic coverage / ACES	-	88%	75%	75%
	Eligible population (n)	-	148 133	152 184	129 670
	No. of patients summoned (n)	-	20 301	18 029	14 028
	No. of patients screened (n)	19 792	18 845	13 803	9 907
	Rate of adherence to DR screening	-	93%	77%	71%
	Population coverage rate	-	14%	12%	11%
	Population screening rate	-	13%	9%	8%
	No. Positive Cases (n)	-	600	361	156
	% Positive Cases	2,0%	3,0%	2,6%	1,6%
ARS LVT	No. of ACES/ULS with DR screening facilities	-	11	15	15
	Total ACES/ULS	-	15	15	15
	Geographic coverage / ACES	-	73%	100%	100%
	Eligible population (n)	-	231 060	238 136	247 249
	No. of patients summoned (n)	-	76 056	136 744	144 985
	No. of patients screened (n)	28 562	47 784	74 744	80 228
	Rate of adherence to DR screening	-	63%	55%	55%
	Population coverage rate	-	33%	57%	59%
	Population screening rate	-	21%	31%	32%
	No. Positive Cases (n)	-	3 337	3 550	4 519
	% Positive Cases	7,0%	7,0%	4,7%	5,6%

		2015(%)	2016(%)	2017(%)	2018(%)
ARS Alentejo	No. of ACES/ULS with DR screening facilities	-	4	2	2
	Total ACES/ULS	-	4	4	4
	Geographic coverage / ACES	-	100%	50%	50%
	Eligible population	-	46 795	27 649	27 829
	No. of patients summoned	-	9 360	9 999	10 944
	No. of patients screened	3 477	7 144	6 956	6 725
	Rate of adherence to DR screening	-	76%	70%	61%
	Population coverage rate	-	14%	36%	39%
	Population screening rate	-	13%	25%	24%
	No. Positive Cases	-	321	321	360
	% Positive Cases	4,0%	5,0%	4,6%	5,4%
ARS Algarve	No. of ACES/ULS with DR screening facilities	-	3	3	3
	Total ACES/ULS	-	3	3	3
	Geographic coverage / ACES	-	100%	100%	100%
	Eligible population	-	30 964	32 342	33 529
	No. of patients summoned	-	24 739	NA	NA
	No. of patients screened	16 491	16 444	NA	NA
	Rate of adherence to DR screening	-	66%	NA	NA
	Population coverage rate	-	80%	NA	NA
	Population screening rate	-	53%	NA	NA
	No. of positive cases	-	1 675	NA	NA
	% of positive cases	10	10%	NA	NA
Portugal Continental	No. of ACES/ULS with DR screening facilities	-	42	47	47
	Total ACES/ULS	-	54	54	54
	Geographic coverage / ACES	-	78%	87%	87%
	Eligible population	-	719 773	700 219	723 702
	No. of patients summoned	-	237 021	340 582	354 687
	No. of patients screened	113 443	158 526	200 965	218 223
	Rate of adherence to DR screening	-	67%	59%	62%
	Population coverage rate	-	32%	49%	49%
	Population screening rate	-	22%	29%	30%
	No. Positive Cases	-	8 054	8 602	9 364
	% of Positive Cases	5,0%	5,0%	4,3%	4,3%

Geographic Coverage Rate: No. of ACES with DR screening facilities / Total no. of ACES in the region; Eligible population: Target population – Excluded population; No. of patients summoned: No. of patients who were sent an invitation to undergo Diabetic Retinopathy Screening; No. of patients screened: Total no. of eligible users who underwent retinography (2 eyes) as part of the region's screening program; Rate of adherence to DR screening: No. of users screened/no. of users diagnosed with Diabetes summoned to undergo screening; Population coverage rate: No. of users diagnosed with diabetes summoned to undergo screening/Eligible population in the region; Population screening rate: No. of patients with Diabetes screened in the region/No. of patients diagnosed with Diabetes eligible for screening in the region.
Source: SPMS – SIM@SNS

Figure 4. **Trend in number of users with Diabetes screened for diabetic retinopath**
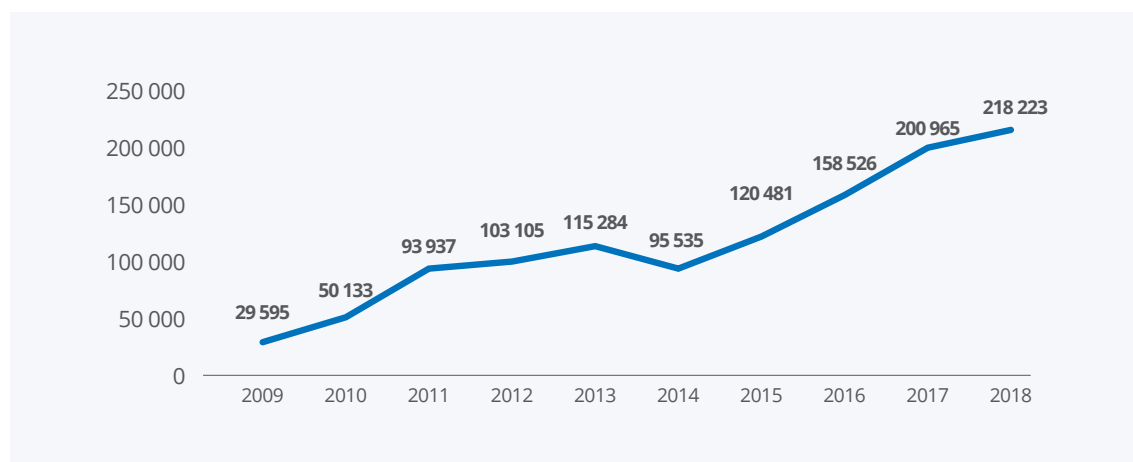
Source: DGS/ARS

The proportion of users assessed for albuminuria in 2018 was 64%.

Table 17. **Percentage of NHS users assessed for albuminuria, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	75	76	75	76
ARS Centre	59	61	62	63
ARS LVT	52	53	53	55
ARS Alentejo	54	55	55	57
ARS Algarve	37	42	43	45
Mainland Portugal	62	63	63	64

Source: SIM@SNS.

In 2017 and 2018, the proportion of users with at least one-foot check record was 71% and 66%, respectively. In 2017, 795,478 foot risk assessments were carried out, in which 8.8% of users presented a high risk of developing diabetic foot disease. Overall, in 2017 and 2018, respectively 0.22% and 0.26% of patients with Diabetes in mainland Portugal had active foot ulcers, as recorded in Primary Health Care, with a sustained prevalence above average in the ARS Alentejo.

Table 18. **Percentage of NHS users with Diabetes and who had a foot check, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	78	82	82	85
ARS Centre	61	63	63	68
ARS LVT	51	54	53	58
ARS Alentejo	64	65	65	71
ARS Algarve	43	46	48	55
Mainland Portugal	64	66	66	71

Source: SIM@SNS.

Table 19. **Total diabetic foot risk assessments, by risk level, carried out in Primary Health Care, Mainland Portugal**

		2015	2016	2017	2018
ARS North	N	NAD	NAD	429 954	479 606
	Baixo [n (%)]	NAD	NAD	392 333 (91,3)	438 165 (91,4)
	Médio [n (%)]	NAD	NAD	7 974 (1,9)	9 132 (1,9)
	Alto [n (%)]	NAD	NAD	29 647 (6,9)	32 309 (6,7)
ARS Centre	N	NAD	130 257	133 966	152 230
	Baixo [n (%)]	NAD	114 516 (87,9)	118 265 (88,3)	138 674 (88,2)
	Médio [n (%)]	NAD	2 991 (2,3)	3 226 (2,4)	4035 (2,6)
	Alto [n (%)]	NAD	12 750 (9,8)	12 475 (9,3)	14 521 (9,2)
ARS LVT	N	NAD	151 079	152 677	190 921
	Baixo [n (%)]	NAD	128 678 (85,2)	130 622 (85,5)	162 357 (85,0)
	Médio [n (%)]	NAD	4 331 (2,9)	4 227 (2,8)	5 691 (3,0)
	Alto [n (%)]	NAD	18 070 (12,0)	17 828 (11,7)	22 873 (12,0)
ARS Alentejo	N	NAD	59 905	58 388	65 847
	Baixo [n (%)]	NAD	50 366 (84,1)	49 411 (84,6)	57 326 (87,1)
	Médio [n (%)]	NAD	1 478 (2,5)	1 297 (2,2)	1 346 (2,0)
	Alto [n (%)]	NAD	8 061 (13,5)	7 680 (13,2)	7 175 (11,0)
ARS Algarve	N	NAD	17 855	20 491	26 931
	Baixo [n (%)]	NAD	15 616 (87,5)	17 369 (84,8)	22 596 (89,3)
	Médio [n (%)]	NAD	466 (2,6)	767 (3,7)	1 078 (4,0)
	Alto [n (%)]	NAD	1 773 (9,9)	2 355 (11,5)	3 257 (12,1)
Mainland Portugal	N	702 651	756 703	795 476	920 535
	Baixo [n (%)]	632 957 (90,0)	669 484 (88,9)	708 000 (89,0)	819 118 (89,0)
		9 697 (1,4)	17 057 (2,2)	17 491 (2,2)	21 282 (2,3)
	Alto [n (%)]	59 997 (8,5)	70 162 (8,9)	69 985 (8,8)	80 135 (8,7)

Source: SIARS/SPMS – SIM@SNS

Figure 5. **Total diabetic foot risk assessments, by risk level, carried out in Primary Health Care, Mainland Portugal**
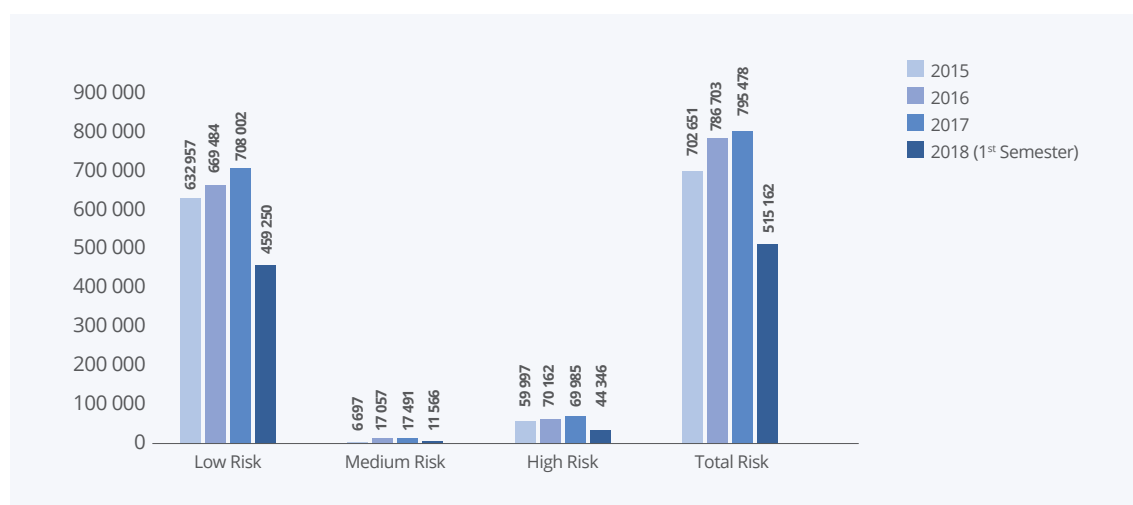
Source: SIARS/SPMS – SIM@SNS

Table 20. **Percentage of users with diabetes with active foot ulcer recorded in Primary Health Care, Mainland Portugal**

		2017	**2018**
ARS North	N	632	803
	%	0,23	0,28
ARS Centre	N	263	341
	%	0,2	0,25
ARS LVT	N	386	470
	%	0,18	0,21
ARS Alentejo	N	177	179
	%	0,38	0,38
ARS Algarve	N	33	52
	%	0,13	0,19
Mainland Portugal	N	1491	1 845
	%	0,22	0,26

Source: SIM@SNS.

THERAPY

In 2018, 72% of users newly recorded as having type 2 Diabetes started therapy with metformin used as monotherapy. Overall, 46% of users with Diabetes were on metformin.

35% of non-insulin antidiabetic agents prescribed to people with type 2 Diabetes were DPP-4 inhibitors (either as monotherapy or in combination).

Table 21. **Percentage of newly diagnosed as having type 2 Diabetes that started therapy with metformin used as monotherapy in Primary Health Care, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	NAD	73	75	76
ARS Centre	NAD	72	73	73
ARS LVT	NAD	66	67	68
ARS Alentejo	NAD	73	70	74
ARS Algarve	NAD	60	63	63
Mainland Portugal	NAD	70	71	72

Source: SPMS – SIM@SNS

Table 22. **Percentage of users recorded as having type 2 Diabetes on metformin in Primary Health Care, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	52	53	53	53
ARS Centre	42	44	45	43
ARS LVT	46	46	45	43
ARS Alentejo	45	46	47	45
ARS Algarve	24	30	31	29
Mainland Portugal	47	48	47	46

Source: SPMS – SIM@SNS

Table 23. **Percentage (ou proportion) of DPP-4 inhibitors among non-insulin antidiabetic agents prescribed to people with type 2 Diabetes, among non-insulin antidiabetic agents, in Primary Health Care, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	NAD	NAD	NAD	33
ARS Centre	NAD	NAD	NAD	40
ARS LVT	NAD	NAD	NAD	34
ARS Alentejo	NAD	NAD	NAD	37
ARS Algarve	NAD	NAD	NAD	38
Mainland Portugal	NAD	NAD	NAD	35

Source: SPMS – SIM@SNS

Of those diagnosed with Diabetes, 9% were registered as "insulin-dependent", and therefore, were on insulin therapy. Additionally, 5.6% were registered as "non-insulin dependent" /type 2 Diabetes were also treated with insulin. On the other hand, 79% of users with type 2 Diabetes considered "eligible for insulin therapy" according to the dosing formula [insulin-treated users with type 2 Diabetes/ (insulin-treated users with type 2 Diabetes + non-insulin-treated users with type 2 Diabetes and HbA1c>9%)] were effectively treated with insulin. However, this result also points to the existence of a subgroup of users with type 2 Diabetes among which it is necessary to promote insulin therapy.

Table 24. **Percentage of insulin-treated of patients with insulin-treated typ2 diabetes in Primary Health Care, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	5,6	5,9	6,0	6,1
ARS Centre	5,8	6,2	6,3	6,2
ARS LVT	5,0	5,3	5,2	5,0
ARS Alentejo	4,8	4,8	4,9	5,1
ARS Algarve	2,4	3,0	3,1	3,0
Mainland Portugal	5,3	5,6	5,6	5,6

Source: SPMS – SIM@SNS

ORGANIZATION OF PRIMARY HEALTH CARE

In Mainland Portugal, Primary Health Care is organized into three different models: UCSP, USF model A and USF model B. The distribution of the different models is not homogeneous in the various Regional Health Administrations.

It should be noted that the percentage of users without a Family Physician, or GP, is highest in the Lisbon and Tagus Valley region and in the Algarve, and that the largest number of users per GP is recorded in the UCSPs of those same regions (approximately 2,200-2,300 users per GP in Lisbon and Tagus Valley and Algarve, while this number is about 1500 users per GP in the North, Centre and Alentejo regions). In the USFs, the number of users per GP is relatively homogeneous in the various regions. In the North region, most GPs work in USFs model B, while in the Centre, Alentejo and Algarve regions they work mostly in UCSPs.

Table 25. **Distribution of users by ARS and Primary Health Care organization model**

		ARS North	ARS Centre	ARS LVT	ARS Alentejo	ARS Algarve
Registered users		3 735 052	1 788 203	3 731 257	503 434	486 979
ACeS		24	9	15	4	3
Total GPs		2 186	1 103	1 907	311	248
User/GP ratio		1709	1621	1957	1619	1964
% of Users without GP		0,98%	1,79%	13,09%	5,57%	11,73%
UCSP	NHS users	859 366	910 660	1 492 645	303 891	248 420
	GP	561 (25,7%)	590 (53,5%)	644 (33,8%)	198 (63,7%)	115 (46,6%)
	NHS users/GP	1532	1543	2318	1535	2160
USF A	NHS users	1 022 505	546 211	1 203 163	119 193	141 283
	GP	603 (27,6%)	330 (29,9%)	691 (36,2%)	69 (22,2%)	82 (33,1%)
	NHS users/GP	1696	1655	1741	1727	1723
USF B	NHS users	1 853 181	331 332	1 035 449	80 350	97 276
	GP	1.025 (46,9%)	183 (16,6%)	572 (30,0%)	44 (14,1%)	53 (21,4%)
	NHS users/GP	1808	1811	1810	1826	1835

GP: General Practitioner
Source: BI-CSP, https://bicsp.min-saude.pt/pt/biufs/5/Pages/default.aspx

1.3 Prehospital Care – SNS 24 Helpline

The number of calls to the SNS 24 helpline due to Diabetes-related problems has been increasing since 2014. With its good response capacity and the potential to answer more Diabetes-related calls, this service can promptly solve some of the problems of people with Diabetes, thus reducing unnecessary visits to emergency services.

