NHS
SCOTLAND

Scottish Diabetes Survey 2010

Scottish Diabetes Survey Monitoring Group

Foreword

The Scottish Diabetes Survey is now in its tenth year. This 2010 Survey, as with previous versions, continues to demonstrate an increase in the prevalence of diabetes and an increase in recording key data that reflects the quality of diabetes care across the whole of Scotland. This provides useful information for the Scottish Diabetes Action Plan review and should aid and influence NHS Boards in Scotland in service planning, audit and with quality improvement. It also offers great potential for epidemiological research.

The survey has some major strengths;
- It provides information on the whole population.
- The data items collected are nationally agreed, consistently defined and evidence based
- The information is provided at NHS Board level, each responsible for the healthcare of their region.
- The system used to collect the data is integrated into the provision of care, and is available at all levels – from data for one individual, through the general practice, hospital unit, GP group, NHS Board and nationally.

The information collected also presents NHS Scotland a number of challenges
- The increasing prevalence of diabetes presents an organisational and resource pressure
- There are still many patients who do not appear to have key parameters measured or recorded. In six NHS Boards an automatic link between SCI-Store and SCI-DC has improved data capture and this will be implemented across all Boards this year.
- The report presents data from people with type 1 and type 2 diabetes separately and shows that 38% of those with type 1 diabetes have poor glycaemic control.
- There are data collection issues for those people with diabetes who receive specialist care at a clinic which does not link directly to the SCI-DC system. This will include some paediatric clinics and will rely on primary care staff entering the data from clinic letters.
- 14.9% of people with diabetes do not appear to have an up-to-date eye screen, and this is worse (22.6%) in those with type 1 diabetes who are at greater risk of proliferative retinopathy.
- The use of the foot screening risk calculation needs further emphasis as it is not widely used.
- There is no decline in smoking prevalence in the last 6 years which is quite different from the general population.

In this survey we also attempted to ascertain what proportion of people with diabetes was achieving ideal targets for glycaemia, blood pressure and cholesterol. The glycaemic target was probably set unrealistically low making this calculation difficult to interpret.

The launch of the 2010 SIGN guideline for diabetes and the Diabetes Action Plan review presents a further opportunity to build on the work of the survey to encourage further improvements in diabetes care in Scotland.

John A McKnight

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Executive Summary

This report presents the results of the 2010 Scottish Diabetes Survey. The survey collates data submitted by all 14 NHS Boards. The Scottish Diabetes Survey provides data on the number of people with diabetes, the effects on their health, and the progress being made to improve the delivery and outcomes of care for diabetes. In this survey, we report separately on those with type 1 and those with type 2 diabetes.

In this Scottish Diabetes Survey 2010, we report that:

- There were 237,468 people diagnosed with diabetes in Scotland recorded on local diabetes registers at the start of 2011. This represents 4.6% of the population and is more than the total population of some of the health boards in Scotland.

- The prevalence of diabetes ranged from 4% to 5.2% across NHS Boards

- 87.7% (208,279) of all people registered with diabetes had type 2 diabetes

- 11.6% of all registered people had type 1 diabetes. The number of people with type 1 diabetes has increased from 26,294 in 2006 to 27,910 in 2010

- 0.5% (1,279) of the total registered population were recorded as having "other" types of diabetes (which includes MODY and cases where the diabetes type is unknown)

- 36.6% of patients with a recorded BMI and type 1 diabetes and 31.9% of those with a recorded BMI and type 2 diabetes were overweight (BMI 25-29.9 kg/m²), while 25.4% of those with type 1 and 55.1% of those with type 2 were obese (BMI ≥ 30 kg/m²)

- 87.7% of those with type 1 diabetes and 91.9% of those with type 2 diabetes had an HbA1c recorded in the previous 15 months. Of these, 21.8% and 64.0% respectively had a result < 7.5%, the target reported in previous surveys

- 85.9% of those with type 1 and 94.4% of those with type 2 diabetes had their blood pressure recorded in the previous 15 months. 45.4% and 31.5% respectively had a systolic BP measurement of ≤ 130 mmHg

- Cholesterol was recorded in 89.6% of patients within the previous 15 months, and the target of ≤ 5 mmol/l was achieved in 71.5% of those with type 1 and 81.4% of those with type 2 diabetes

- 3.1% of those with type 1 and 12.3% of those with type 2 diabetes achieved all three targets of HbA1c<7%, cholesterol of <5 mmol/l, systolic BP<130 mmHg and diastolic BP ≤ 80 mmHg

- 24.3% of those with type 1 and 18.7% of those with type 2 diabetes are current smokers.

- 85.4% of people with diabetes had appropriate eye screening provision in the previous 15 months, including those attending ophthalmology services

- 0.8% (1,859) people with diabetes were reported to be blind, but not all because of diabetes.

- 59.5% of patients with type 1 diabetes and 78.1% of those with type 2 had their foot pulses checked in the previous 15 months

- 0.7% (206) of those with type 1 and 0.5% (1,044) of those with type 2 diabetes have had a lower limb amputation

- 1.2% (82) of those with type 1 and 0.4% (409) of those with type 2 diabetes have been recorded as having end stage renal failure

- 1,043 (3.7%) of those with type 1 and 9.8% (20,445) of those with type 2 diabetes have had a myocardial infarction and survived, and 2.7% and 6.9% respectively have undergone cardiac revascularisation

SCI-DC Data Sources

All the data for the survey is taken from SCI-DC Network which receives clinical data from a variety of data sources in order to maintain its shared electronic record for diabetes. A breakdown of the main sources at March 2011 is as follows:

- 1005 general practices across Scotland (using EMIS, Vision and GPASS IT systems). 4 practices in NHS Dumfries and Galloway and two in NHS Highland do not link to SCI-DC.
- 38 hospital diabetes clinics (SCI-DC Clinical)
- 7 regional instances of SCI Store (laboratory data)
- National Diabetic Retinopathy Screening (DRS) System (eye assessments and images)
- Community Health Index (master patient identifier)
- Direct web entry
  - Patient administration form
  - Clinical review form
  - Foot risk assessment form
  - Diabetes Specialist Nurse form
- Data validation system

Registration onto the system can be initiated via the primary and secondary care feeds, registration onto the DRS system, the patient administration form or the data validation system. The key source of registration information is via the feed from GP systems. Each night, practice systems send SCI-DC an update on the registration details and clinical information held on each patient diagnosed with diabetes or pre-diabetic conditions. The full dataset conforms to the NHS Scotland clinical dataset for diabetes, and diagnosis information is identified using a series of 'qualifying' READ codes. The main READ code stem used to identify people with diabetes is 'C10..'. All sub-codes of this stem are used with the exception of 'C10F8 = Reaven's Disease'. These diagnostic codes identify the patient population, and the status of the full diabetes dataset for these individuals is sent to SCI-DC to ensure that the shared electronic record is maintained. Only data that is new, amended or deleted is sent to SCI-DC, flagged with the appropriate status, in order to minimise the data load. All GP practices, with the exception of 6 nationally, participate in this parsing and transmission of records.

GP systems must have the appropriate diabetes diagnostic code recorded in order to qualify for the Quality and Outcomes Framework (QOF) reporting, maintaining these systems as the main source of information. If patients have mistakenly not been given a relevant diagnosis, diagnostic information may still be received from hospital clinics or any of the other sources of data eligible for registration. As part of the DRS monitoring process, GPs are expected to review their SCI-DC lists periodically to ensure that all patients eligible for screening are included. This is to ensure that any data link issues are identified and resolved in order to maintain the accuracy of the register. At present, it is known that this process is not routinely performed and improvements are necessary to ensure that this approach is followed. There is a strong incentive for GP practices to ensure all patients are registered on SCI-DC as there is a QOF target for payments tied to the percentage of all patients in a practice with diabetes who are having retinopathy screening in the national programme. Although SCI-DC is the main route into the DRS service, manual registration processes can override this, although this route will ultimately lead to registration onto SCI-DC.

Patients may deny consent for their data to be passed to SCI-DC Network, with most primary care systems and SCI-DC Clinical now containing functionality to deny consent on an individual basis to ensure that data does not leave its source system. To prevent data from any further data source populating SCI-DC Network for these patients, the system contains functionality for their data to be removed as soon as it is received. These patients are currently quantified in the Scottish Diabetes Survey return for each health board.

The CHI linkage ensures that individuals are only included once and all records related to a historical identifier are merged into the main patient record. An increased prevalence may be reported if, for example a patient's CHI is entered erroneously, however this can be subsequently resolved using manual record linkage in SCI-DC Network. The likelihood of this occurring is minimised in modern systems using a CHI validation algorithm, although erroneous CHIs which pass the checksum routine may still appear.

At present, the SCI-DC team is, via its National Implementation Group, encouraging those boards that have not yet activated their SCI Store link to do so to ensure the completeness of their laboratory data. Although transcribed versions of these data are received from practice and clinic systems, data completeness cannot be guaranteed and so a SCI Store link is essential. Boards currently in negotiation regarding implementation are:

- Borders
- Greater Glasgow & Clyde
- Lothian

Health Boards who have not yet indicated a timescale for this interface are:

- Dumfries & Galloway
- Highland
- Lanarkshire
- Orkney

In addition to incoming feeds, SCI-DC data is also transferred to external systems

- Back-Population of 313 GP systems (in support of a single-point of data entry)
- National Diabetic Retinopathy Screening System (to maintain the call-recall system)
- My Diabetes My Way: Patient Access (patients getting access to their own information)

Prevalence and incidence of diabetes

At the beginning of 2011 there were 237,468 people with known diabetes in Scotland recorded on local diabetes registers, which represents a crude prevalence of 4.6% of the population. In the 2009 Scottish Diabetes Survey, 228,004 people (4.4%) were known to have diabetes. The increase in reported prevalence depends on a number of factors, including:

- demographic change. Diabetes is more prevalent in older people so an increase in the number of older people will increase the prevalence of diabetes

- an increase in the incidence of type 2 diabetes, related to rising levels of overweight and obesity

- possibly, a fall in the age of onset of type 2 diabetes

- an increase in the incidence of type 1 diabetes. We know that there has been a steady increase in the incidence of diabetes in Scottish children over the last 40 years

- better survival because of improved control of blood glucose, blood pressure and cholesterol level

- possibly better detection of diabetes in people with type 2 diabetes, many of whom have no symptoms

Variation between health boards also depends on deprivation and the age and ethnic distribution of the population of each board. However the broad similarity of reported prevalence, compared to some previous years, gives confidence in the completeness of recording. The increased prevalence is likely to be real rather than because of better reporting.

Table 1 Diabetes Register: Crude and Age-adjusted Percentage of total population

NHS Board	Population	Number on diabetes register at start of 2011	Crude prevalence percentage	Age adjusted prevalence
Ayrshire & Arran	367,160	19,075	5.2%	4.8%
Borders	112,680	5,355	4.8%	4.2%
Dumfries & Galloway	148,510	7,771	5.2%	4.4%
Fife	363,385	17,467	4.8%	4.7%
Forth Valley	291,383	13,618	4.6%	4.7%
Grampian	544,980	23,357	4.3%	4.3%
Greater Glasgow & Clyde	1,199,026	54,470	4.5%	4.8%
Highland	310,530	13,914	4.5%	4.0%
Lanarkshire	562,215	27,450	4.9%	5.0%
Lothian	826,231	32,717	4.0%	4.3%
Orkney	19,960	923	4.6%	4.2%
Shetland	22,210	958	4.3%	4.2%
Tayside	399,550	19,223	4.8%	4.5%
Western Isles	26,180	1,170	4.5%	3.9%
Scotland	**5,194,000**	**237,468**	**4.6%**	**-**

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Figure 1 Total diabetes prevalence in each NHS Heath Board
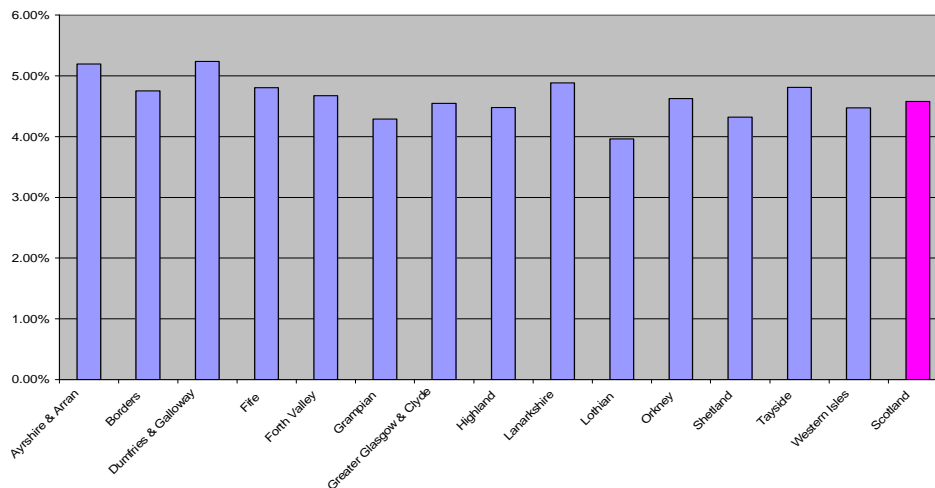
Figure 2 Number of people recorded with diabetes 2001 – 2010 – all types of diabetes
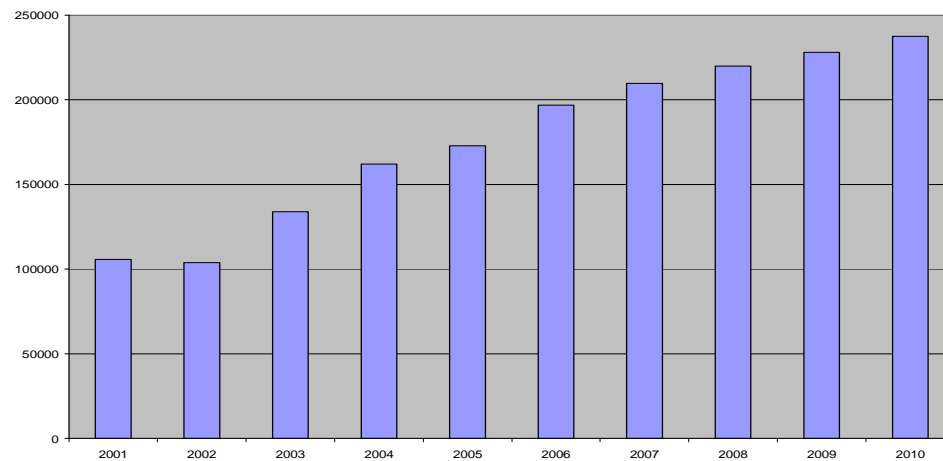
Table 2 Number of patients included in Scottish Diabetes Surveys 2007 to 2010

Survey	Diabetes register	Crude prevalence	Change on previous year		Absolute increase
2010	**237,468**	**4.6%**	**9,464**	**4.2%**	**0.2%**
2009	228,004	4.4%	8,041	3.7%	0.1%
2008	219,963	4.3%	10,257	4.0%	0.2%
2007	209,706	4.1%	12,905	6.6%	0.2%

Note: SCI-DC achieved complete coverage of Health Board areas in 2006.

Between 2001 and 2006, the increase in numbers was partly due to improved recording. Since 2007, we are confident the data are a reflection of a real increase in numbers.

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Table 3 Scottish incidence of Type 1 Diabetes by 10 year age bands 2007-2010 per 1,000 population

Age in years	2007			2008			2009			2010		
	GRO Pop*	(n)	Per 1,000 pop	GRO Pop*	(n)	Per 1,000 pop	GRO Pop*	(n)	Per 1,000 pop	GRO Pop*	(n)	Per 1,000 pop
<10	547887	121	**0.22**	548640	133	**0.24**	552452	148	**0.27**	557034	145	**0.26**
10-19	636902	278	**0.44**	632267	264	**0.41**	625189	258	**0.41**	619493	268	**0.43**
20-29	649378	171	**0.26**	670802	159	**0.24**	688884	168	**0.24**	701045	177	**0.25**
30-39	701958	169	**0.24**	680584	140	**0.21**	662299	145	**0.22**	650813	127	**0.20**
40-49	783053	149	**0.19**	790920	130	**0.16**	794973	92	**0.12**	795295	93	**0.12**
50-59	680184	69	**0.10**	674381	57	**0.08**	675778	71	**0.11**	681616	69	**0.10**
60-69	522939	29	**0.06**	545258	52	**0.10**	560178	44	**0.08**	572305	50	**0.09**
>=70	594599	37	**0.06**	601348	23	**0.04**	608747	28	**0.05**	616399	29	**0.05**
Total	**5116900**	**1023**	**0.20**	**5144200**	**958**	**0.19**	**5168500**	**954**	**0.18**	**5194000**	**958**	**0.18**

Please note that these are crude incidence figures that have been calculated retrospectively using SCI-DC data and therefore may be slightly affected by factors such as post-survey patient migration and on-going validation of diabetes classification. *GRO Pop = National Records of Scotland (formerly General Register Office for Scotland) Mid-year Estimates that were used at the time of the survey in each year.

Table 4 Scottish Incidence of Type 2 Diabetes by 10 year age bands 2007-2010 per 1,000 population

Age in years	2007			2008			2009			2010		
	GRO Pop*	(n)	Per 1000 pop	GRO Pop*	(n)	Per 1000 pop	GRO Pop*	(n)	Per 1000 pop	GRO Pop*	(n)	Per 1000 pop
<10	547887	0	**0**	548640	0	**0**	552452	2	**0.00**	557034	0	**0**
10-19	636902	28	**0.04**	632267	21	**0.03**	625189	22	**0.04**	619493	18	**0.03**
20-29	649378	148	**0.23**	670802	163	**0.24**	688884	164	**0.24**	701045	166	**0.24**
30-39	701958	711	**1.01**	680584	865	**1.27**	662299	797	**1.20**	650813	755	**1.16**
40-49	783053	2382	**3.04**	790920	2451	**3.10**	794973	2667	**3.35**	795295	2555	**3.21**
50-59	680184	4134	**6.08**	674381	4235	**6.28**	675778	4411	**6.53**	681616	4287	**6.29**
60-69	522939	4995	**9.55**	545258	4998	**9.17**	560178	5286	**9.44**	572305	4870	**8.51**
>=70	594599	4964	**8.34**	601348	5255	**8.74**	608747	5278	**8.67**	616399	4925	**7.99**
Total	**5116900**	**17362**	**3.39**	**5144200**	**17988**	**3.50**	**5168500**	**18627**	**3.60**	**5194000**	**17576**	**3.38**

Please note that these are crude incidence figures that have been calculated retrospectively using SCI-DC data and therefore may be slightly affected by factors such as post-survey patient migration and on-going validation of diabetes classification. *GRO Pop = National Records of Scotland (formerly General Register Office for Scotland) Mid-year Estimates that were used at the time of the survey in each year.

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Table 5 Incidence of Type 1 Diabetes by NHS Board 2007-2010 per 1,000 population

NHS Board	2007 GRO Pop*	(n)	Per 1000 pop	2008 GRO Pop*	(n)	Per 1000 pop	2009 GRO Pop*	(n)	Per 1000 pop	2010 GRO Pop*	(n)	Per 1000 pop
Ayrshire & Arran	366450	76	0.21	367020	72	0.20	367510	70	0.19	367160	69	0.19
Borders	110247	21	0.19	111430	19	0.17	112430	16	0.14	112680	20	0.18
Dumfries & Galloway	148030	24	0.16	148300	24	0.16	148580	29	0.20	148510	26	0.18
Fife	358858	79	0.22	360428	61	0.17	361815	56	0.15	363385	53	0.15
Forth Valley	286053	48	0.17	288473	62	0.21	290047	50	0.17	291383	64	0.22
Grampian	529889	80	0.15	535290	103	0.19	539630	115	0.21	544980	123	0.22
GG & Clyde	1191584	249	0.21	1192419	209	0.18	1194675	218	0.18	1199026	205	0.17
Highland	306701	43	0.14	308790	66	0.21	309900	69	0.22	310530	53	0.17
Lanarkshire	558139	142	0.25	560042	108	0.19	561174	127	0.23	562215	103	0.18
Lothian	801310	182	0.23	809764	144	0.18	817727	136	0.17	826231	155	0.19
Orkney	19770	3	0.15	19860	6	0.30	19890	2	0.10	19960	4	0.20
Shetland	21880	3	0.14	21950	4	0.18	21980	5	0.23	22210	6	0.27
Tayside	391639	69	0.18	394134	75	0.19	396942	57	0.14	399550	71	0.18
Western Isles	26350	4	0.15	26300	5	0.19	26200	4	0.15	26180	6	0.23
Scotland	**5116900**	**1023**	**0.20**	**5144200**	**958**	**0.19**	**5168500**	**954**	**0.18**	**5194000**	**958**	**0.18**

Please note that these are crude incidence figures that have been calculated retrospectively using SCI-DC data and therefore may be slightly affected by factors such as post-survey patient migration and on-going validation of diabetes classification. *GRO Pop = National Records of Scotland (formerly General Register Office for Scotland) Mid-year Estimates that were used at the time of the survey in each year.
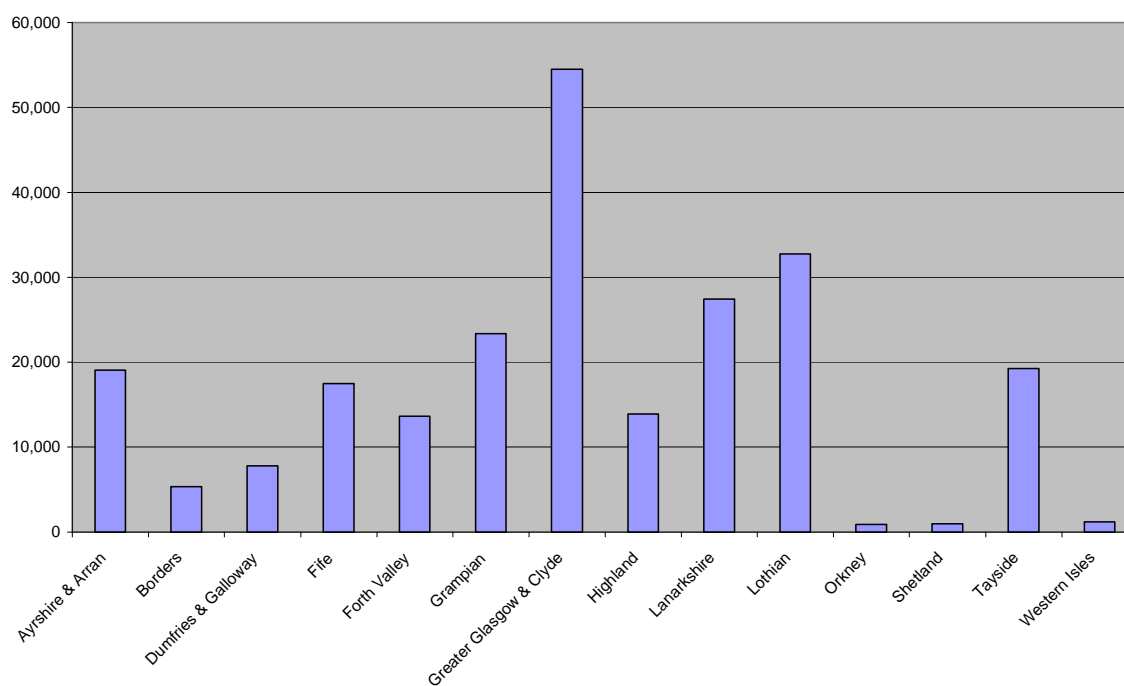
Table 6: Incidence of Type 2 Diabetes by NHS Board 2007-2010

NHS Board	2007 GRO Pop*	(n)	%	2008 GRO Pop*	(n)	%	2009 GRO Pop*	(n)	%	2010 GRO Pop*	(n)	%
Ayrshire & Arran	366450	1429	0.39%	367020	1635	0.45%	367510	1660	0.45%	367160	1521	0.41%
Borders	110247	419	0.38%	111430	428	0.38%	112430	411	0.37%	112680	428	0.38%
Dumfries & Galloway	148030	532	0.36%	148300	561	0.38%	148580	669	0.45%	148510	589	0.40%
Fife	358858	1264	0.35%	360428	1307	0.36%	361815	1315	0.36%	363385	1296	0.36%
Forth Valley	286053	916	0.32%	288473	953	0.33%	290047	970	0.33%	291383	973	0.33%
Grampian	529889	1743	0.33%	535290	1796	0.34%	539630	2063	0.38%	544980	1721	0.32%
GG & Clyde	1191584	3840	0.32%	1192419	4154	0.35%	1194675	4039	0.34%	1199026	3952	0.33%
Highland	306701	1027	0.33%	308790	1075	0.35%	309900	1136	0.37%	310530	1122	0.36%
Lanarkshire	558139	2130	0.38%	560042	2076	0.37%	561174	2302	0.41%	562215	2081	0.37%
Lothian	801310	2483	0.31%	809764	2278	0.28%	817727	2211	0.27%	826231	1988	0.24%
Orkney	19770	73	0.37%	19860	77	0.39%	19890	67	0.34%	19960	59	0.30%
Shetland	21880	52	0.24%	21950	63	0.29%	21980	74	0.34%	22210	75	0.34%
Tayside	391639	1369	0.35%	394134	1499	0.38%	396942	1614	0.41%	399550	1670	0.42%
Western Isles	26350	85	0.32%	26300	86	0.33%	26200	96	0.37%	26180	101	0.39%
Scotland	**5116900**	**17362**	**0.34%**	**5144200**	**17988**	**0.35%**	**5168500**	**18627**	**0.36%**	**5194000**	**17576**	**0.34%**

Please note that these are crude incidence figures that have been calculated retrospectively using SCI-DC data and therefore may be slightly affected by factors such as post-survey patient migration and on-going validation of diabetes classification. *GRO Pop = National Records of Scotland (formerly General Register Office for Scotland) Mid-year Estimates that were used at the time of the survey in each year.

