KOREAN DIABETES FACT SHEET 2015
Source of Data

The estimated percentages and the total number of people over the age of 30 with type 2 diabetes were determined using the information from the National Health Information Database from January 2002 through to December 2013 made by National Health Insurance Service (NHIS).

Definition of Diabetes

› Diagnosis of diabetes was based on the disease-classification codes from the health insurance claim forms and database on Health Screening Service.
› When the database on Health Screening Service was used, diabetes was diagnosed based on fasting glucose ($\geq 126 \text{ mg/dL}$).
› When the database on health insurance claim forms was used, type 2 diabetes was defined based on ICD-10 code (E11-E14) and prescription of antidiabetic medications.

Summary

› About 2.7 million Korean people (8.03%) aged 30 years or older had type 2 diabetes in 2013. Based on fasting glucose level, 25.0% of adults had prediabetes (impaired fasting glucose).
› 62.5% of subjects with type 2 diabetes had hypertension and were being treated with antihypertensive medication, which was 3.7-fold higher compared with adults without diabetes in 2013.
49.5% of subjects with type 2 diabetes had dyslipidemia and were being treated with lipid-lowering medication, which was 5-fold higher than non-diabetic adults in 2013.

The prevalence of type 2 diabetes in childhood and adolescence had been steadily increasing since 2006.

40% of individuals with end-stage renal disease (ESRD) had type 2 diabetes, and 1.2% of subjects with type 2 diabetes had ESRD. The mortality was 2-fold higher in patients with type 2 diabetes and ESRD compared with those with ESRD but without type 2 diabetes.

15.9% of patients with type 2 diabetes had diabetic retinopathy, and 6.1% of those patients with diabetic retinopathy had proliferative diabetic retinopathy (PDR).

The prevalence of metabolic syndrome was 3-fold higher in patients with type 2 diabetes than in those without diabetes.

Percutaneous coronary intervention (PCI) was performed 7-fold more frequently in subjects with type 2 diabetes than in non-diabetic adults.

Coronary artery bypass graft (CABG) has been remarkably decreased during the last 7 years, but it is still 10-fold higher in patients with type 2 diabetes than in those without diabetes.

The use of metformin increased up to 80% of total antidiabetic prescriptions in 2013. The prescription of dipeptidyl peptidase-4 (DPP-4) inhibitors increased dramatically since 2008, and comprised 3\(^{rd}\) of the market share (38.4%) in 2013.

60% of subjects with type 2 diabetes were treated with more than two classes of antidiabetic medication, but drug adherence rate was only 45% in 2013.

Cancers were more prevalent in individuals with type 2 diabetes than those without diabetes, especially in stomach, colorectum, liver, pancreas, and lung.
Prevalence of diabetes using anti-diabetic medications
(
≥ 30 yrs old)

The prevalence of diabetes using anti-diabetic medications steadily increased from 5.6% in 2006 to 8.0% in 2013.

Prevalence
= [(Patients who had type 2 diabetes based on ICD-10 code and were being treated with anti-diabetic medications)/(total subjects visiting hospitals or clinics or having health security service in each year)] X 100 (%)
Prevalence of diabetes according to age

The prevalence has steadily increased in aged 60 years or older.
Prevalence of diabetes and prediabetes

Confined to participants in National Health Screening Service

<table>
<thead>
<tr>
<th>Year</th>
<th>Normal fasting glucose (%)</th>
<th>Fasting glucose 100 ~ 125 mg/dL (%)</th>
<th>Known diabetes or fasting glucose ≥ 126 mg/dL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>70.1</td>
<td>21.5</td>
<td>8.4</td>
</tr>
<tr>
<td>2007</td>
<td>68.1</td>
<td>23.0</td>
<td>9.0</td>
</tr>
<tr>
<td>2008</td>
<td>68.5</td>
<td>22.6</td>
<td>8.9</td>
</tr>
<tr>
<td>2009</td>
<td>65.9</td>
<td>24.2</td>
<td>9.9</td>
</tr>
<tr>
<td>2010</td>
<td>66.3</td>
<td>23.8</td>
<td>9.9</td>
</tr>
<tr>
<td>2011</td>
<td>66.0</td>
<td>23.7</td>
<td>10.3</td>
</tr>
<tr>
<td>2012</td>
<td>65.5</td>
<td>24.0</td>
<td>10.5</td>
</tr>
<tr>
<td>2013</td>
<td>64.1</td>
<td>25.0</td>
<td>10.9</td>
</tr>
</tbody>
</table>
Regional difference of diabetes prevalence

The highest diabetes prevalence rates were found in Jeonnam, Gangwon, and Sejong City. The lowest prevalence was found in Jeju island.
62.5% of subjects with type 2 diabetes had hypertension and were being treated with antihypertensive medication, which is 3.7-fold higher compared with those without diabetes in 2013.
Dyslipidemia

Type 2 diabetes accompanying dyslipidemia had steadily increased during the last 7 years. In 2013, about half of subjects with diabetes had dyslipidemia, which was about 5-fold higher compared with those without diabetes.

DEFINITION OF DYSLIPIDEMIA:
ICD-10 code (E78) and use of lipid-lowering medication.
Childhood and adolescent diabetes

DEFINITION OF DIABETES: subjects aged 18 years or younger with ICD-10 code (E10-E14).
The total number of patients with type 1 diabetes was not changed, but that of type 2 diabetes has been steadily increasing since 2006.
Type 2 diabetes and ESRD (end stage renal disease)

38.8% of subjects with ESRD had type 2 diabetes, and 1.2% of subjects with type 2 diabetes had ESRD.