Figure 6. **Annual number of calls to the SNS 24 helpline for Diabetes-related problems in Portugal**
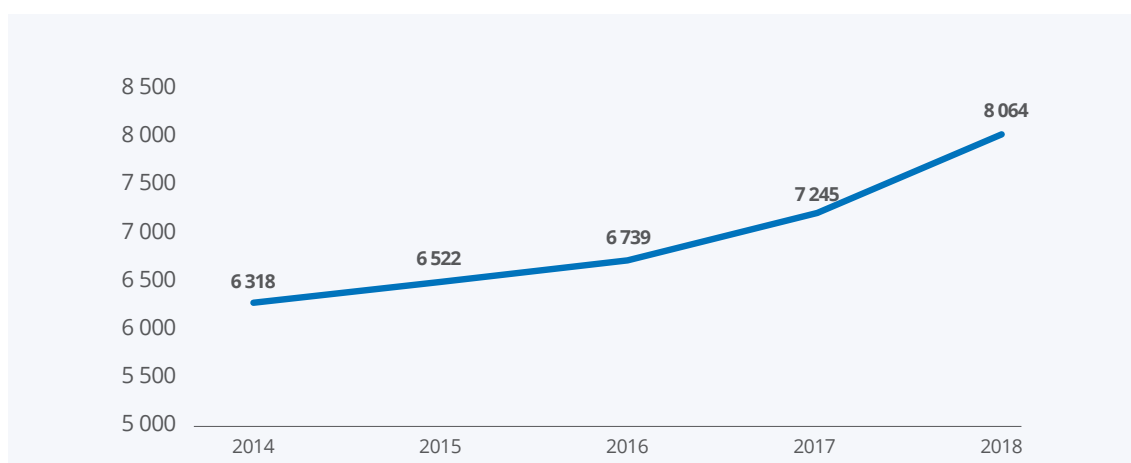
Source: SNS24

It is mainly women and the elderly who resorted to this helpline.

Table 26. **Gender and age group of those who used the SNS 24 helpline**

		2015	2016	2017	2018
Women	N	3 911	4 098	4 356	4 797
	%	60	60,8	60,1	59,5
≤29 years	N	159	122	185	235
	%	2	1,5	2,3	2,9
30-59 years	N	1 076	1 022	1 333	1 553
	%	13,3	12,7	16,5	19,3
≥60 years	N	5 287	4 495	5 726	6 276
	%	65,6	69,4	71	77,8
Total	N	**6 522**	**6 739**	**7 244**	**8 064**

Source: SNS24

In 2017 and 2018, the number of calls was higher in the winter months.

Figure 7. **Annual distribution of calls to the SNS 24 helpline due to Diabetes-related problems**
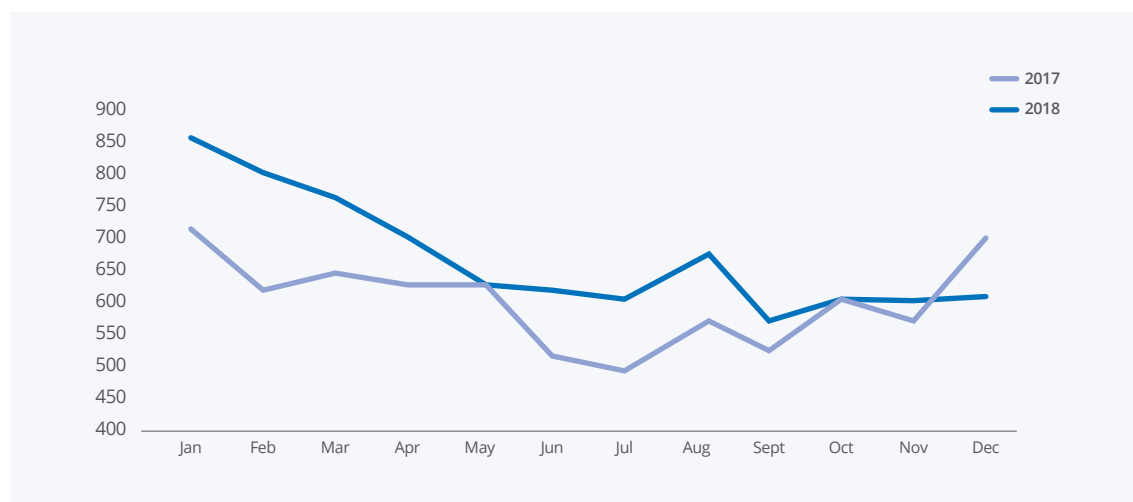
Source: SNS24

Both in 2017 and 2018, the main reason for contact was the change/worsening of symptoms. Overall, 72% were referred to urgent medical care, in 22% of cases self-care was suggested, and 6% were referred to non-urgent medical care.

Table 27. **Contact reasons of, and referral pathways from calls to the SNS 24 helpline due to Diabetes related problems**

Reasons for contact	Forwarding (%)							Total - reasons for contact	
	Urgent medical care		Self Care		Medical care 12h				
	2017	2018	2017	2018	2017	2018	2019	2017	2018
Worsening of symptoms (%)	42,5	42,4	9,4	9,5	3,6	3,1	3,5	**55,6**	**55,0**
Hyperglycae-mia (%)	13,8	14,9	3,3	2,9	0,9	1,0	0,9	**18,0**	**18,7**
Variation hypo / hyperglycae-mia (%)	10,5	9,7	4,1	4,0	0,7	0,8	0,5	**15,3**	**14,4**
Hypoglycae-mia (%)	2,2	2,2	1,8	2,0	0,3	0,4	0,7	**4,2**	**4,6**
Information on insulin (%)	1,4	1,5	2,3	2,4	0,1	0,2	0,2	**3,9**	**4,1**
Information on non-insulin antidiabetic drugs (%)	0,3	0,3	1,3	1,4	0,2	0,2	0,1	**1,8**	**1,9**
Balance problems (%)	1,0	1,0	0,1	0,3	0,1	0,0	0,1	**1,2**	**1,3**
Total	**71,7**	**71,9**	**22,4**	**22,5**	**5,9**	**5,6**	**8,3**	100,0	100,0

Source: SNS24

1.4 Hospital Diabetes Care in the National Health Service

The data presented in this section were extracted from the Hospital Morbidity Databases and provided by the Health System Central Administration. Data extraction was performed in the month of November 2019.

ADMISSIONS OF USERS WITH DIABETES

Admission of NHS users with Diabetes includes both outpatient episodes and hospitalizations. Within the category of hospitalizations, Day Cases correspond to hospitalizations of less than 24 hours.

In 2017, there were approximately 35,000 admissions with Diabetes as primary diagnosis and 177,000 admissions with diagnosis associated to Diabetes. In both cases, a steady upward trend in the number of admissions was observed. Overall, in that year, 12.2% of hospital admissions were of patients with Diabetes (in 2015, patients with diabetes accounted for 11.0% of admissions).

The data presented herein on hospital output in 2018 are provisional, for the coding for that year is not yet completed. It should also be noted that the classification used has changed over the period under analysis: as of 2017, the ICD-10 hospital morbidity classification was adopted, with 2016 and 2017 being years of transition in adoption of the new classification.

Figure 8. **Total Hospital Admissions with a Diagnosis of Diabetes**
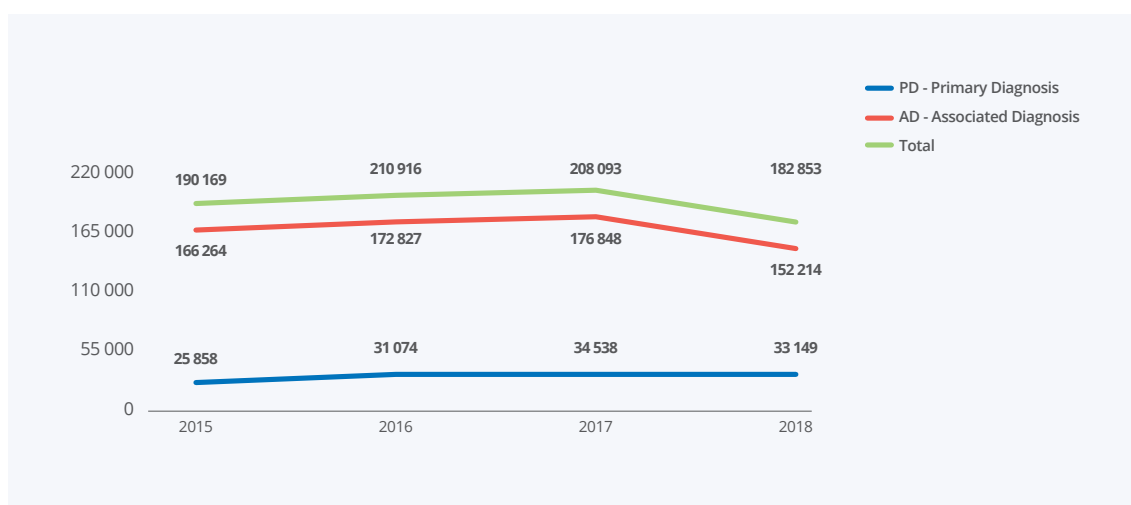
Note: 2018 data are provisional (as coding not yet completed). PD: Primary Diagnosis; AD: Associated Diagnosis.
Source: BDMH/ACSS, 2019

Hospitalizations for over 24 hours with Diabetes as primary diagnosis declined between 2015 and 2017, while outpatient episodes increased. This last category includes admissions to day hospitals and admissions for outpatient surgery. Hospitalizations of more than 24 hours with a diagnosis associated to Diabetes increased slightly between 2015 and 2017.

Figure 9. **Total Hospital Admissions with Diabetes as Primary Diagnosis**
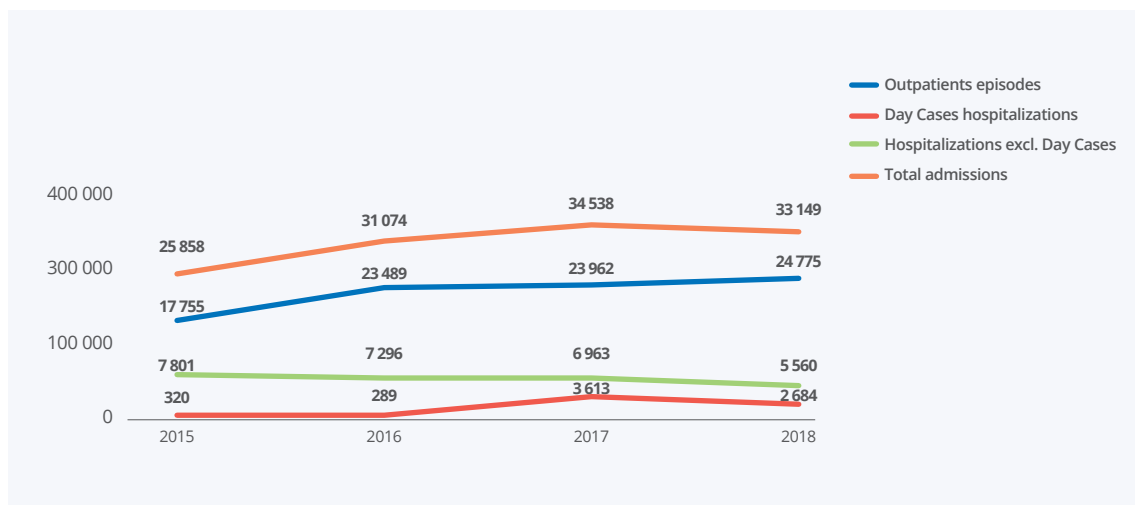
Note: 2018 data are provisional (as coding not yet completed).
Source: BDMH/ACSS, 2019. Day Cases: number of hospitalizations for less than 24h, excluding those who, after hospital admission, died during the first day of hospitalization.

Figure 10. **Total Hospital Admissions with Diabetes as Primary or Associated diagnosis**
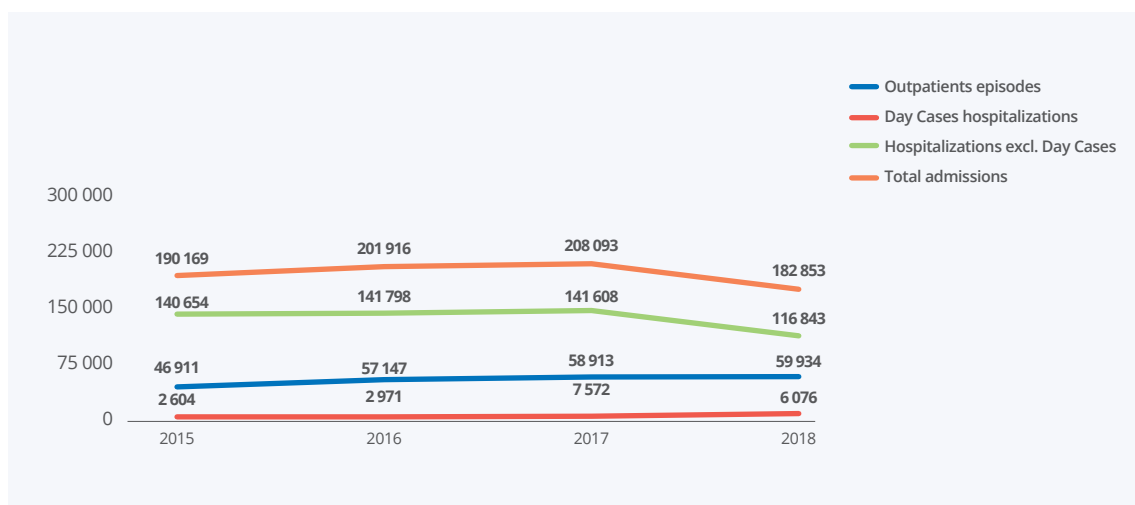
Note: 2018 data are provisional (as coding not yet completed).
Source: BDMH/ACSS, 2019. Day Cases: number of hospitalizations for less than 24h, excluding those who, after hospital admission, died during the first day of hospitalization.

Figure 11. **Percentage of Hospital Admissions with a Diagnosis of Diabetes**
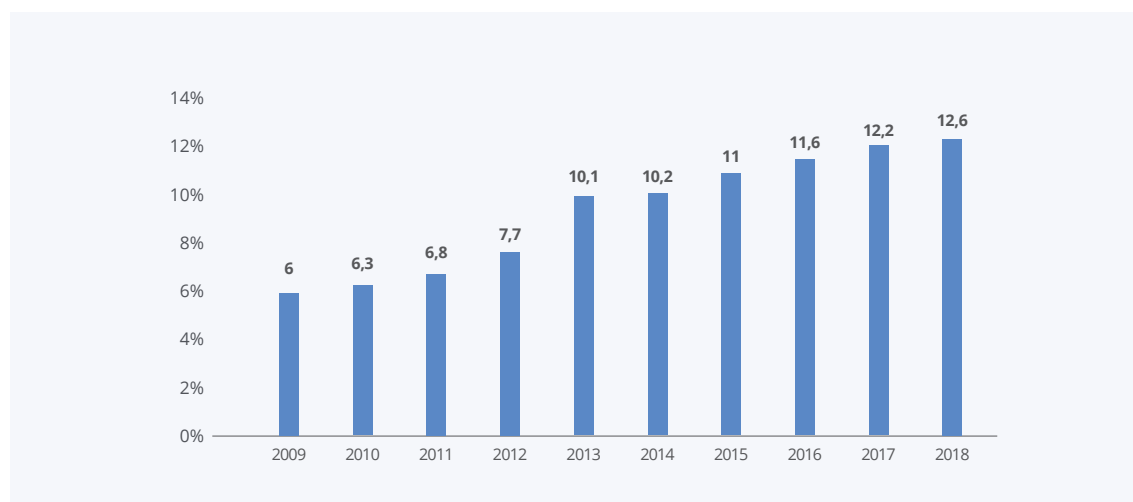
Source: BDMH/ACSS, 2019.