Figure 3 Number of people with all types of diabetes in each NHS Health Board in 2010

Undiagnosed diabetes

Type 2 diabetes comes on gradually and people can have the condition with no symptoms, so many people with type 2 diabetes are undiagnosed. The Scottish Public Health Observatory has estimated the proportions undiagnosed for each health board area, as shown in table7. Full details can be found on the SPHO website at;
http://www.scotpho.org.uk/home/Healthwell-beinganddisease/Diabetes/Data/diabetes_undiagnosed.asp

Table 7 Estimated proportion of population undiagnosed with diabetes by NHS Board

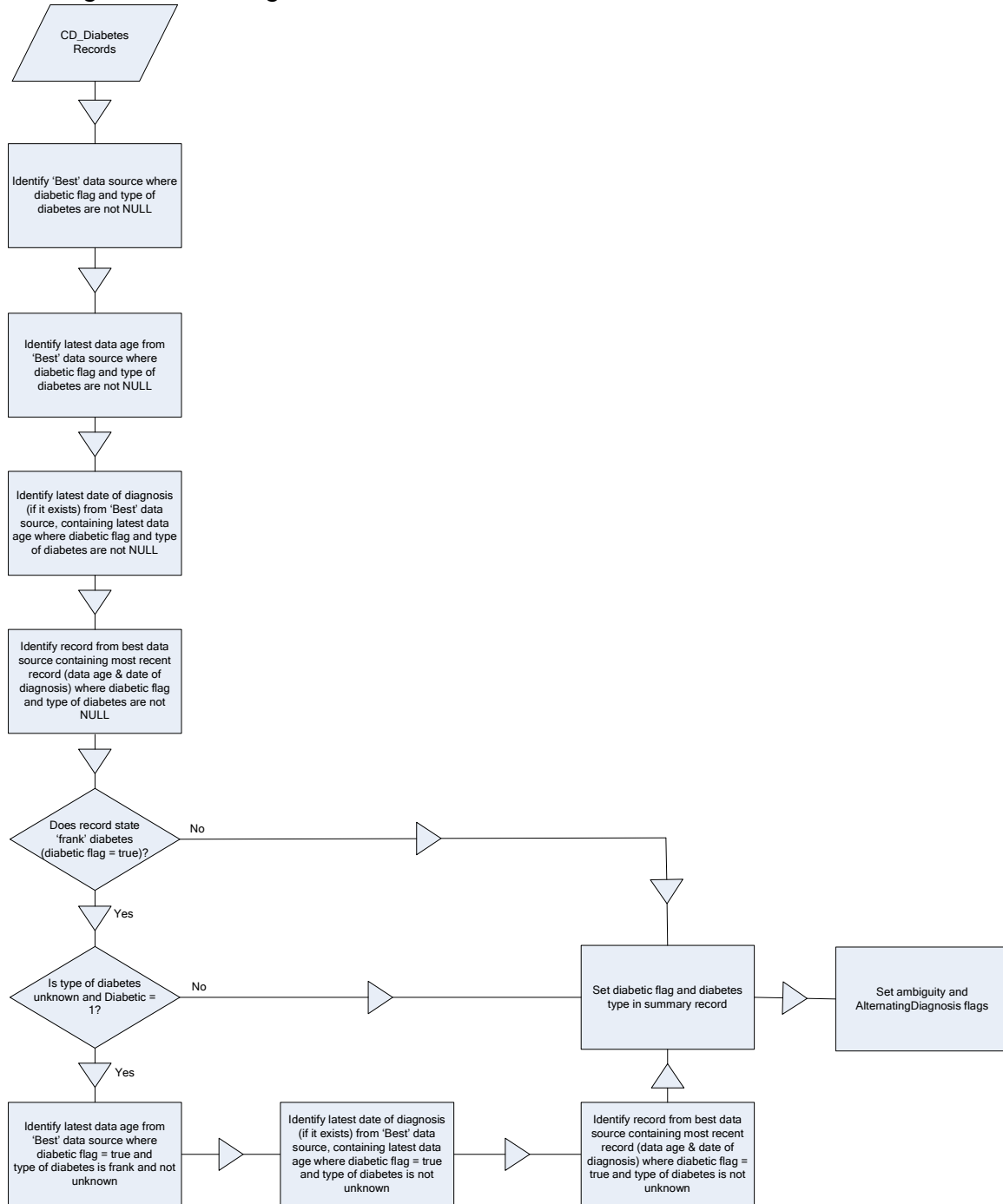| NHS Board	Estimated % of population undiagnosed
Ayrshire & Arran	0.5%
Borders	0.7%
Dumfries & Galloway	0.8%
Fife	0.3%
Forth Valley	0.2%
Grampian	0.4%
Greater Glasgow & Clyde	0.2%
Highland	1.0%
Lanarkshire	0.2%
Lothian	0.4%
Orkney	0.6%
Shetland	0.7%
Tayside	0.6%
Western Isles	1.7%
Scotland	**0.4%**

Practice System Migration Issues

As a result of the phasing out of GPASS, many GP surgeries have been faced with the prospect of moving to a new practice information technology system. The main systems of choice have been EMIS and InPS Vision. Although this has allowed SCI-DC to receive data in a standardised format, the migration itself has caused an issue for SCI-DC, particularly in identify the chronology of the migrated data. SCI-DC used the record age as a marker for its entry on to source systems. This, in addition to the date associated with a data item (clinic visit, etc) helps to identify the order in which events and diagnoses have taken place. When migration occurs, this record age is currently being set to the date of the migration.

The result of this sequence of events is that, in some cases it has been difficult to identify a patient's true type of diabetes as the chronology has been lost. Although diagnosis date can be used, a small number of patients still exist where their diagnosis alternates between types of diabetes, or indeed frank diabetes and pre-diabetic conditions. Work is continuing to resolve these issues and to provide tools to regional users to highlight these patients for resolution.

Determining Diabetes Diagnosis

```
      ┌─────────────────┐
     ╱ CD_Diabetes     ╱
    ╱  Records        ╱
   └─────────────────┘
           │
           ▽
   ┌────────────────────┐
   │ Identify 'Best' data source where
   │ diabetic flag and type of
   │ diabetes are not NULL │
   └────────────────────┘
           │
           ▽
   ┌────────────────────┐
   │ Identify latest data age from
   │ 'Best' data source where
   │ diabetic flag and type of
   │ diabetes are not NULL │
   └────────────────────┘
           │
           ▽
   ┌────────────────────┐
   │ Identify latest date of diagnosis
   │ (if it exists) from 'Best' data
   │ source, containing latest data
   │ age where diabetic flag and type
   │ of diabetes are not NULL │
   └────────────────────┘
           │
           ▽
   ┌────────────────────┐
   │ Identify record from best data
   │ source containing most recent
   │ record (data age & date of
   │ diagnosis) where diabetic flag
   │ and type of diabetes are not
   │ NULL │
   └────────────────────┘
           │
           ▽
       ◇ Does record state
         'frank' diabetes        ──No──▷──────────┐
         (diabetic flag = true)? ◇                │
           │                                      ▽
          Yes                          ┌──────────────────────┐
           ▽                           │ Set diabetic flag and diabetes
       ◇ Is type of diabetes           │ type in summary record │ ──▷── Set ambiguity and
         unknown and Diabetic = ──No──▷│                        │       AlternatingDiagnosis flags
         1? ◇                          └──────────────────────┘
           │                                      △
          Yes                                     │
           ▽                                      │
   ┌────────────────┐   ┌────────────────┐   ┌────────────────┐
   │ Identify latest │──▷│ Identify latest │──▷│ Identify record from best data
   │ data age from   │   │ date of diagnosis│  │ source containing most recent
   │ 'Best' data     │   │ (if it exists) from │ record (data age & date of
   │ source where    │   │ 'Best' data     │   │ diagnosis) where diabetic flag =
   │ diabetic flag = │   │ source, containing│  │ true and type of diabetes is not
   │ true and type of│   │ latest data age  │  │ unknown │
   │ diabetes is frank│  │ where diabetic   │  └────────────────┘
   │ and not unknown │   │ flag = true and  │
   └────────────────┘    │ type of diabetes │
                         │ is not unknown   │
                         └────────────────┘
```

The diagram above shows how 'raw' diabetes diagnosis data from multiple data sources can be manipulated to produce a 'true' diabetes type for each patient. Record identification is based on flagging the 'best' data source as defined by the priority weightings held for each in relation to diabetes diagnosis. The latest diagnosis record from the 'best' data source must be used to determine the most appropriate diabetes type. The data flow continues by determining and setting the type of diabetes or pre-diabetic condition of patient. If a patient is flagged as 'diabetes type unknown', the process above will be repeated for any other records obtained from the 'best' data source that contain a valid diabetes type. If one does not exist, then the 'diabetes type unknown' record will prevail. If there are any variations in diabetes type across any of a patient's diagnosis records, then an ambiguity flag will be set. Where a patient has multiple diagnoses identified with the same record age and date of diagnosis (as happens in some cases after practice system migration) the AlternatingDiagnosis flag will be set.

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Gender

Men with diabetes make up a larger proportion than women with both type 1 diabetes (56% v 44%) and type 2 diabetes (55% v 45%) This ratio is relatively unchanged from 2001.

Duration of Diabetes

The date of diagnosis was recorded for 99.7% of patients, of which 7.4% have had diabetes for less than one year and 9.0% have had diabetes for 20 years or more. There is ongoing work to make this data more accurate through the epidemiology subgroup of the Scottish Diabetes Research Network.

Table 8 Duration of diabetes (years since diagnosis) by type of diabetes

Duration (Years)	Type 1 diabetes		Type 2 diabetes		T1 and T2 diabetes	
	Number of patients	Percentage	Number of patients	Percentage	Total numbers	Total percentage
< 1	923	3.3%	16,516	8.0%	17,439	7.4%
1-4	3,679	13.2%	65,716	31.6%	69,395	29.5%
5-9	4,579	16.5%	65,881	31.7%	70,460	29.9%
10-14	4,312	15.5%	33,832	16.3%	38,144	16.2%
15-19	3,775	13.6%	15,068	7.3%	18,843	8.0%
20-24	2,964	10.7%	6,309	3.0%	9,273	3.9%
25-29	2,377	8.5%	2,538	1.2%	4,915	2.1%
30-34	1,941	7.0%	900	0.4%	2,841	1.2%
35-39	1,347	4.8%	402	0.2%	1,749	0.7%
40-44	920	3.3%	209	0.1%	1,129	0.5%
45-49	519	1.9%	99	0.1%	618	0.3%
≥50	487	1.8%	211	0.1%	698	0.3%
Total	**27,823**	**100%**	**207,681**	**100%**	**235,504**	**100%**

Note: Excludes patients where date of diagnosis not known (n = 1,085)

Age

Type 2 diabetes is more common in older people; 119,660 (50.4%) of all the people reported in the survey are aged 65 years or older. The possibility that type 2 diabetes is developing in people at a younger age is currently under investigation. This may have long-term implications for the NHS, because they will have diabetes for long enough to develop complications such as renal failure.

Figure 1 Age of people recorded with diabetes

15
1,904
11,603
25,166
108,057
90,723

- 0-14
- 15-44
- 45-64
- 65-84
- ≥85
- Not known
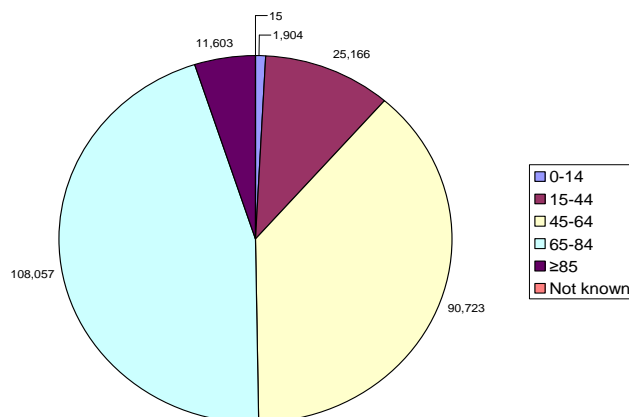
Table 9 Age group of people with an age recorded - type 1 or type 2 diabetes

Age	Type 1 diabetes		Type 2 diabetes		Total number with diabetes	
0-4	91	0.33%	1	0.00%		
5-9	491	1.76%	5	0.00%	1,904	0.8%
10-14	1,277	4.58%	11	0.01%		
15-19	1,807	6.47%	59	0.03%		
20-24	2,138	7.66%	219	0.1%		
25-29	2,132	7.64%	546	0.3%	25,166	10.6%
30-34	2,136	7.65%	1,343	0.6%		
35-39	2,564	9.19%	2,832	1.4%		
40-44	2,879	10.32%	6,244	3.0%		
45-49	2,979	10.67%	11,496	5.5%		
50-54	2,490	8.92%	17,311	8.3%	90,723	38.2%
55-59	2,031	7.28%	22,277	10.7%		
60-64	1,607	5.76%	30,021	14.4%		
65-69	1,181	4.23%	29,276	14.1%		
70-74	913	3.27%	30,996	14.9%	108,057	45.5%
75-79	696	2.49%	26,623	12.8%		
80-84	342	1.23%	17,613	8.5%		
>=85	151	0.54%	11,396	5.5%	11,603	4.9%

Mortality

Table 10. The percentage of the diabetes population who have died within the last year.

NHS Board	Deaths	
	Total	% of people with diabetes
Ayrshire & Arran	675	3.4%
Borders	208	3.7%
Dumfries & Galloway	286	3.5%
Fife	588	3.3%
Forth Valley	528	3.7%
Grampian	839	3.5%
Greater Glasgow & Clyde	2034	3.6%
Highland	501	3.5%
Lanarkshire	1007	3.5%
Lothian	1164	3.4%
Orkney	45	4.6%
Shetland	37	3.7%
Tayside	696	3.5%
Western Isles	49	4.0%
Scotland	**8657**	**3.5%**

Note: These data were calculated from all people with diabetes who died in the prior year expressed as a percentage of all people with diabetes still alive **plus** those who have died.

Type of diabetes

The majority of registered patients had type 2 diabetes (208,279 or 87.7%). The proportion of people with diabetes who have type 1 diabetes has fallen from 18.2% in 2002 to 11.8% in 2010, probably largely due to relatively more complete recording of data from people with type 1 diabetes than type 2 diabetes in earlier years. However, the absolute number of patients with type 1 diabetes continues to increase (22,597 in 2003; 27,910 in 2010). This reflects the rising incidence of type 1 diabetes in children over the last 40 years. We know from a series of studies of incidence that it has been rising by 2-3% a year since 1968.

The SCI-DC development team in conjunction with the Scottish Diabetes Research Network's epidemiology subgroup are working to improve the recording of the type of diabetes and the diagnosis date where data sources disagree on these items.   This may occur because patient details are recorded on more than one system (e.g. practice versus diabetes clinics, etc)

Where diagnostic details are found to be incorrect and where evidence or dialogue with the patient's primary carer confirms the true details, the SCI-DC records are amended accordingly.

Other types of diabetes include Maturity Onset Diabetes of the Young (MODY), gestational diabetes and secondary diabetes.

Table 11 Type of diabetes by NHS board

NHS Board	Type 1		Type 2		Other types of diabetes	Total
Ayrshire & Arran	2,238	11.7%	16,775	87.9%	62	19,075
Borders	601	11.2%	4,728	88.3%	26	5,355
Dumfries & Galloway	888	11.4%	6,836	88.0%	47	7,771
Fife	1,911	10.9%	15,480	88.6%	76	17,467
Forth Valley	1,568	11.5%	12,007	88.2%	43	13,618
Grampian	3,045	13.0%	20,227	86.6%	85	23,357
Greater Glasgow and Clyde	6,115	11.2%	48,090	88.3%	265	54,470
Highland	1,706	12.3%	12,100	87.0%	108	13,914
Lanarkshire	3,480	12.7%	23,840	86.8%	130	27,450
Lothian	4,109	12.6%	28,279	86.4%	329	32,717
Orkney	116	12.6%	807	87.4%	0	923
Shetland	119	12.4%	834	87.1%	5	958
Tayside	1,837	9.6%	17,283	89.9%	103	19,223
Western Isles	177	15.0%	993	85.0%	0	1,170
Scotland	**27,910**	**11.8%**	**208,279**	**87.7%**	**1,279**	**237,468**

Percentages (of the total diabetes populations) have been calculated for type 1 and type 2 diabetes only. These patients will be the focus of the remainder of this report.

Ethnicity

Ethnicity data were available for 69.6% of the registered diabetic population. The completeness of this information fell from 37% in 2002 to 24.4% in 2006, increased to 33.3% in 2007 and again to 69.59% in 2010.

Table 12 Recording of ethnic group by NHS board (type 1 and type 2)

NHS Board	Ethnic group identified		Not recorded / Not known	
	Number	Percentage	Number	Percentage
Ayrshire & Arran	7,880	41.5%	11,133	58.6%
Borders	2,813	52.8%	2,516	47.2%
Dumfries & Galloway	6,403	82.9%	1,321	17.1%
Fife	5,919	34.0%	11,472	66.0%
Forth Valley	11,690	86.1%	1,885	13.9%
Grampian	11,741	50.5%	11,531	49.6%
Greater Glasgow and Clyde	49,249	90.9%	4,956	9.1%
Highland	8,267	59.9%	5,539	40.1%
Lanarkshire	19,652	71.9%	7,668	28.1%
Lothian	23,976	74.0%	8,412	26.0%
Orkney	567	61.4%	356	38.6%
Shetland	818	85.8%	135	14.2%
Tayside	14,944	78.2%	4,176	21.8%
Western Isles	451	38.6%	719	61.4%
Scotland	**164,370**	**69.6%**	**71,819**	**30.4%**

Table 13 Recording of ethnic group 2007-2010 (Type 1 and type 2)

Year	Number identified	Percentage identified
2010	**164,370**	**69.6%**
2009	126,997	56.0%
2008	94,925	43.2%
2007	69,875	33.3%

Body Mass Index

Body Mass Index (BMI) has been recorded for 82.6% of patients in the previous 15 months. This is a decrease from the 89.7% recorded in 2009. Of the 82.6%, 32.4% are overweight (BMI 25-29.9kg/m^2) and 51.7% are obese (BMI 30kg/m^2 or over). Despite type 2 diabetes being more prevalent in obese patients, 12.4% have normal weight (BMI 18.5-24.9kg/m²) and 31.9% are overweight (BMI 25-29.9 kg/m²).

Table 14 Percentage of patients with a recording of BMI in the previous 15 months for each health board in Scotland

NHS Board	Type 1 diabetes BMI percentage recorded	Type 2 diabetes BMI percentage recorded	Total recorded	Total not recorded
Ayrshire & Arran	74.9%	80.0%	15033	3901
Borders	91.8%	91.7%	4866	437
Dumfries & Galloway	71.4%	69.7%	5375	2313
Fife	85.5%	84.1%	14598	2724
Forth Valley	88.3%	86.1%	11667	1842
Grampian	67.6%	76.9%	17548	5623
Greater Glasgow & Clyde	86.9%	84.1%	45590	8410
Highland	83.8%	81.7%	11259	2476
Lanarkshire	78.5%	80.5%	21814	5369
Lothian	89.4%	84.8%	27547	4719
Orkney	68.5%	65.7%	606	312
Shetland	90.3%	88.8%	843	104
Tayside	80.7%	80.3%	15304	3753
Western Isles	75.0%	79.4%	917	248
Scotland	**82.0%**	**82.0%**	**192,967**	**42,231**

Note: Excludes children under 12 years of age (n = 991)

Table 15 Percentage of patients with a recording of BMI in the previous 15 months 2001 – 2010 (type 1 and type 2 diabetes)

Year	BMI recorded
2010	**82.0%**
2009	89.7%
2008	87.4%
2007	85.3%
2006	84.8%
2005	69.1%
2004	66.1%
2003	58.9%
2002	52.3%
2001	39.8%

Note: Excludes children under 12 years of age

Note: The BMI data in Tables 14 and 15 and figure 6 may be compromised due to the change over from GPASS to other primary care systems and should be viewed with caution.

