



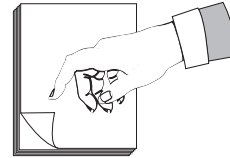
# Drug use in type 2 diabetes

## Aims of the clinical audit

- To review the management of patients with type 2 diabetes
- To review antidiabetic drug use to achieve optimal control of blood glucose levels
- To review frequency of monitoring
- To assess and manage co-existing dyslipidaemia and hypertension to minimise cardiovascular risk.

### Please tear off each section carefully.

Registration/summary form and clinical audit forms should be returned to NPS by 8 July 2005.



## How to participate

### 1. Select patients

Prospectively as patients present for consultation, or retrospectively from a search of electronic/paper medical records, identify 20 patients who:

- have been diagnosed with type 2 diabetes
- are currently treated with oral antidiabetic agent(s)
- are older than 16 years of age.

### 2. Obtain patient consent

Patients must be informed that data from their medical records may be used for the purposes of clinical audits, and written consent obtained.

### 3. Record patient data (first data collection)

Use the *Patient record form* to record the patients you have included. DO NOT send to NPS — keep this record to assist in identifying patients for second data collection (see No. 6).

Complete a clinical audit form for each patient. See notes on pages 2–7.

Please note:

- patient information must only be collected and recorded by the participating doctor
- both full-time and part-time GPs are required to submit 20 completed clinical audit forms.

### 4. Submit the clinical audit forms

Return the 20 clinical audit forms and *Registration/summary form* to:

**NPS Clinical Audit: Diabetes**  
**Locked Bag 4888**  
**STRAWBERRY HILLS NSW 2012**

**To be received at NPS not later than 8 July 2005.**

**Please note:** Unfortunately, late submissions cannot be accepted.

### 5. When you receive your results

You will receive:

- your original clinical audit forms
- feedback on your individual results
- the aggregate results of all participants' management practices
- commentary on the aggregate results
- a *Review Phase pack* to complete and return (see below).

### 6. Completing the clinical audit cycle (including second data collection)

You are required to:

- review your individual and the aggregate results in the *Feedback report*
- identify which of your original 20 patients require follow-up
- record additional patient data
- reflect on changes in management
- submit the *Review Phase pack*.

### Professional development and PIP

NPS has applied for clinical audit points in the 2005–2007 triennium of the Royal Australian College of General Practitioners (RACGP) Quality Assurance & Continuing Professional Development (QA&CPD) Program (Category 1 activity) and the Australian College of Rural and Remote Medicine (ACRRM) Professional Development Program (practice improvement category).

The *Review Phase pack* must be completed and returned to NPS for RACGP and/or ACRRM clinical audit points to be allocated and for the clinical audit to qualify for the Quality Prescribing Initiative (QPI) of the Practice Incentives Program (PIP). You will then be sent a certificate of completion.

#### \*Important notice: please read

Changes to the clinical audit module (Category 1 activity) for the 2005–2007 triennium of the RACGP QA&CPD Program: the RACGP now requires that participants complete all steps of this clinical audit for clinical audit points (Category 1 activity) to be allocated.

# Notes for clinical audit form

Additional information to assist you to review management

## Patient details

### Your patient code

**(Q1)** Choose your own unique identifying code for the patient, e.g. sequential number or patient's initials.

### Body mass index (BMI)

**(Q3)** A healthy diet, optimal bodyweight and regular physical activity are important objectives for people with diabetes.<sup>1</sup>

To assess bodyweight, BMI or waist circumference (cm) can be measured.<sup>1</sup>

**Table 1. BMI and waist circumference categories<sup>1</sup>**

	BMI	Waist circumference	
		male	female
<b>Healthy</b>	20–25 kg/m <sup>2</sup>	< 94 cm	< 80 cm
<b>Overweight</b>	25–30 kg/m <sup>2</sup>	94–102 cm	80–88 cm
<b>Obese</b>	> 30 kg/m <sup>2</sup>	> 102 cm	> 88 cm

### Estimation of renal function

**(Q4)** Calculated creatinine clearance is an estimation of renal function.

Serum creatinine is normally measured annually, or more frequently if renal impairment is evident.<sup>1</sup>

Degrees of renal impairment<sup>2</sup>:

- mild 25–50 mL/min
- moderate 10–25 mL/min
- severe < 10 mL/min

### Converting serum creatinine units to mmol/L

**To convert:  $\mu\text{mol/L}$  to mmol/L**  
divide by 1000

Example 70  $\mu\text{mol/L}$  = 0.07 mmol/L

**To convert: mg/dL to mmol/L**  
divide by 11.32

Example 0.8 mg/dL = 0.07 mmol/L

### Creatinine clearance (CrCl) calculation: Cockcroft–Gault formula

$$\text{Men: CrCl (mL/min)} = \frac{(140 - \text{age}) \times \text{ideal bodyweight (kg)}}{815 \times \text{serum creatinine (mmol/L)}}$$

Women: Use formula for men and multiply the result by 0.85

The Cockcroft–Gault formula provided is invalid in severe renal insufficiency or with rapidly changing renal function.<sup>2</sup>

Renal function and muscle mass both decline with age, so elderly people may have apparently normal serum creatinine levels but abnormal renal function. Thus calculation of creatinine clearance provides a better estimate of renal function than serum creatinine.<sup>2</sup> Ideal bodyweight, if less than actual bodyweight, is used in the calculation, as it correlates better with muscle mass.

### To calculate ideal bodyweight<sup>2</sup>

- Men:  
50 kg + 0.9 kg for every cm over 152 cm (height)
- Women:  
45.5 kg + 0.9 kg for every cm over 152 cm (height)

### Using prescribing software to calculate creatinine clearance

Several of the prescribing software packages estimate creatinine clearance (termed GFR on some of the calculators) after input of serum creatinine (in mmol/L) and weight in kg, which should be entered as ideal bodyweight if less than actual bodyweight.

Care should be taken with units when entering and recording the parameters.

*Genie:* within the notes section of the patient consultation, click on the parameters button and enter details.

*Medical Director:* within the patient record, click the renal function calculator icon in the tool bar at the top of the screen.

*Plexus:* within the health record, under the consultation tool, click on the renal function tab. (Creatinine clearance is reported as mL/sec; multiply by 60 to get mL/min.)

## Lifestyle interventions

**(Q5)** The lifestyle interventions listed on the clinical audit form are aimed at reducing the risk factors for diabetes and cardiovascular disease. Lifestyle advice should be repeated and reinforced to optimise the reduction in overall cardiovascular risk.

Ensure that the patient has ongoing access to information, educational materials and support services.<sup>1</sup> Refer to:

- Diabetes Australia: 1800 640 862 for patient information
- Dietitians Association: 1800 812 942 for dietitians in your local area
- Australian Diabetes Educators Association: (02) 6287 4822 or <http://www.adea.com.au> for local contacts.

## Management of blood glucose levels

### Target levels

**(Q6,7)** Long-term glycaemic control is monitored by measuring glycated haemoglobin (HbA<sub>1c</sub>). The United Kingdom Prospective Diabetes Study (UKPDS) showed reduced incidence and progression of diabetes-related complications in subjects with a low HbA<sub>1c</sub>. The recommended target for overall glycaemic control is HbA<sub>1c</sub> ≤ 7%.<sup>1</sup>

HbA<sub>1c</sub> should be measured at least 6-monthly and random blood glucose levels should be monitored every 3–4 months (see Table 2).<sup>1</sup>

These are recommendations for best practice, which may differ from the minimum annual cycle of care requirements set by the Health Insurance Commission (HIC) for the Service Incentives Payments (SIP).

It is important to individualise the aims of treatment.<sup>1</sup>

**Table 2. Target blood glucose levels<sup>1</sup>**

Preprandial blood glucose (mmol/L)	Postprandial blood glucose (mmol/L)	Comment
4.0–6.0	4.0–7.7	Normoglycaemia. Rarely possible in type 1 diabetes
6.1–6.9	7.8–11.0	Minimises microvascular problems
≥ 7.0	≥ 11.1	Associated with microvascular and macrovascular complications. Consider more active treatment
> 10	> 20	Generally prompts further and more active treatment

### Contra-indications to metformin treatment

**(Q8)** Metformin should be considered in all patients with type 2 diabetes unless contra-indicated.

Sulfonylureas are an alternative for patients in whom metformin is contra-indicated (including those at risk of lactic acidosis) or not tolerated.

#### Contra-indications to metformin use<sup>2</sup>:

- alcohol misuse
- creatinine clearance < 30 mL/min
- dehydration
- moderate to severe heart failure
- ketoacidosis
- respiratory failure
- type 1 diabetes
- severe infection or trauma
- conditions predisposing to lactic acidosis e.g. vascular collapse, conditions leading to shock.