Table 28. **Number of admissions with at least one primary or one associated diagnosis of Diabetes**

		2015	2016	2017	2018*
DM with ketoacidosis without coma	Hospitalizations (n)	1 805	1 902	1 575	1 577
	Outpatient (n)	0	0	0	0
	Subtotal (%)	0,95%	0,94%	0,76%	0,90%
DM with ketoacidosis with coma	Hospitalizations (n)	NAD	NAD	54	45
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	0,03%	0,02%
DM with hyperosmolarity without coma	Hospitalizations (n)	853	955	1 427	1 275
	Outpatient (n)	0	0	44	22
	Subtotal (%)	0,45%	0,47%	0,70%	0,70%
DM with hyperosmolarity with coma	Hospitalizations (n)	NAD	NAD	100	81
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	0,05%	0,04%
Hypoglycaemia without coma	Hospitalizations (n)	NAD	164	1 569	1 271
	Outpatient (n)	NAD	0	0	0
	Subtotal (%)	NAD	0,08%	0,75%	0,70%
Hypoglycaemic coma	Hospitalizations (n)	NAD	NAD	72	65
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	0,03%	0,04%
Comatose DM (unspecified cause)	Hospitalizations (n)	240	95	NAD	NAD
	Outpatient (n)	0	0	NAD	NAD
	Subtotal (%)	0,13%	0,05%	NAD	NAD
DM with kidney manifestations	Hospitalizations (n)	13 023	13 121	14 716	12 726
	Outpatient (n)	7 952	7 110	9 169	11 985
	Subtotal (%)	11,00%	10,00%	11,50%	13,50%
DM with ophthalmic manifestations	Hospitalizations (n)	7 881	7 799	12 020	9 098
	Outpatient (n)	18 770	25 255	25 657	26 494
	Subtotal (%)	14,01%	16,37%	18,11%	19,50%

		2015	2016	2017	2018*
DM with neurological manifestations	Hospitalizations (n)	3 386	3 247	3 292	2 596
	Outpatient (n)	108	275	279	419
	Subtotal (%)	1,80%	1,74%	1,72%	1,60%
DM with peripheral circulatory disorders	Hospitalizations (n)	6 066	5 379	3 766	3 203
	Outpatient (n)	298	339	346	102
	Subtotal (%)	3,35%	2,83%	2,00%	1,80%
DM with diabetic arthropathy	Hospitalizations (n)	NAD	NAD	142	93
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	0,07%	0,05%
DM with skin disorders (dermatitis, ulceration)	Hospitalizations (n)	NAD	70	1 653	1 465
	Outpatient (n)	NAD	NAD	11	0
	Subtotal (%)	NAD	0,03%	0,80%	0,80%
DM with oral complications	Hospitalizations (n)	NAD	NAD	0	0
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	0,00%	0,00%
DM with hyperglycaemia	Hospitalizations (n)	NAD	817	16 105	12 485
	Outpatient (n)	NAD	0	377	187
	Subtotal (%)	NAD	0,40%	7,90%	6,90%
DM with other specified manifestations	Hospitalizations (n)	2 960	2 307	551	275
	Outpatient (n)	14	19	13	26
	Subtotal (%)	1,56%	1,15%	0,27%	0,16%
DM with unspecified complications	Hospitalizations (n)	934	1 115	3 473	2 643
	Outpatient (n)	49	18	494	669
	Subtotal (%)	0,52%	0,56%	1,90%	1,81%
DM without mention of complication	Hospitalizations (n)	116 462	117 545	101 989	85 301
	Outpatient (n)	20 253	24 684	24 245	22 189
	Subtotal (%)	71,89%	70,43%	60,66%	58,78%
Total hospitalizations with a diagnosis of Diabetes		190 169	201 916	208 093	182 853
n (% of total hospitalizations)		-11,00%	-11,60%	-12,20%	-12,50%

*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019.

Ophthalmic manifestations were the main cause for admission of users with Diabetes (as primary diagnosis), similarly to what was previously observed. Most of these admissions for Diabetes with ophthalmic manifestations were outpatient episodes.

Table 29. **Causes for admission (hospitalizations including day cases and outpatient episodes) for Diabetes as primary diagnosis**

		2015	2016	2017	2018*
Diabetes with ketoacidosis without coma	Hospitalizations (n)	1323	1380	1221	1147
	Outpatient (n)	0	0	0	1
	Subtotal (%)	5,10%	4,40%	3,50%	3,50%
Diabetes with ketoacidosis with coma	Hospitalizations (n)	NAD	NAD	54	45
	Outpatient (n)	NAD	NAD	6	0
	Subtotal (%)	NAD	NAD	0,20%	0,10%
Diabetes with hyperosmolarity without coma	Hospitalizations (n)	447	512	482	469
	Outpatient (n)	1	2	9	22
	Subtotal (%)	1,70%	1,70%	1,40%	1,50%
Diabetes with hyperosmolarity with coma	Hospitalizations (n)	NAD	NAD	100	81
	Outpatient (n)	NAD	NAD	0	4
	Subtotal (%)	NAD	NAD	0,30%	0,20%
Comatose Diabetes	Hospitalizations (n)	148	100	NAD	NAD
	Outpatient (n)	2	2	NAD	NAD
	Subtotal (%)	0,60%	0,30%	NAD	NAD
Diabetes with ophthalmic manifestations	Hospitalizations (n)	658	498	3 694	2 776
	Outpatient (n)	17 540	23 255	23 357	24 152
	Subtotal (%)	70,40%	76,40%	78,30%	81,20%
Diabetes with kidney manifestations	Hospitalizations (n)	993	879	689	347
	Outpatient (n)	169	177	572	571
	Subtotal (%)	4,50%	3,40%	3,70%	2,80%
Diabetes with neurological manifestations	Hospitalizations (n)	226	190	109	72
	Outpatient (n)	2	0	0	1
	Subtotal (%)	0,90%	0,60%	0,30%	0,20%
Diabetes with peripheral circulatory disorders	Hospitalizations (n)	1 823	1 506	1 075	889
	Outpatient (n)	12	17	3	10
	Subtotal (%)	7,10%	5,10%	3,10%	2,70%
Diabetes with diabetic arthropathy	Hospitalizations (n)	NAD	NAD	24	18
	Outpatient (n)	NAD	NAD	1	1
	Subtotal (%)	NAD	NAD	0,07%	0,06%
Diabetes with skin disorders (dermatitis, ulceration)	Hospitalizations (n)	NAD	NAD	716	671
	Outpatient (n)	NAD	NAD	5	7
	Subtotal (%)	NAD	NAD	2,10%	2,10%
Diabetes with oral complications	Hospitalizations (n)	NAD	NAD	1	0
	Outpatient (n)	NAD	NAD	0	1
	Subtotal (%)	NAD	NAD	0,00%	0,00%
Diabetes with hypoglycaemia without coma	Hospitalizations (n)	NAD	NAD	518	421
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	1,50%	1,30%
Diabetes with hypoglycaemic coma	Hospitalizations (n)	NAD	NAD	72	65
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	0,20%	0,20%

		2015	2016	2017	2018*
Diabetes with hyperglycaemia	Hospitalizations (n)	NAD	NAD	1 451	1 083
	Outpatient (n)	NAD	NAD	0	0
	Subtotal (%)	NAD	NAD	4,20%	3,30%
Diabetes with other specified manifestations	Hospitalizations (n)	983	948	99	69
	Outpatient (n)	2	2	2	0
	Subtotal (%)	3,80%	2,70%	0,30%	0,20%
Diabetes with unspecified complications	Hospitalizations (n)	49	64	40	36
	Outpatient (n)	1	1	1	0
	Subtotal (%)	0,20%	0,20%	0,10%	0,10%
Diabetes without mention of complication	Hospitalizations (n)	1 453	1 376	146	98
	Outpatient (n)	26	32	5	4
	Subtotal (%)	5,70%	4,50%	0,40%	0,30%
Total (n)		25 858	31 074	34 538	33 149

*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019

Approximately 40% of the total admissions of patients with Diabetes (as primary or associated diagnosis), were due to disorders of the circulatory, respiratory or genitourinary systems.

Table 30. **Causes for Admission to Hospitals (hospitalizations including day cases and outpatient episodes) of patients with DM**

	2017 (%)	2018 (%)
Ch. I. Some infectious and parasitic diseases	2,60%	2,30%
Ch. II. Neoplasms	7,00%	6,50%
Ch. III. Disorders of the blood and hematopoietic organs	0,80%	0,60%
Ch. IV. Endocrine, nutritional and metabolic diseases	17,90%	19,40%
Ch. V. Mental, behavioural and neurodevelopmental disorders	0,80%	0,80%
Ch. VI. Diseases of the nervous system		2,00%
Ch. VII. Diseases of the eye and adnexa	8,50%	7,10%
Ch. VIII. Diseases of the ear and mastoid process		0,20%
Ch. IX. Diseases of the circulatory system	20,00%	19,00%
Ch. X. Diseases of the respiratory system	10,70%	10,50%
Ch. XI. Diseases of the digestive system	8,10%	7,60%
Ch. XII. Diseases of the skin and subcutaneous tissue	1,00%	1,00%
Ch. XIII. Diseases of the musculoskeletal system and connective tissue	2,50%	2,50%
Ch. XIV. Diseases of the genitourinary system	9,70%	10,30%
Ch. XV. Pregnancy, childbirth and the puerperium	0,10%	0,10%
Ch. XVI. Certain conditions originating in the perinatal period	0,00%	0,00%
Ch. XVII. Congenital malformations, deformations and chromosomal abnormalities	0,10%	0,00%
Ch. XVIII. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1,50%	1,40%
Ch. XIX. Injury, poisoning and certain other consequences of external causes	5,20%	4,90%
Ch. XX. external causes of morbidity and mortality	0,00%	0,00%
Ch. XXI. Factors influencing health status and contact with health services	3,40%	3,70%
Total (n)	208 093	182 853

Notes: As per WHO International Classification of Diseases; Hospitalizations in 2015: 189 926; 2016: 188 363.
*2018 data are provisional (as coding not yet completed).
Source: BDMH/ACSS, 2019.

With regard to admissions for hypoglycaemia with and without coma, it can be observed that, in absolute numbers, 590 users were admitted to hospitals in 2017 and 486 users in 2018. In line with the higher prevalence of type 2 Diabetes, more patients were admitted with type 2 Diabetes and said complications than users with type 1 Diabetes.

Table 31. **Admissions due to hypoglycemia (with or without coma) in NHS users with Type 1 Diabetes (T1DM) and Type 2 Diabetes T2DM)**

		2017	2018*
Diabetes with hypoglycaemia without coma	T1DM	61 (12%)	48 (11%)
	T2DM	449 (87%)	363 (86%)
	Total	**518**	**421**
Diabetes with hypoglycaemic coma	T1DM	5 (7%)	2 (3%)
	T2DM	51 (71%)	55 (85%)
	Total	**72**	**65**

*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019.

Table 32. **Causes for all admissions (hospitalizations including day cases and outpatient episodes) to hospitals**

	2015 (%)	2016 (%)	2017 (%)	2018 (%)
Ch. I. Some infectious and parasitic diseases	1,50%	1,50%	1,50%	1,30%
Ch. II. Neoplasms	6,80%	6,70%	7,40%	6,80%
Ch. III. Disorders of the blood and hematopoietic organs	0,50%	0,50%	0,50%	0,40%
Ch. IV. Endocrine, nutritional and metabolic diseases	2,40%	2,70%	3,00%	3,10%
Ch. V. Mental, behavioural and neurodevelopmental disorders	1,20%	1,20%	1,20%	1,30%
Ch. VI. Diseases of the nervous system				3,30%
Ch. VII. Diseases of the eye and adnexa	10,00%	10,50%	12,30%	9,40%
Ch. VIII. Diseases of the ear and mastoid process				0,50%
Ch. IX. Diseases of the circulatory system	8,60%	8,30%	8,70%	8,20%
Ch. X. Diseases of the respiratory system	6,70%	6,70%	6,90%	6,90%
Ch. XI. Diseases of the digestive system	6,90%	6,90%	7,40%	7,00%
Ch. XII. Diseases of the skin and subcutaneous tissue	1,30%	1,30%	1,40%	1,30%
Ch. XIII. Diseases of the musculoskeletal system and connective tissue	3,00%	3,10%	3,00%	3,10%
Ch. XIV. Diseases of the genitourinary system	5,60%	5,50%	8,00%	8,30%
Ch. XV. Pregnancy, childbirth and the puerperium	4,70%	4,70%	5,00%	5,20%
Ch. XVI. Certain conditions originating in the perinatal period	0,10%	0,10%	0,20%	0,20%
Ch. XVII. Congenital malformations, deformations and chromosomal abnormalities	0,50%	0,50%	0,50%	0,40%
Ch. XVIII. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1,10%	1,20%	1,50%	1,40%
Ch. XIX. Injury, poisoning and certain other consequences of external causes	4,50%	4,50%	4,90%	4,60%
Ch. XX. External causes of morbidity and mortality		0,00%	0,00%	0,00%
Ch. XXI. Factors influencing health status and contact with health services	34,60%	34,00%	26,80%	27,40%
Total (n)	1 734 780	1 747 633	1 704 361	1 468 677

Note: As per WHO International Classification of Diseases.
*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019.

The average length of hospital stay among patients with Diabetes was higher than the average length of stay in hospitals. Considering the sum of hospitalizations and outpatient episodes, there was a declining trend in the average length of stay of patients with Diabetes, particularly among cases with Diabetes as primary diagnosis.

Table 33. **Length of hospital stay (including day cases) for Diabetes, and total length of stay in hospitals**

	2015 Average (median)	2016 Average (median)	2017 Average (median)	2018 Average (median)
Diabetes as primary diagnosis	11,0 (6,0)	11,2 (6,0)	8,1 (3,0)	8,2 (4,0)
Diabetes as secondary diagnosis	10,3 (7,0)	10,3 (7,0)	10,4 (7,0)	10,4 (7,0)
Diabetes (primary + secondary diagnosis)	10,2	10,3	10,1	10,2
Hospitalizations (with and without Diabetes)	6,6	6,7	7,1	7

*2018 data are provisional, as coding for that year is not yet completed.
Note: Outpatient episodes were not considered as hospitalizations and were not included in the calculation of the average length of hospital stays shown in this table.
Source: BDMH/ACSS, 2019.

Table 34. **Length of stay (hospitalizations including day cases and outpatient episodes) of patients with Diabetes in hospitals**

	2015 Average	2016 Average	2017 Average	2018 Average
Diabetes as primary diagnosis	3,5	2,7	2,5	2,1
Diabetes as secondary diagnosis	8,5	8,3	8,3	8

*2018 data are provisional, as coding for that year is not yet completed.
 Source: BDMH/ACSS, 2019.

Table 35. **Average length of hospital stay (including day cases) for Diabetes, and total length of stay in hospitals, by diagnostic group**

	2016		2017	
	Total	With DM	Total	With DM
Ch. I. Some infectious and parasitic diseases	11,5	14,1	11,5	12,8
Ch. II. Neoplasms	8,6	10,8	8,2	10,2
Ch. III. Disorders of the blood and hematopoietic organs	8,6	10,2	8,4	10,8
Ch. IV. Endocrine, nutritional and metabolic diseases	6,8	8,2	6,7	8
Ch. V. Mental, behavioural and neurodevelopmental disorders	17,4	19,9	19,1	23,4
Ch. VI. Diseases of the nervous system	7,3	10	7,8	9,4
Ch. VII. Diseases of the eye and adnexa	2,8	2,13	1,9	3
Ch. VIII. Diseases of the ear and mastoid process	7,4	8,1	3,1	7,4
Ch. IX. Diseases of the circulatory system	9,4	10,4	9,5	10,5
Ch. X. Diseases of the respiratory system	8,7	10,5	8,6	10,4
Ch. XI. Diseases of the digestive system	6,5	8,2	6,4	8,2
Ch. XII. Diseases of the skin and subcutaneous tissue	8	15,4	7,8	15,5
Ch. XIII. Diseases of the musculoskeletal system and connective tissue	6,3	9,3	5,9	8,8
Ch. XIV. Diseases of the genitourinary system	6,1	8,6	6,3	8,7
Ch. XV. Pregnancy, childbirth and the puerperium	3,5	7,1	3,5	6,5
Ch. XVI. Certain conditions originating in the perinatal period	7,2	7,4	7,9	5
Ch. XVII. Congenital malformations, deformations and chromosomal abnormalities	4,8	7,8	4,4	6,5

	2016		2017	
	Total	**With DM**	**Total**	**With DM**
Ch. XVIII. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	5,4	7,8	5,6	7,7
Ch. XIX. Injury, poisoning and certain other consequences of external causes	10,3	13,4	10,4	14

Note: As per WHO International Classification of Diseases.
Average length of hospital stay (days).
Source: BDMH/ACSS, 2019.