Figure 2 Distribution of BMI among those with BMI recorded in previous 15 months by type of diabetes
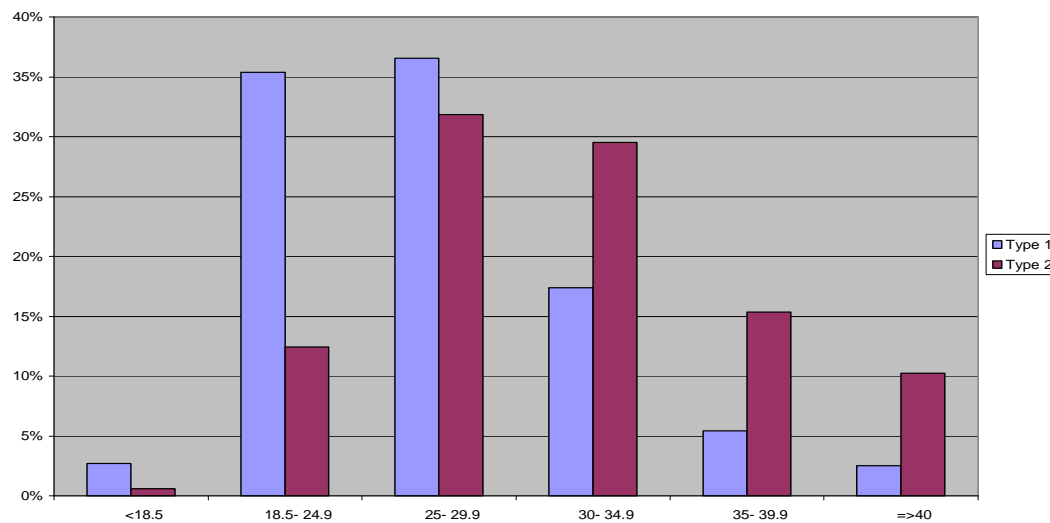
Note: Excludes children under 12 years (n=991)

**Table 16 Distribution of BMI by NHS board for patients with type 1 diabetes as a percentage of those with BMI recorded**

NHS Board	BMI						Total recorded	Not known
	<18.5	18.5 - 24.9	25 - 29.9	30 - 34.9	35 - 39.9	≥40		
Ayrshire & Arran	1.9%	34.2%	34.9%	18.3%	7.1%	3.5%	1,618	541
Borders	1.5%	31.6%	36.7%	20.4%	6.2%	3.6%	529	47
Dumfries & Galloway	3.9%	33.9%	33.0%	18.5%	5.9%	4.8%	610	244
Fife	2.9%	33.6%	37.1%	18.3%	5.5%	2.7%	1,576	268
Forth Valley	3.5%	38.9%	34.5%	15.9%	5.1%	2.0%	1,326	176
Grampian	2.2%	35.0%	37.9%	16.5%	5.9%	2.6%	1,992	953
Greater Glasgow & Clyde	3.2%	36.7%	36.6%	16.4%	4.7%	2.3%	5,139	774
Highland	1.7%	31.7%	42.3%	18.0%	4.7%	1.6%	1,370	265
Lanarkshire	3.2%	33.0%	34.1%	19.0%	7.6%	3.1%	2,625	719
Lothian	2.9%	38.2%	35.9%	16.2%	4.6%	2.2%	3,564	423
Orkney	1.3%	27.6%	34.2%	26.3%	5.3%	5.3%	76	35
Shetland	1.0%	32.4%	37.3%	22.6%	5.9%	1.0%	102	11
Tayside	1.3%	35.1%	39.2%	18.2%	4.5%	1.9%	1,432	342
Western Isles	0.0%	33.3%	44.2%	18.6%	3.9%	0.0%	129	43
Scotland	**2.7%**	**35.4%**	**36.6%**	**17.4%**	**5.5%**	**2.5%**	**22,088**	**4,841**

Note: Excludes children under 12 years of age (n = 981)

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Table 17 Distribution of BMI by NHS board for patients with type 2 diabetes as a percentage of those with BMI recorded

NHS Board	BMI						Total recorded	Not known
	<18.5	18.5 - 24.9	25 - 29.9	30 - 34.9	35 - 39.9	≥40		
Ayrshire & Arran	0.5%	12.2%	31.8%	29.8%	15.1%	10.5%	13,415	3,360
Borders	0.5%	12.4%	31.9%	29.8%	14.9%	10.5%	4,337	390
Dumfries & Galloway	0.6%	11.5%	32.7%	29.0%	15.7%	10.5%	4,765	2,069
Fife	0.5%	11.4%	30.4%	29.4%	16.6%	11.7%	13,022	2,456
Forth Valley	0.5%	11.6%	30.5%	30.2%	15.9%	11.3%	10,341	1,666
Grampian	0.5%	12.1%	32.6%	29.7%	15.1%	10.0%	15,556	4,670
Greater Glasgow & Clyde	0.7%	14.0%	33.4%	28.7%	14.0%	9.2%	40,451	7,636
Highland	0.4%	11.7%	32.6%	29.9%	15.7%	9.8%	9,889	2,211
Lanarkshire	0.6%	11.7%	30.5%	30.3%	16.4%	10.6%	19,189	4,650
Lothian	0.7%	12.4%	31.1%	29.1%	15.9%	10.8%	23,983	4,296
Orkney	0.0%	8.1%	27.2%	35.7%	16.8%	12.3%	530	277
Shetland	0.5%	9.7%	29.8%	27.1%	19.8%	13.0%	741	93
Tayside	0.7%	12.5%	31.7%	30.4%	15.1%	9.7%	13,872	3,411
Western Isles	0.5%	10.4%	30.2%	31.6%	17.3%	10.0%	788	205
Scotland	**0.6%**	**12.4%**	**31.9%**	**29.5%**	**15.4%**	**10.2%**	**170,879**	**37,390**

Note: Excludes children under 12 years of age (n = 10)

Glycaemic Control

91.4% of patients had an HbA_{1c} recorded in the previous 15 months. In 59.2% of patients with a recorded result, HbA_{1c} was less than 7.5%, suggesting quite good control of diabetes. While all laboratories in Scotland are using a standardised (DCCT aligned) HbA_{1c} assay, there are some slight differences in actual results between laboratories. This should be considered when comparing results from different health board areas. It should be noted that, in the winter, HbA_{1c} is higher on average by 0.5%

Figure 3 Percentage of patients with a recording of HbA_{1c} within the previous 15 months
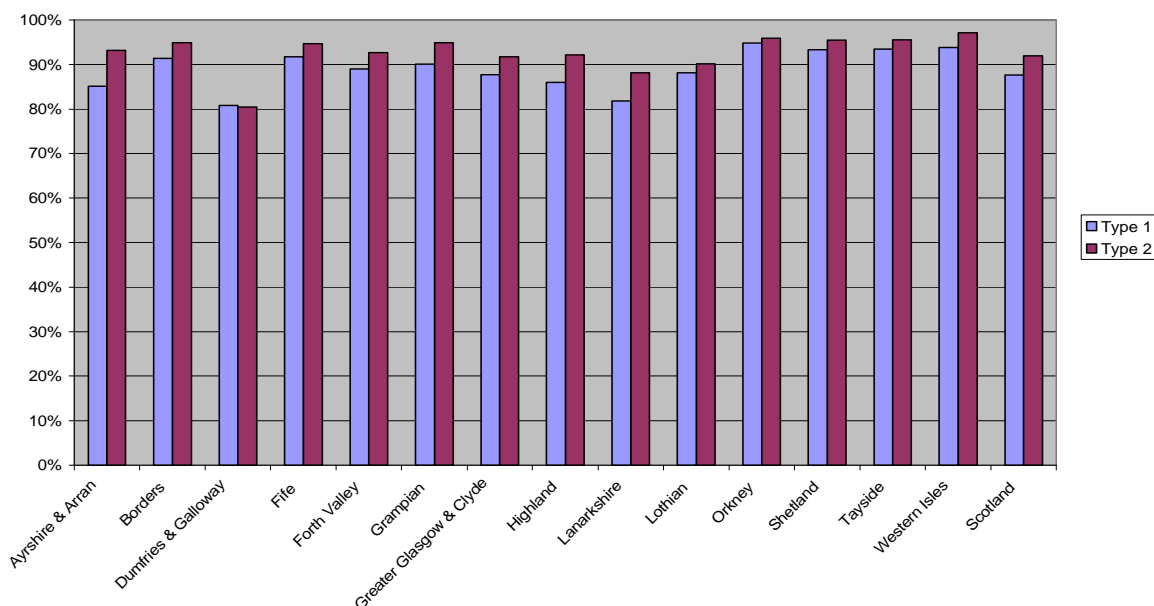
Table 18 Recording of HbA$_{1c}$ within previous 15 months by NHS board

NHS Board	Type 1 diabetes			Type 2 diabetes			Total recorded
	Recorded within previous 15 months		Not recorded	Recorded within previous 15 months		Not recorded	
Ayrshire & Arran	1,906	85.2%	332	15,619	93.1%	1,156	17,525
Borders	549	91.4%	52	4,486	94.9%	242	5,035
Dumfries & Galloway	717	80.7%	171	5,497	80.4%	1,339	6,214
Fife	1,753	91.7%	158	14,657	94.7%	823	16,410
Forth Valley	1,396	89.0%	172	11,120	92.6%	887	12,516
Grampian	2,743	90.1%	302	19,192	94.9%	1,035	21,935
Greater Glasgow & Clyde	5,364	87.7%	751	44,146	91.8%	3,944	49,510
Highland	1,466	85.9%	240	11,155	92.2%	945	12,621
Lanarkshire	2,848	81.8%	632	21,018	88.2%	2,822	23,866
Lothian	3,620	88.1%	489	25,484	90.1%	2,795	29,104
Orkney	110	94.8%	6	774	95.9%	33	884
Shetland	111	93.3%	8	796	95.4%	38	907
Tayside	1,717	93.5%	120	16,522	95.6%	761	18,239
Western Isles	166	93.8%	11	964	97.1%	29	1,130
Scotland	**24,466**	**87.7%**	**3,444**	**191,430**	**91.9%**	**16,849**	**215,896**

Table 19 Recording of HbA$_{1c}$ in previous 15 months 2004-2010 (Type 1 and Type 2 combined)

Year	Recorded within previous 15 months
2010	**91.4%**
2009	89.5%
2008	89.8%
2007	88.7%
2006	87.0%
2005	84.0%
2004	73.6%

9,375 (38.3%) of patients with type 1 diabetes who had an HbA$_{1c}$ recorded have a result > 75 mmol/mol (9%), which is considered as poor control. This is despite high rates of measurement of HbA$_{1c}$. This data emphasises the difficulty in achieving good control for a substantial number of patients with type 1 diabetes. The data is similar to that from GP practices in England (Calvert BMJ 2009) and shows a somewhat worse picture than some other European countries (Hanberger Diabetes Care 2008, Margeirsdottir Diabetologia 2007).

Figure 4 Percentage of Type 1 patients in each HbA$_{1c}$ category for HbA$_{1c}$ recorded in the previous 15 months
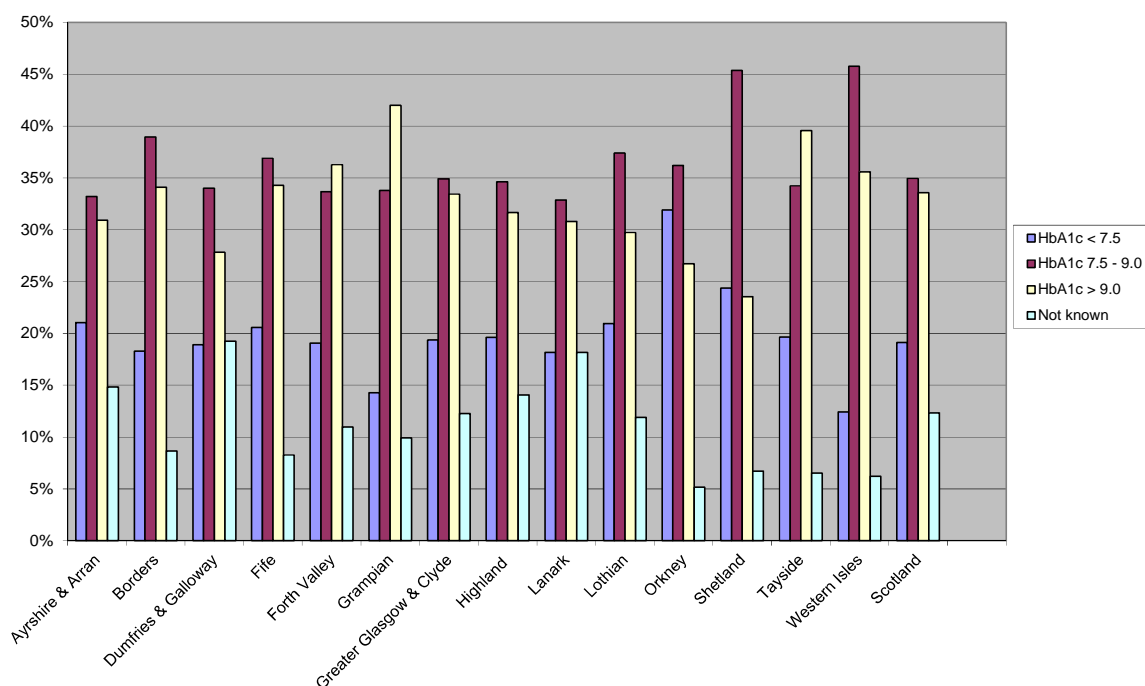
Note: for conversion between DCCT and IFCC measures for HbA1c, please refer to the chart on p 62

Figure 5 Percentage of Type 2 patients in each HbA$_{1c}$ category for HbA$_{1c}$ recorded in the previous 15 months
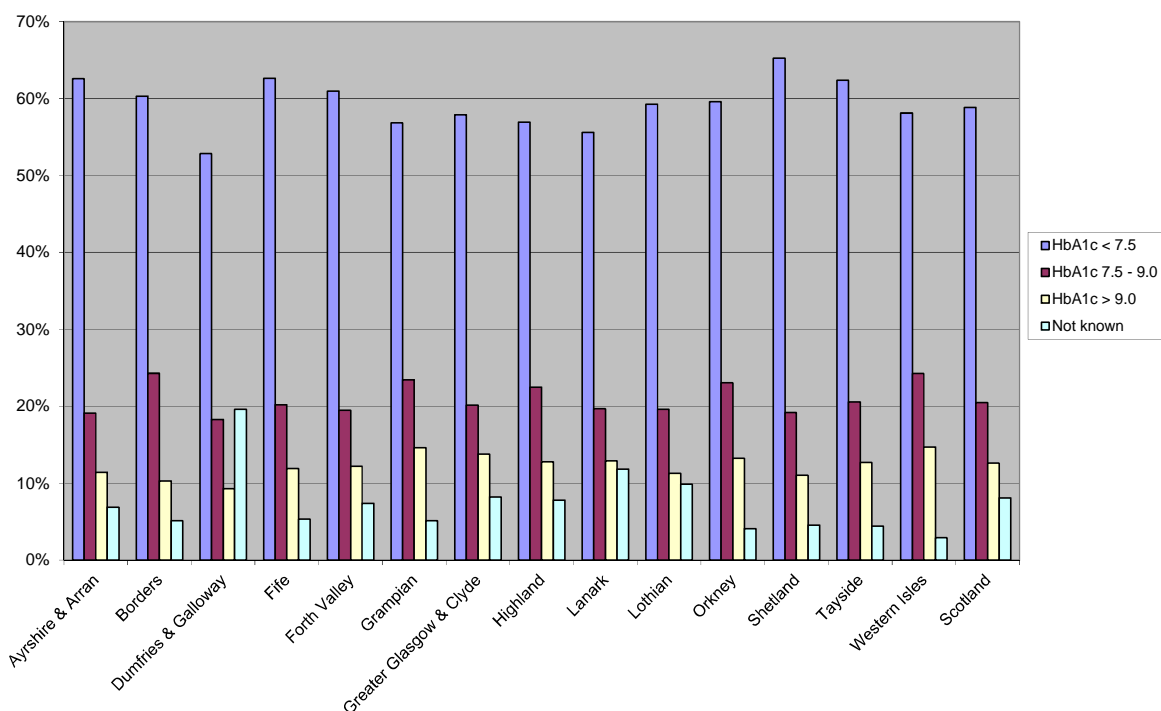
Note: for conversion between DCCT and IFCC measures for HbA1c, please refer to the chart on p 62

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Table 20 Type 1 diabetes: HbA$_{1c}$ category as percent of patients with HbA$_{1c}$ recorded in previous 15 months

NHS Board	HbA$_{1c}$ < 7.5 (<53 mmol/mol)		HbA$_{1c}$ 7.5 - 9.0 (53-75 mmol/mol)		HbA$_{1c}$ > 9.0 (>75 mmol/mol)		Total recorded	Not recorded
Ayrshire & Arran	471	24.7%	743	39.0%	692	36.3%	1,906	332
Borders	110	20.0%	234	42.6%	205	37.3%	549	52
Dumfries & Galloway	168	23.4%	302	42.1%	247	34.5%	717	171
Fife	393	22.4%	705	40.2%	655	37.4%	1,753	158
Forth Valley	299	21.4%	528	37.8%	569	40.8%	1,396	172
Grampian	435	15.9%	1,029	37.5%	1,279	46.6%	2,743	302
Greater Glasgow & Clyde	1,184	22.1%	2,135	39.8%	2,045	38.1%	5,364	751
Highland	335	22.9%	591	40.3%	540	36.8%	1,466	240
Lanarkshire	632	22.2%	1,144	40.2%	1,072	37.6%	2,848	632
Lothian	861	23.8%	1,537	42.5%	1,222	33.8%	3,620	489
Orkney	37	33.6%	42	38.2%	31	28.2%	110	6
Shetland	29	26.1%	54	48.7%	28	25.2%	111	8
Tayside	361	21.0%	629	36.6%	727	42.3%	1,717	120
Western Isles	22	13.3%	81	48.8%	63	38.0%	166	11
Scotland	**5,337**	**21.8%**	**9,754**	**39.9%**	**9,375**	**38.3%**	**24,466**	**3,444**

Table 21 Type 2 diabetes: HbA$_{1c}$ category as percentage of patients with HbA$_{1c}$ recorded in previous 15 months

NHS Board	HbA$_{1c}$ < 7.5 (<53 mmol/mol)		HbA$_{1c}$ 7.5 - 9.0 (53-75 mmol/mol)		HbA$_{1c}$ > 9.0 (>75 mmol/mol)		Total recorded	Not recorded
Ayrshire & Arran	10,496	67.2%	3,209	20.6%	1,914	12.3%	15,619	1,156
Borders	2,851	63.6%	1,148	25.6%	487	10.9%	4,486	242
Dumfries & Galloway	3,612	65.7%	1,250	22.7%	635	11.6%	5,497	1,339
Fife	9,690	66.1%	3,127	21.3%	1,840	12.6%	14,657	823
Forth Valley	7,319	65.8%	2,338	21.0%	1,463	13.2%	11,120	887
Grampian	11,493	59.9%	4,743	24.7%	2,956	15.4%	19,192	1,035
Greater Glasgow & Clyde	27,834	63.1%	9,690	22.0%	6,622	15.0%	44,146	3,944
Highland	6,889	61.8%	2,719	24.4%	1,547	13.9%	11,155	945
Lanarkshire	13,252	63.1%	4,688	22.3%	3,078	14.6%	21,018	2,822
Lothian	16,748	65.7%	5,552	21.8%	3,184	12.5%	25,484	2,795
Orkney	481	62.1%	186	24.0%	107	13.8%	774	33
Shetland	544	68.3%	160	20.1%	92	11.6%	796	38
Tayside	10,777	65.2%	3,552	21.5%	2,193	13.3%	16,522	761
Western Isles	577	59.9%	241	25.0%	146	15.2%	964	29
Scotland	**122,563**	**64.0%**	**42,603**	**22.3%**	**26,264**	**13.7%**	**191,430**	**16,849**

Table 22 HbA$_{1c}$ category 2007-2010 (as percentage of results recorded) - Type 1 and Type 2 diabetes

Year		HbA$_{1c}$ < 7.5	HbA$_{1c}$ 7.5-9.0	HbA$_{1c}$ >9.0	Total recorded	Not known
2010	**Number**	**127,900**	**52,357**	**35,639**	**215,896**	**20,293**
	Percentage	**59.2%**	**24.3%**	**16.5%**		
2009	Number	119,474	50,092	33,330	202,896	23,735
	Percentage	58.9%	24.7%	16.4%		
2008	Number	114,540	51,754	31,289	197,583	22,380
	Percentage	58.0%	26.2%	15.8%		
2007	Number	114,594	52,987	33,397	200,978	8,728
	Percentage	57.0%	26.4%	16.6%		

Figure 9 Percentage of Type 1 patients in each HbA$_{1c}$ category for HbA$_{1c}$ recorded in the previous 15 months (HbA1c in mmol/mol)
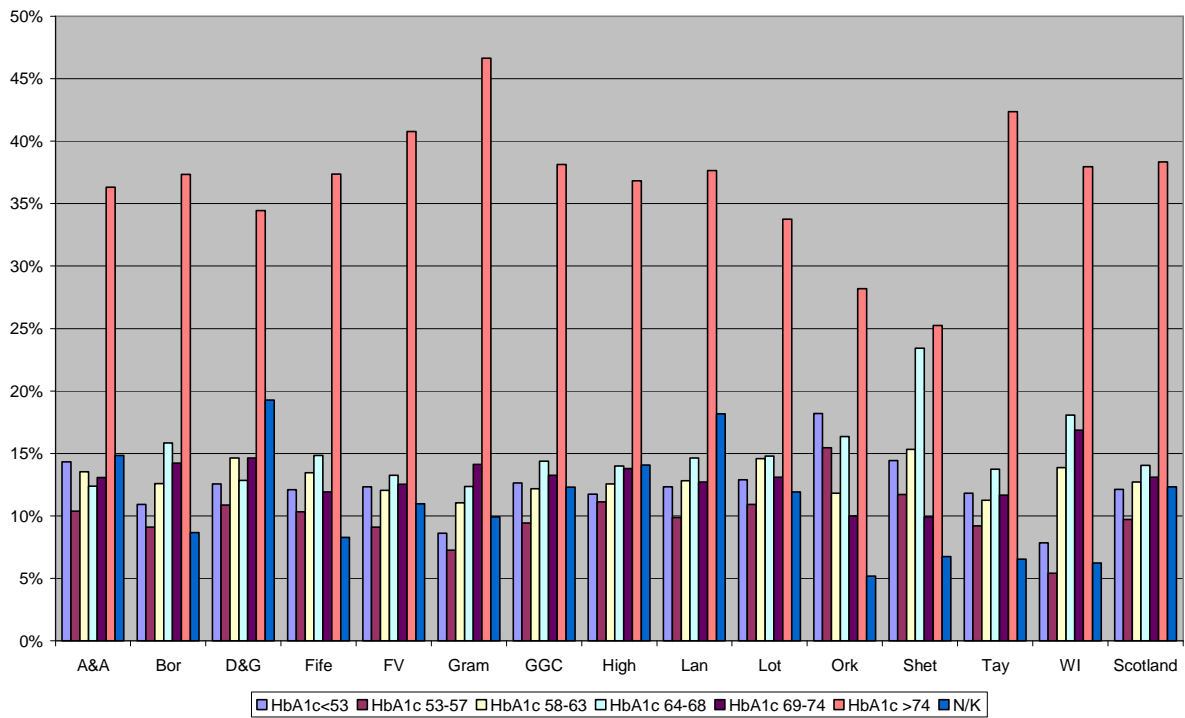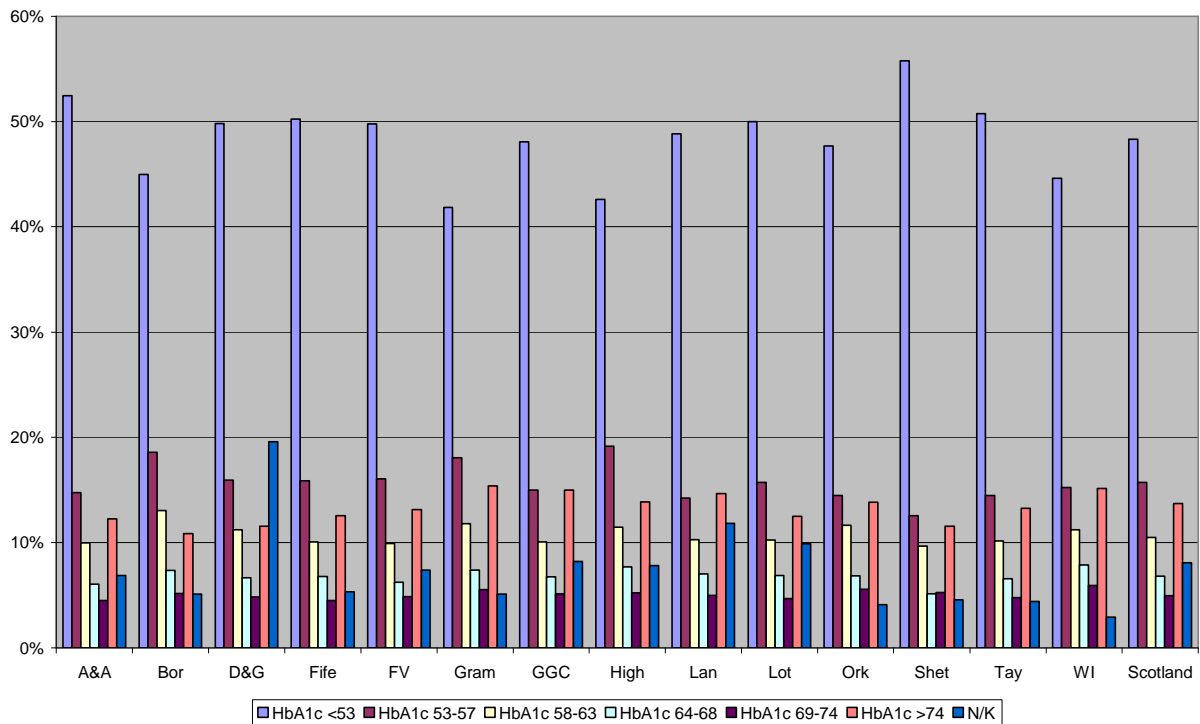

