Glucose Lowering Medicines and Older People with Diabetes: Information for *Personal Care Workers*

Barwon Health

DEAKIN UNIVERSITY

Glucose Lowering Medicines and Older People with Diabetes: Information for *Personal Care Workers*

The third book in a series of three. The titles of the other books are:

Glucose Lowering Medicines: Information for *Older People with Diabetes and their Family Members*

and

Glucose Lowering Medicines and Older People with Diabetes: Information for *Registered and Enrolled Nurses*

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Disclaimer

Glucose Lowering Medicines and Older People with Diabetes: Information for Personal Care Workers was designed to help Personal Care Workers who work with nurses and older people with diabetes use glucose lowering medicines safely. The information was designed to be used with other relevant guidelines and policies for managing medicines for older people with diabetes. The authors and Expert Advisory Groups who developed the glucose lowering medicines information are not responsible for any actual care provided on the basis of Glucose Lowering Medicines and Older People with Diabetes: Information for Personal Care Workers and disclaim liability and responsibility to any person for the consequences of anything done or omitted by any person relying wholly or partially on the whole or part of the content of the Glucose Lowering Medicines and Older People with Diabetes: Information for Personal Care Workers.

It is essential that the information in Glucose Lowering Medicines and Older People with Diabetes: Information for Personal Care Workers is used within local policies, service structures and resources.

It is also important that Personal Care Workers only administer medicines if they have completed a certificate 3 or 4 medication administration course.

Conflict of interest

The authors and members of the Expert Advisory Group have no conflict of interest to declare with respect to commercial enterprises, governments and non-government organisations. The Australian Government Department of Health funded the development and implementation of the Glucose Lowering Medicine and Older People with Diabetes: Information for Personal Care Workers. No fees were paid to the authors or the Expert Advisory Groups in connection with the Glucose Lowering Medicine and Older People with Diabetes: Information for Personal Care Workers with the exception of Sam Korn who was employed as a Project Manager between January 2014 and June 2015 and Nicole Duggan who was employed as a research assistant throughout the study.

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Importantly, we sincerely thank David Seymour from Outline Print Design for designing the information and for his perseverence and professionalism.

The information in the Glucose Lowering Medicines and Older People with Diabetes: Information for Personal Care Workers is the same as the information in Glucose Lowering Medicines and Older People with Diabetes: Information for Older People with Diabetes and Their Families except the suggestions about how Personal Care Workers can use the information.

Older people have a right to expect that the people administering their medicines have the same knowledge and information they have.

Older people are often vulnerable and require their health care providers to have the knowledge and competence to deliver safe, best practice care.

Contents

Section 3

Section 4

How to use the information in this book

You can read all the information in the book if you want to.

But you only need to read the information you are interested in or that suits the older people with diabetes you are caring for.

Ask the nurse, doctor or pharmacist to show you which information is important for specific individuals.

Mark those sections so you can read them later and/or discuss them with your work colleagues.

If you do not understand the information ask the nurse, doctor or pharmacist to explain it to you.

Suggestions about how to use the information are shown on page 3 and throughout the book.

Making a start: Where to look for information about Glucose Lowering Medicines and Older People with Diabetes in this book

The information will help Personal Care Workers to:

- Safely administer medicines to older people with diabetes.
- Support older people with diabetes to safely self-administer their glucose lowering medicines.
- Discuss glucose lowering medicines with nurses and doctors.

A good place to start is to think about what type of information you need or would be most useful for the older person with diabetes.

If you want information about medicines and your:

- Role and responsibilities.
- Knowledge and competency.
- Team work.
- Risk assessment.

Section 1: Outlines some general 'how to use' strategies, see pages 7–8.

If you want information about:

- Quality use of Medicines.
- Managing medicines.
- Types of medicines and ingredients in medicines.
- Medicine labels, dose aids and lists.
- Side effects, Risk assessment tools.
- Other medicines that affect blood glucose.

Section 2: Contains general information about medicines and key factors to help keep older people safe, see pages 9–35.

If you want information about:

- Glucose Lowering Medicines.
- How the glucose lowering medicines work.
- The main side effects.
- Ways Personal Care Workers can check the older person is safe.

Section 3: Pages 36–66, provides information about the different types of glucose lowering medicines.

If you want more information about:

- Key Diabetes organisations.
- Medicines.
- The McKellar Guidelines.
- Other useful resources.

Section 4: Provides details to and links for other useful sources of information, see pages 67–71.

The information in this book was current at the time it was published.

Changes to the availability of equipment such as blood glucose test strips and blood glucose monitoring meters can occur.

New medicines are introduced from time-to-time.