Despite the declining trend of in-hospital lethality in patients with Diabetes, in recent years in-hospital lethality in admissions of patients with Diabetes has been more than double the average of all admissions to hospitals (in 2017, the lethality rate was 6.5%, while the average in hospitals was 3.1%). Deaths of people with Diabetes accounted for 20.6% of in-hospital mortality and occurred mainly in hospitalizations of patients with Diabetes as associated diagnosis (97% of in-hospital deaths).

Table 36. **Number of hospital admissions in people with at least one Diabetes (primary or associated) diagnosis, and in-hospital lethality in people with Diabetes and among all users admitted to hospitals**

	2015 (%)	**2016 (%)**	**2017 (%)**	**2018 (%)**
Total hospital admissions of patients diagnosed with Diabetes	190 169	201 916	208 093	182 853
[n, (%of total admissions)]	(11%,0)	-11,60%	-12,20%	-12,50%
Total users with Diabetes	120 610	130 340	127 232	112 792
Average number of admissions per user	1,58	1,55	1,64	1,62
In-hospital lethality in users with Diabetes	13 128	13 461	13 554	11 230
No. of deaths in users with Diabetes/No. of admissions of users with Diabetes [n (%)]	-6,90%	-6,70%	-6,50%	-6,10%
In-hospital lethality in users with Diabetes **No. of deaths in users with Diabetes/ No. of users with Diabetes (%)**	10,90%	10,30%	10,70%	10,00%
In-hospital lethality in total users admitted to hospitals **No. of deaths/No. of admissions (%)**	2,60%	2,90%	3,10%	2,90%
In-hospital lethality in total users admitted to hospitals **No. of deaths/No. of users (%)**	4,50%	4,40%	4,60%	4,30%
Diabetes-related in-hospital lethality in total users admitted to hospitals **No. of Diabetes-related deaths/Total no. of admissions (%)**	0,76%	0,77%	0,80%	0,76%
Diabetes-related in-hospital lethality in total users admitted to hospitals **No. of Diabetes-related deaths/Total no. of users (%)**	1,23%	1,18%	1,20%	1,16%

*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019.

Table 37. **In-hospital lethality in hospitalizations (including day cases) of users with Diabetes as primary or associated diagnosis**

	2015	**2016**	**2017**	**2018***
In-hospital lethality in users with Diabetes as primary diagnosis **No. of Diabetes-related deaths/No. of users with Diabetes (%)**	5,4	5,7	4,6	5,3
In-hospital lethality in users with Diabetes as associated diagnosis **No. of Diabetes-related deaths/No. of users with Diabetes (%)**	13,1	13,1	13,1	12,7
Proportion of in-hospital deaths in hospitalizations of users with Diabetes as associated diagnosis	97%	97%	97%	97%

*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019.

RENAL COMPLICATIONS

In 2017, approximately 1/3 of patients with Chronic Kidney Disease, undergoing renal replacement therapy by haemodialysis had Diabetes. This percentage is identical to that of the previous two years (27.7% in 2011).

Table 38. **Characterization of kidney disease in people with Diabetes and renal replacement therapy**

	2015 (%)	2016 (%)	2017 (%)	2018 (%)
Prevalence of Diabetes in people with CKD - Global (%)	28,1	28,5	28	27,8
Prevalence of Diabetes in new CKD cases – Global (%)	33,9	31,8	32,2	31,5
Prevalence of Diabetes in people with CKD on haemodialysis (%)	28,7	29,1	28,7	28,1
Prevalence of Diabetes in new CKD cases on haemodialysis (%)	34,6	33	33,4	32,5
Prevalence of Diabetes in people with CKD on peritoneal dialysis (%)	19,4	18,1	16,4	15,5
Prevalence of Diabetes in new CKD cases on peritoneal dialysis (%)	27,1	18,9	21,3	19,2
Diabetes as the cause of CKD in kidney transplants (%)	19,7	18,9	14,9	17,6
Simultaneous kidney-pancreas transplants (n)	27	24	26	33
Pancreas after kidney transplantations (n)	1	0	1	2

Source: Annual reports of the Portuguese Society of Nephrology 2015-18.

MACROVASCULAR DISEASE

Macrovascular complications are responsible for high Diabetes-related morbidity and mortality. About 1/3 of hospitalizations for cerebrovascular accident (CVA), or stroke, and acute myocardial infarction (AMI) occur in people with Diabetes. Despite this, in recent years, the number of hospitalizations for acute myocardial infarction and stroke in people with Diabetes has decreased, as well as mortality from acute myocardial infarction.

People with Diabetes had a lower percentage of ST-elevated heart attacks (transmural) when compared to people without Diabetes. However, for any type of acute myocardial infarction the average length of stay in hospital was higher in people with Diabetes. In-hospital mortality for people with Diabetes who suffered a stroke, was similar to that of the general population. However, in-hospital mortality from acute myocardial infarction remained higher among people with Diabetes when compared to that of people hospitalized for the same cause but without Diabetes.

Table 39. **Number of admissions and lethality from acute myocardial infarction (AMI) in people with Diabetes, and total numbers in hospitals**

			2015	2016	2017	2018*
Admissions for AMI	With DM	N	4 111	4 080	4 066	3 200
		% transmural	34%	30%	27%	29%
		Average stay for transmural (days)	7,8	7,9	7,6	6,5
		Average stay for non-transmural (days)	8,7	9,1	8,6	8,8
		Transmural - deaths (n)	141	146	126	81

			2015	2016	2017	2018*
Admissions for AMI	**With DM**	Non-transmural - deaths (n)	188	196	186	109
		Total deaths (n)	329	342	312	190
	Total	N	12 656	12 155	12 539	9 960
		% Transmural	41%	38%	35%	36%
		Average stay for transmural l(days)	6,8	7	6,8	6,2
		Average stay for non-transmural (days)	7,5	7,8	7,6	7,5
% of AMI occurring in people with DM			32%	34%	32%	32%
In-hospital lethality	**With DM**		8,60%	8,90%	8,10%	6,20%
	Total		8,00%	7,40%	6,60%	5,80%

*2018 data are provisional, as coding for that year is not yet completed. In-hospital lethality: number of deaths/number of patients.
DM – Diabetes *Mellitus*.
Source: BDMH/ACSS, 2019

Table 40. **Number of admissions and lethality from stroke (CVA) in people with Diabetes, and total numbers in hospitals**

			2015	2016	2017	2018*
Admissions	**With DM**	N	**7 971**	**7 818**	**7243**	**6131**
		% ischaemic	86%	85%	84%	85%
		Average stay for ischaemic stroke (days)	12,9	12,8	13,3	13,3
		Average stay for haemorrhagic stroke (days)	16,6	15,2	16,4	16,9
		Ischaemic/haemorrhagic stroke deaths (n)	783/297	755/304	704/307	580/233
		Total deaths (n)	1 080	1 059	1 011	813
	Total	N	26 895	26 499	25 450	20 895
		% ischaemic stroke	81%	81%	80%	80%
		Average stay for ischaemic stroke (days)	12,4	12,4	12,8	12,8
		Average stay for haemorrhagic (days)	16,1	16	17,1	16,6
% de AVC que ocorrem em pessoas com DM			30%	30%	28%	29%
Letalidade intrahospitalar	**With DM**		14,10%	14,30%	14,70%	14,00%
	Total		14,60%	14,80%	15,00%	14,80%

*2018 data are provisional, as coding for that year is not yet completed. DM – Diabetes Mellitus.
Source: BDMH/ACSS, 2019

DIABETIC FOOT

If not prevented and/or treated in a timely manner, diabetic foot complications can lead to amputations, which can be minor (involving part of the foot) or major (at the level of the ankle, leg below the knee or at thigh level). In recent years, admissions for diabetic foot complications have increased, but the corresponding lethality rate has declined between 2015 and 2017.

The number of lower limb amputations has decreased in people admitted to hospital for Diabetes as primary diagnosis. Despite this, when considering the total number of patients with Diabetes (primary or associated diagnosis), the total number of amputations (Diabetes-related or not) remained the same in 2015-2017. Many of these amputations will not have been attributed to Diabetes, but they show the importance of con-

trolling the various cardiovascular risk factors. In said period from 2015 to 2017, the decrease in the number of amputations occurred in respect of minor amputations.

Table 41. **Hospital Admissions for Diabetic foot**

	2015	2016	2017	2018
No. of admissions	1619	1797	2362	2142
Lethality	9,2%	8,4%	6,1%	7,4%
Average time (days)	22	22	23	21

*2018 data are provisional, as coding for that year is not yet completed.
Source: BDMH/ACSS, 2019

Figure 12. **Trend in number of amputations for diabetic foot (with Diabetes as primary diagnosis)**
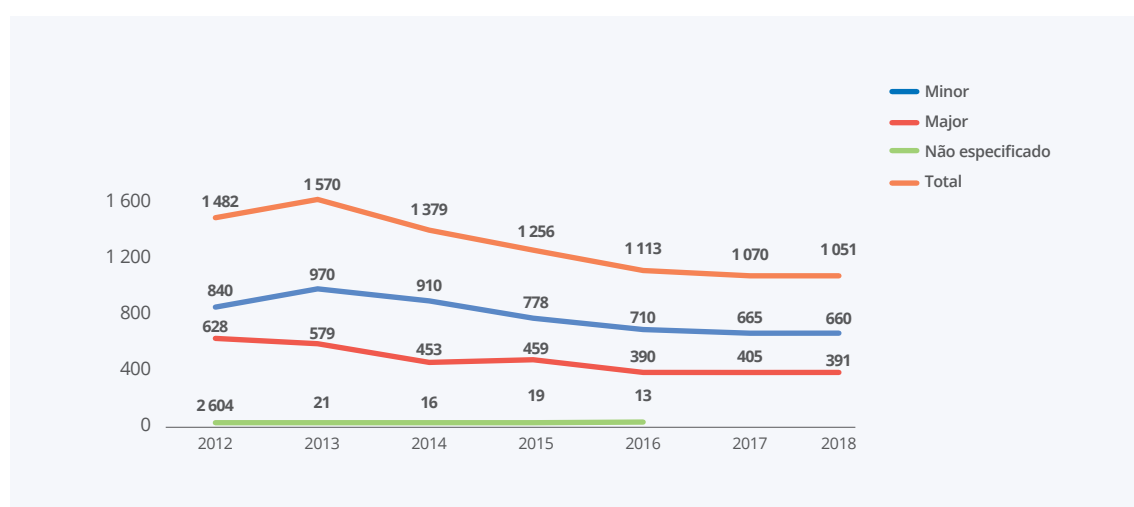
During 2010-2015, diagnoses coding was done according to ICD 9 CM. 2016 was a transition period, where the coding was done according to ICD 9 CM and ICD 10 CM.
Source: BDMH/ACSS, 2019

Figure 13. **Trend in total number of amputations in people with Diabetes (as primary or associated diagnosis)**

During 2010-2015, diagnoses coding was done according to ICD 9 CM. 2016 was a transition period, where the coding was done according to ICD 9 CM and ICD 10 CM.
Source: BDMH/ACSS, 2019.

Primary health care records for lower limb amputations in mainland Portugal point to Alentejo as being the region with the highest amputation rate (15 out of 100,000 people from ARS Alentejo underwent a Diabetes--related amputation in 2018, the average in mainland Portugal being 8: 100,000).

Table 42. **Primary Health Care (adjusted) registration rate of hospitalizations for lower limb amputation in people with Diabetes, Mainland Portugal**

	2015(%)	2016(%)	2017(%)	2018(%)
ARS North	NAD	NAD	0,009	0,007
ARS Centre	NAD	NAD	0,006	0,005
ARS LVT	NAD	NAD	0,012	NAD
ARS Alentejo	NAD	NAD	0,012	0,015
ARS Algarve	NAD	NAD	0,017	0,014
Mainland Portugal	NAD	NAD	0,01	0,008

Note: Diabetes considered as primary and associated diagnosis.
Source: SPMS – SIM@SNS.

CONTINUOUS SUBCUTANEOUS INSULIN INFUSION

Within the framework of the National Program for Diabetes, until 2016, 100 Continuous Subcutaneous Insulin Infusion (CSII) devices (insulin pumps) were distributed to users aged 5 and older, 30 CSII devices were distributed to pregnant women and women in the preconception period, and CSII devices were assigned to all children aged 5 and under. Additionally, Government Order No. 13 277/2016 provided for coverage in this respect for all eligible children up to the age of 10 by the end of 2017 and all eligible children up to the age of 14 by the end of 2018, as well as access to treatment using these devices to the entire eligible population aged 18 and under by the end of 2019.

During 2015-2018, the number of users in treatment with continuous insulin infusion devices increased by 80%. By the end of 2018, 54% of the people with Diabetes being treated with these devices were women and 46% were men. 40% were children and young people aged 14 years and under and 56% of users were children and young people of paediatric age (18 years and under). The geographic distribution of the number of users undergoing treatment was proportional to the number of treatment centres and the population distribution in mainland Portugal. However, the regions of Alentejo and Algarve did not yet have treatment centres for the adult population.

Table 43. **Number of users in treatment with continuous subcutaneous insulin infusion devices (insulin pumps), Mainland Portugal**

	2015			2018					2019		
	Total			Total					Total		
Users in treatment	n	%	%	N	%	%	M (%)	F (%)	N	%	%
0-5 years	69	5		102	4		55	45	119	4	
6-10 years	197	15	41	412	18	56	53	47	404	13	54
11-14 years	141	11		440	19		50	50	564	18	
15-18 years	137	10		365	15		56	44	584	19	
19-39 years	489	37		657	28		37	63	903	29	
40-64 years	264	20	59	371	16	44	34	66	475	15	46
≥65 years	16	1		17	1		71	29	21	1	
Total	1313	100	100	2 364	100	100	46	54	3 070	100	100

Relatório de Acesso a Tratamento com dispositivos PSCI (Report on Access to Treatment with CSII devices) - DGS/ACSS/SPMS/INFARMED (2015).
Source: DGS (2018);

Table 44. **Reason for placing a continuous subcutaneous insulin infusion device, Mainland Portugal**

	2018 (%)
Glycaemic lability	58
Poor glycaemic control	57
Lifestyle flexibility	38
Low insulin doses	28
Hypoglycaemia unawareness	26
Dawn phenomenon	8
Preconception and Pregnancy	2

Note: The data shown are for the 958 users with a record of the reason for placing the device. More than one reason for placement may occur per user.
Source: DGS; Profile of patients using subcutaneous insulin infusion in Portugal (7).

Table 45. **Distribution of people using a continuous subcutaneous insulin infusion device, Mainland Portugal**

	2015 (%)	2018 (%)
ARS North	39,4	39,8
ARS Centre	18,7	17,7
ARS LVT	42	40
ARS Alentejo	0	1,4
ARS Algarve	0	1,1

Profile of patients using subcutaneous insulin infusion in Portugal (7).
Source: DGS

1.5 Diabetes-related Mortality

In 2017 and 2018, diabetes was responsible for 4,143 and 4,292 deaths, respectively, accounting in both years for 3.8% of deaths in Portugal (https://app.powerbi.com). This percentage has declined since 2012, when it was 4.5%. Between 2015 and 2018 the number of deaths dropped in both sexes, as did the number of years of life lost and the rates of early and total mortality. However, in 2018, Diabetes still accounted for 4,452 years of life lost under the age of 70, corresponding to an average 8.8 years of life lost for each death occurring under the age of 70.