Figure 10 Percentage of Type 2 patients in each HbA$_{1c}$ category for HbA$_{1c}$ recorded in the previous 15 months (HbA1c in mmol/mol)

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Table 23 Type 1 diabetes: HbA₁c category as percent of patients with HbA₁c recorded in previous 15 months (HbA1c in mmol/mol)

NHS Board	HbA1c <53	HbA1c 53-57	HbA1c 58-63	HbA1c 64-68	HbA1c 69-74	HbA1c >74	Total recorded	Not recorded
Ayrshire &Arran	14.3%	10.4%	13.5%	12.4%	13.1%	36.3%	1906	332
Borders	10.9%	9.1%	12.6%	15.8%	14.2%	37.3%	549	52
Dumfries & Galloway	12.6%	10.9%	14.6%	12.8%	14.6%	34.4%	717	171
Fife	12.1%	10.3%	13.5%	14.8%	11.9%	37.4%	1753	158
Forth Valley	12.3%	9.1%	12.0%	13.3%	12.5%	40.8%	1396	172
Grampian	8.6%	7.3%	11.0%	12.4%	14.1%	46.6%	2743	302
Greater Glasgow & Clyde	12.6%	9.4%	12.2%	14.4%	13.3%	38.1%	5364	751
Highland	11.7%	11.1%	12.6%	14.0%	13.8%	36.8%	1466	240
Lanarkshire	12.3%	9.9%	12.8%	14.6%	12.7%	37.6%	2848	632
Lothian	12.9%	10.9%	14.6%	14.8%	13.1%	33.8%	3620	489
Orkney	18.2%	15.5%	11.8%	16.4%	10.0%	28.2%	110	6
Shetland	14.4%	11.7%	15.3%	23.4%	9.9%	25.2%	111	8
Tayside	11.8%	9.2%	11.2%	13.7%	11.6%	42.3%	1717	120
Western Isles	7.8%	5.4%	13.9%	18.1%	16.9%	38.0%	166	11
Scotland	**12.1%**	**9.7%**	**12.7%**	**14.1%**	**13.1%**	**38.3%**	**24466**	**3444**

Table 24 Type 2 diabetes: HbA₁c category as percent of patients with HbA₁c recorded in previous 15 months (HbA1c in mmol/mol)

NHS Board	HbA1c <53	HbA1c 53-57	HbA1c 58-63	HbA1c 64-68	HbA1c 69-74	HbA1c >74	Total recorded	Not recorded
Ayrshire &Arran	52.5%	14.7%	10.0%	6.1%	4.5%	12.3%	15619	1156
Borders	45.0%	18.6%	13.1%	7.4%	5.2%	10.9%	4486	242
Dumfries & Galloway	49.8%	15.9%	11.2%	6.7%	4.8%	11.6%	5497	1339
Fife	50.2%	15.9%	10.1%	6.8%	4.5%	12.6%	14657	823
Forth Valley	49.8%	16.1%	9.9%	6.3%	4.9%	13.2%	11120	887
Grampian	41.8%	18.1%	11.8%	7.4%	5.5%	15.4%	19192	1035
Greater Glasgow & Clyde	48.1%	15.0%	10.1%	6.8%	5.1%	15.0%	44146	3944
Highland	42.6%	19.1%	11.5%	7.7%	5.2%	13.9%	11155	945
Lanarkshire	48.8%	14.2%	10.3%	7.0%	5.0%	14.6%	21018	2822
Lothian	50.0%	15.7%	10.2%	6.9%	4.7%	12.5%	25484	2795
Orkney	47.7%	14.5%	11.6%	6.8%	5.6%	13.8%	774	33
Shetland	55.8%	12.6%	9.7%	5.2%	5.3%	11.6%	796	38
Tayside	50.8%	14.5%	10.2%	6.5%	4.8%	13.3%	16522	761
Western Isles	44.6%	15.2%	11.2%	7.9%	5.9%	15.1%	964	29
Scotland	**48.3%**	**15.7%**	**10.5%**	**6.8%**	**5.0%**	**13.7%**	**191430**	**16849**

Table 25 Mean HbA$_1$c in mmol/mol recorded in previous 15 months for people with type 1 diabetes (in 8 age categories) and type 2 diabetes (all ages)

NHS Board	Type 1 diabetes								T2 diabetes
	Age 0-4	Age 5-9	Age 10-14	Age 15-19	Age 20-24	Age 25-29	Age 30-39	Age ≥40	All ages
Ayrshire & Arran	76	69	72	76	81	70	70	68	55
Borders	112	74	70	86	72	76	75	69	56
Dumfries & Galloway	99	77	83	88	79	71	72	67	56
Fife	71	73	76	84	79	72	70	69	56
Forth Valley	76	67	75	88	79	76	70	69	56
Grampian	69	73	75	85	79	77	72	73	59
Greater Glasgow & Clyde	71	64	69	79	78	72	71	70	57
Highland	0	72	76	83	78	76	73	68	58
Lanarkshire	73	68	72	82	77	73	71	69	57
Lothian	61	68	68	78	77	73	69	67	56
Orkney	0	0	71	80	76	52	60	65	57
Shetland	64	73	72	87	78	60	68	66	54
Tayside	76	72	76	88	79	75	73	70	56
Western Isles	0	77	80	78	82	81	71	69	58

Table 26 Number of people with Type 1 diabetes on continuous subcutaneous insulin infusion (CSII or insulin pumps) as a percentage of all those with type 1 diabetes

NHS Board	Type 1 population	Number of patients	Percentage
Ayrshire & Arran	2,238	18	0.8%
Borders	601	29	4.8%
Dumfries & Galloway	888	20	2.3%
Fife	1,911	113	5.9%
Forth Valley	1,568	40	2.6%
Grampian	3,045	63	2.1%
Greater Glasgow & Clyde	6,115	67	1.1%
Highland	1,706	18	1.1%
Lanarkshire	3,480	45	1.3%
Lothian	4,109	173	4.2%
Orkney	116	3	2.6%
Shetland	119	2	1.7%
Tayside	1,837	104	5.7%
Western Isles	177	1	0.6%
Scotland	**27,910**	**696**	**2.5%**

Cardiovascular Risk

Diabetes is associated with an increased risk of cardiovascular disease and it is therefore important to address cardiovascular risk factors such as raised blood pressure (BP), cholesterol and smoking.

Blood Pressure

93.9% of diabetic patients had their BP recorded within the previous 15 months, of which 75.1% had a systolic BP less than of equal to 140mmHg, suggesting reasonable control of blood pressure. However, this target level is under review.

Figure 12 Percentage of patients with a recording of BP in previous 15 months (type 1 and type 2)
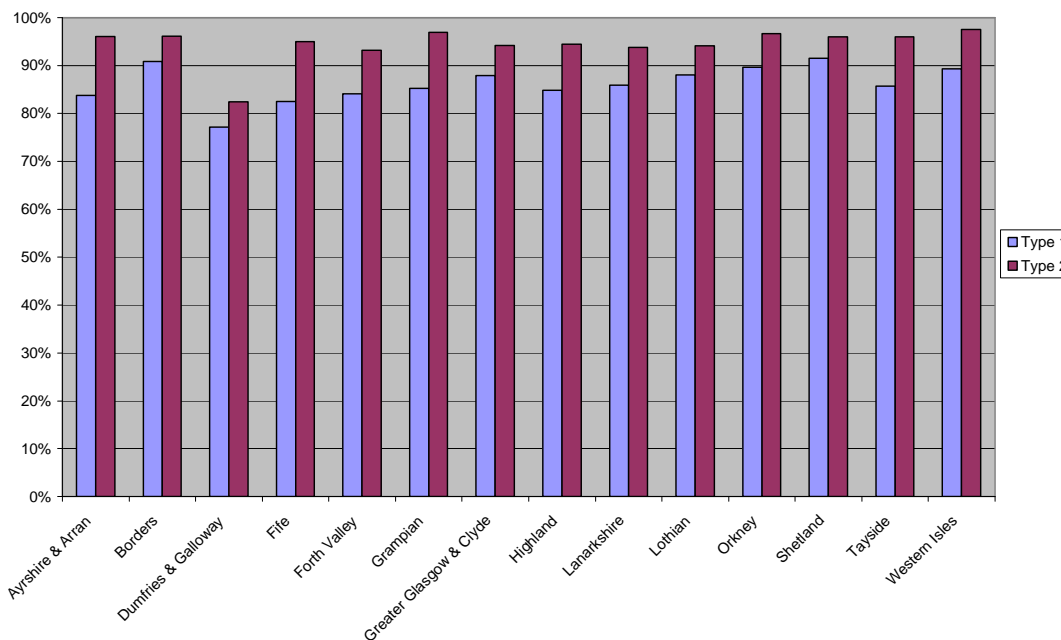
Table 27 Recording of BP within previous 15 months 2002-2010 (T1 and T2)

Year	Measured within previous 15 months	Total
2010	**93.4%**	**236,189**
2009	93.9%	226,631
2008	90.8%	219,963
2007	89.7%	209,706
2006	88.9%	196,801
2005	84.3%	172,699
2004	77.7%	138,233
2003	51.6%	123,780
2002	66.8%	103,774

Figure 13a BP category as percentage of Type 1 patients with SBP ≤ 140 mmHg recorded within previous 15 months
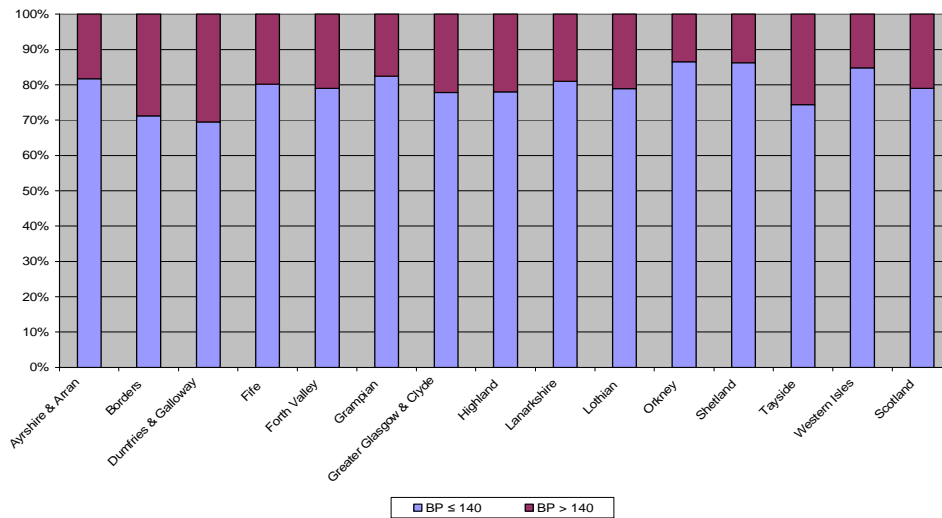
Figure 13b BP category as percentage of Type 1 patients with SBP ≤ 130 mmHg recorded within previous 15 months
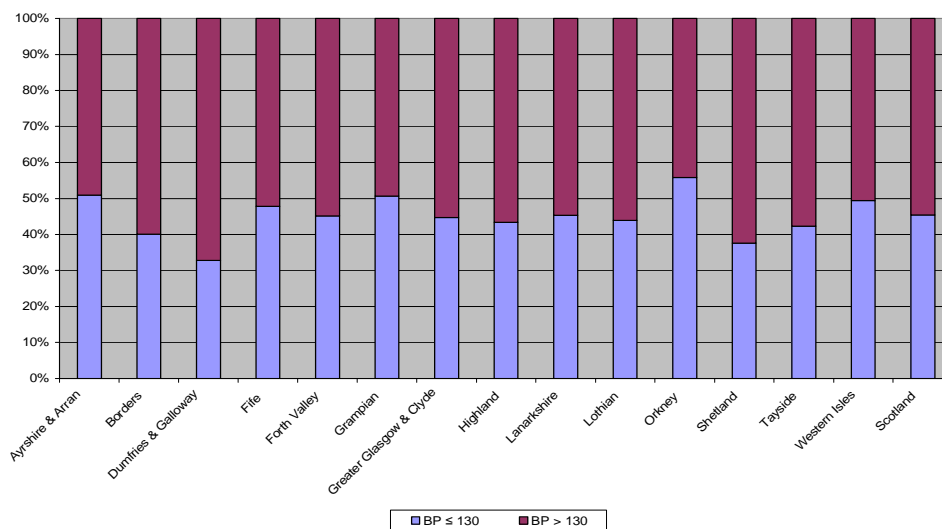
Figure 14a BP category as percentage of Type 2 patients with SBP ≤140 mmHg recorded within previous 15 months
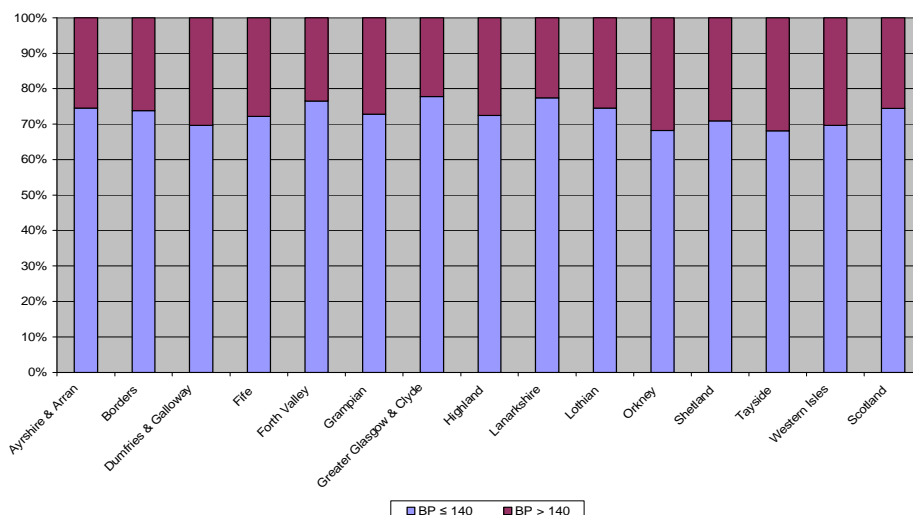
Figure 14b BP category as percentage of Type 2 patients with SBP ≤ 130 mmHg recorded within previous 15 months
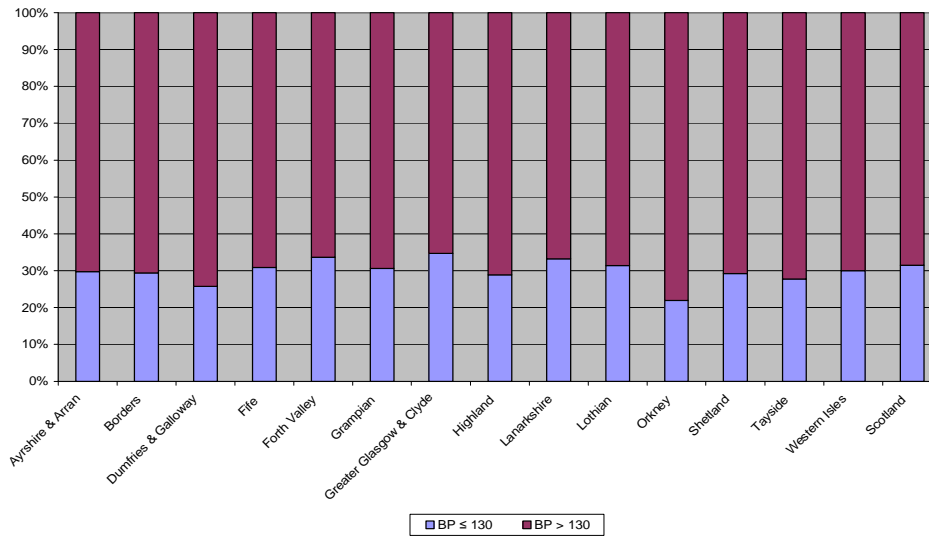
Table 28a Type 1 diabetes: BP category as percent of patients with SBP ≤ 140mmHg and > 140 mmHg recorded in previous 15 months

NHS Board	Systolic BP ≤ 140		Systolic BP > 140		Total recorded	Not recorded
Ayrshire & Arran	1,533	81.8%	342	18.2%	1,875	363
Borders	389	71.3%	157	28.8%	546	55
Dumfries & Galloway	476	69.5%	209	30.5%	685	203
Fife	1,265	80.2%	312	19.8%	1,577	334
Forth Valley	1,042	79.0%	277	21.0%	1,319	249
Grampian	2,140	82.5%	455	17.5%	2,595	450
Greater Glasgow & Clyde	4,190	77.9%	1,190	22.1%	5,380	735
Highland	1,129	78.0%	318	22.0%	1,447	259
Lanarkshire	2,423	81.0%	567	19.0%	2,990	490
Lothian	2,854	78.9%	764	21.1%	3,618	491
Orkney	90	86.5%	14	13.5%	104	12
Shetland	94	86.2%	15	13.8%	109	10
Tayside	1,171	74.4%	403	25.6%	1,574	263
Western Isles	134	84.8%	24	15.2%	158	19
Scotland	**18,930**	**79.0%**	**5,047**	**21.1%**	**23,977**	**3,933**

Table 28b Type 1 diabetes: BP category as percent of patients with SBP ≤ 130 mmHg and > 130 mmHg recorded in previous 15 months

NHS Board	Systolic BP ≤ 130		Systolic BP > 130		Total recorded	Not recorded
Ayrshire & Arran	955	50.9%	920	49.1%	1875	363
Borders	219	40.1%	327	59.9%	546	55
Dumfries & Galloway	225	32.9%	460	67.2%	685	203
Fife	754	47.8%	823	52.2%	1577	334
Forth Valley	596	45.2%	723	54.8%	1319	249
Grampian	1316	50.7%	1279	49.3%	2595	450
Greater Glasgow & Clyde	2407	44.7%	2973	55.3%	5380	735
Highland	627	43.3%	820	56.7%	1447	259
Lanarkshire	1357	45.4%	1633	54.6%	2990	490
Lothian	1588	43.9%	2030	56.1%	3618	491
Orkney	58	55.8%	46	44.2%	104	12
Shetland	41	37.6%	68	62.4%	109	10
Tayside	665	42.3%	909	57.8%	1574	263
Western Isles	78	49.4%	80	50.6%	158	19
Scotland	**10,886**	**45.4%**	**13,091**	**54.6%**	**23,977**	**3,933**

Table 29a Type 2 diabetes: BP category as percent of patients with SBP ≤ 140mmHg and > 140 mmHg recorded in previous 15 months

NHS Board	Systolic BP ≤ 140		Systolic BP > 140		Total recorded	Not recorded
Ayrshire & Arran	12016	74.6%	4097	25.4%	16113	662
Borders	3356	73.8%	1191	26.2%	4547	181
Dumfries & Galloway	3926	69.7%	1709	30.3%	5635	1201
Fife	10618	72.2%	4090	27.8%	14708	772
Forth Valley	8554	76.4%	2637	23.6%	11191	816
Grampian	14265	72.8%	5330	27.2%	19595	632
Greater Glasgow & Clyde	35224	77.8%	10072	22.2%	45296	2794
Highland	8279	72.4%	3156	27.6%	11435	665
Lanarkshire	17316	77.4%	5051	22.6%	22367	1473
Lothian	19834	74.5%	6777	25.5%	26611	1668
Orkney	532	68.2%	248	31.8%	780	27
Shetland	568	70.9%	233	29.1%	801	33
Tayside	11312	68.2%	5279	31.8%	16591	692
Western Isles	674	69.6%	294	30.4%	968	25
Scotland	**146,474**	**74.5%**	**50,164**	**25.5%**	**196,638**	**11,641**

Table 29b Type 2 diabetes: BP category as percent of patients with SBP ≤ 130 mmHg and > 130 mmHg recorded in previous 15 months

NHS Board	Systolic BP ≤ 130		Systolic BP > 130		Total recorded	Not recorded
Ayrshire & Arran	4795	29.8%	11318	70.2%	16113	662
Borders	1338	29.4%	3209	70.6%	4547	181
Dumfries & Galloway	1455	25.8%	4180	74.2%	5635	1201
Fife	4543	30.9%	10165	69.1%	14708	772
Forth Valley	3767	33.7%	7424	66.3%	11191	816
Grampian	5996	30.6%	13599	69.4%	19595	632
Greater Glasgow & Clyde	15739	34.8%	29557	65.3%	45296	2794
Highland	3311	29.0%	8126	71.1%	11437	665
Lanarkshire	7418	33.2%	14949	66.8%	22367	1473
Lothian	8362	31.4%	18249	68.6%	26611	1668
Orkney	171	21.9%	609	78.1%	780	27
Shetland	234	29.2%	567	70.8%	801	33
Tayside	4609	27.8%	11982	72.2%	16591	692
Western Isles	290	30.0%	678	70.0%	968	25
Scotland	**62,028**	**31.5%**	**134,612**	**68.5%**	**196,640**	**11,641**

Table 30 BP category 2004-2010(as percentage of patients with BP recorded)

Year	Systolic BP ≤ 140		Systolic BP > 140		Total	Not recorded
2010	**165,404**	**75.0%**	**55,211**	**25.0%**	**220,615**	**15,574**
2009	159,815	75.1%	53,042	24.9%	212,857	13,774
2008	146,452	73.4%	53,198	26.7%	199,650	20,313
2007	149,038	73.0%	55,128	27.0%	204,166	5,540
2006	133,898	71.1%	54,526	28.9%	188,424	8,377
2005	107,398	69.2%	47,871	30.8%	155,269	13,384
2004	76,729	62.7%	45,738	37.4%	122,467	12,104

Note: From 2008 onwards, there was a requirement that BP should be in previous 15 months. In 2004 to 2007, older results could be included if there was no recent result.

