Achieving Good Glycemic Control
Aim

Provide practical guidance on improving diabetes care through highlighting the need to:

• treat to glucose targets
• intensively monitor glycemia
• use a holistic approach to treatment
• involve experts in diabetes management
Type 2 diabetes: a global call to action

Type 2 diabetes accounts for 85–95% of diabetes cases

Global prevalence of diabetes (millions)

Year

1985  2000  2025

30 million  150 million  333 million

http://www.idf.org/home/
Obesity is a key driver of the diabetes epidemic

- 50–65% of the general population are obese or overweight\(^1\)
- The risk of developing type 2 diabetes increases with increasing weight\(^2\)
- It is estimated that half of all diabetes cases would be eliminated if weight gain could be prevented\(^3\)

Despite falling CHD mortality rates, diabetes increases the risk of CHD.

Factors ↓ CHD deaths include ↓ smoking, cholesterol, and BP and changes in treatments.

Factors ↑ CHD deaths include diabetes and obesity.

Data from England and Wales between 1981 and 2000 in men and women aged 35–84 years.
There were 68,230 fewer CHD deaths than expected from baseline mortality rates in 1981.

Individuals with diabetes are at increased risk of cardiovascular mortality

Age-adjusted relative risk of death compared with men with no diabetes or CHD

Mortality rate is doubled in individuals with diabetes

- **Ratio 2.5**
  - Whitehall Study
  - Mortality rate is doubled in individuals with diabetes

- **Ratio 2.2**
  - Paris Prospective Study

- **Ratio 2.1**
  - Helsinki Policemen Study

Type 2 diabetes is associated with serious complications

Diabetic Retinopathy
Leading cause of blindness in adults

Diabetic Nephropathy
Leading cause of end-stage renal disease

Stroke
2- to 4-fold increase in cardiovascular mortality and stroke

Cardiovascular Disease
8/10 individuals with diabetes die from CV events

Diabetic Neuropathy
Leading cause of non-traumatic lower extremity amputations

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Individuals suffering ‘extreme problems’ in quality of life

![Bar chart showing individuals reporting 'extreme problems' in quality of life by Diabetic and General population.](chart)

*Significant versus general population

Costs of diabetes are rising

Estimated US costs

<table>
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<th>Year</th>
<th>Indirect costs</th>
<th>Direct costs</th>
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Hospitalizations account for the majority of the costs of managing type 2 diabetes.

- Hospitalizations: 55%
- Ambulatory care: 18%
- Antidiabetic drugs: 7%
- Other drugs: 21%

Jönsson B. Diabetologia 2002; 45 (Suppl.):S5–S12.
Lowering HbA$_{1c}$ reduces the risk of complications

Deaths related to diabetes: 21%

Microvascular complications: 37%

Myocardial infarction: 14%

Risk of complications decreases as HbA$_{1c}$ decreases

Incidence per 1,000 patient-years

Normal HbA$_{1c}$ levels

Updated mean HbA$_{1c}$ (%)
Diabetes management guidelines: $\text{HbA}_{1c}$

ADA (US)\(^1\)
$\text{HbA}_{1c} < 7\%$

AACE (US)\(^2\)
$\text{HbA}_{1c} \leq 6.5\%$

ALAD (Latin America)\(^6\)
$\text{HbA}_{1c} < 6–7\%$

APPG (Asia Pacific)\(^7\)
$\text{HbA}_{1c} < 6.5\%$

CDA (Canada)\(^4\)
$\text{HbA}_{1c} \leq 7\%$

IDF (Europe)\(^3\)
$\text{HbA}_{1c} \leq 6.5\%$

NICE (UK)\(^5\)
$\text{HbA}_{1c} 6.5–7.5\%$

Australia\(^8\)
$\text{HbA}_{1c} \leq 7\%$

\(^6\)ALAD. *Rev Asoc Lat Diab* 2000; Suppl. 1.
\(^8\)NSW Health Department. 1996.
Diabetes management guidelines: a sense of urgency

"... the results of the UKPDS mandate that treatment of type 2 diabetes include aggressive efforts to lower blood glucose levels as close to normal as possible"