Figure 14. **Causes of death (%) in Portugal, in 2018**
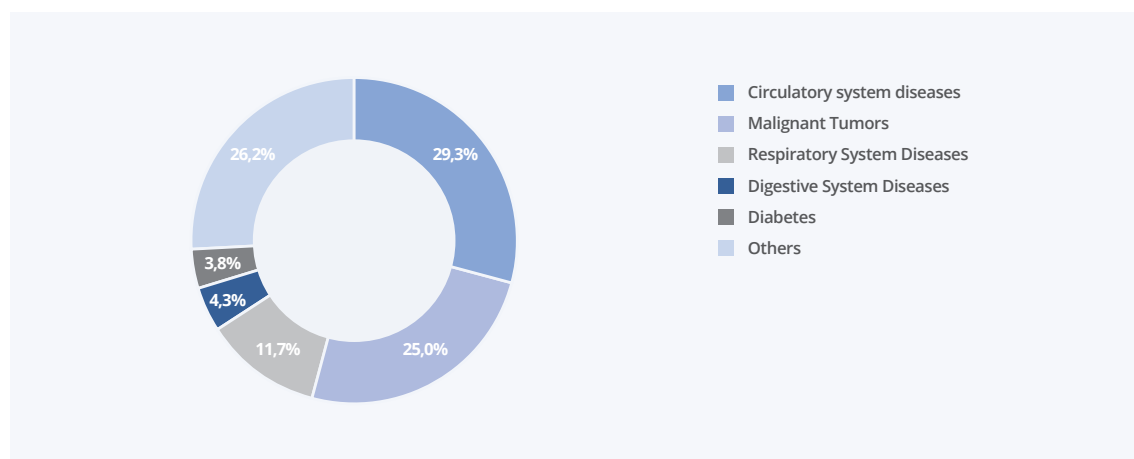
Source: INE, INE | DGS/MS 2019.

Table 46. **Diabetes as a cause of death (%) in Portugal**

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Deaths due to Diabetes (%)	4,4	4,5	4.3	4,1	4,1	3,9	3,8	3,8

Source: INE, INE | DGS/MS 2019.

Table 47. **Deaths due to Diabetes according to age group in Portugal**

	2015		**2016**		**2017**		**2018**	
	N	**%**	**N**	**%**	**n**	**%**	**n**	**%**
<70 years	563	13	558	13	475	11	504	12
70-74 years	425	10	421	10	362	9	363	8
75-79 years	690	16	643	15	656	16	675	16
≥80 years	2 725	62	2 733	63	2 650	64	2750	64
Total	4403	100	4355	100	4143	100	4292	100

Source: Diabetes Dashboard – Mortality, DGS, 16-11-2019 (2015-2017 mortality); 22-01-2020 (2018 mortality).

The highest premature mortality rate occurred in the Azores, Alentejo and Madeira regions..

Table 48. **Standardized Rate of Premature Mortality (<70 years) in Portugal according to geographic region (per 100,000 population)**

	2015	**2016**	**2017**	**2018**
ARS North	4,71	4,55	3,8	3,8
ARS Centre	4,58	5,2	4,75	4,7
ARS LVT	7,03	6,8	5,47	5,5
ARS Alentejo	6,8	7,12	7,59	7
ARS Algarve	4,71	3,64	3,32	4,6
R. A. Madeira	13,4	13,1	7,3	11,9
R.A. Azores	11,1	12,5	13,2	18,4
Total Portugal	**6,1**	**6,0**	**5,0**	**5,3**

Source: Diabetes Dashboard – Mortality, DGS, 16-11-2019, using the 2013 standard population (European Standard Population).

Table 49. **Standardized Rate of Mortality ≥70 years in Portugal according to geographic region (per 100,000 population)**

	2015	**2016**	**2017**	**2018**
ARS North	217	195	195	196
ARS Centre	215	218	207	214
ARS LVT	235	234	219	226
ARS Alentejo	301	326	278	293
ARS Algarve	189	176	170	166
R. A. Madeira	279	332	271	335
R.A. Azores	477	424	417	405
Portugal	**237**	**229**	**217**	**224**

Source: Diabetes Dashboard – Mortality, DGS, 16-11-2019, using the 2013 standard population (European Standard Population).

Table 50. **Total and premature mortality from Diabetes in Portugal**

	2015	2016	2017	2018
Both sexes				
Deaths at all ages	4403	4355	4143	4292
Deaths in <70-year olds	563	558	475	504
Potential years of life lost in <70-year olds	4 866	4 769	4 130	4452*
Potential years of life lost due to death in <70-year olds	8,6	8,5	8,7	8,8
Crude mortality rate at all ages	42,5	42,2	40,2	41,7
Crude mortality rate in <70-year olds	6,4	6,4	5,4	5,8
Standardized mortality rate at all ages	39,3	38	35,4	35,9
Standardized mortality rate in <70-year olds	6,1	6	5	5,3
Males				
Deaths at all ages	1904	1877	1725	1828
Deaths in <70-year olds	356	344	286	325
Potential years of life lost in <70-year olds	3 108	2 857	2 473	2900*
Potential years of life lost due to death in <70-year olds	8,7	8,3	8,6	8,9
Crude mortality rate at all ages	38,8	38,4	35,4	37,6
Crude mortality rate in <70-year olds	8,3	8,1	6,7	7,7
Standardized mortality rate at all ages	44	42,6	38,5	39,8
Standardized mortality rate in <70-year olds	8,3	7,9	6,5	7,3
Females				
Deaths at all ages	2499	2478	2 418	2 464
Deaths in <70-year olds	206	214	189	179
Potential years of life lost in <70-year olds	1 758	1 912	1 657	1 552*
Potential years of life lost due to death in <70-year olds	8,5	8,9	8,8	8,7
Crude mortality rate at all ages	45,9	45,6	44,6	45,4
Crude mortality rate in <70-year olds	4,6	4,8	4,2	4,0
Standardized mortality rate at all ages	35,6	34,5	32,8	32,6
Standardized mortality rate in <70-year olds	4,2	4,3	3,7	3,5

Rates per 100,000 population. *Provisional.
Source: Diabetes Dashboard – Mortality, DGS, 16-11-2019 (2015-2017 mortality); 22-01-2020 (2018 mortality); DSIA/DGS, based on data provided by INE, using the 2013 standard population (European Standard Population).

In 2017, Diabetes with kidney complications accounted for approximately 22% of deaths attributed to Diabetes. The number of deaths from Diabetes with associated peripheral circulatory disorders declined during 2015-2016, both among the total population and persons aged under 70, and remained stable between 2016 and 2017 (8-9% of deaths). However, the number of deaths from diabetic ketoacidosis rose by 32% (104 in 2015 and 137 in 2017; this number increased mainly among the population aged 70 and over and diagnosed with type 2 Diabetes or "Diabetes from an unspecified cause").

Although this section contains no detailed data on acute myocardial infarction and stroke, these continue to be important causes of mortality among people with Diabetes. It should be noted that, in 2017, 312 in-hospital deaths of patients with Diabetes occurred in hospitals following hospitalization for acute myocardial infarction, and 1,011 deaths following hospitalization due to stroke.

Table 51. **Recorded causes of death from Diabetes in Portugal**

	2015		2016		2017		2018	
	Total deaths (n/%)	Deaths in <70-yr olds (n/%)	Total deaths (n/%)	Deaths in <70-yr olds (n/%)	Total deaths (n/%)	Deaths in <70-yr olds (n/%)	Total deaths (n/%)	Deaths in <70-yr olds (n/%)
DM without mention of complication	1562 (35)	188 (34)	(n/%)	(n/%)	(n/%)	(n/%)	1 346 (31)	122 (24)
DM with renal complications	953 (22)	101 (18)	975 (22)	124 (22)	922 (22)	98 (21)	897 (21)	99 (20)
DM with other specified manifestations	815 (19)	84 (15)	541 (12)	68 (12)	716 (17)	81 (17)	845 (20)	85 (17)
DM with peripheral circulatory disorders	420 (10)	69 (12)	365 (8)	43 (8)	365 (9)	42 (9)	367 (9)	58 (11)
DM with various complications	377 (9)	74 (13)	375 (9)	74 (13)	332 (8)	50 (11)	520 (12)	104 (21)
DM with ketoacidosis	104 (2)	20 (4)	125 (2)	17 (3)	137 (3)	19 (4)	144 (3)	22 (4)
Comatose DM	102 (2)	17 (3)	83 (2)	12 (2)	103 (2)	17 (4)	113 (3)	10 (2)
DM with unspecified complications	64 (1)	4 (1)	77 (2)	8 (1)	57 (1)	6 (1)	50 1)	4 (1)
DM with ophthalmic manifestations	6 (0,1)	1 (0,2)	11 (0,2)	3 (0,5)	6 (0,1)	3 (0,6)	7 (0,2)	0 (0)
DM with neurological manifestations	-	-	2 (0)	3 (0,5)	7 (0,2)	2 (0,4)	3 (0,1)	0 (0)

Source: Diabetes Dashboard – Mortality, DGS, 16-11-2019.

Table 52. **Distribution by type of Diabetes in diabetic ketoacidosis-related deaths**

	2015		2016		2017		2018	
	Total deaths (n/%)	Deaths in <70-yr olds (n/%)	Total deaths (n/%)	Deaths in <70-yr olds (n/%)	Total deaths (n/%)	Deaths in <70-yr olds (n/%)	Total deaths (n/%)	Deaths in <70-yr olds (n/%)
Type 1 Diabetes	3	2	2	2	2	0	0	0
Type 2 Diabetes	41	6	45	4	53	8	53	4
Diabetes from an unspecified cause	60	12	78	11	82	11	91	18
Total	104	20	125	17	137	19	144	22

Source: Diabetes Dashboard – Mortality, DGS, 16-11-2019.

1.6 Use of Medication and Devices

OUTPATIENT USE OF MEDICATION AND DEVICES

The use and the costs of Diabetes medication have increased in recent years. This increase is mostly due to the larger number of people diagnosed with and medicated for Diabetes and to the use of more expensive new drugs.

Since 2015, insulin consumption has increased mainly due to the growing use of long-acting analogues, which, in 2018, accounted for more than half of insulin spending. Between 2015 and 2018, insulin consumption, measured by the number of packages consumed, increased by approximately 10%, and so did the costs.

During 2015-2018, the consumption of non-insulin antidiabetic agents, in number of packages, increased by 11%, but their costs grew by 25%. In this group, DPP-4 inhibitors (alone or in combination) continued to be the drugs responsible for most spending in 2018, accounting for approximately 36% of packages consumed and 65% of expenditure with non-insulin antidiabetic agents.

Table 53. **Use of medication (non-insulin antidiabetic agents, insulin and glucagon, excluding drug combinations), Mainland Portugal - Defined Daily Dose dispensed to outpatients during one year**

	2015	2016	2017	2018
DDD	233 476 504	236 601 861	245 017 774	246 516 118

DDD: Defined Daily Dose dispensed to outpatients during one year in mainland Portugal.
Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Table 54. **Use of non-insulin antidiabetic agents, Mainland Portugal**

	Quantidade de Embalagens			
	2015	2016	2017	2018
Non-insulin antidiabetic agents				
Biguanide	3 208 537	3 293 288	3 350 961	3 471 890
Sulphonylureas	1 803 075	1 711 332	1 633 295	1 539 476
Alpha-glucosidase inhibitors	344 748	279 085	232 865	192 640
Glinides	36 207	29 903	26 045	22 246
Glitazones	81 860	69 681	64 772	61 751
DPP-4 inhibitors	835 818	887 353	947 410	1 004 512
GLP-1 agonists	98 041	126 292	147 597	257 390
Glyphlozines	125 973	255 833	387 442	599 407
Total non-insulin antidiabetic agents	6 534 259	6 652 767	6 790 387	7 149 312
Combinations of non-insulin antidiabetic agents				
Glimepiride + Pioglitazone	12 174	10 598	9 677	9 057
Metformin + Pioglitazone	42 773	34 581	28 783	24 930
Glibenclamide + Metformin	82 977	68 763	55 168	44 267
Metformin + DPP-4 inhibitors	2 272 975	2 352 784	2 447 060	2 547 273
Metformin + Glyphlozines			102 127	190 393
Pioglitazone + DPP-4 inhibitors			3 017	3 393
Total combinations	2 410 899	2 466 726	2 645 832	2 819 313
Total	**8 945 158**	**9 119 493**	**9 436 219**	**9 968 625**

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Table 55. **Use of insulin packages, Mainland Portugal**

	Number of Packages			
	2015	2016	2017	2018
Human insulins				
Fast-acting insulin (soluble)	27 065	24 151	22 051	20 662
Intermediate-acting insulin (isophane)	213 215	202 162	187 452	173 911
Fast-/Intermediate-acting insulin (soluble + isophane)	120 680	110 729	100 932	91 298
Total human insulins	360 960	337 042	310 435	285 871
Insulin analogues				
Fast-acting insulin analogues	199 014	212 178	224 524	247 635
Long-acting insulin analogues	511 307	569 528	618 377	678 430
Fast-/Intermediate-acting insulin analogues	310 543	313 214	308 419	306 412
Total insulin analogues	1 020 864	1 094 920	1 151 320	1 232 477
Total insulins	1 381 824	1 431 962	1 461 755	1 518 348

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA

Tabela 56. **Spending on non-insulin antidiabetic agents, Mainland Portugal**

	Total Costs (thousands of €)				NHS Costs (thousands of €)			
	2015	2016	2017	2018	2015	2016	2017	2018
Human insulins								
Biguanide	11 369	11 744	12 340	12 788	7 628	7 789	8 075	8 770
Sulphonylureas	11 905	10 337	9 593	8 855	9 257	8 306	7 324	6 812
Alpha-glucosidase inhibitors	2 343	1 778	1 484	1 224	1 933	1 510	1 263	1 044
Glinides	1 176	972	849	724	1 078	893	780	664
Glitazones	1 507	1 259	1 146	1 075	989	860	822	752
DPP-4 inhibitors	36 508	37 310	39 216	41 203	33 562	34 359	36 165	37 996
GLP-1 agonists	10 746	13 769	15 408	22 951	9 752	12 479	14 008	20 863
Glyphlozines	5 692	11 559	17 546	27 370	5 187	10 541	16 020	24 993
Total non-insulin antidiabetic agents	**81 247**	**88 729**	**97 582**	**116 190**	**69 386**	**76 737**	**84 458**	**101 895**
Combinations of non-insulin antidiabetic agents								
Glimepiride + Pioglitazone	563	489	441	411	514	447	404	377
Metformin + Pioglitazone	1 743	1 385	1 147	993	1 598	1 272	1 053	912
Glibenclamide + Metformin	531	440	347	278	487	404	319	255
Metformin + DPP-4 inhibitors	112 410	111 084	114 638	118 932	102 698	101 722	105 084	108 983
Metformin + Glyphlozines			4 809	8 842			4 382	8 056
Pioglitazone + DPP-4 inhibitors			106	121			97	111
Total combinations	**115 248**	**113 398**	**121 488**	**129 577**	**105 296**	**103 844**	**111 339**	**118 694**
Total	**196 495**	**202 126**	**219 070**	**245 767**	**174 682**	**180 581**	**195 797**	**220 589**

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Tabela 57. **Spending on insulins, Mainland Portugal**

|	Total costs (thousands of €)				NHS Costs (thousands of €)			
	2015	2016	2017	2018	2015	2016	2017	2018
Human insulins								
Fast-acting insulin (soluble)	887	789	720	673	884	788	719	674
Intermediate-acting insulin (isophane)	7 066	6 686	6. 92	5 746	7 046	6 676	6 190	5 743
Fast-/Intermediate-acting insulin (soluble + isophane)	3 884	3 550	3 234	2 930	3 874	3 546	3 234	2 929
Total human insulins	**11 837**	**11 026**	**10 147**	**9 350**	**11 804**	**11 009**	**10 143**	**9 345**
Insulin analogues								
Fast-acting insulin analogues	7 892	8 529	9 065	9 960	7 868	8 515	9 061	9 956
Long-acting insulin analogues	31 918	34 222	35 569	38 598	31 817	34 170	35 553	38 585
Fast-/Intermediate-acting insulin analogues	**12 673**	**12 792**	**12 621**	**12 611**	**12 641**	**12 774**	**12 616**	**12 205**
Total insulin analogues	**52 483**	**55 543**	**57 255**	**61 169**	**52 325**	**55 460**	**57 230**	**60 746**
Total Insulinas	**64 320**	**66 569**	**67 402**	**70 519**	**64 129**	**66 469**	**67 372**	**70 091**

Source: INFARMED, CCF (Centro de Conferência de Faturas). Dados tratados por DGS/DSIA

Looking at trends since 2006 (2), it can be observed that the compound number of packages of insulin and non-insulin antidiabetic agents sold on an outpatient basis rose from 6.2 million in 2006 to 11.5 million in 2018, which corresponds to an 85 % increase. During that same period, costs rose from € 70.8 million (2006) to € 316.3 million (2018), accounting for a 347% increase. Therefore, globally, the number of non-insulin anti-diabetic agent and insulin packages sold increased by 1.9 times, while costs increased by 4.5 times.