#### Specific considerations for metformin use<sup>2</sup>:

- **elderly** — use cautiously; avoid use in very old people, e.g. > 85 years
- **hepatic impairment** — avoid use (risk of lactic acidosis)
- **pregnancy** — usually replaced with insulin; some clinical use; ADEC category C
- **renal impairment** — increases the risk of lactic acidosis; a reduced maximum daily dose is suggested, based on creatinine clearance, i.e. 2 g/day for 60–90 mL/min and 1 g/day for 30–60 mL/min
- **surgery** — stop metformin 2 days before, during, and for 2 days after surgery; replace with insulin as required.

Accumulation of metformin can cause **lactic acidosis**, which although rare is often fatal. This may occur when contra-indications are overlooked (e.g. renal or hepatic impairment, heart failure) or in high-risk situations such as major illness or surgery. Early symptoms include anorexia, nausea, vomiting, abdominal pain, cramps, malaise and weight loss.<sup>2</sup>

## Management of blood glucose levels (cont'd)

### Medication(s) to control blood glucose levels

**(Q9)** For medications available see table 3 (*Comparative information for antidiabetic drugs*).

Metformin has been shown to have an effect on diabetes-related complications in overweight patients and should be considered first-line treatment in this group.

Metformin should also be considered as first-line treatment in non-overweight patients as well because:

- it is the only antidiabetic drug shown to reduce the risk of diabetes-related death and all-cause mortality<sup>3</sup>
- unlike sulfonylureas, it does not cause weight gain
- unlike sulfonylureas, it does not cause hypoglycaemia when used alone.

A sulfonylurea could be considered first-line when metformin is contra-indicated or not tolerated, or in non-overweight people.<sup>2</sup>

When monotherapy with metformin (or a sulfonylurea) is insufficient, the combination of first choice is metformin plus a sulfonylurea. A glitazone can be considered as part of this combination when:

- metformin or a sulfonylurea is contra-indicated or not tolerated, or
- combination therapy with metformin and a sulfonylurea fails.

More information about the glitazones is available in the April 2005 issue of NPS RADAR (<http://www.npsradar.org.au>).

### Initiation of insulin in type 2 diabetes

Insulin treatment may be initiated in type 2 diabetes when oral therapy alone does not provide adequate glycaemic control. About 30% of patients eventually require insulin; in most cases this is started after 10–15 years of successful oral therapy.<sup>1</sup> Ensure exercise and dietary management are optimal and exclude exacerbating factors, e.g. concurrent infection and other agents that may affect glycaemic control.<sup>1,4</sup>

There is no consensus on when to start insulin for patients with HbA<sub>1c</sub> > 7%. If the patient is symptomatic then insulin is required. If there are no symptoms but fasting blood glucose is consistently > 7 mmol/L, the decision is more difficult.<sup>1</sup>

### Drugs that may affect glycaemic control

**(Q10)** The following drugs are some of the most frequently encountered agents that have the potential to affect glycaemic control. These are unlikely to be a problem in patients already stabilised on both drugs. Beware when changing dosing or starting new agents.

#### Hypoglycaemic effect:

- alcohol
- androgens
- disopyramide
- perhexilene
- quinine
- quinolones
- salicylates (high doses)

#### Hyperglycaemic effect:

- atypical antipsychotics, e.g. clozapine, olanzapine, quetiapine, risperidone
- cyclosporin
- danazol
- glucocorticoids
- nicotinic acid
- oral contraceptives (high dose)
- protease inhibitors
- quinolones
- tacrolimus
- thiazide diuretics (high-dose), e.g. hydrochlorothiazide 50 mg

### Management of hypoglycaemia

**(Q11)** Hypoglycaemia may be due to:

- excessive insulin
- a sulfonylurea
- repaglinide
- deficient carbohydrate intake
- unaccustomed exercise.

The patient should be familiar with treating hypoglycaemia with sugar-containing food/drink (followed by a longer-acting carbohydrate) or subcutaneous glucagon administration given by another person.<sup>4</sup>

### Self-monitoring of blood glucose levels

**(Q12)** Self-monitoring is essential; the method and frequency of testing should be individualised after initial close supervision.

Suggested initial schedule: 3–4 times daily (early morning plus other tests before and after meals).<sup>1</sup>

Suggested maintenance schedule: 1–4 times a day, at different times of the day on 1–3 days of the week.<sup>1,2,4</sup>

In elderly patients: testing on 1 or 2 days of the week, varying in time, may be adequate.<sup>1</sup>

Perform extra tests when the patient's normal routine is changed, e.g. during illness, travelling or changes in diet.