American Diabetes Association

"Diabetes must be... diagnosed earlier. And once diagnosed, all types of diabetes must then be managed much more aggressively"

Canadian Diabetes Association


Two thirds of individuals do not achieve target HbA$_1c$
Proportion of individuals reaching target HbA$_{1c}$ is not improving over time

- HbA$_{1c} < 7.0%$
- BP < 130/80 mmHg
- Total cholesterol < 200 mg/dL

*Individuals achieving goals for HbA$_{1c}$, blood pressure and total cholesterol

Barriers to achieving good glycemic control

- Lack of clarity over definition of good glycemic control
- Inadequate monitoring of glycemia
- Complexity of managing hyperglycemia relative to dyslipidemia and hypertension
- Insufficient involvement of specialist care units
Lack of clarity over definition of good glycemic control
Although HbA\textsubscript{1c} targets are converging, good glycemic control is not reached.

Destination Good Glycemic Control
What is good glycemic control?

The Global Partnership recommends:

Aim for good glycemic control = HbA$_{1c}$ $< 6.5\%$*

*Or fasting/preprandial plasma glucose $< 110$ mg/dL (6.0 mmol/L) where assessment of HbA$_{1c}$ is not possible

Inadequate monitoring of glycemia
Frequent monitoring of glycemia is important

• Cornerstone of diabetes care
• Ensures best possible glycemic control by:
  – assessing efficacy of therapy
  – guiding adjustments in diabetes care regimen, including diet, exercise and medications
Who should monitor glycemia?

- Patient
  Self-monitoring of blood glucose

- Healthcare professionals
  Regular monitoring of HbA$_1^c$

- Diabetes care team
  Combined synergistic efforts of team are crucial to ensure effective monitoring of glycemic control
Self-monitoring of blood glucose (SMBG)

- Regular SMBG increases the proportion of individuals achieving their glycemic targets.
- Individuals should monitor postprandial glucose as part of their SMBG schedule.
- Regular discussion of results with diabetes care team is essential.

![Graph showing HbA1c levels in SMBG performers and non-performers.](image-url)

HbA$_{1c}$ monitoring

- HbA$_{1c}$ measures glycemia over preceding 2–3 months
- Regular assessment of HbA$_{1c}$ can lead to more proactive management of diabetes
- Two consecutive measurements of HbA$_{1c} \geq 7.0\%$ should lead to a review of the treatment algorithm
How often should HbA$_{1c}$ be monitored?

The Global Partnership recommends:

Monitor HbA$_{1c}$ every 3 months in addition to regular glucose self-monitoring.

Complexity of managing hyperglycemia relative to dyslipidemia and hypertension
Influence of multiple risk factors and diabetes on CVD mortality

*Serum cholesterol > 200 mg/dL, smoking, systolic blood pressure > 120 mmHg

What are the priorities in diabetes management?

- Glucose?
- Blood pressure?
- Cholesterol?
Fewer individuals achieve goals for HbA$_{1c}$ versus lipids and blood pressure.

- HbA$_{1c}$ < 6.5%: 15%
- Total cholesterol < 175 mg/dL: 72%
- Triglycerides < 150 mg/dL: 58%
- Systolic BP < 130 mmHg: 46%
- Diastolic BP < 80 mmHg: 72%

Should glycemia be given more or less priority versus lipids and blood pressure?

The Global Partnership recommends:

Aggressively manage hyperglycemia, dyslipidemia and hypertension with the same intensity to obtain the best patient outcome.

Glycemic control = Lipid-lowering = Antihypertensive

FPG, HbA\textsubscript{1c}, TC, TGS, HDL, LDL, SBP, DBP, ABPM

Insufficient involvement of specialist care units
Type 2 diabetes is a complex disorder

• Management of type 2 diabetes needs considerable expertise in order to:
  – match medication to individual ‘phenotype’
  – manage complex drug regimens
  – provide strong support for patient education
Specialist input leads to better outcomes in type 2 diabetes

In the Verona Diabetes Study, individuals attending a specialist diabetes center had a substantially improved chance of survival compared with those seen only by family physicians.
How can expertise be best utilized in diabetes management?

*The Global Partnership recommends:*

Refer all newly diagnosed patients to a unit specializing in diabetes care *where possible*.