A comparison between insulins and non-insulin antidiabetic agents shows that the number of insulin pa-ckages rose from 0.7 million in 2006 to 1.5 million in 2018 (representing a growth of roughly 114%, in other words, the use of insulin more than doubled) and that the corresponding costs rose from 20.8 M€ to 70.5 M€ (representing a 239% increase, that is, the values more than tripled), while the number of packages of non-insulin antidiabetic agents went from 5.6 million in 2006 to approximately 10.0 million in 2018 (up by 79%) and the corresponding costs went from 49.9 M€ to 245.8 M€ (up by 393%, that is, the values increased almost five-fold).

In 2018, 92% of insulin and non-insulin antidiabetic agent costs were borne by the NHS and 8% directly by the users.

Figure 15. **Trends in the use of non-insulin antidiabetic agents and insulins, Mainland Portugal | 2006 – 2018**
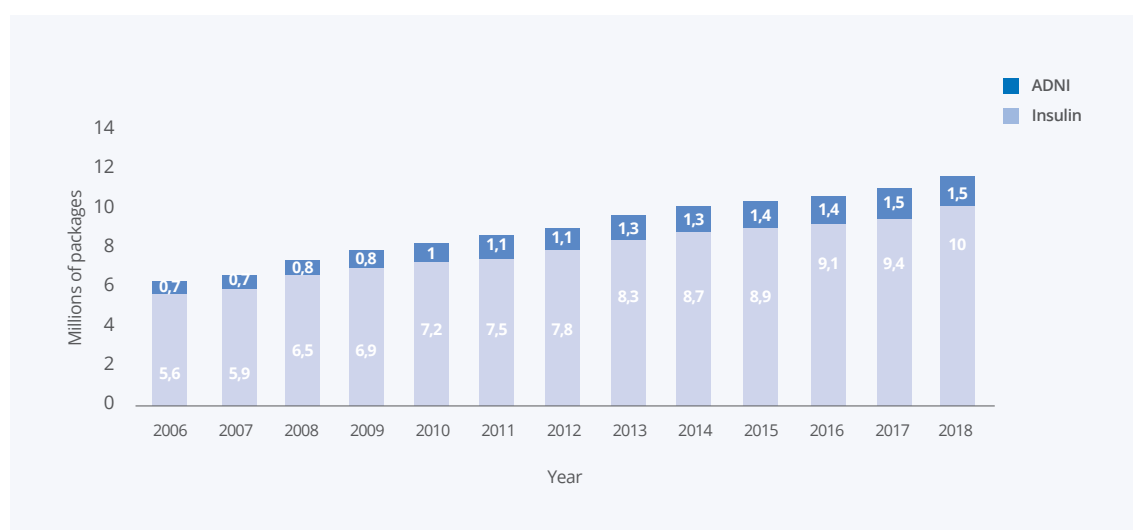
Source: OND (2006-15) (2); INFARMED, CCF (Centro de Conferência de Faturas). Dados tratados por DGS/DSIA.

Figure 16. **Trends in over-the-counter spending on non-insulin antidiabetic agents and insulins, Mainland Portugal | 2006 – 2018**
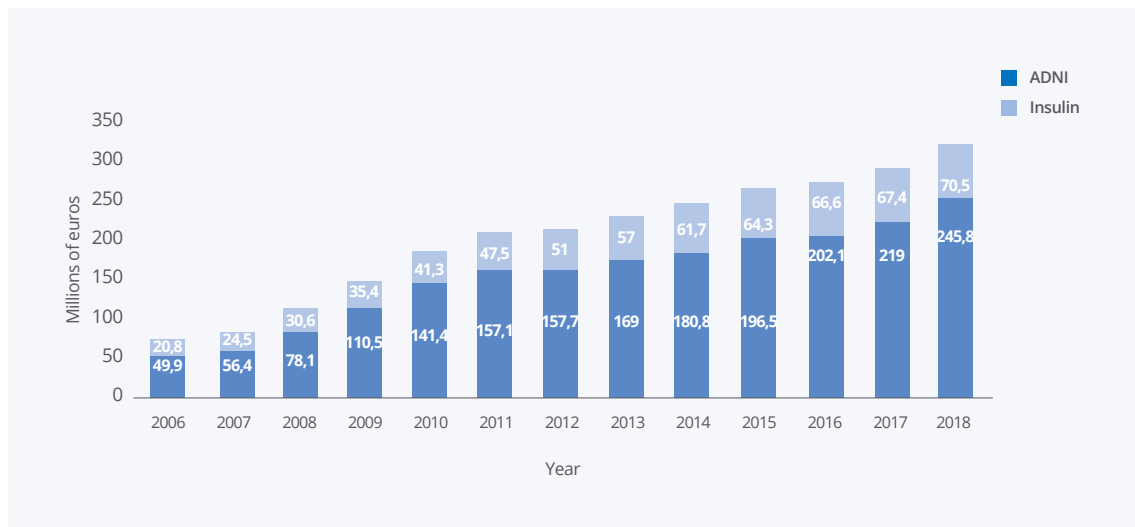
Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Figure 17. **Trends in NHS costs and user spending on non-insulin antidiabetic agents and insulins, Mainland Portugal | 2006 – 2018**
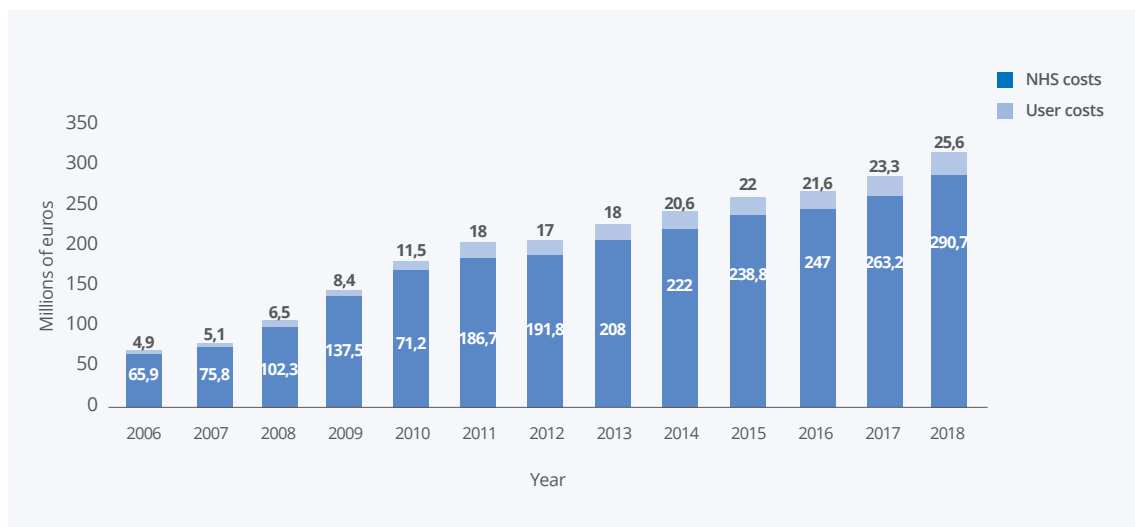
Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Glucagon use and spending remained relatively stable.

Tabela 58. **Glucagon use on the NHS, Mainland Portugal**

	Package quantity			
	2015	**2016**	**2017**	**2018**
Total Glucagom	5 907	5 456	5825	6 102

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Tabela 59. **Spending on glucagon, Mainland Portugal**

	Total costs (thousands of €)				NHS costs (thousands of €)			
	2015	**2016**	**2017**	**2018**	**2015**	**2016**	**2017**	**2018**
Total Glucagom	117	107	115	120	45	42	45	46

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

The number of packages of capillary blood glucose test strips used and the corresponding spending declined slightly between 2015 and 2018, while sales of ketosis measuring strips increased. Spending on test strips remained relatively stable during 2015-2017. Between 2017 and 2018, costs of monitoring outpatient glycaemic control rose by 20%, mostly due to the use of flash glucose monitoring sensors (co-funded by the NHS since 2018).

Tabela 60. **Use of test strips and sensors on the NHS**

	Number of Packages			
	2015	**2016**	**2017**	**2018**
Blood glucose test strips	2 803 759	2 775 398	2 773 720	2 627 511
Interstitial glucose sensors	-	-	NAD	242 124
Glycosuria and ketonuria test strips	924	990	624	487
β-Ketonemia test strips	12 398	13 170	15 076	20 578
Total	2 817 081	2 789 558	2 789 420	2 890 700

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

Tabela 61. **Spending on test strips and sensors in mainland Portugal**

	Total costs (thousands of €)				NHS Costs (thousands of €)			
	2015	**2016**	**2017**	**2018**	**2015**	**2016**	**2017**	**2018**
Blood glucose test strips	51 173	50 496	50 397	47 688	43 360	42 860	42 818	40 525
Interstitial glucose sensors	-	-	-	12 838	-	-	-	10 908
Glycosuria and ketonuria test strips	3,6	3,8	2,4	1,9	3	3,2	2	1,6
β-Ketonemia test strips	165	174	198	270	138	147	168	230
Total	51 342	50 674	50 597	60 798	43 501	43 010	42 988	51 665

Source: INFARMED, CCF (Invoice Control Centre). Data processed by DGS/DSIA.

CONTINUOUS SUBCUTANEOUS INSULIN INFUSION SYSTEMS (INSULIN PUMPS)

During 2015-2018, a growing number of continuous subcutaneous insulin infusion devices and associated consumables were purchased. Spending increased, but the unit price of devices fell.

Tabela 62. **Trends in use of and spending on continuous subcutaneous insulin infusion devices, Mainland Portugal**

	Number (n)				Costs (thousands of €)			
	2015	2016	2017	2018	2015	2016	2017	2018
New devices and associated consumables for one year	NAD	278	664	852	NAD	327	790	880
One-year consumable sets	NAD	1 287	1 442	2 165	NAD	1 254	1 281	1 840
Total	1 311	1 565	2 106	3 017	1 413	1 581	2 071	2 720

Source: DGS

1.7 Cost of Diabetes in Portugal

Hospitalizations and indirect expenditure account for most Diabetes-related spending. According to a study by Bommer et al., indirect costs of Diabetes (e.g. due to mortality or absenteeism) correspond to approximately 36.5% of the total costs (8; 9). The CODE-2 study estimated that the unidentified expenditure corresponds to 40-50% of the total (10). In Portugal, Gouveia et al. estimated that, in 2008, the indirect costs of Diabetes amounted to roughly 330 million euros, which would account for 3.52% of total Health expenditure (11).

Based on identified expenditure and the CODE-2 study, the National Diabetes Observatory estimated that, in 2014, Diabetes costs amounted to 1300-1550 million euros, corresponding to 0.7-0.9% of GDP and 8-10% of health expenditure in 2015 (2).

In 2017, INFARMED pointed to the group of "Hormones and drugs used to treat endocrine disorders" as being responsible for 23.8% of spending on outpatient medication, so this group proved to be responsible for the largest share of expenditure, followed by drugs used for central nervous system and cardiovascular system disorders (12). Taking into account the previously referred spending on non-insulin antidiabetic agents and insulins dispensed to outpatients that year (290.7 M €) and the published figure for total medication expenditure in 2018 (1,255 M €), those drugs will have accounted for roughly 23% of spending on medication that year (13; 14). Trends in spending on medicines to control Diabetes show an important investment in this area.

According to data shown in this report, there is an increase in identified direct spending on people with Diabetes (including outpatient Diabetes therapy and monitoring thereof, and hospitalizations of people with Diabetes), estimated at least 785 million euros in 2018. This increased spending is mainly due to the rise in outpatient therapy costs and the costs of hospitalizations with Diabetes as associated diagnosis.

Tabela 63. **Identified costs, Mainland Portugal**

	Costs (thousands of €)			
	2015	**2016**	**2017**	**2018**
Medication and devices (total user + NHS)				
1. Non-insulin antidiabetic agents and insulins dispensed to outpatients	260,8	268,6	285,5	316,3
2. Glucagon	0,1	0,1	0,1	0,1
3. Blood glucose and test strips	51,3	50,7	50,6	60,8
4. Continuous subcutaneous insulin infusion systems	1,4	1,6	2,1	2,7
Subtotal	313,6	321	338,3	379,9
Hospitalizations				
5. Hospitalizations for Diabetes as primary diagnosis	26,5	25,8	26,4	29
5.1 Decompensated Diabetes without complications	1,3	1,5	3	3,4
5.2 Acute Diabetes complications	3,5	3,6	4,6	4,6
5.3 Chronic Diabetes complications	13,8	12,8	11,3	12
5.4 Lower limb amputation in patients with Diabetes	7,9	7,9	7,5	9,0
6. Hospitalizations for Diabetes as associated diagnosis*	352,7	361,2	371	376,2
Subtotal	**379,2**	**387**	**397,4**	**405,2**
Total *	**692,8**	**708**	**735,7**	**785,1**

* Costs of hospitalizations with Diabetes as associated diagnosis; it is noted that although total cost estimates for these hospitalizations are shown, such costs are not entirely attributable to Diabetes.
Source: BDMH/ACSS/INFARMED/CCF-MS/DGS, 2020. Costs for hospitalizations: ACSS, DPS, BDMH, 06.01.2019 (data for 2015 to 2017) and 22.10.2020 (data for 2018). Indicators according to doc 2019.03.18_EspecificaçãoIndicadores_ICD-10-CMPCS_Diabetes and inclusion of patients with less than 18 years old and E08xxx and E09xxxx diagnosis (E12 does not exist in CD10CM/PCS).

1.8 1.8 Diabetes in the World

PORTUGAL IN EUROPE AND THE OECD

While the OECD 2017 estimate of the average standardized prevalence of Diabetes diagnosed among 18-99 year olds in Europe was 6% (15), the corresponding figure for Portugal was 9.9%. More recently, in its 2019 report, the OECD estimated a 6.4% average prevalence of Diabetes in OECD countries (16).

Figure 18. **Prevalence of (type 1 and type 2) Diabetes diagnosed in 18-99 years old**
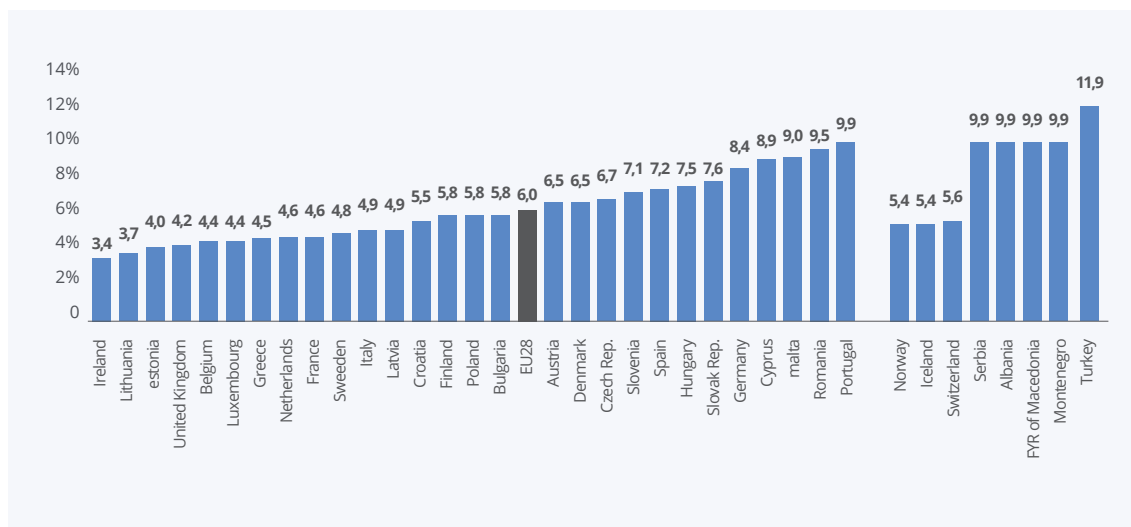
Source: IDF Diabetes Atlas, Eighth Edition, 2017.