Table 31 Mean BP recorded in previous 15 months in people with type 1 diabetes aged <40 years

NHS Board	Mean systolic BP	Mean diastolic BP
Ayrshire & Arran	120	72
Borders	126	73
Dumfries & Galloway	126	77
Fife	121	73
Forth Valley	125	73
Grampian	121	71
Greater Glasgow & Clyde	124	74
Highland	124	74
Lanarkshire	121	74
Lothian	123	75
Orkney	116	71
Shetland	126	72
Tayside	124	74
Western Isles	122	73

Table 32 Mean BP recorded in previous 15 months in people with type 2 diabetes aged 50-60 years by NHS board

NHS Board	Mean systolic BP	Mean diastolic BP
Ayrshire & Arran	133	78
Borders	134	77
Dumfries & Galloway	134	80
Fife	133	79
Forth Valley	132	77
Grampian	133	79
Greater Glasgow & Clyde	131	77
Highland	133	78
Lanarkshire	132	77
Lothian	132	78
Orkney	135	79
Shetland	134	79
Tayside	134	79
Western Isles	133	79

Cholesterol

Cholesterol was recorded in 89.6% of people with type 1 or type 2 diabetes within the previous 15 months. Total cholesterol was found to be less than or equal to the target of 5.0mmol/l in 80.4% of patients with a recorded result.

Figure 15 Recording of cholesterol in those with T1 and T2 diabetes within the previous 15 months
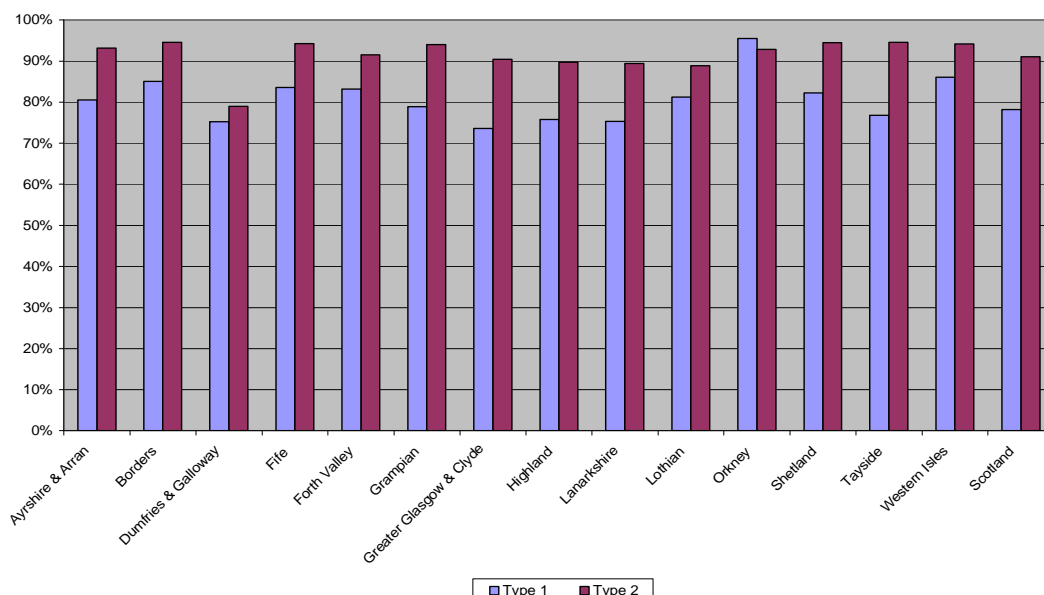
Note: Excludes children under 12 years (n=991)

Table 33 Recording of cholesterol within the previous 15 months 2007-2010 (all diabetes)

Year	Recorded within previous 15 months	Total
2010	**89.6%**	**234,208**
2009	86.5%	225,635
2008	90.1%	218,903
2007	88.4%	208,652
2002	60.5%	102,837

Note: Excludes children under 12 years of age (n=991).

Figure 16 Type 1: Total cholesterol category recorded within previous 15 months as percentage of patients with total cholesterol recorded
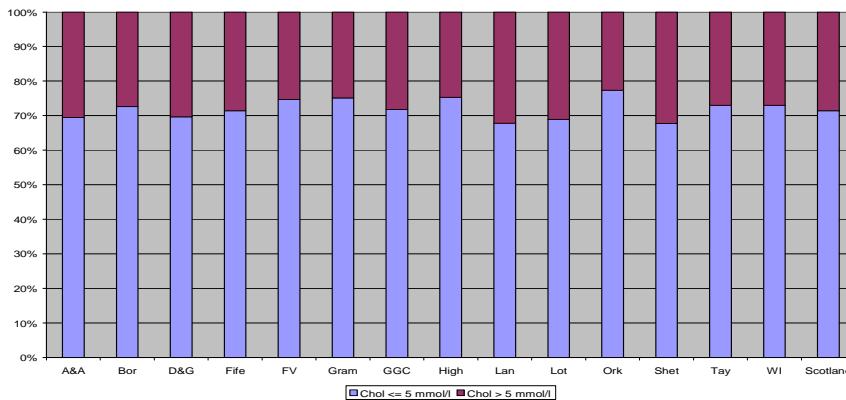
Note: Excludes children under 12 years (n=981)

Figure 17 Type 2: Total cholesterol category recorded within previous 15 months as percentage of patients with total cholesterol recorded
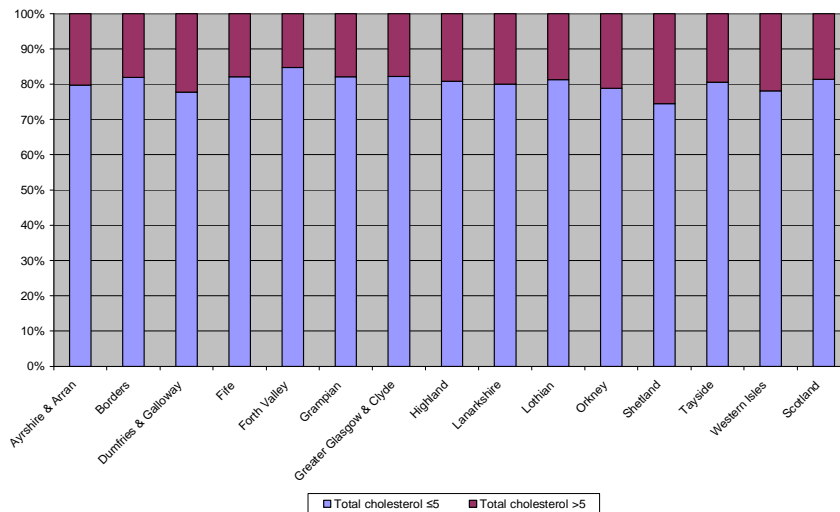
Note: Excludes children under 12 years (n= 10)

Table 34 Type 1: Total cholesterol category by NHS board as percentage of patients with cholesterol recorded within the previous 15 months

NHS Board	Total cholesterol ≤ 5		Total cholesterol > 5		Total recorded	Not recorded
Ayrshire & Arran	1,208	69.5%	530	30.5%	1,738	421
Borders	356	72.7%	134	27.4%	490	86
Dumfries & Galloway	448	69.7%	195	30.3%	643	211
Fife	1,100	71.4%	441	28.6%	1,541	303
Forth Valley	933	74.7%	316	25.3%	1,249	253
Grampian	1,745	75.1%	578	24.9%	2,323	622
Greater Glasgow & Clyde	3,124	71.8%	1,227	28.2%	4,351	1,562
Highland	933	75.4%	305	24.6%	1,238	397
Lanarkshire	1,709	67.8%	811	32.2%	2,520	824
Lothian	2,231	68.9%	1,007	31.1%	3,238	749
Orkney	82	77.4%	24	22.6%	106	5
Shetland	63	67.7%	30	32.3%	93	20
Tayside	995	73.0%	368	27.0%	1,363	411
Western Isles	108	73.0%	40	27.0%	148	24
Scotland	**15,035**	**71.5%**	**6,006**	**28.5%**	**21,041**	**5,888**

Note: Excludes children under 12 years of age (n=981)

Table 35 Type 2: Total cholesterol category by NHS board as percentage of patients with cholesterol recorded within the previous 15 months

NHS Board	Total cholesterol ≤ 5		Total cholesterol > 5		Total recorded	Not recorded
Ayrshire & Arran	12,462	79.8%	3,159	20.2%	15,621	1,154
Borders	3,663	82.0%	807	18.1%	4,470	257
Dumfries & Galloway	4,196	77.8%	1,200	22.2%	5,396	1,438
Fife	11,987	82.1%	2,609	17.9%	14,596	882
Forth Valley	9,316	84.7%	1,677	15.3%	10,993	1,014
Grampian	15,627	82.1%	3,400	17.9%	19,027	1,199
Greater Glasgow & Clyde	35,738	82.2%	7,737	17.8%	43,475	4,612
Highland	8,772	80.8%	2,086	19.2%	10,858	1,242
Lanarkshire	17,056	80.0%	4,270	20.0%	21,326	2,513
Lothian	20,423	81.3%	4,707	18.7%	25,130	3,149
Orkney	591	78.9%	158	21.1%	749	58
Shetland	587	74.5%	201	25.5%	788	46
Tayside	13,183	80.6%	3,170	19.4%	16,353	930
Western Isles	731	78.2%	204	21.8%	935	58
Scotland	**154,332**	**81.4%**	**35,385**	**18.7%**	**189,717**	**18,552**

Note: Excludes children under 12 years of age (n=10)

Table 36 Total cholesterol category 2004-2010 as percentage of diabetic population Type1 and Type2

Year	Cholesterol ≤ 5		Cholesterol > 5		Not known		Total
2010	**169,367**	**72.0%**	**41,391**	**17.6%**	**24,440**	**10.4%**	**235,198**
2009	157,434	69.8%	37,650	16.7%	30,551	13.5%	225,635
2008	157,938	72.1%	39,107	17.9%	21,858	10.0%	218,903
2007	159,843	76.6%	40,552	19.4%	8,257	4.0%	208,652
2006	143,999	73.6%	38,614	19.7%	13,104	6.7%	195,717
2005	113,542	67.6%	37,631	22.4%	16,680	9.9%	167,853
2004	78,688	54.0%	39.051	26.8%	27,952	19.2%	145,691

Note: From 2008 onwards, there was a requirement that cholesterol should be in previous 15 months. In 2004 to 2007, older results could be included if there was no recent result.
Excludes children under 12 years of age (n=991)

Table 37 Mean total cholesterol in people with type 2 diabetes aged 50-60 years by NHS board

NHS Board	Mean total cholesterol (mmol/l)
Ayrshire & Arran	4.5
Borders	4.6
Dumfries & Galloway	4.6
Fife	4.5
Forth Valley	4.3
Grampian	4.5
Greater Glasgow & Clyde	4.4
Highland	4.4
Lanarkshire	4.5
Lothian	4.5
Orkney	4.5
Shetland	4.5
Tayside	4.5
Western Isles	4.6

Smoking status

Smoking status was recorded for 99.04% of the diabetic population. Almost 1 in 5 people with diabetes were recorded as being current smokers. There has been no decline in the recorded smoking prevalence in people with diabetes in the last six years, which is in contrast to that of the general population.

Figure 18a Smoking status as a percentage of Type 1 diabetic population
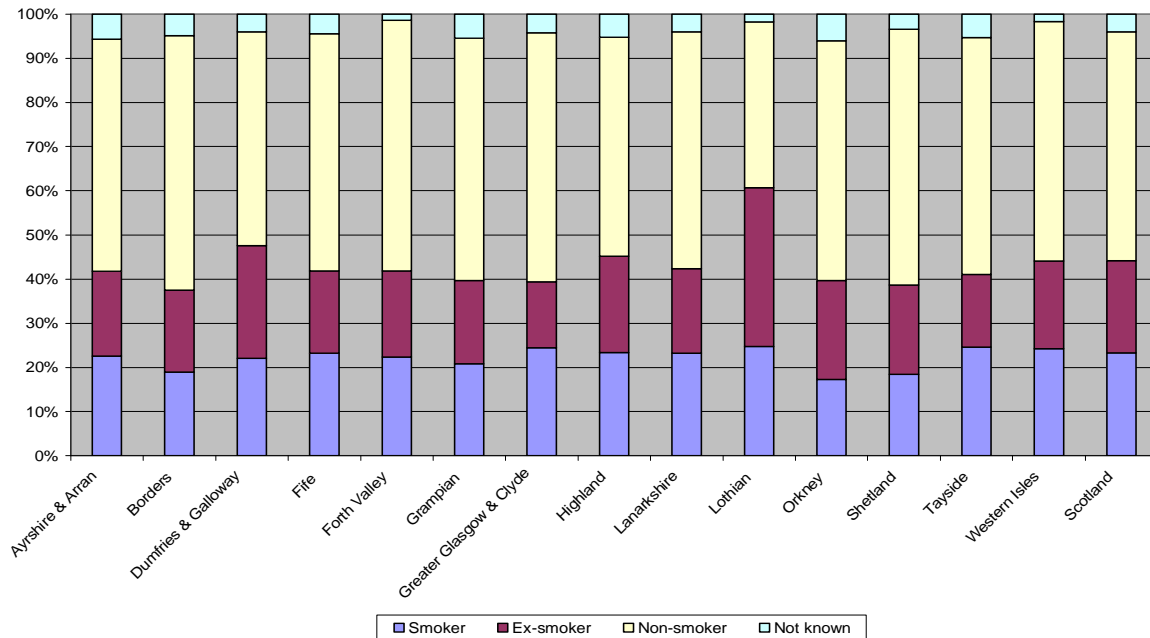
Figure 18b Smoking status as a percentage of Type 2 diabetic population

35
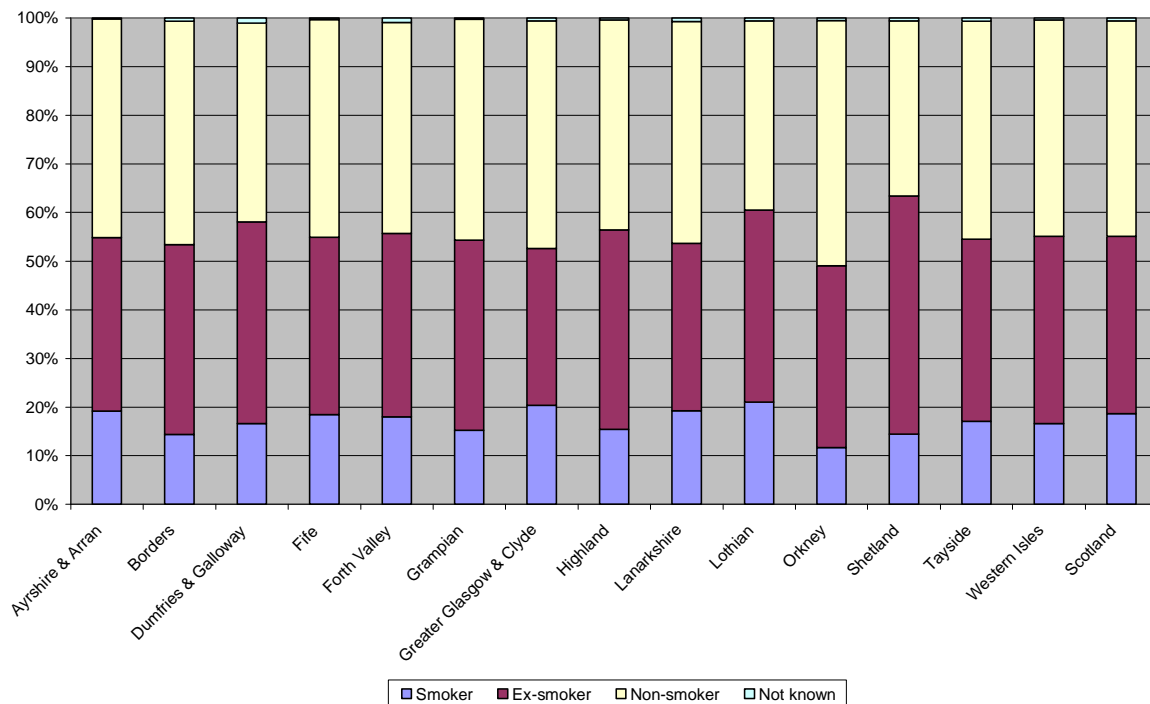
Table 38 Type 1: Smoking status by NHS board as percentage of patients with smoking status recorded

NHS Board	Current smoker	Ex-smoker	Never smoked	Total recorded	Not recorded
Ayrshire & Arran	23.9%	20.3%	55.8%	2,111	127
Borders	19.9%	19.4%	60.7%	572	29
Dumfries & Galloway	23.0%	26.5%	50.5%	852	36
Fife	24.3%	19.5%	56.3%	1,827	84
Forth Valley	22.6%	19.8%	57.6%	1,547	21
Grampian	22.0%	20.0%	58.0%	2,879	166
Greater Glasgow & Clyde	25.5%	15.6%	58.9%	5,858	257
Highland	24.6%	23.1%	52.3%	1,616	90
Lanarkshire	24.2%	20.0%	55.8%	3,339	141
Lothian	25.2%	36.6%	38.2%	4,037	72
Orkney	18.4%	23.9%	57.8%	109	7
Shetland	19.1%	20.9%	60.0%	115	4
Tayside	26.0%	17.3%	56.7%	1,739	98
Western Isles	24.7%	20.1%	55.2%	174	3
Scotland	**24.3%**	**21.7%**	**54.0%**	**26,775**	**1,135**

Table 39 Type 2: Smoking status by NHS board as percentage of patients with smoking status recorded

NHS Board	Current smoker	Ex-smoker	Never smoked	Total recorded	Not recorded
Ayrshire & Arran	19.2%	35.8%	45.0%	16,743	32
Borders	14.4%	39.3%	46.2%	4,697	31
Dumfries & Galloway	16.8%	41.9%	41.3%	6,764	72
Fife	18.5%	36.6%	44.9%	15,432	48
Forth Valley	18.1%	38.1%	43.8%	11,901	106
Grampian	15.3%	39.2%	45.6%	20,171	56
Greater Glasgow & Clyde	20.5%	32.4%	47.1%	47,835	255
Highland	15.5%	41.2%	43.3%	12,049	51
Lanarkshire	19.4%	34.7%	45.9%	23,664	176
Lothian	21.2%	39.7%	39.1%	28,110	169
Orkney	11.7%	37.6%	50.7%	803	4
Shetland	14.5%	49.3%	36.2%	829	5
Tayside	17.2%	37.7%	45.1%	17,168	115
Western Isles	16.7%	38.6%	44.7%	989	4
Scotland	**18.7%**	**36.8%**	**44.6%**	**207,155**	**1,124**

Table 40 Smoking status 2004-2010 as percentage of those with data recorded (Type 1 and Type 2)

Year	Current smoker	Ex-smoker	Never smoked	Not recorded
2010	**19.3%**	**35.1%**	**45.6%**	**2,259**
2009	19.5%	35.5%	45.0%	2,568
2008	19.2%	35.0%	44.0%	1.8%
2007	19.3%	34.0%	43.4%	3.3%
2006	19.0%	33.0%	41.8%	6.3%
2005	19.5%	30.0%	41.6%	8.9%
2004	19.2%	28.4%	40.5%	11.9%

Note: Data for years 2001 to 2008 are calculated as a percentage of all registered patients

Scottish Diabetes Survey 2010

HbA$_{1c}$, BP and cholesterol targets

The proportions of patients known to be reaching current target levels for control of their blood glucose (HbA1c<53 mmol/mol), blood pressure (systolic BP<130 mmHg and diastolic BP ≤ 80 mmHg) and cholesterol (≤ 5mmol/l) are shown below.

Figure 19 Percentage of patients reaching targets for HbA$_{1c}$, BP and total cholesterol by NHS Board – Type 1
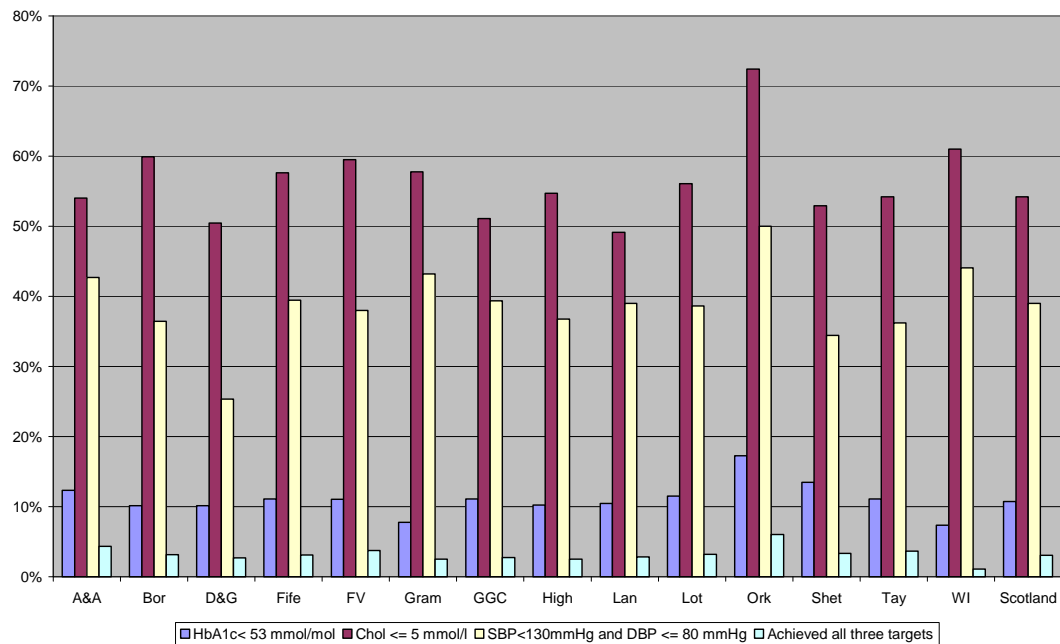
Figure 20 Percentage of patients reaching targets for HbA$_{1c}$, BP and total cholesterol by NHS board – Type 2
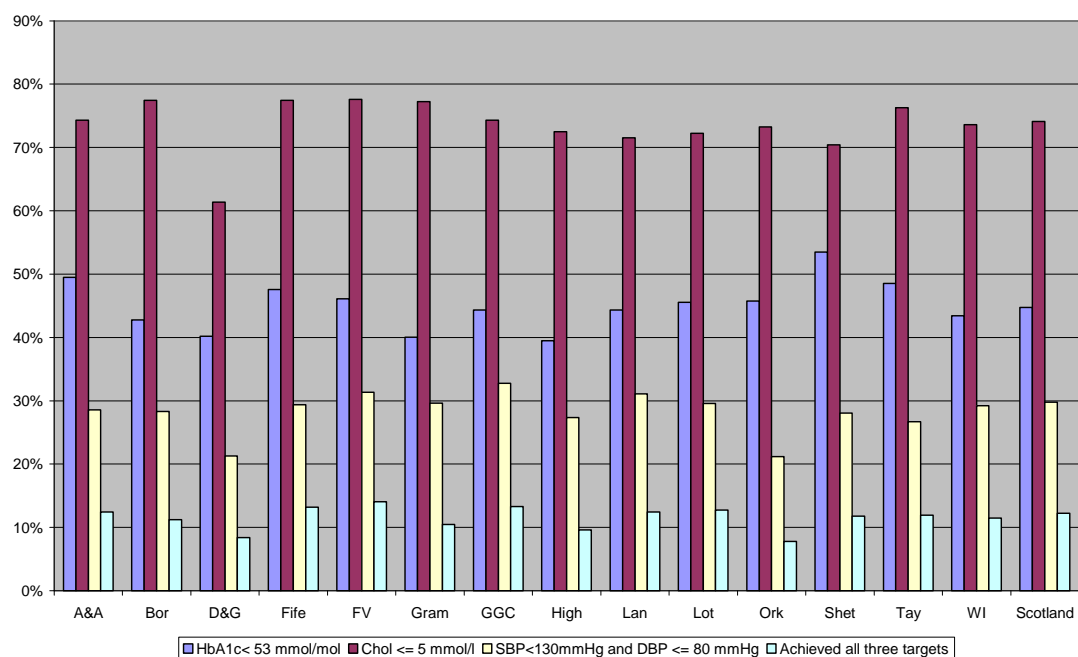
Scottish Diabetes Survey 2010