**DEFINITION OF ESRD:** ICD-10 code of renal failure (N18, N19) or treated with renal replacement therapy (hemodialysis, peritoneal dialysis, or kidney transplantation).

### In 2013

**ESRD in diabetes**

1.2%

32,312 persons

**Diabetes in ESRD**

38.8%

83,243 persons
Mortality rate in patients with ESRD

The mortality rate was about 2-fold higher in patients with type 2 diabetes and ESRD compared with those with ESRD but without diabetes.

In 2013

- Non-diabetes: 5.2%
- Type 2 diabetes: 9.7%
Diabetic retinopathy

- Only 30% of patients with diabetes had comprehensive eye examination in 2013.
- 15.9% of patients with type 2 diabetes had diabetic retinopathy.

In 2013

15.9%

Diabetic Retinopathy

431,964 persons
6.1% of patients with diabetic retinopathy had proliferative diabetic retinopathy (PDR) in 2013.
The prevalence of metabolic syndrome was about 3-fold higher in patients with type 2 diabetes than in those without diabetes.

DEFINITION OF METABOLIC SYNDROME:
Defined in accordance with the updated National Cholesterol Education Program Adult Treatment Panel (NCEP-ATP) III criteria for Asia. The presence of three or more of the following criteria constituted a diagnosis of metabolic syndrome: (1) waist circumference ≥ 90 cm in men or ≥ 85 cm in women; (2) fasting triglyceride ≥ 150 mg/dL or medication use; (3) HDL-cholesterol < 40 mg/dL in men or < 50 mg/dL in women or medication use; (4) blood pressure ≥ 130/85 mmHg or antihypertensive medication use; and (5) fasting glucose ≥ 100 mg/dL or current anti-diabetes medication.

Confined to participants in National Health Screening Service.
The prevalence of dementia has been steadily increasing both in patients with and without diabetes.

DEFINITION OF DEMENTIA: ICD-10 code of dementia (F00, F01, F02, F03), treated with medication, and aged more than 60 years.
Percutaneous coronary intervention (PCI)

PCI was performed about 7-fold more frequently in patients with type 2 diabetes than in those without diabetes.
The number of cases with CABG was remarkably decreased during the last 7 years, but it was more than 10-fold higher in patients with type 2 diabetes than in those without diabetes.
Only 10.0% of patients with type 2 diabetes were being treated with insulin in 2013. When included insulin use in the hospitalized patients, it goes up to 16.4%.

The use of metformin increased up to 80.4% of total prescriptions by 2013.

The use of dipeptidyl peptidase-4 (DPP-4) inhibitor increased dramatically since 2008 and comprised 3rd of the market share (38.4%) in 2013.
Percentage of people with diabetes receiving treatment with dual or triple therapy steadily increased from 35% and 6.6% in 2002 to 45% and 15.5% in 2013, respectively. Only 40% of people with type 2 diabetes are receiving treatment with a single oral medication.
Among prescriptions for monotherapy, only 13.0% was metformin in 2002, but it increased up to 53.2% by 2013. In contrast, the use of sulfonylurea declined dramatically from 75.2% in 2002 to 30.6% in 2013 as monotherapy.
Dual therapy

In 2013

- SULFONYLUREA + DPP-4 INHIBITOR: 41.7%
- METFORMIN + DPP-4 INHIBITOR: 32.5%
- SULFONYLUREA + METFORMIN: 4.8%
- INSULIN + METFORMIN: 4.4%
Medication cost

(hundred million won)

825.0  1205.3  1644.6  2164.3  2803.2  3156.4  3477.2  3888.4  4198.7  4275.5  4338.6  4802.6

(year)
Medication adherence rate
(more than > 80% (292 days) per year)

Prescription rate
Medication possession ratio (MPR)


12.8 17.7 20.0 19.4 24.0 28.9 35.6 38.0 38.1 38.5 41.4 67.2

(%) (%)
Cardiovascular events

In 2013

<table>
<thead>
<tr>
<th>Event</th>
<th>Type 2 diabetes</th>
<th>Non-diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic Stroke</td>
<td>295 / 62</td>
<td></td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>248 / 59</td>
<td></td>
</tr>
<tr>
<td>Cerebral hemorrhage</td>
<td>41 / 17</td>
<td></td>
</tr>
</tbody>
</table>

DEFINITION OF CARDIOVASCULAR EVENTS:
ICD-10 code and events-related hospitalization
Ischemic stroke: I63, I64, I693, I694, G45
Ischemic heart disease: I20, I21, I22, I23, I24, I25
Cerebral hemorrhage: I61, I61, I62, I690, I692
Cancer-related hospitalization

In 2013

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Men (Non-diabetes)</th>
<th>Women (Non-diabetes)</th>
<th>Men (Type 2 diabetes)</th>
<th>Women (Type 2 diabetes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach</td>
<td>14 (19.2:9.1)</td>
<td></td>
<td>50.6:23.2</td>
<td></td>
</tr>
<tr>
<td>Colorectal</td>
<td>14.2 (16.9:11.7)</td>
<td></td>
<td>50.8:33.9</td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td>10.9 (16.0:6.0)</td>
<td></td>
<td>68.3:24.2</td>
<td></td>
</tr>
<tr>
<td>Pancreatic</td>
<td>2.4 (2.7:2.2)</td>
<td></td>
<td>18.9:16.2</td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td>11.8 (16.1:7.8)</td>
<td></td>
<td>49.2:20.6</td>
<td></td>
</tr>
</tbody>
</table>

(events/10,000 persons)

DEFINITION OF CANCER:
ICD-10 code and cancer-related hospitalization
Stomach cancer: C16
Colorectal cancer: C18, C19, C20
Liver cancer: C22
Pancreatic cancer: C25
Lung cancer: C33, C34