Regarding type 1 diabetes in children up to 14 years of age, in 2015 the known prevalence in Portugal (0.9/1,000) was below the OECD average (1.2/1,000) (5). However, the most recent analysis of the DOCE register (shown in this report) pointed to a prevalence for that year, in Portugal, of 1.6/1,000, leading to the conclusion that the actual prevalence should be even higher, as the records are incomplete.

Inadequate eating habits, lack of physical activity, excessive weight and smoking are risk factors for developing type 2 Diabetes. The 2019 OECD report shows that, among the adult population in Portugal, the daily fruit intake is higher than the average for this group of countries (70.9 vs 57.1%, data from 2017), the daily consumption of vegetables is lower (55.2 vs 59.6%, 2017), the practice of moderate physical activity is below average (57.1 vs 66, 5%, data from 2014) and the overweight or obesity prevalence is higher (67.6 vs 58.2%, 2017) (16). Smoking habits were identical to or slightly below the OECD average (17 vs 18% among the population aged 15 and over, 2017) (16).

The rate of hospitalizations for Diabetes in Portugal is also lower than the OECD average (129:100,000 population, 2017); however, the rate of amputations, although showing a declining trend, was higher than the average (6.4:100,000 population, 2017) (16).

In Europe, Diabetes-related expenditure accounts for 4.2 to 23.8% of health spending (9). Expenditure per person with Diabetes also differs considerably across different countries in Europe (between US$ 145-341 and US$ 7,978-11,916) (9).

DIABETES IN THE WORLD

The 2016 World Health Organization Report (17) estimated that:

- The prevalence of type 2 Diabetes continued to increase worldwide;
- 8.5% of the world's adult population had Diabetes in 2014, a rate which nearly doubled since 1980;
- This figure corresponded to 422 million people aged 18 and above who had Diabetes, worldwide;
- The incidence of type 1 Diabetes varies widely across countries, from 0.5 to 60 cases annually for every 100,000 children aged 15 and below;
- Diabetes caused 1.5 million deaths in 2012, 43% of which occurred under the age of 70;

- 10-25% of pregnancies were affected by hyperglycaemia, induced in an estimated majority (75-90%) by gestational Diabetes;
- The annual cost of Diabetes worldwide is approximately US$ 827 billion;
- In 2030, this figure will rise to an annual expenditure of US$ 1.7 trillion.

2. Activities | 2018-2019

2.1 Epidemiological Surveillance

During 2009-2016, data on the epidemiological surveillance of DM in Portugal were presented by the National Diabetes Observatory of the Portuguese Diabetes Society in its report "Diabetes: Factos e Números" ("Diabetes: Facts and Figures"). The 2016 report contained data on Diabetes surveillance in 2015 (2).

In 2016, the NPD prioritized the autonomous collection and publication of data on the epidemiological surveillance of Diabetes, and prepared a chapter as part of the publication "A Saúde dos Portugueses" ("The Health of the Portuguese") (18), from data provided and analysed by the relevant structures in the Directorate-General of Health (DGS). In the 2017 report on the National Program for Diabetes (19), a chapter on this subject was also included, entitled "The state of Health in 2016".

Proper knowledge and epidemiological monitoring of Diabetes in Portugal is fundamental for the NPD, so a range of indicators were analysed. This report contains an extensive chapter with data on the epidemiological surveillance of Diabetes until 2018, which resulted from that analysis. However, in the particular case of data relating to hospital admissions, the 2018 data are still provisional. This is because the coding of clinical processes in hospitals for 2018 has not been completed yet.

In view of the difficulties encountered in obtaining regular epidemiological data that are essential for a number of priority programs, the Directorate for Information and Analytic Services (DSIA) of the Directorate-General of Health is preparing computer-based dashboards containing these epidemiological data. In 2019, the National Program for Diabetes collaborated with the DSIA in preparing this material. The section on Diabetes ("Power BI - DGS Diabetes") already includes data on Hospital Care (admissions), Primary Health Care, mortality, and medication costs. Included in this project is a future, publicly accessible version which will contribute to the general knowledge on the epidemiology of this disease in Portugal.

2.2 Prevention and Diagnosis of Diabetes

The National Health Examination Survey carried out in 2015 pointed to a 9.9% standardized prevalence of Diabetes in Portugal among the population aged 25-74 (3).

Early diagnosis is key for proper treatment and prevention of Diabetes complications. In 2009, it was estimated that 44% of the Portuguese population with Diabetes were unaware of the disease (20), while in 2015, using a different diagnostic methodology, it was estimated that the disease was unknown in 13% of the cases (3). Both estimates show that there is still a large number of people with Diabetes who are unaware of their condition.

Primary Health Care (CSP) units' commitment to diagnostic work in their daily clinical activity should be highlighted. Over the last three years CSP units have carried out more than 1.9 million Diabetes risk assessments and recorded more than 60,000 new Diabetes diagnoses per year.

Notwithstanding this, given the importance of early diagnosis and, above all, the need to promote Diabetes prevention at National level, the PND stressed the need to promote a program directed at achieving those goals, implemented by the relevant structures and centrally managed by the DGS. Accordingly, the preparation of the "More Health, Less Diabetes" project has started in collaboration with the National Program for the Promotion of Healthy Eating, the National Program for the Promotion of Physical Activity, and the Health Literacy Action Plan developed by the DGS.

As regards children and young people, the DGS/NPD maintains a National Register of Diabetes in Children and Young People, the aforementioned DOCE (**D**iabetes – rec**O**rd of **C**hildren and youngst**E**rs) register.

2.3 Early Diagnosis of Diabetes Complications

Early diagnosis and treatment of chronic Diabetes complications is another priority, as it can prevent progression to more severe forms of the disease. In particular, it can prevent cases of blindness, kidney failure requiring haemodialysis and lower limb amputation.

In this context, Screening for Diabetic Retinopathy and Diabetic Foot Risk Assessment have been implemented.

In 2018, screening for Diabetic Retinopathy was carried out in 43 of the 54 ACES/ULS, representing an 82% geographical coverage of mainland Portugal. It should be noted that only 62% of invited users attended the screening, resulting in a population screening rate of 30%. This rate corresponds to 218,223 people with Diabetes who underwent screening and represents an 9% increase over the previous year. 4.3% (9,364) of the individuals screened had a positive result and were referred to an ophthalmology consultation. In the first half of 2019, 110,740 people with Diabetes were screened, of which 6,674 had a positive test result (6%).

In 2018, DGS published the standards on Diabetic Retinopathy Screening (21), which lay down the criteria for population screening, referral and treatment.

With regard to diabetic foot, 700-800 thousand diabetic foot risk assessments were carried out during 2015-2017. Most ACES and Hospitals/Hospital Centres/Local Health Units already have diabetic foot consultations, evidencing an effort to prevent and treat this complication.

2.4 Treatment

Promoting good practices in the treatment of Diabetes is another important goal of the NPD. To that effect, efforts were directed towards the review of standards on surveillance and monitoring of eye, kidney and foot complications in people with Diabetes.

As mentioned, the standard on Screening for Diabetic Retinopathy (21), including the criteria for referral and treatment of the same, was published by DGS in 2018. The standard on Prevention, Diagnosis, Treatment, Monitoring and Referral of Diabetic Foot in Adults and the Elderly was reviewed and is currently under external validation. The standard on Prevention, Diagnosis and Treatment of Diabetic Kidney Disease in Adults is in preparation.

The NPD is responsible for managing access to therapy using Subcutaneous Continuous Insulin Infusion (SCII) systems. Within the framework of the NPD, until 2016, SCII devices (insulin pumps) were assigned to all children aged 5 and under, 100 devices were distributed to users over the age of 5, and 30 SCII devices were given to pregnant women and women in the preconception period. Additionally, Government Order No. 13 277/2016 provided for coverage in this respect for all eligible children up to the age of 10 by the end of 2017 and all eligible children up to the age of 14 by the end of 2018, as well as access to treatment with CSII devices to the entire eligible population up to the age of 18 by the end of 2019 (22). As a result, 664, 852 and 857 CSII devices were purchased in 2017, 2018 and 2019, respectively, ensuring eligible waitlist users aged 18 and under access to these devices until the end of 2019. While at the end of 2015 there were 1,311 patients undergoing treatment with SCII devices under this program, 40% of which aged 19 and under (2), at the end of 2018 that number had risen to 2,364 patients, 56% of which aged 18 and under (7). In 2018 and the first

half of 2019, two new CSII Therapy Centres opened, so, in total, there are currently 22 CSII Therapy Centres in mainland Portugal.

Children and Young People with type 1 Diabetes *Mellitus* (T1DM) need adequate management of insulin administration, food intake and physical activity throughout the day. Therefore, engaging the School in their therapy is paramount, through capacity-building of school health teams and of the entire school community on T1DM treatment. Joint Guideline No. 06/2016 (23) of the General-Directorate of Health and the General--Directorate of Education, on Children and Young People with type 1 Diabetes *Mellitus* (T1DM) at School, provided for a training plan for School Health Teams, the School Community and the School Reference Persons. Decree-Law nº 54/2018 of 6 July underlined the right of every student to an inclusive education that responds to their potential, expectations and needs, under effective equity conditions (24).

In 2019, Government Order No. 8297-C/2019 was published, which adopted the Regulation on assistance to children and young people with type 1 Diabetes *Mellitus* at school (25). Every child and youth with type 1 Diabetes *Mellitus* must have an Individual Health Plan (Plano de Saúde Individual, or PSI) prepared on the basis of their therapeutic plan, completed with the participation of parents or guardians, members of the school health team and school staff, and involving whenever possible the child or youth with T1DM. Following the review of this Individual Health Plan for Children and Youth with type 1 Diabetes in 2019, its updated version has now been published and is available on the websites of the Directorate-General of Education (DGE) and the Directorate-General of Health (DGS) (26).

In this context, with a view to optimizing the treatment of, and ensuring health, inclusion and equity conditions for children and young people with type 1 Diabetes at school, the NPD prepared, in collaboration with various professionals and other Priority Programs, a Trainer's Support Manual on Children and Young People with type 1 Diabetes *Mellitus*, addressed to Health and Education professionals (27). It also prepared an abridged version of this manual (28), a set of slides for use in training sessions promoted by School Health teams and addressed to school reference persons, and two films on type 1 Diabetes addressed to children and young people (29). These materials were published by DGS in 2019 (in electronic format) and are available from dgs.pt (https://www.dgs.pt).

2.5 Organization Model

Following the appointment of the new Director of the National Program for Diabetes (NPD), the Regional Diabetes Coordinators for the North, Centre, Lisbon and Tagus Valley, Alentejo and Algarve regions were reappointed by the corresponding Regional Health Administrations (ARS).

A Functional Coordinating Diabetes Unit (UCFD) is to be established in the geographical area covered by each ACES (30). These UCFDs comprise professionals from Primary Health Care, Hospital Care and the Local Health Authority, and their organizational model facilitates the coordination, multi-disciplinary and integration of care provided to people with or at risk of developing Diabetes. UCFDs expedite the identification of local needs and put in place adequate strategies to respond to those needs, they facilitate communication between different health professionals and with the civilian population and local institutions, and they are important drivers of NPD implementation.

Regional meetings took place in the North, Centre, LVT and Algarve ARS, organized by the respective Regional Coordination Units for Diabetes. In addition, between October and November 2019, UCFDs of the North, LVT, Alentejo and Algarve ARS were nominated and/or sworn-in for the 2020-2022 triennium. Only the UCFDs of the ARS Centre were previously formally nominated and in office, ending their term of office in December 2019. For this reason, appointments for the ARS Centre are scheduled for December 2019.

The Scientific Council of the National Program for Diabetes is in the process of being established. According to Government Order No. 1758/2019 (31), the NPD Scientific Council is composed of one representative from the Medical Association, the Nursing Association, the Pharmacy Association, the Dietetic Association, the Psychologist Association, the Portuguese Society of Diabetology, the Portuguese Society of Endocrinology, Diabetes and Metabolism, the Portuguese Society of Internal Medicine, the Portuguese Association for General and Family Medicine, the Portuguese Society of Paediatrics and other personalities of known merit. Among these, the NPD proposed including at least one representative from among the Associations of People with Diabetes, given the importance of involving people with diabetes and their Associations in the search for and the implementation of solutions in the field of Diabetes.

2.6 Supporting Civil Society

The Rotary Anti-Diabetes Front (FRAD) - Rotary and international Rotaract clubs from district 3190 - has developed diptychs promoting type 2 Diabetes risk assessment and healthy lifestyles, and this project was supported by the NPD. These diptychs were circulated by the Rotary and Rotaract clubs, as well as by 3,190 parish councils, under a collaboration protocol between FRAD and the National Parish Association (ANADFRE).

In accordance with Decree-Law No. 186/2006 (32) and Article 9 of Ministerial Ordinance No. 258/2013 (33), the Directorate-General of Health (DGS) has secured the financing of ad-hoc and multiannual projects developed by non-profit private legal persons working in the field of Diabetes. Within this legal framework, in December 2016 the DGS made public the launching of two financing calls for tenders worth one hundred thousand euros (fifty thousand euros per call) under the National Program for Diabetes, in the following areas of intervention: a) Provision of Podiatric Care to People with Diabetes in institutional care; b) Provision of Podiatric Home Care to People with Diabetes and mobility or sight problems that force them to home confinement most of the time. In 2018, the launching of two other identical tenders was made public.

As a result of these tenders, four projects submitted by the Association for the Protection of Diabetics in Portugal (APDP) were selected, two starting in 2017 and two starting in 2019, all with the duration of one year. In geographical terms, the projects carried out between 30-11-2017 and 29-11-2018 took place in the Lisbon district (Loures, Odivelas and Sintra municipalities) and allowed for podiatric care to be provided to 100 individuals in institutional care and 100 individuals with mobility issues. The projects that started on 02/20/2019 are underway in the districts of Évora (Montemor-o-Novo and Vendas Novas municipalities) and Setúbal (Alcácer do Sal municipality) and have already allowed for podiatric care to be provided to 137 individuals in institutional care and 167 individuals with mobility problems. These projects include training of formal and informal caregivers dealing people with diabetes (family members and podiatric care providers) in chiropody treatment in low-risk cases and the education of people with Diabetes themselves.

2.7 Communication and Image

The NPD took part in interviews for medical journals and civil society newspapers, as well as in radio and television newscasts. It took an active part in meetings and congresses of various National Scientific Societies and Associations of People with Diabetes.

At Gabriel Pereira Secondary School, in Évora, the NPD presented the Trainer's Support Manual on Children and Young People with type 1 Diabetes *Mellitus*. In addition to the presentation of this manual and of the Regulation on assistance to children and young people with type 1 Diabetes *Mellitus* at school and other supporting material, the event included a debate on the topic, a photo exhibition ("Diabetes won't stop me") with the contribution of various associations of people with Diabetes, and the live show of the play "Dia & Betes and the friendship school", aimed at primary school students.

The NPD prepared and published infographics and three films: 1) one on type 1 Diabetes addressed to children; 2) another one on type 1 Diabetes aimed at young people; 3) and a third one on Diabetes Prevention and Control, addressed to the adult population in general, in particular those with increased risk of developing type 2 Diabetes or who already live with Diabetes.

3. Roadmap for action | 2019 - 2021

Diabetes is a chronic disease with related complications that can seriously affect quality of life and contribute to premature mortality. It is an epidemic with a growing prevalence worldwide: in its 2016 report, WHO estimated that the prevalence of Diabetes has increased from 4.7% (108 million) of the adult population in 1980 to 8.5% (422 million) of the adult population in 2014 (age-standardized prevalence rates) (17). Being associated with the increasing prevalence of obesity, this epidemic can be prevented to a considerable extent. This is why in recent years the need to fight the Diabetes epidemic has been highlighted by WHO (Global Action Plan for the prevention and control of noncommunicable diseases 2013-2020) (34), the United Nations (Sustainable Development Goals) (35), and the European Parliament (Declaration on Diabetes, 2016).

As mentioned before, Portugal has one of the highest prevalence rates of Diabetes in Europe, with around 10-13% of the population aged 20-79 having the disease (15). It is further estimated that about ¼ of the Portuguese population has intermediate hyperglycaemia (prediabetes) (2). In addition to the serious consequences it can have for those affected and their families, this National Diabetes epidemic has high costs for society (2). Defining a plan for the prevention and control of Diabetes is therefore an important priority.