Frequent consultation with healthcare professional is important.<sup>1</sup>

## Associated cardiovascular risk factors

### Dyslipidaemia

#### Monitoring

**(Q13)** Fasting lipid levels should be monitored annually if below target, and more frequently if the patient is being actively treated.<sup>1</sup>

#### Target plasma lipid profile levels<sup>1,5</sup>:

- total cholesterol < 4.0 mmol/L
- HDL cholesterol ≥ 1.0 mmol/L
- LDL cholesterol < 2.5 mmol/L
- triglycerides < 2.0 mmol/L

If patients are not achieving target lipid levels check compliance with medications, as a high rate of non-compliance with 'statins' has been reported.<sup>6</sup>

#### **(Q14) Current medication(s) to control lipid levels**

**Table 4. Drugs to control lipid levels**

Drug group	Generic name	Product name
<b>HMG-CoA reductase inhibitors ('statins')</b>	atorvastatin	Lipitor
	fluvastatin	Lescol, Vastin
	pravastatin	Pravachol
	simvastatin	Lipex, Simvar, Zocor
<b>Bile acid binding resins</b>	cholestyramine	Questran Lite
	colestipol	Colestid
<b>Nicotinic acid</b>	nicotinic acid	
<b>Fibrates</b>	fenofibrate	Lipidil
	gemfibrozil	Ausgem, Gemhexal, Jezil, Lipazil, Lipid
<b>Other</b>	ezetimibe	Ezetrol

High triglyceride – low HDL-cholesterol is the most common form of dyslipidaemia in type 2 diabetes.<sup>7</sup>

**Table 5. Choice of agent to control lipid levels<sup>2</sup>**

Predominant lipid abnormality	First-choice agent
Hypertriglyceridaemia	fibrates
Elevated LDL-cholesterol	statin
Mixed hyperlipidaemia:	
— elevated cholesterol predominates	statin
— elevated triglycerides predominates	fibrates

Gemfibrozil and statins have been shown to reduce the risk of cardiovascular events and mortality. Both fenofibrate and ezetimibe are newer drugs in Australia. Further studies are needed to demonstrate their safety and effect on clinical outcomes.<sup>2</sup>

#### **Pharmaceutical Benefits Scheme Subsidy Criteria**

The Pharmaceutical Benefits Scheme<sup>8</sup> currently subsidises initiation of HMG-CoA reductase inhibitors (statins) and fibrates for **patients with diabetes** who:

- have received dietary therapy (typically for 6 weeks) AND
- have had their fasting lipid levels checked after completing dietary therapy AND subsequently:
  - have total cholesterol > 6.5 mmol/L OR
  - total cholesterol > 5.5 mmol/L and HDL < 1.0 mmol/L OR
  - have total cholesterol > 4.0 mmol/L and existing coronary heart disease.

Ezetimibe (see <http://www.npsradar.org.au>) may be prescribed on PBS authority for **patients with diabetes** who satisfy the above criteria AND:

- have inadequately controlled cholesterol levels with a daily dose of statin of ≥ 40 mg for at least 3 months OR
- have a contra-indication to treatment with a statin OR
- when treatment is unsuitable due to development of a clinically important product-related adverse effect requiring discontinuation of the statin, e.g. severe myalgia, myositis, unexplained persistent elevated serum transaminase levels OR
- who have homozygous familial hypercholesterolaemia and are already using a statin.

### Aspirin therapy

**(Q15)** There is a 20-fold increased risk of ischaemic heart disease in patients with microalbuminuria.<sup>4</sup> These patients should receive aspirin even in the absence of manifest large vessel disease. Patients aged > 50 years with diabetes have a cardiovascular risk equivalent to that of a person with known coronary artery disease and no diabetes and should receive aspirin. Weigh up the potential cardiovascular benefits versus bleeding risks before starting aspirin therapy.

Aspirin 75–150 mg daily is recommended for people with type 2 diabetes who<sup>4</sup>:

- are > 50 years of age and/or
- have microalbuminuria and/or
- have ischaemic heart or cerebrovascular disease.

## Associated cardiovascular risk factors (cont'd)

### Hypertension

Target blood pressure levels in patients with diabetes are particularly important — tight control of blood pressure reduces the risks of microvascular and macrovascular diabetic complications.<sup>9</sup>

#### Monitoring

**(Q16)** Early detection, active treatment and frequent review of hypertension are essential to reduce the risks of microvascular and macrovascular complications.<sup>1</sup> Blood pressure should be monitored every 3–4 months.<sup>1</sup> The magnitude of proteinuria in 24 hours is needed to determine the target blood pressure (see section *Complications of type 2 diabetes* below).