Table 41 Percentage of patients reaching targets for HbA$_{1c}$, BP and total cholesterol – Type 1

NHS Board	HbA1c <53 mmol/mol		Chol≤ 5 mmol/l		SBP<130 mmHg DBP ≤ 80mmHg		HbA1c <53, chol≤ 5, SBP<130 and DBP ≤ 80	
Ayrshire & Arran	276	12.3%	1209	54.0%	955	42.7%	97	4.3%
Borders	61	10.1%	360	59.9%	219	36.4%	19	3.2%
Dumfries & Galloway	90	10.1%	448	50.5%	225	25.3%	24	2.7%
Fife	212	11.1%	1101	57.6%	754	39.5%	60	3.1%
Forth Valley	173	11.0%	933	59.5%	596	38.0%	59	3.8%
Grampian	237	7.8%	1759	57.8%	1316	43.2%	76	2.5%
Greater Glasgow & Clyde	680	11.1%	3123	51.1%	2407	39.4%	168	2.7%
Highland	175	10.3%	933	54.7%	627	36.8%	43	2.5%
Lanarkshire	364	10.5%	1709	49.1%	1357	39.0%	98	2.8%
Lothian	472	11.5%	2304	56.1%	1588	38.6%	131	3.2%
Orkney	20	17.2%	84	72.4%	58	50.0%	7	6.0%
Shetland	16	13.4%	63	52.9%	41	34.5%	4	3.4%
Tayside	204	11.1%	996	54.2%	665	36.2%	67	3.6%
Western Isles	13	7.3%	108	61.0%	78	44.1%	2	1.1%
Scotland	**2993**	**10.7%**	**15130**	**54.2%**	**10886**	**39.0%**	**855**	**3.1%**

Table 42 Percentage of patients reaching targets for HbA$_{1c}$, BP and total cholesterol – Type 2

NHS Board	HbA1c <53 mmol/mol		Chol≤ 5 mmol/l		SBP<130 mmHg DBP ≤ 80mmHg		HbA1c <53, chol≤ 5, SBP<130 and DBP ≤ 80	
Ayrshire & Arran	8304	49.5%	12460	74.3%	4795	28.6%	2085	12.4%
Borders	2021	42.7%	3663	77.5%	1338	28.3%	530	11.2%
Dumfries & Galloway	2748	40.2%	4196	61.4%	1455	21.3%	575	8.4%
Fife	7362	47.6%	11986	77.4%	4543	29.3%	2041	13.2%
Forth Valley	5537	46.1%	9315	77.6%	3767	31.4%	1687	14.1%
Grampian	8104	40.1%	15627	77.3%	5996	29.6%	2114	10.5%
Greater Glasgow & Clyde	21311	44.3%	35731	74.3%	15739	32.7%	6389	13.3%
Highland	4777	39.5%	8770	72.5%	3311	27.4%	1160	9.6%
Lanarkshire	10567	44.3%	17056	71.5%	7418	31.1%	2969	12.5%
Lothian	12882	45.6%	20422	72.2%	8362	29.6%	3604	12.7%
Orkney	369	45.7%	591	73.2%	171	21.2%	63	7.8%
Shetland	446	53.5%	587	70.4%	234	28.1%	98	11.8%
Tayside	8388	48.5%	13183	76.3%	4609	26.7%	2061	11.9%
Western Isles	431	43.4%	731	73.6%	290	29.2%	114	11.5%
Scotland	**93247**	**44.8%**	**154,318**	**74.1%**	**62,028**	**29.8%**	**25,490**	**12.3%**

Complications of diabetes

The main complications of diabetes include those due to large vessel (arterial) disease;

- *myocardial infarction (MI) – the commonest cause of death in people with diabetes*

- *stroke – the risk is increased compared to people without diabetes*

- *peripheral vascular disease, which can lead to amputations*

and those due to small vessel disease (microangiopathy);

- *renal disease, which can lead to end-stage renal failure requiring dialysis*

- *retinopathy – diabetes has been the commonest cause of blindness in the people of working age*

Diabetes also leads to poorer outcomes in pregnancy, but this survey does not include pregnancy outcomes.

In this section, the data presented include both screening performance and recording of prevalent complications. The purpose of screening is to detect problems at an early stage and intervene to prevent further deterioration.

Myocardial infarction

21,488 (9.1%) of registered patients have a record of a previous MI. Others will have had an MI but not survived. Validation of this data is needed. There have been improvements in recording, increased use of procedures and better survival following an MI in recent years.

Table 43 Percentage of patients recorded as ever having had a myocardial infarct and survived by NHS board

NHS Board	Recorded as having had an MI			
	Type 1		Type 2	
Ayrshire & Arran	101	4.5%	1,712	10.2%
Borders	32	5.3%	462	9.8%
Dumfries & Galloway	36	4.1%	572	8.4%
Fife	61	3.2%	1,562	10.1%
Forth Valley	54	3.4%	1,214	10.1%
Grampian	110	3.6%	2,019	10.0%
Greater Glasgow & Clyde	216	3.5%	4,966	10.3%
Highland	66	3.9%	1,204	10.0%
Lanarkshire	169	4.9%	2,420	10.2%
Lothian	117	2.9%	2,805	9.9%
Orkney	8	6.9%	71	8.8%
Shetland	4	3.4%	56	6.7%
Tayside	63	3.4%	1,990	11.5%
Western Isles	6	3.4%	98	9.9%
Scotland	**1,043**	**3.7%**	**20,445**	**9.8%**

Note: these data are as reported and have not been validated.

Table 44 Percentage of patients recorded as ever having had a myocardial infarct 2007-2010 (both Type 1 and Type 2) and survived

Year of Survey	Myocardial infarctions
2010	**9.1%**
2009	9.5%
2008	9.5%
2007	9.5%

Note: this table shows the percentage of patients who have ever had a heart attack and survived.

Cardiac revascularisation

15,171 (6.4%) people included in the survey have a record of having undergone cardiac revascularisation.

Table 45 Cardiac revascularisation in type 1 and type 2

NHS Board	Recorded as having undergone cardiac revascularisation			
	Type 1		Type 2	
Ayrshire & Arran	61	2.7%	1,076	6.4%
Borders	15	2.5%	298	6.3%
Dumfries & Galloway	28	3.2%	403	5.9%
Fife	34	1.8%	930	6.0%
Forth Valley	39	2.5%	768	6.4%
Grampian	80	2.6%	1,453	7.2%
Greater Glasgow & Clyde	172	2.8%	3,635	7.6%
Highland	43	2.5%	797	6.6%
Lanarkshire	126	3.6%	1,699	7.1%
Lothian	95	2.3%	1,974	7.0%
Orkney	1	0.9%	56	6.9%
Shetland	2	1.7%	34	4.1%
Tayside	50	2.7%	1,222	7.1%
Western Isles	3	1.7%	77	7.8%
Scotland	**749**	**2.7%**	**14,422**	**6.9%**

Table 46 Percentage of patients recorded as ever having had cardiac revascularisation 2001-2010

Year of Survey	Cardiac Revascularisation
2010	**6.4%**
2009	6.3%
2008	6.1%
2007	5.9%
2006	5.5%
2005	4.9%
2004	3.9%
2003	2.8%
2002	3.7%
2001	2.1%

Stroke

11,800 (5.0%) people with diabetes are recorded as having had a cerebrovascular accident (stroke), an increase in numbers but a similar percentage to that in previous surveys.

Table 47 Recorded as having had a stroke and survived

NHS Board	Recorded as having had a stroke			
	Type 1 diabetes		Type 2 diabetes	
Ayrshire & Arran	62	2.8%	911	5.4%
Borders	11	1.8%	300	6.4%
Dumfries & Galloway	20	2.3%	278	4.1%
Fife	37	1.9%	830	5.4%
Forth Valley	33	2.1%	601	5.0%
Grampian	47	1.5%	913	4.5%
Greater Glasgow & Clyde	124	2.0%	2,729	5.7%
Highland	39	2.3%	602	5.0%
Lanarkshire	69	2.0%	1,195	5.0%
Lothian	88	2.1%	1,707	6.0%
Orkney	1	0.9%	26	3.2%
Shetland	3	2.5%	32	3.8%
Tayside	33	1.8%	1,062	6.1%
Western Isles	4	2.3%	43	4.3%
Scotland	**571**	**2.1%**	**11,229**	**5.4%**

Kidney Disease

Serum creatinine

Serum creatinine was recorded for 90.8% of patients.

Table 48 Recording of serum creatinine within the previous 15 months by NHS board

NHS Board	Type 1 diabetes		Type 2 diabetes		Total
	Recorded within previous 15 months				
Ayrshire & Arran	1,828	84.7%	15,846	94.5%	17,674
Borders	497	86.3%	4,047	85.6%	4,544
Dumfries & Galloway	665	77.9%	5,335	78.1%	6,000
Fife	1,651	89.5%	14,893	96.2%	16,544
Forth Valley	1,307	87.0%	11,323	94.3%	12,630
Grampian	2,480	84.2%	19,502	96.4%	21,982
Greater Glasgow & Clyde	4,636	78.4%	43,882	91.3%	48,518
Highland	1,215	74.3%	10,504	86.8%	11,719
Lanarkshire	2,653	79.3%	21,924	92.0%	24,577
Lothian	3,216	80.7%	25,072	88.7%	28,288
Orkney	103	92.8%	732	90.7%	835
Shetland	101	89.4%	810	97.1%	911
Tayside	1,556	87.7%	16,760	97.0%	18,316
Western Isles	155	90.1%	967	97.4%	1,122
Scotland	**22,063**	**81.9%**	**191,597**	**92.0%**	**213,660**

Note: Excludes children under 12 years of age (n=991)

Table 49 Recording of serum creatinine within the previous 15 months 2002-2010 (Type 1 and Type 2 diabetes)

Year	Recorded within previous 15 months	Total eligible population
2010	**90.8%**	**235,198**
2009*	90.0%	225,635
2008	90.3%	218,903
2007	88.6%	208,652
2006	86.1%	195,717
2005	82.3%	171,899
2004	69.2%	149,353
2003	42.5%	133,889
2002	63.5%	97,246

Note: Excludes children under 12 years of age (n=991)

*Figures prior to 2009 reported on those with all types of diabetes mellitus. The figures for 2009 and onwards report only on those with type 1 and type 2 diabetes.

Urinary microalbuminuria

In 2007, the data showed that 80% of patients had urinary microalbuminuria checked within the previous 15 months. In 2008, the SCI-DC data recorded that only 41% of patients have had microalbuminuria checked. The decrease is due to a change to the guidance regarding data collection and analysis. In previous years, it was sufficient that a protein dipstick test had been done. From 2008 onwards, a value is required. The figures for microalbuminuria therefore under-estimate numbers tested.

Table 50 Recording of urinary microalbumin value available on SCI-DC within the previous 15 months by NHS board for T1 and T2

NHS Board	Type 1 diabetes		Type 2 diabetes		Total
	Recorded within previous 15 months				
Ayrshire & Arran	1,035	47.9%	9,081	54.1%	10,116
Borders	375	65.1%	104	2.2%	479
Dumfries & Galloway	158	18.5%	1,708	25.0%	1,866
Fife	1,273	69.0%	12,208	78.9%	13,481
Forth Valley	766	51.0%	5,868	48.9%	6,634
Grampian	1,627	55.3%	16,558	81.9%	18,185
Greater Glasgow & Clyde	2,991	50.6%	24,702	51.4%	27,693
Highland	770	47.1%	6,866	56.7%	7,636
Lanarkshire	1,465	43.8%	10,872	45.6%	12,337
Lothian	1,927	48.3%	8,500	30.1%	10,427
Orkney	55	49.6%	485	60.1%	540
Shetland	83	73.5%	609	73.0%	692
Tayside	1,108	62.5%	13,131	76.0%	14,239
Western Isles	142	82.6%	828	83.4%	970
Scotland	**12,426**	**48.6%**	**111,520**	**53.6%**	**123,946**

Note: Excludes children under 12 years of age (n=996)

Estimated Glomerular Filtration rate (eGFR)

Table 51 Recording of eGFR available on SCI-DC within the previous 15 months

NHS Board	Type 1 diabetes		Type 2 diabetes		Total
	Recorded within previous 15 months				
Ayrshire & Arran	222	11.1%	3840	22.9%	4,062
Borders	491	92.3%	4467	94.6%	4,958
Dumfries & Galloway	208	25.7%	1957	28.6%	2,165
Fife	457	26.8%	6581	42.5%	7,038
Forth Valley	157	11.3%	2525	21.0%	2,682
Grampian	492	17.9%	4394	21.7%	4,886
Greater Glasgow & Clyde	1,405	25.6%	18298	38.1%	19,703
Highland	52	3.4%	398	3.3%	450
Lanarkshire	43	1.4%	262	1.1%	305
Lothian	456	12.2%	2146	7.6%	2,602
Orkney	14	14.1%	135	16.7%	149
Shetland	92	92.9%	807	96.8%	899
Tayside	1,291	78.3%	16521	95.6%	17,812
Western Isles	143	89.9%	925	93.2%	1,068
Scotland	**5,523**	**22.1%**	**63,256**	**30.4%**	**68,779**

Due to existing data flow issues it is still not possible to present adequate figures on direct eGFR testing. It is however, possible to derive approximate eGFR values by applying the abbreviated Modification of Diet in Renal Disease (MDRD) formula to creatinine values that are available to SCI-DC. A breakdown of these by eGFR range as a percentage of the type 1 and type 2 diabetes populations is shown below. This data was derived on 9th April 2011 and is limited to patients aged 18 or over.

Table 52 Derived eGFR values for creatinine values available on SCI-DC by NHS Board – Type 1 diabetes

NHS Board	eGFR (Derived)					Total derived	Not derived	% Derived
	<15	15-29	30-44	45-59	>=60			
Ayrshire & Arran	1.2%	1.6%	3.9%	8.4%	84.9%	1,825	159	92.0%
Borders	0.8%	1.2%	3.7%	6.1%	88.2%	492	38	92.8%
Dumfries & Galloway	0.7%	0.9%	4.0%	7.8%	86.5%	676	129	84.0%
Fife	0.5%	1.5%	4.1%	8.6%	85.3%	1,555	157	90.8%
Forth Valley	1.0%	1.1%	3.2%	10.3%	84.3%	1,271	147	89.6%
Grampian	0.6%	1.2%	2.4%	5.7%	90.0%	2,423	303	88.9%
Greater Glasgow & Clyde	0.8%	1.3%	3.1%	5.8%	89.0%	4,535	971	82.4%
Highland	0.2%	1.4%	4.0%	7.0%	87.4%	1,250	277	81.9%
Lanarkshire	0.7%	1.8%	3.6%	7.0%	86.9%	2,607	467	84.8%
Lothian	0.4%	1.1%	1.9%	4.3%	92.4%	3,194	537	85.6%
Orkney	2.2%	2.2%	7.5%	5.4%	82.8%	93	6	93.9%
Shetland	0.0%	0.0%	1.0%	1.0%	98.0%	98	2	98.0%
Tayside	0.9%	1.4%	2.3%	4.8%	90.7%	1,510	140	91.5%
Western Isles	0.0%	1.3%	2.0%	4.0%	92.7%	150	7	95.5%
Scotland	**0.7%**	**1.3%**	**3.1%**	**6.4%**	**88.4%**	**21,679**	**3,340**	**86.7%**

Table 53 Derived eGFR values for creatinine values available on SCI-DC by NHS Board – Type 2 diabetes

NHS Board	eGFR (Derived)					Total derived	Not derived	% Derived
	<15	15-29	30-44	45-59	>=60			
Ayrshire & Arran	0.4%	1.7%	5.8%	12.8%	79.3%	16,593	529	96.9%
Borders	0.3%	1.7%	6.4%	13.1%	78.5%	4,121	622	86.9%
Dumfries & Galloway	0.2%	1.5%	7.0%	14.2%	77.1%	5,593	1,307	81.1%
Fife	0.3%	2.0%	8.8%	20.7%	68.2%	15,231	502	96.8%
Forth Valley	0.3%	2.1%	9.8%	23.7%	64.1%	11,446	651	94.6%
Grampian	0.2%	1.8%	5.9%	12.4%	79.6%	19,852	592	97.1%
Greater Glasgow & Clyde	0.3%	1.7%	5.5%	10.8%	81.7%	44,666	3,528	92.7%
Highland	0.3%	1.8%	7.3%	16.3%	74.3%	10,761	1,461	88.0%
Lanarkshire	0.3%	1.7%	5.3%	11.7%	81.0%	22,249	1,867	92.3%
Lothian	0.3%	1.6%	5.8%	12.1%	80.2%	25,581	2,936	89.7%
Orkney	0.1%	2.9%	6.7%	8.7%	81.6%	759	61	92.6%
Shetland	0.0%	1.7%	5.2%	9.5%	83.5%	820	20	97.6%
Tayside	0.3%	1.7%	6.2%	12.6%	79.1%	17,042	442	97.5%
Western Isles	0.7%	1.3%	7.7%	15.1%	75.1%	985	19	98.1%
Scotland	**0.3%**	**1.7%**	**6.3%**	**13.5%**	**78.1%**	**195,699**	**14,537**	**93.1%**

End stage renal failure

End stage renal failure implies a need for renal dialysis or transplantation.

Table 54 End stage renal failure by NHS board

NHS Board	Type 1 diabetes		Type 2 diabetes	
	Recorded as having end stage renal failure			
Ayrshire & Arran	33	1.5%	44	0.3%
Borders	11	1.8%	28	0.6%
Dumfries & Galloway	6	0.7%	14	0.2%
Fife	25	1.3%	75	0.5%
Forth Valley	14	0.9%	42	0.3%
Grampian	47	1.5%	71	0.4%
Greater Glasgow & Clyde	60	1.0%	216	0.4%
Highland	20	1.2%	49	0.4%
Lanarkshire	36	1.0%	71	0.3%
Lothian	36	0.9%	174	0.6%
Orkney	3	2.6%	<5	0.1%
Shetland	<5	0.8%	4	0.5%
Tayside	33	1.8%	114	0.7%
Western Isles	0	0.0%	9	0.9%
Scotland	**325**	**1.2%**	**912**	**0.4%**

Diabetic Eye Disease

Diabetic retinal screening

85.4% of patients had a record of eye screening through the diabetes retinal screening (DRS) service recorded on SCI-DC in the previous 15 months, including those attending ophthalmology services.   More exploratory work on data accuracy needs to be carried out.

Figure 21 Recording of appropriate diabetic eye screening provision within the previous 15 months (type 1 and type 2) including those screened by DRS, those attending ophthalmology clinics and those clinically suspended.
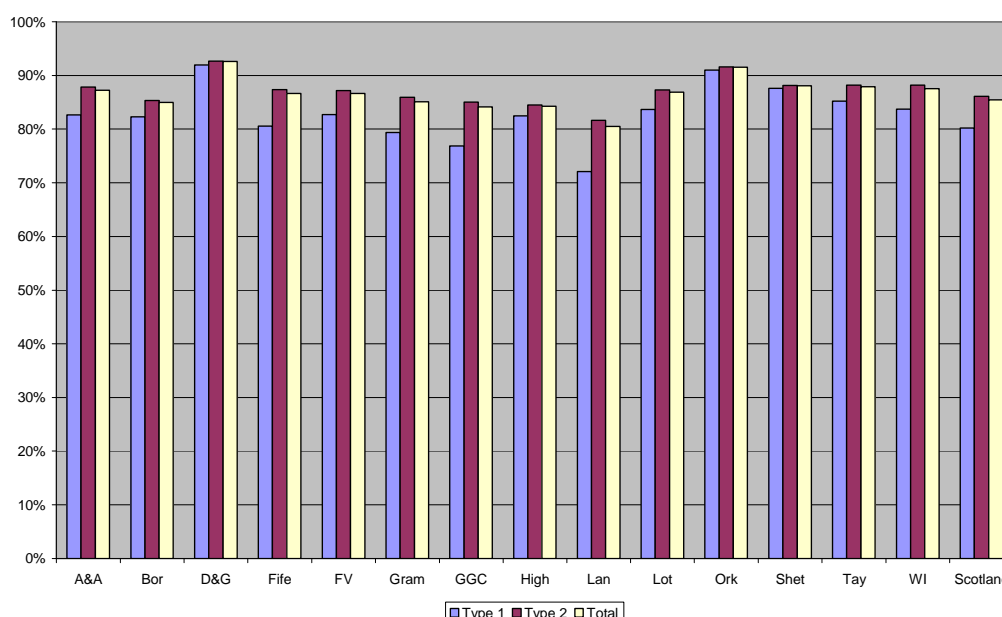
Note: Excludes children under 12 years (n=991)

Table 55 Recording of appropriate diabetic eye screening provision within the previous 15 months (type 1 and type 2) including those screened by DRS, those attending ophthalmology clinics and those clinically suspended.

NHS Board	Type 1 diabetes		Type 2 diabetes		Total screened or suspended		Not recorded
	Screened within previous 15 months						
Ayrshire & Arran	1784	82.6%	14733	87.8%	16517	87.2%	2417
Borders	474	82.3%	4032	85.3%	4506	85.0%	797
Dumfries & Galloway	785	91.9%	6333	92.7%	7118	92.6%	570
Fife	1486	80.6%	13520	87.3%	15006	86.6%	2316
Forth Valley	1242	82.7%	10464	87.1%	11706	86.7%	1803
Grampian	2337	79.4%	17382	85.9%	19719	85.1%	3452
Greater Glasgow & Clyde	4546	76.9%	40902	85.1%	45448	84.2%	8552
Highland	1348	82.4%	10222	84.5%	11570	84.2%	2165
Lanarkshire	2410	72.1%	19468	81.7%	21878	80.5%	5305
Lothian	3337	83.7%	24688	87.3%	28025	86.9%	4241
Orkney	101	91.0%	739	91.6%	840	91.5%	78
Shetland	99	87.6%	735	88.1%	834	88.1%	113
Tayside	1511	85.2%	15246	88.2%	16757	87.9%	2300
Western Isles	144	83.7%	876	88.2%	1020	87.6%	145
Scotland	**21,604**	80.2%	**179,340**	86.1%	**200,944**	85.4%	**34,254**

Note: Excludes children under 12 years (n=991).

Table 56 Recording of diabetic retinopathy screening 2001-2010 (T1 and T2)

Year	Recorded within previous 15 months	Not recorded
2010	**85.1%**	**14.9%**
2009	80.6%	19.8%
2008	71.9%	28.1%
2007	83.6%	16.4%
2006	70.8%	29.2%
2005	67.7%	32.2%
2004	60.4%	39.6%
2003	40.4%	59.6%
2002	60.3%	39.7%
2001	42.2%	57.8%

Note: Excludes children under 12 years (n=991). 2008 data is taken only from digital imaging via Diabetes Retinopathy Screening. For 2001 to 2007, data from any form of screening was acceptable.

Diabetic retinopathy

28.5% of people with data available are recorded as having had retinopathy in one or both of their eyes at some time, based on digital photography, slit lamp or ophthalmology assessment. However, for 9.2% of patients, the register did not include a record of retinopathy status.