This chapter presents the challenges and strategies for 2019/2021, following on from the activities developed by the PND in previous years. These strategies seek to contribute to solving the problems encountered in the fight against Diabetes-related problems.

3.1 Epidemiological Surveillance

Proper knowledge of the prevalence of Diabetes at National and regional level is fundamental in order to measure the extent of the problem, assess the effectiveness of the strategies implemented, and redefine strategies for prevention and control of the disease. The last population survey was carried out in 2015 (3).

Knowing the prevalence and incidence of type 1 Diabetes in Portugal is also essential. Currently we have a register for Children and Young People up to the age of 21 (DOCE), but it is very incomplete. The new special therapies/technologies directed at this type of Diabetes highlight the need for a better knowledge of its incidence, prevalence and geographic distribution, in order to define health strategies targeted at this population.

A systematic computer-based registration at National level, as part of clinical practice, would allow for better assessment of the prevalence of type 1 Diabetes as well as of other types of Diabetes or prediabetes among the Portuguese population.

Characterizing patients with diabetes in terms of their risk factors, complications, therapy use and disease control is also an important step, and facilitates the work of the care team. The quality of these records facilitates healthcare assistance and is key to identify problems and solutions and define strategies to be put in place.

ACTIONS TO BE UNDERTAKEN:

- Proposing and taking part in a new National survey on the prevalence of Diabetes, in collaboration with INSA.
- Developing computer applications that allow for systematic registration of the diagnosed type of Diabetes or prediabetes.
- Reviewing the Diabetes module in the "SClínico" registry.
- Monitoring trends in epidemiological and healthcare indicators..

3.2 Prevention and Diagnosis of Diabetes

Primary Health Care risk assessment of type 2 Diabetes among the adult population allowed for the identification of many users with increased risk (moderate or higher) of developing Diabetes. In addition to maintaining this Primary Health Care assessment, it is envisaged to promote community-wide risk assessment in order to cover those not yet assessed for type 2 Diabetes risk and allow for their referral for screening/diagnosis, in particular at Health Centre Group (ACES) level. For those users who do not yet have Diabetes, but are at increased risk of developing it, preventive measures should now be implemented to prevent or delay the onset of the disease.

ACTIONS TO BE UNDERTAKEN:

- Diabetes prevention and control campaign.
- Implementing the "More Health, Less Diabetes" prevention project: preparing support materials for face-to-face and online sessions, and trainers' training whenever necessary.
- Developing the IT module at the "SClínico" registry, to allow for registration, monitoring of the implementation and evaluation of project outcomes.
- Beginning project implementation at Primary Health Care level and establishing partnerships, particularly for promoting physical exercise.

3.3 Treatment

In recent years, we have seen steady progress and growing complexity in the treatment of Diabetes. In this context, and in line with the aim of promoting best practices in the treatment of Diabetes, review of the standards on diagnosis, treatment, monitoring and referral of type 2 Diabetes was requested.

As mentioned before, the standards on Prevention, Diagnosis, Treatment, Monitoring and Referral of Diabetic Foot in Adults and the Elderly and those on Prevention, Diagnosis and Treatment of Diabetic Kidney Disease in Adults are expected to be finalized/published during the coming months.

The extended population coverage of Diabetic Retinopathy Screening and early treatment of positive cases, in line with the already published standard, is also of vital importance.

Within the scope of Nationwide coordination of type 1 Diabetes treatment using Continuous Subcutaneous Insulin Infusion, it is envisaged for 2020 to extend accessibility to this treatment method to all children and young people aged 21 and under with a referral for this type of treatment, as well as to increase the number of new devices assigned to users over 21 (from 100 devices for users over 18 to 300 new devices for users over 21) and to pregnant women and women in the preconception period (from 30 to 60 devices). With the growing acquisition of devices in recent years and the said measures, a significant waiting-list reduction is expected.

Two or three new Treatment Centres are expected to open in 2020, totalling 24-25 Treatment Centres in mainland Portugal. Although they are not included in this report because they are not coordinated by the NPD, it is worth mentioning that the Azores archipelago also has a Treatment Centre and the Madeira archipelago plans to open one in 2020, facilitating accessibility for and monitoring of users from these autonomous regions.

Another particularly important goal is empowering those living with Diabetes to control the disease and prevent its complications. In this context, the PND joined the "Diabetes in Motion" project, notably in preparing the training plan for its users (with type 2 Diabetes).

With regard to type 1 Diabetes in school-age children and young people, it is expected that in 2020 the paediatric diabetes consulting teams will further develop the capacity-building of school health teams in their area of influence, thus facilitating the inclusion, healthcare and safety of children and young people with type 1 Diabetes.

ACTIONS TO BE UNDERTAKEN:

- DGS is in the process of reviewing/preparing the standards on "Prevention, Diagnosis, Treatment, Monitoring and Referral of Diabetic Foot in Adults and the Elderly", "Prevention, Diagnosis and Treatment of Diabetic Kidney Disease in Adults" and "Diagnosis, Therapy, Monitoring and Referral of type 2 Diabetes".
- Coordinating the assignment of Subcutaneous Insulin Infusion devices to all eligible users with type 1 Diabetes aged 21 and under, plus 300 devices for users over 21, and 60 devices for women in the preconception period and pregnant women.
- Opening of new Treatment Centres providing Continuous Subcutaneous Insulin Infusion.
- Preparing training plan for people with type 2 Diabetes under the joint coordination of the "Diabetes in Motion" Project (National Program for the Promotion of Physical Activity, National Program for Diabetes, National Program for the Promotion of Healthy Eating).
- Liaising with paediatric diabetes consulting teams and engaging with the National School Health Program in order to promote Nationwide capacity-building of school health teams, education professionals and the school community.
- Surveillance and promotion of population coverage for screening for diabetic retinopathy and early treatment of positive cases.

3.4 New Technologies

The introduction of CSII and continuous glucose monitoring systems allows for better control of type 1 Diabetes, with fewer complications and better quality of life for users. Integrated real-time continuous glucose monitoring systems allow for even better control of the disease and reduce its complications, being cost-effective in selected groups of patients.

The NPD has joined efforts with INFARMED, the ACSS and the SPMS with a view to the eventual acquisition of new, possibly integrated CSII devices, within the framework of the PND.

Viewing of the data stored in Glucometers, Continuous Glucose Monitoring readers and Continuous Subcutaneous Insulin Infusion devices raise some difficulties for people with Diabetes and health professionals, owing to the variety of devices and the multiplicity of computer applications, the time consumed, or the legal barriers to their use by professionals. The introduction of a single IT tool allowing for data to be downloaded from all devices used in the National territory, accessible to users and health professionals, would be an asset that would facilitate self-management and surveillance/treatment of Diabetes, overcoming IT and legal barriers and making it easier to obtain National data.

ACTIONS TO BE UNDERTAKEN:

- Reviewing the Framework Agreement applicable to CSII devices.
- Development of an IT tool by the SPMS for viewing and analysing data stored in glucose meters, continuous glucose monitoring devices and continuous subcutaneous insulin infusion devices.

3.5 Communication

Review of the NPD page (website of the Directorate-General for Health) is planned. This webpage should contribute to the dissemination of content and activities relating to the National Program for Diabetes among health professionals and the community at large.

Dissemination of infographics and other information content through UCFDs, DGS IT tools (Facebook, Tweeter, YouTube, institutional website) and various social media.

ACTIONS TO BE UNDERTAKEN:

- Reviewing NPD page on the DGS website.
- Disseminating information on Diabetes through UCFDs, the Diabetes Dashboard, DGS IT tools and social media.

Final notes

The goals of the National Program for Diabetes are to reduce the incidence of type 2 Diabetes, lessen complications from all forms of Diabetes, lower the number of early deaths related to this disease and increase quality-adjusted life years for people living with diabetes. In pursuing these goals, the NPD promotes the implementation of programs for prevention, diagnosis and early treatment of Diabetes and its complications, through quality health care and always ensuring equality of access for the entire population in the National territory, so as to promote the integration and inclusion of all people.

In a chronic and highly prevalent disease such as Diabetes, in which lifestyles are decisive, success in the pursuit of said goals require the active participation of all sectors of society and, as a rule, the involvement of the entire population. Coordination with other health programs, establishing partnerships and promoting community involvement are therefore paramount.

SEARCH METHODS FOR THE INDICATORS SHOWN

Table 2: Search method in BDMH: ICD9-CM: DP/DA: V27.-, 648.8.-; ICD 10-CM DP/DA: Z37.-, O24.42.

Table 3: Search method in BDMH: ICD9-CM: DP/DA: V27.-, 648.0-; ICD 10-CM DP/DA: Z37.-, O24.02, O24.12

Table 4: Search method: SIARS code 2013.262.01

Table 5: Search method: SIARS code MORB.198.01

Table 6: Search method: SIARS code MORB.236.01

Table 7: Search method: SIARS code MORB.2011.011

Table 8: Search method: SIARS code 2013.075.01

Table 9: Search method: SIARS code 2013.037.01

Table 10: Search method: SIARS code 2013.088.01

Table 11: Search method: SIARS code 2013.091.01

Table 12: Search method: SIARS code 2013.039.01

Table 13: Search method: SIARS code 2015.315.01 FL

Table 14: Search method: SIARS code 2015.314.02 FL

Table 15: Search method: SIARS code 2013.036.01

Table 16: Search method: SIARS code 2013.040.01

Table 17: Search method: SIARS code 2013.097.01

Table 18: Search method: SIARS code 2013.035.01

Table 19: Search method: SIARS code 2011.043.01

Table 20: Search method: SIARS code 2011.005.02

Table 21: Search method: SIARS code 2013.275.01

Table 22: Search method: SIARS code 2013.042.01

Table 23: Search method: SIARS code 2013.276.01

Table 24: Search method: SIARS code 2013.041.01

Table 28
Search method in BDMH: ICD9-CM DP/DA: 249.1, 250.1, 249.2, 250.2, 249.7, 250.7, 249.3, 250.3, 249.4, 250.4, 249.5, 250.5, 249.6, 250.6, 249.0, 250.0, 249.8, 250.8, 249.9, 250.9; ICD 10-CM DP/DA: 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, E08.51, E08.52, E09.51, E09.52, E10.51, E10.52, E11.51, E11.52, E12.51, E12.52, E13.51, E13.52, E08.641, E09.641, E10.641, E11.641, E12.641, E13.641, E08.649, E09.649, E10.649, E11.649, E12.649, E13.649, 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-, E08.9 E09.9, E10.9, E11.9, E12.9, E13.9, E08.69, E09.69, E10.69, E11.69, E12.69, E13.69, E08.8 E09.8, E10.8, E11.8, E12.8, E13.8.

Table 29
Search method in BDMH: ICD9-CM DP: 249.1, 250.1, 249.2, 250.2, 249.7, 250.7, 249.3, 250.3, 249.4, 250.4, 249.5, 250.5, 249.6, 250.6, 249.0, 250.0, 249.8, 250.8, 249.9, 250.9; 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, E08.51, E08.52, E09.51, E09.52, E10.51, E10.52, E11.51, E11.52, E12.51, E12.52, E13.51, E13.52, E08.641, E09.641, E10.641, E11.641, E12.641, E13.641, E08.649, E09.649, E10.649, E11.649, E12.649, E13.649, 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-, E08.9 E09.9, E10.9, E11.9, E12.9, E13.9, E08.69, E09.69, E10.69, E11.69, E12.69, E13.69, E08.8 E09.8, E10.8, E11.8, E12.8, E13.8.

Table 30
Search method in BDMH: ICD9-CM DP: 249.-, 250.-; Ch 1 001-139; Ch 2 140-239; Ch 3 280-289; Ch 4 240-279; Ch 5 290-319; Ch 6, 7 e 8 220-389; Ch 9 390-459; Ch 10 460-519; Ch 11 520-579; Ch 12 680-709; Ch 13 710-739; Ch 14 580-629; Ch 15 630-679; Ch 16 760-779; Ch 17 740-759; Ch 18 780-799; Ch 19 800-999; Ch 20 E000-E999; Ch 21 V01-V91; ICD 10-CM DP: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-; Ch 1 A00-B99; Ch 2 C00-D49; Ch 3 D50-D89; Ch 4 E00-E89; Ch 5 F01-F99; Ch 6 G00-G99; Ch 7 H00-H59; Ch 8 H60-H95; Ch 9 I00-I99; Ch 10 J00-J99; Ch 11K00-K95; Ch 12 L00-L99; Ch 13 M00-M99; Ch 14 N00-N99; Ch 15 O00-O9A; Ch 16 P00-P96; Ch 17 Q00-Q99; Ch 18 R00-R99; Ch 19 S00-T88; Ch 20 V00-Y99; Ch 21 Z00-Z99.

Table 31 - hypoglycaemias
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,

Table 32
Search method in BDMH: ICD9-CM DP: Ch 1 001-139; Ch 2 140-239; Ch 3 280-289; Ch 4 240-279; Ch 5 290-319; Ch 6, 7 e 8 220-389; Ch 9 390-459; Ch 10 460-519; Ch 11 520-579; Ch 12 680-709; Ch 13 710-739; Ch 14 580-629; Ch 15 630-679; Ch 16 760-779; Ch 17 740-759; Ch 18 780-799; Ch 19 800-999; Ch 20 E000-E999; Ch 21 V01-V91; ICD 10-CM DP: Ch 1 A00-B99; Ch 2 C00-D49; Ch 3 D50-D89; Ch 4 E00-E89; Ch 5 F01-F99; Ch 6 G00-G99; Ch 7 H00-H59; Ch 8 H60-H95; Ch 9 I00-I99; Ch 10 J00-J99; Ch 11K00-K95; Ch 12 L00-L99; Ch 13 M00-M99; Ch 14 N00-N99; Ch 15 O00-O9A; Ch 16 P00-P96; Ch 17 Q00-Q99; Ch 18 R00-R99; Ch 19 S00-T88; Ch 20 V00-Y99; Ch 21 Z00-Z99.

Table 33
Search method in BDMH: ICD9-CM DP, DA, DP/DA: 249.-, 250.-; ICD 10-CM DP, DA, DP/DA: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-;

Table 34
Search method in BDMH: ICD9-CM DP: 249.-, 250.-; Ch 1 001-139; Ch 2 140-239; Ch 3 280-289; Ch 4 240-279; Ch 5 290-319; Ch 6, 7 e 8 220-389; Ch 9 390-459; Ch 10 460-519; Ch 11 520-579; Ch 12 680-709; Ch 13 710-739; Ch 14 580-629; Ch 15 630-679; Ch 16 760-779; Ch 17 740-759; Ch 18 780-799; Ch 19 800-999; Ch 20 E000-E999; Ch 21 V01-V91; ICD 10-CM DP: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-; Ch 1 A00-B99; Ch 2 C00-D49; Ch 3 D50-D89; Ch 4 E00-E89; Ch 5 F01-F99; Ch 6 G00-G99; Ch 7 H00-H59; Ch 8 H60-H95; Ch 9 I00-I99; Ch 10

J00-J99; Ch 11K00-K95; Ch 12 L00-L99; Ch 13 M00-M99; Ch 14 N00-N99; Ch 15 O00-O9A; Ch 16 P00-P96; Ch 17 Q00-Q99; Ch 18 R00-R99; Ch 19 S00-T88; Ch 20 V00-Y99; Ch 21 Z00-Z99.

Table 39
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 40
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.-;

Table 41
Search method in BDMH: ICD9-CM DP: 440.23, 440,24, 785.4, 707.1-; ICD9-CM DA: 249.-, 250.-; ICD 10-CM DP: E08.52, E09.52, E10.52, E11.52, E12.52, E13.52, I70.233, I70.234, I70.235, I70.243, I70.244, I70.245; ICD-10-DA: E08.-, E09.-, E10.-, E11.-, E12.-, E13.-

Table 42 – Hospitalizations for amputation
Search method: SIARS code 2017.360.01

Figure 12
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

Figure 13
Search 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, 0Y620ZZ, 0Y630ZZ, 0Y640ZZ, 0Y670ZZ, 0Y680ZZ, 0Y6F-0ZZ, 0Y6G0ZZ, 0Y6C0Z1, 0Y6C0Z2, 0Y6C0Z3, 0Y6D0Z1, 0Y6D0Z2, 0Y6D0Z3, 0Y6H0Z1, 0Y6H0Z2, 0Y6H0Z3, 0Y6J0Z1, 0Y6J0Z2, 0Y6J0Z3

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