#### **(Q17) Target blood pressure levels**

- For patients with proteinuria  $\leq 1$  g/day:
  - < 130/85 mmHg.<sup>2,10,11</sup>
  - < 130/80 mmHg.<sup>1,4,12</sup>
- For patients with proteinuria  $> 1$  g/day:
  - < 125/75 mmHg.<sup>10,12</sup>

Please note: there are inconsistencies in guideline recommendations for patients with diabetes and proteinuria  $\leq 1$  g/day. Specific guidelines for diabetes recommend a target blood pressure of  $< 130/80$  mmHg.

Patients with autonomic neuropathy are particularly prone to orthostatic hypertension. It may be preferable to accept some hypertension in these patients rather than episodes of postural hypotension.<sup>1</sup>

#### **Current medication(s) to control blood pressure**

**(Q18)** Refer to [http://www.nps.org.au/resources/Clinical\\_Audits/hypertension\\_2004.pdf](http://www.nps.org.au/resources/Clinical_Audits/hypertension_2004.pdf) (page 7) for a table of antihypertensive drug classes and brand names, or fax NPS on 02 9211 7578 to request a copy.

ACE inhibitors, beta-blockers and low-dose thiazide diuretics are antihypertensive agents of choice in people with both diabetes and hypertension.<sup>2</sup>

ACE inhibitors are associated with reduced proteinuria and slowing of the rate of progression of renal failure in patients with renal disease, in particular those with type 1 diabetes and diabetic nephropathy.<sup>2</sup>

Angiotensin II receptor antagonists have been shown to delay progression of renal disease in people with type 2 diabetic nephropathy.<sup>13,14</sup>

## Complications of type 2 diabetes

### Screening for albuminuria

#### **(microalbuminuria)<sup>1,4,15</sup>**

**(Q20)** Screen for microalbuminuria annually and monitor microalbuminuria more frequently when diagnosed.<sup>1</sup>

People with macroalbuminuria defined by one of the specific assays or with clinical albuminuria detected by a routine urinalysis (e.g. multi-test dipstick for overt proteinuria) should have a 24-hour urine sample collected to quantify the amount of urinary protein. The magnitude of proteinuria in 24 hours will determine the target blood pressure.

### Management of microalbuminuria

In people with type 2 diabetes, microalbuminuria is an indicator of high cardiovascular risk.<sup>1</sup>

Both glycaemic control and strict control of blood pressure have been shown to prevent or delay the development of nephropathy or retard its progression.<sup>2,4</sup>

**Table 6. Degree of albuminuria**

Degree of albuminuria	Timed collection (albumin excretion rate micrograms/min) <i>e.g. measured over 4 hours or overnight</i>	Spot collection (albumin:creatinine ratio, mg/mmol) <i>measured in collection of urine on first void</i>		24-hour collection with creatinine (mg/24 hours) <i>allowing simultaneous measurement of creatinine clearance</i>
		men	women	
normal urinary protein	< 20	$\leq 2.5$	$\leq 3.5$	< 30
microalbuminuria	20–200	2.6–25	3.6–35	30–299
macroalbuminuria	> 200	> 25	> 35	$\geq 300$ and $\leq 1000$
proteinuria				> 1000