Table 57 Type 1: Diabetic retinopathy present – last known retinopathy status left or right eye

NHS Board	Present		Absent		Unknown		Total
Ayrshire & Arran	1,279	59.2%	570	26.4%	310	14.4%	2159
Borders	241	41.8%	228	39.6%	107	18.6%	576
Dumfries & Galloway	631	73.9%	138	16.2%	85	10.0%	854
Fife	941	51.0%	647	35.1%	256	13.9%	1844
Forth Valley	847	56.4%	495	33.0%	160	10.7%	1502
Grampian	1,405	47.7%	1,111	37.7%	429	14.6%	2945
Greater Glasgow and Clyde	2,847	48.1%	2,298	38.9%	768	13.0%	5913
Highland	834	51.0%	652	39.9%	149	9.1%	1635
Lanarkshire	1,763	52.7%	1,134	33.9%	447	13.4%	3344
Lothian	1,801	45.2%	1,695	42.5%	491	12.3%	3987
Orkney	59	53.2%	41	36.9%	11	9.9%	111
Shetland	64	56.6%	40	35.4%	9	8.0%	113
Tayside	704	39.7%	647	36.5%	423	23.8%	1774
Western Isles	100	58.1%	64	37.2%	8	4.7%	172
Scotland	**13,516**	**50.2%**	**9,760**	**36.2%**	**3653**	**13.6%**	**26,929**

Note: Excludes children under 12 years (n=981).

Table 58 Type 2: Diabetic retinopathy present – last known retinopathy status left or right eye

NHS Board	Present		Absent		Unknown		Total
Ayrshire & Arran	5,447	32.5%	9,924	59.2%	1,404	8.4%	16,775
Borders	906	19.2%	3,205	67.8%	616	13.0%	4,727
Dumfries & Galloway	4,154	60.8%	2,251	32.9%	429	6.3%	6,834
Fife	3,870	25.0%	10,426	67.4%	1,182	7.6%	15,478
Forth Valley	3,543	29.5%	7,582	63.1%	882	7.3%	12,007
Grampian	4,580	22.6%	13,998	69.2%	1,648	8.1%	20,226
Greater Glasgow and Clyde	11,122	23.1%	33,023	68.7%	3,942	8.2%	48,087
Highland	2,995	24.8%	8,166	67.5%	939	7.8%	12,100
Lanarkshire	6,444	27.0%	15,159	63.6%	2,236	9.4%	23,839
Lothian	6,102	21.6%	19,767	69.9%	2,410	8.5%	28,279
Orkney	193	23.9%	539	66.8%	75	9.3%	807
Shetland	197	23.6%	566	67.9%	71	8.5%	834
Tayside	3,665	21.2%	11,402	66.0%	2,216	12.8%	17,283
Western Isles	259	26.1%	683	68.8%	51	5.1%	993
Scotland	**53,477**	**25.7%**	**136,691**	**65.6%**	**18,101**	**8.7%**	**208,269**

Note: Excludes children under 12 years (n=10).

Table 59 Diabetic retinopathy present – left or right eye 2007-2010 (percentage of total diabetic population)

Year	Present	Absent	Not known
2010	**28.5%**	**62.3%**	**9.2%**
2009	20.4%	50.1%	29.5%
2008	20.4%	48.8%	30.8%
2007	28.7%	53.1%	18.2%

Note: Excludes children under 12 years (n=991). *2008 and 2009 reported data collected within the previous 15 months only. Other years include retinopathy ever recorded.

Blindness

1,859 (0.8%) people with diabetes were recorded as blind in 2009. However, not all of these patients lost their sight through diabetic complications. This reflects the combination of improvements in diabetes control (so less retinopathy), and the effect of screening, early detection and laser treatment to preserve vision.

Table 60 Type 1: Recorded as blind for Scotland

NHS Board	Diabetic cause		Non-diabetic cause		Not specified		Total		Total on register
Scotland	37	0.13%	9	0.03%	150	0.5%	196	0.7%	27,910

Note: Because of the low numbers, it was decided to omit the board specific data for recorded blindness for those with Type 1 diabetes.

Table 61 Type 2: Recorded as blind by NHS Board

NHS Board	Diabetic cause		Non-diabetic cause		Not specified		Total		Total on register
Ayrshire & Arran	3	0.0%	4	0.0%	104	0.6%	111	0.7%	16,775
Borders	0	0.0%	0	0.0%	36	0.8%	36	0.8%	4,728
Dumfries & Galloway	1	0.0%	2	0.0%	34	0.5%	37	0.5%	6,836
Fife	8	0.1%	4	0.0%	95	0.6%	107	0.7%	15,480
Forth Valley	3	0.0%	11	0.1%	48	0.4%	62	0.5%	12,007
Grampian	0	0.0%	2	0.0%	161	0.8%	163	0.8%	20,227
Greater Glasgow & Clyde	12	0.0%	34	0.1%	349	0.7%	395	0.8%	48,090
Highland	3	0.0%	4	0.0%	92	0.8%	99	0.8%	12,100
Lanarkshire	12	0.1%	14	0.1%	195	0.8%	221	0.9%	23,840
Lothian	6	0.0%	35	0.1%	215	0.8%	256	0.9%	28,279
Orkney	0	0.0%	0	0.0%	5	0.6%	5	0.6%	807
Shetland	0	0.0%	1	0.1%	7	0.8%	8	1.0%	834
Tayside	14	0.1%	20	0.1%	121	0.7%	155	0.9%	17,283
Western Isles	1	0.1%	0	0.0%	7	0.7%	8	0.8%	993
Scotland	63	0.0%	131	0.1%	1,469	0.7%	1,663	0.8%	208,279

Foot Complications

Peripheral pulses

75.9% of people with Type 1 or Type 2 diabetes have had their feet checked (peripheral pulses recorded) in the previous 15 months. This is a slight decrease from 2009 where 76.5% had their feet checked.

Figure 22 Percentage of people with Type 1 or Type 2 diabetes with peripheral pulses recorded within the previous 15 months
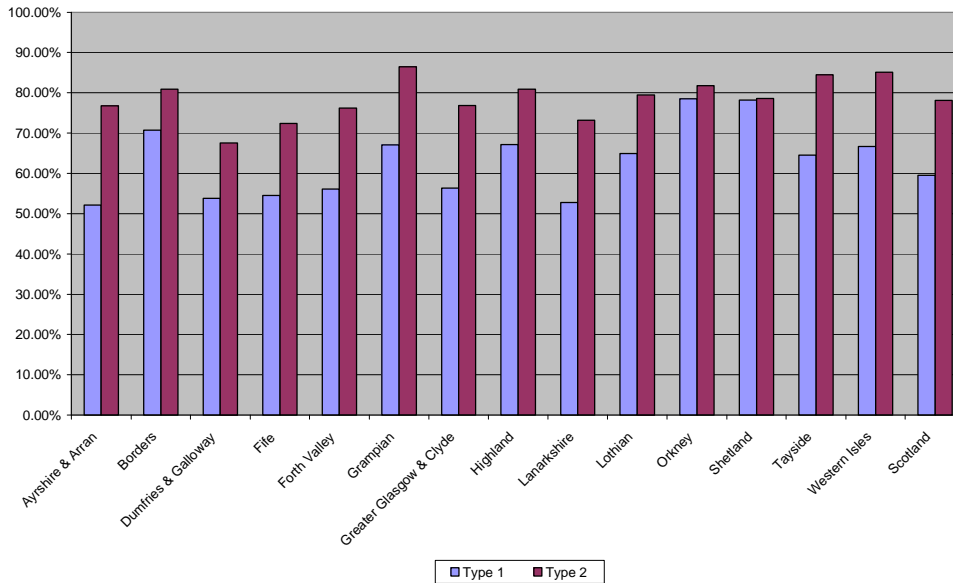
Table 62 Recording of peripheral pulses in T1 and T2 within the previous 15 months by NHS board

NHS Board	Type 1 diabetes		Type 2 diabetes	
	Recorded within previous 15 months			
Ayrshire & Arran	1,167	52.1%	12,885	76.8%
Borders	425	70.7%	3,825	80.9%
Dumfries & Galloway	478	53.8%	4,616	67.5%
Fife	1,043	54.6%	11,197	72.3%
Forth Valley	879	56.1%	9,150	76.2%
Grampian	2,041	67.0%	17,493	86.5%
Greater Glasgow & Clyde	3,446	56.4%	36,987	76.9%
Highland	1,145	67.1%	9,790	80.9%
Lanarkshire	1,837	52.8%	17,439	73.2%
Lothian	2,669	65.0%	22,475	79.5%
Orkney	91	78.5%	660	81.8%
Shetland	93	78.2%	655	78.5%
Tayside	1,185	64.5%	14,597	84.5%
Western Isles	118	66.7%	845	85.1%
Scotland	**16,617**	**59.5%**	**162,614**	**78.1%**

Table 63 Recording of peripheral pulses within the previous 15 months 2004-2010 (Type 1 and Type 2)

Year	Recorded within previous 15 months	Total
2010	**75.9%**	**236,189**
2009	76.5%	226,631
2008	76.1%	219,963
2007	74.5%	209,706
2006	73.9%	196,801
2005	66.9%	172,699
2004	55.2%	149,353

Foot ulceration

10,292 (4.4%) people with Type 1 or Type 2 diabetes were reported to have had a foot ulcer.

Table 64 Recorded as ever having had a foot ulcer by NHS board

NHS Board	Type 1 diabetes		Type 2 diabetes	
	Recorded as ever having had a foot ulcer			
Ayrshire & Arran	94	4.2%	231	1.4%
Borders	35	5.8%	97	2.1%
Dumfries & Galloway	17	1.9%	61	0.9%
Fife	131	6.9%	795	5.1%
Forth Valley	165	10.5%	546	4.6%
Grampian	71	2.3%	234	1.2%
Greater Glasgow & Clyde	513	8.4%	1,723	3.6%
Highland	48	2.8%	225	1.9%
Lanarkshire	412	11.8%	1,685	7.1%
Lothian	332	8.1%	1,935	6.8%
Orkney	6	5.2%	9	1.1%
Shetland	0	0.0%	3	0.4%
Tayside	130	7.1%	748	4.3%
Western Isles	12	6.8%	34	3.4%
Scotland	**1,966**	**7.0%**	**8,326**	**4.0%**

Table 65 Recorded as ever having had a foot ulcer 2001-2010 (Type 1 and Type 2)

Year of Survey	Recorded as ever having had a foot ulcer
2010	**4.4%**
2009	4.3%
2008	4.6%
2007	4.7%
2006	5.0%
2005 (a)	3.9%
2004	2.2%
2003	1.5%
2002	1.4%
2001	1.0%

a. Excludes Borders and Lanarkshire

Lower limb amputation

1250 (0.5%) patients have had a lower limb amputation.

Table 66 Recorded as ever having had a lower limb amputation

NHS Board	Type 1 diabetes		Type 2 diabetes	
	Recorded as ever having had a lower limb amputation			
Ayrshire & Arran	12	0.5%	68	0.4%
Borders	3	0.5%	21	0.4%
Dumfries & Galloway	9	1.0%	41	0.6%
Fife	24	1.3%	88	0.6%
Forth Valley	10	0.6%	47	0.4%
Grampian	19	0.6%	74	0.4%
Greater Glasgow & Clyde	47	0.8%	239	0.5%
Highland	19	1.1%	79	0.7%
Lanarkshire	19	0.6%	98	0.4%
Lothian	20	0.5%	151	0.5%
Orkney	2	1.7%	9	1.1%
Shetland	0	0.0%	2	0.2%
Tayside	20	1.1%	120	0.7%
Western Isles	2	1.1%	7	0.7%
Scotland	**206**	**0.74%**	**1044**	**0.50%**

Table 67 Percentage of patients reported to have ever had lower limb amputation 2001-2010 (Type 1 and Type 2)

Year of Survey	Lower limb amputation	
2010	**1250**	**0.5%**
2009	1132	0.5%
2008	1051	0.5%
2007	950	0.5%
2006	868	0.4%
2005 (a)	774	0.5%
2004	845	0.6%
2003	1014	0.8%
2002	996	1.0%
2001	908	0.9%

a Excludes Borders and Lanarkshire
Note: These figures are for those who have ever had an amputation in any year, and are still alive.

Foot risk calculation

Table 68 Foot risk recorded in the previous 15 months by NHS board as a percentage of those with Type 1 and Type 2 diabetes

NHS Board	Recorded as having a foot risk score – Type 1		Total T1	Recorded as having a foot risk score – Type 2		Total T2
Ayrshire & Arran	126	5.6%	2,238	624	3.8%	16,775
Borders	290	48.3%	601	2582	54.6%	4,728
Dumfries & Galloway	266	30.0%	888	2590	37.9%	6,836
Fife	838	43.9%	1,911	6062	39.2%	15,480
Forth Valley	673	42.9%	1,568	2811	23.4%	12,007
Grampian	1173	38.5%	3,045	7782	38.5%	20,227
Greater Glasgow & Clyde	1756	28.7%	6,115	20523	42.7%	48,090
Highland	925	54.2%	1,706	7784	64.3%	12,100
Lanarkshire	1547	44.5%	3,480	12955	54.3%	23,840
Lothian	1148	27.9%	4,109	7208	25.5%	28,279
Orkney	18	15.5%	116	135	16.7%	807
Shetland	91	76.5%	119	610	73.1%	834
Tayside	1104	60.1%	1,837	12433	71.9%	17,283
Western Isles	59	33.3%	177	494	49.7%	993
Scotland	**10,014**	**35.9%**	**27,910**	**84593**	**40.6%**	**208,279**

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Service improvements

The National Clinical Data for Quality Improvement Advisory Group has been reviewing all national clinical surveys, and has asked boards to show that they are using the survey to demonstrate improvements locally. Each NHS Board was asked to submit examples of this, and the responses received are summarised here.

NHS Ayrshire and Arran uses the data as follows:
- The results from the Scottish Diabetes Survey are used to compare NHS Ayrshire and Arran against other board areas and also to raise areas of concern if identified. This is brought to the attention of the local Diabetes Executive Group who will decide if further investigation or changes to services is required.
- The recording of foot risk scores was brought to the attention of the Executive Group who approached the podiatry service. A decision has now been taken locally by the Podiatry Team to record foot risk scores directly into SCI – DC.
- The Diabetes Retinopathy Screening Programme Steering Group (DRSPSG) monitors the increase in population closely to ensure it continues to provide an adequate screening service in areas where the population is increasing year on year. The DRSPSG are also addressing the population who do not attend for screening by evaluating the service to see where/why/if there are barriers to people not attending.
- The report provides information with regards to e.g. type of diabetes to enable us to makes decisions and changes regarding the re-design of service within primary and secondary care.
- The biochemistry data is monitored to ensure that people are being appropriately screened and if areas of concern are raised clinicians both in primary and secondary care are informed.
- The SDS data was also used to help a Local Enhanced Service to shifting the balance of care from secondary to primary.
- We will be using the SDS data to redesign the transitional Diabetes Clinics in conjunction with the Paediatric service during 2011.

The **NHS Greater Glasgow and Clyde** Diabetes MCN is looking at SDS data in relation to the following areas for improvement:

- Increasing the overall rate of HbA1c being recorded and drive improvements in glycaemic control
- Exploring means of addressing the DNA rates at retinal screening particular amongst Type1 and BME patients
- Recording of a foot risk score to increase the number of patients with a foot risk score recorded to facilitate referral into an appropriate treatment path
- Improvements in inpatient care, in particular around hypo and hyperglycaemia (using SDS data in conjunction with SMR1 data)

In addition they are also using SDS data to facilitate work on improving data quality. This includes looking at:

- HbA1c recording
- New diagnoses
- Diagnosis type

NHS Grampian uses the data as follows:
- It will be used at the Grampian Diabetes professional conference to allow regional and national comparison.

- Their local data operator will break the data down for each of the locality leads so that they can compare practice performance with locality and regional data to identify areas of excellence and areas for improvement.
- They are aware of the type 1 diabetes HbA1c control figures and will use this in a feedback session at the hospital audit meeting at Woolmanhill in due course.
- They note a relatively high rate of type 1 diabetes and initial review of some practice data suggests that there is some miscoding and we will be asking practices to review this.

NHS Lanarkshire uses the data as follows:

- We present the data to our MCN Steering Group to identify aspects of care that Lanarkshire does less well than the national average. This is used to find an explanation of any differences of particular concern and develop an action plan to address these
- We have used the overall prevalence figures to support the case for changes to service provision e.g. the need for more specialist nurses and dietitians in the community in response to the rise in numbers of people with Type 2 diabetes
- We have plotted the annual incidence of Type 1 and Type 2 diabetes in Lanarkshire and used these in a paper to identify potential cost savings related to specific medicines for new patients
- We have used the change in proportion of Type 1 and Type 2 over recent years to support the case for shifting the balance of care. We subsequently measured a real shift in the balance of care from hospital to community management using data from GP systems

NHS Lothian uses the data as follows:
- The data has been used to identify those who default from retinal screening and a research project designed to identify any common factors leading to three consecutive non-attendances. Systems can then be introduced to address this.
- The data is reported in the annual report to make comparisons with previous years.
- Lothian is reported as having high smoking rates in those with Type 1 diabetes. A project has been developed to highlight these patients to be able to offer them stop-smoking services directly.
- An audit project was developed to highlight to primary care those with HbA1c levels >9%. This led to practices' raised awareness of this group of patients and assessing their care.
- The data is used to ensure continuous data quality within SCI-DC.

NHS Shetland:

NHS Shetland identified from the last Diabetes Survey that 29.6% of those with type 2 diabetes and 40% of those with type 1 diabetes either have no recorded cholesterol in the last 15 months or have a cholesterol level of over 5 mmol/l.

They have decided to make this a focus for the group over the next 12 months and work on improving these figures.

NHS Tayside uses the data in the following ways:

- Data are used in the Diabetes MCN Annual Reports to look at progress against objectives for that year and comparable outcomes with previous years.
- The Survey results are discussed at MCN Network Board level and allow us to review our performance in comparison with other Boards and highlight any areas for action.
- The 2009 Scottish Diabetes Survey showed that for Tayside diabetes control measures for people with Type 1 diabetes were not as good as those from comparable NHS Boards and also locally for those people with Type 2 diabetes.   Further analysis of the data was undertaken and this was used to inform a successful business case to support a shift in the

balance of care for people with Type 2 diabetes enabling specialist diabetes services for people with Type 1 diabetes to be improved.

- The data has been used to look at the profile of people with Type 1 diabetes who have not attended specialist diabetes clinics in order to review how services could be delivered to improve outcomes for this group of people as part of NHS Tayside's Health Equity Strategy.

The requirement to participate in the Scottish Diabetes Survey is a key driver to ensure that the core data set is collected, quality checked and interrogated within NHS Tayside.

The **Western Isles Diabetes MCN** has used the survey data in the following ways:

- The Western Isles prevalence of diabetes at 4.3% lies just below the National average of 4.4%. This prompted the local anticipatory care programme (Well North Outer Hebrides) to adopt screening using HbA1C rather than random glucose. This has allowed a much more targeted approach to follow up with approximately 2% of all those screened having an HbA1C in the diabetic range (>6.5%). Previously the use of random glucose meant that approximately 20% of all those screened required further assessment.
- The achieved levels of HbA1C, Cholesterol and Blood Pressure control are on the whole in keeping with the rest of Scotland. In order to try and improve on these levels a series of guidelines have been produced by the MCN using the close working with Glasgow (via an obligate network).
- Information from the Scottish Diabetes survey highlighted the need for training in the use of SCI-DC in screening diabetic feet. A series of training sessions were made available to all staff involved in Diabetic foot screening, including some individual training in some GP practices, training being provided by the Podiatry team. This has resulted in an increase of 47.6% from 2009 in patients having a foot risk score calculated and recorded in SCI-DC in the Western Isles.
- Diabetic Retinopathy Screening information from the Diabetes Survey highlighted a drop in attendance for screening and were concerned about the 20% of our population that were not being screened. We carried out a service user survey which came back with positive results. To help explain the need to have retinal screening carried out by the contracted optometrist, we have produced a fact sheet explaining the two eye tests on offer from the NHS, this fact sheet accompanies the invitation letter from the Retinal Screening Programme to the patient.

Scottish Diabetes Survey 2010: Guidance and definitions

1. Total Regional population:

Mid-2009 Population Estimate - Source: General Register Office for Scotland (GROS)

http://www.gro-scotland.gov.uk/index.html

The 2010 Survey will be based on 14 health board areas and the most recent detailed National and Regional figures can be found here:

http://www.gro-scotland.gov.uk/statistics/publications-and-data/population-estimates/mid-year/mid-2009-pop-est/list-of-tables.html

	NHS Board areas	Persons (n)
1	Ayrshire & Arran	367,160
2	Borders	112,680
3	Dumfries & Galloway	148,510
4	Fife	363,385
5	Forth Valley	291,383
6	Grampian	544,980
7	Greater Glasgow & Clyde	1,199,026
8	Highland	310,530
9	Lanarkshire	562,215
10	Lothian	826,231
11	Orkney	19,960
12	Shetland	22,210
13	Tayside	399,550
14	Western Isles	26,180
	Scotland total	**5,194,000**

2. Area (regional) diabetes register:

The regional diabetes populations allow overall prevalence figures to be calculated. Patients should be alive*****, have a diagnosis of frank diabetes (Type 1, Type 2, Type Unknown, Type "Other" and Maturity Onset Diabetes of the Young (MODY) are the current SCI-DC categories considered frank diabetes) and be registered with a practice in each region on the day of the data extraction.

*The only exception to this rule is when mortality is being quantified and patients may also be deceased and registered to the practice at the time of data extraction – see question 5.

2.1 Note that the 'Check' sums used throughout this report may vary depending upon the question but MUST equal the relevant figure identified by the diabetes register e.g. the Type 1 and/or Type 2 populations, all patients, etc.

2.2 The number of patients, if any, who have been excluded from the survey for reasons of non-consent, should be recorded.

2.3 Where questions refer to those with "Type 1 and Type 2" diabetes, this means that separate figures for each diabetes type are required – as opposed to a summation of both types i.e. NOT Type 1 plus Type 2 (see table in question 7 for the appropriate format).

3. Type of diabetes:

3.1 The number (n) of patients with Type 1 diabetes
3.2 The number (n) of patients with Type 2 diabetes
3.3 The number (n) of patients with "other" types of diabetes*

*'Other types of diabetes ' should include Maturity Onset Diabetes of the Young (MODY); Type Unknown and Type "Other", but should **exclude** Gestational diabetes and pre-diabetic conditions such as Impaired Glucose Tolerance (IGT) and Impaired Fasting Glucose (IFG).*

4. Age of people on register (all diabetes types):

The number of patients (n) on the register in each defined age band

Question	Age Band (Years)
4.1	0-4
4.2	5-14
4.3	15-24
4.4	25-34
4.5	35-44
4.6	45-54
4.7	55-64
4.8	65-74
4.9	75-84
4.10	>=85
4.11	Unknown

*All ages are to be calculated at the day of data extraction and rounded **down** to the whole number at that time e.g. a person is 26 right up until the day of their 27th birthday*

5. Mortality (all diabetes types):

At the time of data extraction, all patients must be registered with a general practice within the region. This includes deceased patients who died while registered with a practice in the region. This allows the crude mortality rate to be calculated by the following method:

Question	Requirement	Methodology
5.1	Number (n) of patients in the **numerator**	This shall be comprised of those patients, included in the denominator population (below), who died in the prior year
5.2	Number (n) of patients in the **denominator**	This shall be comprised of all patients with diabetes who, at the time of data extraction, were either still alive or had died during the prior year.

5.3 Mortality should also be shown as a percentage and is calculated thus:

$$\frac{\text{All patients with diabetes who died in the prior year}}{\text{All patients with diabetes still alive } \textbf{plus} \text{ those who died in the prior year}} \times 100$$

The remainder of this survey shall be limited to patients with Type 1 or Type 2 diabetes only.

All patients should be alive, have a diagnosis of Type 1 or Type 2 diabetes and be registered with a practice in each region on the day of the data extraction.