**Table 3: Comparative information for antidiabetic drugs**

Drug group	Generic name: brand name	Mechanism of action	Dosage	Important dosage points	Common adverse effects*	Important risks and monitoring
Biguanide	Metformin <sup>†</sup> : <i>Diabex, Diatformin, Glucohexal, Glucozet, Glucophage</i>	Improves insulin sensitivity (mainly hepatic)	500 mg daily up to a maximum of 3 g daily	Two or three times daily dosing with or immediately after meals to minimise gastrointestinal effects. Increase dose slowly and reduce or stop if gastrointestinal symptoms persist	Gastrointestinal e.g. diarrhoea, nausea, vomiting <i>No weight gain or hypoglycaemia</i>	Lactic acidosis—rare but can be fatal. Avoid in high-risk patients: renal and hepatic impairment, and cardiac insufficiency Creatinine clearance should be monitored at baseline and every 4–6 months. If creatinine clearance < 30 mL/min, metformin should be avoided Care with drugs that may cause renal impairment <sup>‡</sup>
Sulfonylureas <i>Longer-acting</i>	Glibenclamide <sup>‡</sup> : <i>Daonil, Glimel</i> Glimepiride: <i>Amaryl, Dimivel</i>	Stimulate insulin release	Glimepiride: 1–4 mg daily Glibenclamide: 2.5–20 mg daily (up to 10 mg as single dose) Gliclazide: 40–320 mg daily (up to 160 mg as single dose) Glipizide: 2.5–40 mg daily (up to 15 mg as single dose)	Take dose with meals to minimise risk of hypoglycaemia. Increase dose at weekly intervals until control achieved Glimepiride and modified release gliclazide: once daily Glibenclamide, gliclazide and glipizide: once or twice daily depending on dose	Hypoglycaemia, weight gain	Hypoglycaemia can occur with all drugs in this class—especially in the elderly (particularly with longer-acting agents) Educate patients to recognise and manage hypoglycaemia <sup>§</sup>
<i>Shorter-acting</i>	Gliclazide: <i>Diamicron, Diamicron MR, Glyade, Mellinhexal, Nidem</i> Glipizide: <i>Melizide, Minidiab</i>					Glibenclamide is associated with the highest risk: avoid in elderly and those with renal and hepatic impairment. Care is also warranted with gliclazide and glimepiride
Glitnide	Repaglinide: <i>NorvoNorm</i>	Stimulates insulin release	0.5 mg three times daily up to a maximum of 16 mg daily	Usually three times a day. For effective action and to minimise risk of hypoglycaemia, take immediately before meals Omit dose if meal is skipped	Hypoglycaemia, gastrointestinal, e.g. nausea, diarrhoea	Hypoglycaemia is the greatest risk, especially in the elderly Educate patients to recognise and manage hypoglycaemia <sup>§</sup> Avoid co-administration with gemfibrozil
Alpha-glucosidase inhibitor	Acarbose: <i>Glucobay</i>	Improves postprandial hyperglycaemia by delaying absorption of glucose after meals	50 mg daily up to a maximum of 600 mg daily	Usually three times a day. For effective action, swallow whole immediately before meals or chew with first few mouthfuls of food. Improve tolerance by starting with a low dose and titrating slowly	Gastrointestinal, e.g. flatulence, diarrhoea and abdominal pain	Has been associated with elevated transaminase levels and, rarely, hepatotoxicity Liver transaminase levels should be monitored at monthly intervals for first 6–12 months. If elevated, dose should be decreased and monitored weekly until normal; stop treatment if elevation persists
Thiazolidinediones	Pioglitazone: <i>Actos</i> Rosiglitazone <sup>†</sup> : <i>Avandia</i>	Improve insulin sensitivity (mainly in adipose tissue)	Pioglitazone: 15–30 mg daily to a maximum of 45 mg daily Rosiglitazone: 4–8 mg daily	Pioglitazone: once daily Rosiglitazone: once or twice daily Take with or after food	Peripheral oedema, weight gain	Avoid when transaminase levels > 2.5 times upper limit of normal. LFTs should be monitored at baseline, every two months in the first year, then periodically. Discontinue treatment if ALT > 3 times upper limit of normal or if patient is jaundiced Avoid in heart failure NYHA Class III or IV (caution with Class I or II) Isolated case reports describe hepatic adverse effects
Insulins	Multiple preparations including ultrashort, short, intermediate and long acting insulins	Play a key role in regulating carbohydrate, protein and fat metabolism	Dose depends on individual needs and response	Various dosing frequencies depending on schedule used Ultrashort acting: immediately before meals Short acting: 30 minutes before meals	Hypoglycaemia, weight gain	Hypoglycaemia is the greatest risk, especially in the elderly Educate patients to recognise and manage hypoglycaemia <sup>§</sup>

Developed from the Australian Medicines Handbook 2005.

\* For comprehensive information on potential adverse effects and drug interactions, please refer to the latest edition of *Australian Medicines Handbook*, the approved production information or contact the NPS Therapeutic Advice and Information Service on 1300 138 677.

† Metformin and glibenclamide are now available in the combination product Glucovance. Metformin and rosiglitazone are available in the combination product Avandamet. The usual precautions for the individual components apply when considering use of combination products.

‡ Examples of drugs that could cause renal impairment include NSAIDs, COX-2 selective NSAIDs, ACE inhibitors, angiotensin II receptor antagonists and iodinated contrast media.

§ See [http://www.diabetesaustralia.com.au/\\_lib/doc\\_pdf/resources/factsheets/Hypoglycaemia\\_FS.pdf](http://www.diabetesaustralia.com.au/_lib/doc_pdf/resources/factsheets/Hypoglycaemia_FS.pdf)

## Patient consent

Please:

- display the enclosed poster in your practice
- ask patients who present to the practice to read and sign a copy of the enclosed *Patient information and consent form*, or
- send the enclosed *Patient information and consent form* to patients whose records you wish to use retrospectively, asking them to sign and return it to the practice
- DO NOT send in the *Patient information and consent form*.

## Privacy

By participating you agree to aggregation of your de-identified patient data and use of your personal data. Individual results of your clinical audit are kept confidential by NPS.

### What will happen to

#### Your patient data:

- your de-identified patient data forms are returned to you
- your individual results are provided to you only
- your data are aggregated with that of other participants and the de-identified aggregate results:
  - are provided to all participants
  - may be used in NPS evaluation and reports
  - are provided to the RACGP and ACRRM.

The RACGP has advised that program information may be shared with researchers and interested general practitioners for the purpose of continuing education coordination at the discretion of the QA&CPD Program.

#### Your personal details:

- are provided to the RACGP QA&CPD Program and/or ACRRM Professional Development Program for point allocation (if applicable)
- are recorded for the purpose of the PIP and NPS evaluation
- can be obtained from NPS by request in writing.

Individual clinical audit results will not be available after potentially identifying data are removed from NPS records at the close of the clinical audit cycle.

Please note: you are responsible for advising NPS of any changes of address during the audit cycle.

## Further information

### Therapeutic enquiries

Sheena O’Riordan OR Aphra Robbins  
at NPS: phone (02) 8217 8700

### Audit and QPI enquiries

Cris Abbu at NPS: phone (02) 8217 8700

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*The information contained in this material is derived from a critical analysis of a wide range of authoritative evidence. Any treatment decisions based on this information should be made in the context of the clinical circumstances of each patient.*



National Prescribing Service Limited

NPSA0285 April 2005

**National Prescribing Service Limited ACN 082 034 393**  
**An independent, Australian organisation for Quality Use of Medicines,**  
**funded by the Australian Government Department of Health and Ageing**

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# Clinical audit: Drug use in type 2 diabetes

Please see the *Guide to clinical audit* booklet for supporting information to assist you to complete this double-sided form.

Use a **black biro** to mark a **cross (X)** in the appropriate box beside your response.

If you make a mistake, use white correction fluid.



NPS office use only

## Patient details

Your patient code:

1. Age:  16–50 years  51–85 years  > 85 years

2. Gender:  male  female

3. Calculate body mass index (kg/m<sup>2</sup>):

weight (kg)  / <sup>2</sup> =  kg/m<sup>2</sup>  
height (m)

4. Serum creatinine:  mmol/L  not recently measured

**Creatinine clearance calculation** (See *Guide* page 2)

Men: Creatinine clearance (mL/min) =  $\frac{(140 - \text{age}) \times \text{ideal bodyweight (kg)}}{815 \times \text{serum creatinine (mmol/L)}}$

Women: Use formula for men and multiply the result by 0.85

Creatinine clearance:  mL/min  not calculated

Degree of renal impairment (mL/min):  mild (25–50%)  moderate (10–25)  severe (<10)

## Lifestyle interventions

5. What lifestyle advice has been given to the patient?

- |  |  |
|--|--|
| <input type="checkbox"/> healthy eating              | <input type="checkbox"/> reduce weight                 |
| <input type="checkbox"/> cease smoking               | <input type="checkbox"/> regular moderate exercise     |
| <input type="checkbox"/> minimise alcohol intake     | <input type="checkbox"/> referral to diabetes educator |
| <input type="checkbox"/> reduce salt intake          | <input type="checkbox"/> referral to dietitian         |
| <input type="checkbox"/> reduce saturated fat intake | <input type="checkbox"/> none                          |
| <input type="checkbox"/> reduce sugar intake         | <input type="checkbox"/> other _____                   |

## Management of blood glucose levels

6. Most recent glycated haemoglobin (HbA<sub>1c</sub>):

Target for normoglycaemia

≤ 7.0 %  7.1–8.0%  8.1–10.0%  > 10%

Date last measured:

/  /   not known

0–4 months ago  > 6–12 months ago

> 4–6 months ago  > 12 months ago

7. Most recent blood glucose levels:

Fasting blood glucose (mmol/L)	Postprandial or random blood glucose (mmol/L)	Comment
<input type="checkbox"/> 4.0–6.0	<input type="checkbox"/> 4.0–7.7	Target for normoglycaemia
<input type="checkbox"/> 6.1–6.9	<input type="checkbox"/> 7.8–11.0	Minimises microvascular problems
<input type="checkbox"/> 7.0–10	<input type="checkbox"/> 11.1–20	Associated with microvascular and macrovascular complications
<input type="checkbox"/> > 10	<input type="checkbox"/> > 20	Should prompt further and more active treatment
<input type="checkbox"/> not known	<input type="checkbox"/> not known	Assess blood glucose level at next visit

Date last measured:

/  /   not known

0–4 months ago  > 6–12 months ago

> 4–6 months ago  > 12 months ago

8. Does the patient have contra-indications that would exclude treatment with metformin (see box below)?

yes  no  not known

### Contra-indications to metformin treatment

- alcohol misuse
- ketoacidosis
- creatinine clearance < 30 mL/minute
- respiratory failure
- dehydration
- severe infection or trauma
- moderate to severe heart failure
- type 1 diabetes
- conditions predisposing to lactic acidosis

9. Current medication(s) for controlling blood glucose levels: (see *Guide* p.7 *Comparative information for antidiabetic drugs*)

Mark drug class(es) and specify drug and dose in the space provided

- biguanide (metformin) \_\_\_\_\_
- sulfonylureas
- shorter-acting (gliclazide, glipizide) \_\_\_\_\_
- longer-acting (glibenclamide, gliclazide) \_\_\_\_\_
- alpha-glucosidase inhibitor (acarbose) \_\_\_\_\_
- glitinide (repaglinide) \_\_\_\_\_
- thiazolidinediones (rosiglitazone, pioglitazone) \_\_\_\_\_
- insulin \_\_\_\_\_
- other \_\_\_\_\_

10. Is the patient experiencing any adverse effects from the above medication(s)?

yes  no  not known

11. Has the patient been educated on how to identify and manage hypoglycaemia (where appropriate)? (See *Guide* page 4)

yes  no  not known

12. Does the patient undertake optimal self-monitoring of blood glucose levels? (See *Guide* page 4)

yes  no  not known





## Clinical audit

### Drug use in type 2 diabetes

#### Aims of this clinical audit

Completing this clinical audit cycle offers you the opportunity to:

- review antidiabetic drug use in the management of type 2 diabetes
- achieve optimal control of blood glucose levels
- review the frequency of monitoring
- assess and manage co-existing hypertension and dyslipidaemia.

#### Continuing professional development points and PIP

- NPS has applied for clinical audit points in the 2005–2007 triennium of the RACGP QA&CPD Program and ACRRM PD Program.
- This is the first clinical audit for the Quality Prescribing Initiative (QPI) of the Practice Incentives Program (PIP) for May 2005 to April 2006.

#### What this audit involves

##### Stage 1

- Identify 20 patients with type 2 diabetes currently treated with an oral antidiabetic agent and older than 16 years of age.
- Complete a clinical audit form for each patient.

Participation in this clinical audit requires agreement to aggregation of de-identified patient data.

##### Stage 2

- Review individual and aggregate results and commentary.
- Record patients' progress.
- Identify where improvement in patient management has occurred.

**IMPORTANT**

**To enrol**

Fill out the form on the reverse then return to NPS.





National Prescribing Service Limited



# Clinical audit enrolment form

## Drug use in type 2 diabetes

### To enrol

Fill out the form below then return to NPS.  
Enrolments must be received at NPS by **Friday 10 June, 2005**.

### Submission date for your audit

Completed clinical audit forms must be submitted to NPS by Friday 8 July, 2005. Unfortunately, late submissions cannot be accepted.

### For more information:

Sheena O’Riordan	}	Phone: 02 8217 8700
Chris Abbu		Fax: 02 9211 7579
		Email: info@nps.org.au

### Your details:

Please use BLOCK LETTERS

Doctor’s first name

Family name

Phone number (   )

Fax number (   )

Please enrol me for the audit

After you have enrolled, your free audit pack will be posted to you. To see a sample audit form before enrolling, visit our website at [www.nps.org.au/healthpro](http://www.nps.org.au/healthpro). Enrolments must be received at NPS by **Friday 10 June, 2005**.

Postal address

Suburb/town

State    Postcode

### All participants:



Fax this completed form to (02) 9211 7579

OR



Post to: NPS, PO Box 1147,  
STRAWBERRY HILLS NSW 2012