6. **Number of people with Type 1 and Type 2 diabetes in the following age bands:**

The number (n) of Type 1 and Type 2 patients in each defined age band

Question	Age Band (Years)	Number of people with Type 1 diabetes	Number of people with Type 2 diabetes
6.1	0-4	n	n
6.2	5-9	n	n
6.3	10-14	n	n
6.4	15-19	n	n
6.5	20-24	n	n
6.6	25-29	n	n
6.7	30-34	n	n
6.8	35-39	n	n
6.9	40-44	n	n
6.10	45-49	n	n
6.11	50-54	n	n
6.12	55-59	n	n
6.13	60-64	n	n
6.14	65-69	n	n
6.15	70-74	n	n
6.16	75-79	n	n
6.17	80-84	n	n
6.18	>=85	n	n
6.19	Unknown	n	n

All ages are to be calculated at the day of data extraction and rounded down to the whole number at that time e.g. a person is 26 up until the day of their 27th birthday

Note* - The total number of people in the above categories will act as the check sum for the Type 1 and Type 2 populations respectively

7. **The number (n) of children under 12 years** (for the purposes of exclusion from specific questions)

8. **The number (n) of patients with a viable date of diagnosis in Type 1 and Type 2 diabetes:** (for the purposes of duration related calculations, etc)

Survey response options: Recorded | Unknown

"Unknown" is where only a null value is found or the date of diagnosis is unrealistic e.g. 01/01/1900, 13/12/1899 or is before the patient's date of birth

9. Duration of diabetes (years since diagnosis) in Type 1 and Type 2 diabetes:

The number (n) of Type 1 and Type 2 patients in each defined duration band
(Patients diagnosed less than 1 year are equivalent to incident cases)

Question	Duration Band (Years)
9.1	<1
9.2	1-4
9.3	5-9
9.4	10-14
9.5	15-19
9.6	20-24
9.7	25-29
9.8	30-34
9.9	35-39
9.10	40-44
9.11	45-49
9.12	>=50
9.13	Unknown

Duration is calculated only where a valid date of diagnosis is recorded. Where the date field is null or where the diagnosis date is unrealistic e.g. 01/01/1900, 13/12/1899 or is less than the patient's date of birth, the duration should be considered "Unknown"

> ***Note* If calculating a percentage breakdown of the above bands within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose result was "unknown" should be excluded from the calculation)***

10. Sex of people on register in Type 1 and Type 2 diabetes:

Survey response options: Male | Female | Unknown

The number (n) males, females and "gender undefined" patients in the Type 1 and Type 2 populations

Sex should be as determined by the CHI record if available

11. Insulin pumps (Continuous Subcutaneous Insulin Infusion) in Type 1 diabetes:

The number (n) of patients with Type 1 diabetes who are using an insulin pump

These figures are not currently available via SCI-DC. Each region, therefore, must ascertain the number of Type 1 patients using pumps by their own means

12. Ethnic groups (self assigned) in Type 1 and Type 2 diabetes:

Survey response options: Ethnic group identified | Unknown/Refused

The number (n) of Type 1 and Type 2 patients in each defined ethnic category

An ethnic group is a group of people having racial, religious, linguistic and/or other cultural traits in common.

This is the patient's perception of his or her own ethnic group, and is intended to assist the monitoring of equality of access to NHS services.

The following list is representative of 2011 Scottish Census Ethnicity Categories. Although not currently a requirement of the Scottish Diabetes Survey, these should be used by NHS Scotland organisations for local and SMR return purposes. Local systems may record more detailed codes as required but these must map to 2011 Scottish Census categories for SMR return purposes.

*(*http://www.datadictionaryadmin.scot.nhs.uk/isddd/9739.html*)*

A - White	
1A	Scottish
1E	English
1F	Welsh
1G	Northern Irish
1H	British
1J	Irish
1K	Gypsy/ Traveller
1L	Polish
1Z	Any other white ethnic group
B - Mixed or multiple ethnic groups	
2A	Any mixed or multiple ethnic groups
C - Asian, Asian Scottish or Asian British	
3F	Pakistani, Pakistani Scottish or Pakistani British
3G	Indian, Indian Scottish or Indian British
3H	Bangladeshi, Bangladeshi Scottish or Bangladeshi British
3J	Chinese, Chinese Scottish or Chinese British
3Z	Other
D - African, Caribbean or Black	
4D	African, African Scottish or African British
4E	Caribbean, Caribbean Scottish or Caribbean British
4F	Black, Black Scottish or Black British
4Z	Other
E - Other ethnic group	
5B	Arab
5Z	Other
F - Refused/Not provided by patient	
98	Refused/Not provided by patient
G - Not Known	
99	Not Known

13. BMI within prior 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had their BMI measured in the prior 15 months

Values outwith the 15-month time-frame should be considered "Unknown" for the purposes of this question

Note* Children under 12 years should be excluded from this question

14. BMI range in Type 1 and Type 2 diabetes:

The number (n) of Type 1 and Type 2 patients in each defined BMI range

Question	BMI Range
14.1	<18.5
14.2	18.5-24.9
14.3	25-29.9
14.4	30-34.9
14.5	35-39.9
14.6	>=40
14.7	Unknown

BMI ranges should be based on the most recent value within the prior 15 months.
Where BMI values are outwith the 15-month time-frame, this should be considered "Unknown" for the purposes of this question

BMI may be calculated using a weight (must be less than 15 months) and the most recent valid height (which can be older than 15 months).

Note* Children under 12 years should be excluded from this question

Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose result was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement

15. HbA$_{1c}$ recorded within prior 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had an HbA1c test in the prior 15 months

Values outwith the 15 month time-frame, this should be considered "Unknown" for the purposes of this question

16. HbA$_{1c}$ measurement in Type 1 and Type 2 diabetes:

The number (n) of Type 1 and Type 2 patients in each defined HbA1c range

Question	HbA$_{1c}$ Range (mmol/mol)	HbA$_{1c}$ Range (%)
16.1	<48	<6.5
16.2	48-52	6.5-6.9
16.3	53-57	7.0-7.4
16.4	58-63	7.5-7.9
16.5	64-68	8.0-8.4
16.6	69-74	8.5-8.9
16.8	>=75	>=9.0
16.9	Unknown	Unknown

HbA$_{1c}$ ranges should be based on the most recent value within the prior 15 months.

Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement

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HbA$_{1c}$ values in this report will use IFCC units (mmol/mol) as the primary value but the published report will show the DCCT equivalent values

If conversion from DCCT to IFCC values - or vice versa - is required, the following equations can be used:

DCCT to IFCC
(DCCT−2.15)/0.0915 then rounded to whole number = IFCC

IFCC to DCCT
(IFCC*0.0915)+2.15 then rounded to nearest 1 decimal place = DCCT

An IFCC to DCCT conversion table is shown on the following page

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IFCC mmol/mol	DCCT %		IFCC mmol/mol	DCCT %		IFCC mmol/mol	DCCT %		IFCC mmol/mol	DCCT %		IFCC mmol/mol	DCCT %		IFCC mmol/mol	DCCT %
9	**3**		**31**	**5**		**53**	**7**		**75**	**9**		**97**	**11**		**119**	**13**
10	3.1		32	5.1		54	7.1		76	9.1		98	11.1		120	13.1
11	3.2		33	5.2		55	7.2		77	9.2		99	11.2		121	13.2
13	3.3		34	5.3		56	7.3		78	9.3		100	11.3		122	13.3
14	3.4		36	5.4		57	7.4		79	9.4		101	11.4		123	13.4
15	3.5		37	5.5		58	7.5		80	9.5		102	11.5		124	13.5
16	3.6		38	5.6		60	7.6		81	9.6		103	11.6		125	13.6
17	3.7		39	5.7		61	7.7		83	9.7		104	11.7		126	13.7
18	3.8		40	5.8		62	7.8		84	9.8		105	11.8		127	13.8
19	3.9		41	5.9		63	7.9		85	9.9		107	11.9		128	13.9
20	**4**		**42**	**6**		**64**	**8**		**86**	**10**		**108**	**12**		**130**	**14**
21	4.1		43	6.1		65	8.1		87	10.1		109	12.1		131	14.1
22	4.2		44	6.2		66	8.2		88	10.2		110	12.2		132	14.2
23	4.3		45	6.3		67	8.3		89	10.3		111	12.3		133	14.3
25	4.4		46	6.4		68	8.4		90	10.4		112	12.4		134	14.4
26	4.5		48	6.5		69	8.5		91	10.5		113	12.5		135	14.5
27	4.6		49	6.6		70	8.6		92	10.6		114	12.6		136	14.6
28	4.7		50	6.7		72	8.7		93	10.7		115	12.7		137	14.7
29	4.8		51	6.8		73	8.8		95	10.8		116	12.8		138	14.8
30	4.9		52	6.9		74	8.9		96	10.9		117	12.9		139	14.9

17. Mean HbA$_{1c}$ recording in people with Type 1 and Type 2 diabetes within prior 15 months:

   a) Mean HbA1c value for people with **Type 1** diabetes in each of the following age bands:
Patients with no recorded age or who have no HbA1c result within the prior 15 months are excluded from this tabulation

Question	Age Band (Years)
17.1	0-4
17.2	5-9
17.3	10-14
17.4	15-19
17.5	20-24
17.6	25-29
17.7	30-39
17.8	>=40

Ages are in 5 year bands up to 29 years followed by bands 30-39 and >=40

b) Mean HbA1c value for **ALL** people with **Type 2** diabetes

   Mean HbA$_{1c}$ should be calculated using the most recent value within the prior 15 months.

18. Blood pressure recorded within the previous 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had a Blood Pressure recorded in the prior 15 months

Values outwith the 15-month time-frame should be considered "Unknown" for the purposes of this question

19. Most recent blood pressure measurement in Type 1 and Type 2 diabetes:

The number (n) of Type 1 and Type 2 patients in each defined SBP range

a) SBP <=**140** | >**140** | Unknown

b) SBP <**130 and** DBP <=**80** | SBP >=**130 or** DPB >**80** | Unknown

Blood pressure ranges should be based on the most recent full BP recording within the prior 15 months.

Values older than 15 months, being outwith the accepted time-frame, should be considered "Unknown"

> ***Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement***

20. **Mean Blood pressure measurement for patients within specified groups in the previous 15 months:**

a)   Mean blood pressure value for people with **Type 1** diabetes aged **<40** years

b)   Mean blood pressure value for people with **Type 2** diabetes aged **>=50 and <60** years

Mean blood pressure figures should be calculated using the most recent systolic and diastolic values within the prior 15 months.

21. **Total Cholesterol recorded within the previous 15 months in Type 1 and Type 2 diabetes:**

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had a Total Cholesterol test in the prior 15 months

Values outwith the 15 month time-frame, this should be considered "Unknown" for the purposes of this question

Note* Children under 12 years should be excluded from this question

22. **Most recent total cholesterol measurement in Type 1 and Type 2 diabetes:**

Survey response options: Total Cholesterol was <=5 | > 5 | Unknown

The number (n) of Type 1 and Type 2 patients in each defined Total Cholesterol range

Cholesterol ranges should be based on the most recent value within the prior 15 months.

Values outwith the 15 month time-frame, this should be considered "Unknown" for the purposes of this question"

Note* Children under 12 years should be excluded from this question

> ***Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement***

23. **Mean total cholesterol in those with Type 2 diabetes within a specified age band:**

Mean total cholesterol value for those with Type 2 diabetes aged **>=50 and <60** years

Total cholesterol means should be based on the most recent value within the prior 15 months.

24. HbA1c, Cholesterol and Blood pressure targets in Type 1 and Type 2 diabetes

The number (n) of Type 1 and Type 2 patients who achieved specified biochemistry and blood pressure targets

Question	Targets
24.1	Achieved HbA1c
24.2	Achieved Cholesterol target
24.3	Achieved BP target
24.4	Achieved HbA1c, Cholesterol and BP target

Achieved targets:
HbA1c of less than 53 mmol/mol (7%)
Cholesterol of 5 mmol/L or less
*SBP less than 130mmHg **and** DBP of 80 mmHg or less*

Hba1c, Cholesterol and DBP results are based on the most recent value within the prior 15 months.

25. Serum creatinine recorded within prior 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had a serum creatinine test in the prior 15 months

Values outwith the 15 month time-frame, this should be considered "Unknown" for the purposes of this question

Note* Children under 12 years should be excluded from this question

26. Estimated GFR recorded within prior 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had an e-GFR test in the prior 15 months

Values outwith the 15 month time-frame, this should be considered "Unknown" for the purposes of this question

Note* because patients aged under 18 (EIGHTEEN) rarely have eGFR tests recorded, this question is limited to patients aged 18 years or over.

27. Most recent Estimated Glomerular Filtration rate (eGFR) measurement in Type 1 and Type 2 diabetes:

The number (n) of Type 1 and Type 2 patients in each defined e-GFR range

Question	e-GFR Range
27.1	<15
27.2	15-29
27.3	30-44
27.4	45-59
27.5	>=60
27.6	Unknown

Estimated GFR ranges should be based on the most recent value within the prior 15 months.

Note* because patients aged under 18 (EIGHTEEN) rarely have eGFR tests recorded, this question is limited to patients aged 18 years or over.

Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement

28. Urinary microalbumin recorded within prior 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had a urinary microalbumin test in the prior 15 months

Urine specimen tested for presence of microalbuminuria by Albumin concentration, albumin: creatinine ratio (ACR), timed overnight albumin excretion rate or 24 hour albumin excretion rate. Urinary dipstick should NOT be used unless able to detect low levels of albuminuria and express an ACR

Values outwith the 15 month time-frame, this should be considered "Unknown" for the purposes of this question

Note* Children under 12 years should be excluded from this question

29. Smoking status in Type 1 and Type 2 diabetes:

Survey response options: Current smoker | Ex-smoker | Never smoked | Unknown

The number (n) of Type 1 or Type 2 patients who do or do not have smoking status recorded

Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement

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30. Diabetic Retinopathy Screening (DRS) activity within the previous 15 months in Type 1 and Type 2 diabetes:

Survey response options: Screened by DRS | Attends Ophthalmology clinic | Suspended from Screening | Unknown

The number (n) of Type 1 or Type 2 patients who have or have not had appropriate eye-screening, were receiving ophthalmology care or were clinically suspended from screening

A person should be recorded as having been screened only if they have attended an appropriate diabetic retinal screening appointment within the Scottish Diabetic Retinopathy Screening (DRS) service or had an evaluation at a consultant-led ophthalmology clinic for the purpose of treatment or surveillance of diabetic retinopathy

Fundoscopy and other eye examination methods outwith the approved DRS Service should NOT be included

Results are based upon the most recent DRS screening/suspension status.

The results of DRS activity are calculated thus:
1. *Quantify the number of patients who are, at the time of data extraction, suspended as they are attending an Ophthalmology clinic (flag as "Attends ophthalmology clinic")*
2. *Quantify the number of patients permanently or temporarily suspended for any other reason* e.g. unfit (flag as "Suspended from screening")*
   *Note that DRS patients who are flagged as "Temporarily Unavailable" are considered to be eligible for screening and are NOT to be included here.
3. *Of the remaining patients (i.e. those NOT identified in 1 or 2), quantify those that had a DRS Screening in the prior 15 months (flag as "Screened by DRS")*
4. *The remaining patients (i.e. those who have not been identified in 1, 2 or 3) should be considered "Unknown" for the purposes of this question and flagged as such. This would be patients who either had no DRS attendance recorded or whose last DRS attendance was outwith the 15 month time-frame*

Note* Children under 12 years should be excluded from this question

31. Diabetic Retinopathy – Last known status left or right eye in Type 1 and Type 2 diabetes:

Survey response options: Present | Absent | Unknown

Present means any degree of retinopathy recorded as present in left and/ or right eye; absent means 'no retinopathy' recorded for both eyes.

*Retinal status should be based on the most recent DRS or equivalent assessment **regardless of when this was recorded**. This is to allow the last known, pre-referral retinal status of patients who have been under ophthalmology care for some time, to be included in the survey.*

Where no actual retinal status is recorded, including where only records of "Not Adequately Visualised" are found, this should be considered "Unknown" for the purposes of this question

Note* Children under 12 years should be excluded from this question

> ***Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement***

32. Blindness in Type 1 and Type 2 diabetes:

Survey response options: Diabetic cause | Non-diabetic cause | Unknown

Blindness may be recorded where a clinical record confirms this or can defined as visual acuity corrected (i.e. wearing corrective lenses) of <3/60 (i.e. CF, HM, PL, or NPL) in the better eye or there is bilateral enucleation.

As the permanency or otherwise of the latter method may be difficult to determine, caution in interpreting these particular figures is advised.

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

33. Myocardial infarct in Type 1 and Type 2 diabetes:

The number (n) of Type 1 or Type 2 patients recorded as ever having had an acute myocardial infarction

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

34. Cardiac Revascularisation in Type 1 and Type 2 diabetes:

The number (n) of Type 1 or Type 2 patients recorded as ever having undergone cardiac revascularisation.

All forms of cardiac revascularisation including bypass grafts, stents and angioplasty are permitted

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

35. Stroke in Type 1 and Type 2 diabetes:

The number (n) of Type 1 or Type 2 patients recorded as ever having had a stroke

Stroke (cerebrovascular accident (CVA)) – is defined as rapidly developing signs of focal (and/or global) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than vascular origin.

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

36. Peripheral pulses recorded within the previous 15 months in Type 1 and Type 2 diabetes:

Survey response options: Recorded | Unknown

Where no peripheral pulse data was found, or where assessments were outwith the 15-month time-frame, these should be considered "Unknown" for the purposes of this question

37. Foot ulceration in Type 1 and Type 2 diabetes:

The number (n) of Type 1 or Type 2 patients recorded as ever having had a foot ulcer

Foot ulcer is defined as any break in the epithelium greater than a crack below the level of the malleoli.

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

38. Foot risk calculation within the previous 15 months in Type 1 and Type 2 diabetes:

Survey response options: Active foot disease | High Risk | Moderate Risk | Low Risk| Unknown

Foot risk should be based on the most recent assessment within the previous 15 months.

Where assessments are bilateral (right and left foot assessed separately), the WORST risk status should be used.

Assessments outwith the 15-month time-frame should be considered "Unknown" for the purposes of this question

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The risk grading of the foot of a patient with diabetes mellitus, assessed using criteria from SIGN Guideline 55.

Active foot disease = current ulceration, uncontrolled neuropathy, Charcot foot

High risk = **ANY** previous foot ulcer due to neuropathy/ischaemia, absent pulses and neuropathy, callus with risk factor (absent pulse, neuropathy, foot deformity).

Moderate risk = **ANY** loss of sensation, absent pulses, (or previous vascular surgery), significant visual impairment, physical disability (e.g., stroke, gross obesity).

Low risk = Normal sensation **AND** good pulses, no previous ulcer, no foot deformity, normal vision.

Note* If calculating a percentage breakdown of the above ranges within the Type 1 and Type 2 populations, only those with a valid value should be used (i.e. those whose value was "unknown" should be excluded from the calculation) thus describing the data just for people with a valid measurement

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39. Lower limb amputation in Type 1 and Type 2 diabetes:

The number (n) of Type 1 or Type 2 patients recorded as ever having had a lower limb amputation

Amputation is defined as recommended in the SIGN guideline on management of diabetic foot disease as 'removal of forefoot or part of the lower limb'.

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

Note** this excludes the loss of toes or single metatarsals.

40. End stage renal failure in Type 1 and Type 2 diabetes:

The number (n) of Type 1 or Type 2 patients recorded as ever having had end stage renal failure (ESRF).

"Either serum creatinine was chronically greater than 500 µmol/l or eGFR was less than 15 (stage 5 renal failure) on two occasions at least three months (93 days) apart within the previous 15 months, or the patient has ever been placed on permanent dialysis or received a renal transplant. Or the patient has a diagnosis of ESRF recorded in their record"

Note* this question is limited to patients who are alive and registered with a practice in the region on the day of data extraction.

41. Deprivation Category in Type 1 and Type 2 diabetes:

The number (n) of Type 1 and Type 2 patients in each defined SIMD category

This allows the deprivation profile of the diabetic population to be compared to the profile of the NHS Board and the Scottish population as a whole. Deprivation quintiles are derived from the Scottish Index of Multiple Deprivation (SIMD) rankings

(http://www.scotland.gov.uk/Topics/Statistics/SIMD/)

Question	SIMD Category
41.1	1 (Most deprived)
41.2	2
41.3	3
41.4	4
41.5	5 (Least deprived)
41.6	Unknown

Quintiles divide the Scottish population into five overall deprivation categories ranging from 1 (Most Deprived) to 5 (Least Deprived).

Deprivation quintiles can be assigned to diabetic populations via patient postcodes using SIMD 2009.

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Points of note:

1. The question relating to the **"Use of CHI number"** has been removed from the survey. The CHI is now used across Scotland and this question is now considered redundant.

2. **Question 5. Mortality (all diabetes types)** – This was calculated for the first time in last year's survey but was not in the published report. Again, the method for determining crude mortality shall be: All patients must be registered to a practice in the region at the time of data extraction:

   Numerator = all patients from the denominator population who died in the prior year.

   Denominator = all patients in the region with frank diabetes (any type) who were alive on the date of data extraction **plus** those with frank diabetes who died in the prior year

   In order to allow a national mortality figure to be determined, each region shall provide the numbers of patients in the numerator and denominator populations.

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3. *Crude Incidence of Type 1 and Type 2 diabetes* will now be included in the published reports and can be determined from the "Duration of Diabetes" figures in **question 9** (the number of patients with duration of <1 year being incident cases).

   Crude incidence is then calculated against the GRO population figure for your region shown on page 1.

4. **Question 13. Ethnic groups in Type 1 and Type 2 diabetes –** the guidelines have been updated to include the 2011 Scottish Census Ethnicity Categories. The actual quantification of the population by the defined ethnic categories is not currently required by the survey but these are shown for future reference purposes.

5. **Question 19. Most recent blood pressure measurement in Type 1 and Type 2 diabetes:**

   Part b) of this question has been amended to include both Systolic and Diastolic blood pressure values. The values are based on SIGN 166 target values of SBP <130 **and** DBP <=80 and quantifies those who do or do not achieve this target.

   Part a) of this question - relating to SBP of <=140 or >140 - has been retained for historical comparison with previous reports.

6. **Question 25. HbA1c, Cholesterol and Blood pressure targets in Type 1 and Type 2 diabetes**

   This question has been amended to quantify a) those that passed the HbA1c target, b) those that passed the Cholesterol target, c) those that passed the Blood Pressure target and d) those that passed all 3 targets.

   Figures for a) b) and c) can be found in other sections of the report but they are included here as well.

7. **Question 31. Diabetic Retinopathy Screening (DRS) activity within the previous 15 months in Type 1 and Type 2 diabetes:** This question relates to screening activity (DNAs are excluded) only and does not require an actual retinal status to be recorded.

   This will allow appointments at ophthalmology clinics that have been recorded – without result – on SCI-DC to be included in the figures. This would be limited to patients that have been discharged back to screening i.e. they are not currently suspended for being under the care of ophthalmology. This will include what DRS classify as "Unsuccessful Screenings" as the patients DID attend an appointment (but there may have been some technical failure) but they were seen and, from a survey point of view, they were catered to (as opposed to being denied, or failing to get, screening).

8. **Question 32. Diabetic Retinopathy – Last known status left or right eye in Type 1 and Type 2 diabetes:** This question is now based on last known value – regardless of how long ago. The 15 month time-frame is being dropped to allow the pre-referral retinal status of patients who have been under ophthalmology care for some time, to be included. This is a return to previous methodology.