Meaning of the medical terms and abbreviations used in the book

Medical terms

Administering medicines

Refers to giving medicines to the person the medicine was prescribed for.

Managing medicines

Describes the interdisciplinary process of prescribing medicines, receiving medicines from the suppliers such as pharmacies (including those in residential aged care facilities), preparing the medicine, checking the medicine dose and the individual's identity, administering the medicine and monitoring the effects of the medicine including checking blood glucose and documenting and reporting adverse events and errors.

Double-checking

Describes the process appropriately qualified care staff should use to review and confirm a medicine order including the dose and the older person's details before administering the medicine to the older person it was prescribed for.

Medicine-related abbreviations

PO	by mouth or orally
PRN	as needed
BD	twice a day
TDS	three times a day
QID	four times a day
AC	before meals
PC	after meals
mcg	microgram
mg	milligram
g	gram

General abbreviations

BG	Blood glucose
CAM	Complementary and alternative medicines
GLM	Glucose Lowering Medicines
GP	General Practitioner
QUM	Quality use of Medicines
RACF	Residential Aged Care Facility

Personal Care Workers should only administer medicines if they have completed accredited medicine education as part of certificate III or IV in aged care.

Some organisations require Personal Care Workers to complete a medication competency assessment before they are authorised to administer medicines in that organisation.

Some organisations require Personal Care Workers to undertake annual medicine competency assessments.

Check the policies in your organisation before you administer medicines.

Policies about Personal Care Workers administering insulin and GLP-1 injections differ across Australia. Check the regulations in your state before you administer these medicines.

Section 1

Using the information to manage glucose lowering medicines safely and/or help older people with diabetes manage their glucose lowering medicines

The information in this book only refers to glucose lowering medicines (GLM). Some GLM can affect the action of other medicine when they are administered with other medicines so all of the individual's medicines need to be considered. GLM work in various ways to lower blood glucose. The actions of the main types of GLM are described in Section 3, page 37.

Personal Care Workers can use the information to:

- Ensure they have the knowledge, education and competence to administer medicines.
- Ask nurses, doctors or pharmacists about any information they are not sure about.
- Understand their role, responsibilities and duty of care when administering medicines.
- Read the information in the book and the other information in Section 4, page 67, and organisational policies to understand the risks associated with GLMs.
- Work with the care team to identify, assess, monitor, report and plan strategies to reduce risk for older people with diabetes. GLM risks include hypoglycaemia, falls and pain. The following risk assessment tools can be used:
  - Risk of having problems with glucose lowering medicines, see pages 32 and 33.
  - Hypoglycaemia risk assessment tool, see pages 30 and 31.

The McKellar Guidelines (2014) include a Diabetes-specific falls risk assessment tool and a Diabetes-specific pain risk assessment tool, see reference in Section 4 page 67.

It is essential to check the individual's identity before you administer the medicine to make sure you give the medicine to the right person and that it is safe to administer the medicine at that time.

Check the person does not have a low blood glucose and their meal will not be delayed before you administer GLMs especially insulin.

Insulin is classified as a high risk medicine. Many organisations require insulin to be 'double checked' before administering each dose. The supply and administration of insulin is controlled under legislation in each Australian State and Territory and can be checked by accessing the appropriate web link in Section 4, Other Resources.

The registered nurse is responsible for managing insulin and can delegate the task to other appropriately trained and competent staff. Staff must practice within their level of knowledge and competence and according to their role and responsibilities, including performing medicine-related tasks, or declining to perform them, if the task is outside their role and scope of practice and competency level.

It is important to administer medicines according to relevant legislation.

Always practice safely according to your role and scope of practice.

Monitoring the effectiveness of the medicine regimen and care plan is essential.

Key monitoring tasks are:

- Blood glucose monitoring to identify the person's blood glucose pattern and response to glucose lowering medicines.
- Monitoring HbA1c at least yearly is important to check the average blood glucose level over 3-6 months.
- Clinical assessment such as identifying hypoglycaemia and hyperglycaemia and planning care to reduce side-effects and adverse events.

Section 2

General information about medicines

Introduction

Quality use of medicines, often shortened to QUM, underpins Australia's medicines policies. Medicines are a very important part of treating, and in some cases preventing diseases, and help improve life expectancy and quality of life. However, most medicines have some risks as well as benefits.

Medicines are carefully tested before they are approved for use in Australia; therefore, we know some of the common risks. GLM are sometimes called 'diabetes medicines' or 'oral hypoglycaemic agents.' They are used to keep the blood glucose within a range suitable for the individual older person with diabetes. It is important to keep blood glucose in a safe range for the individual to prevent the blood glucose going too low (hypoglycaemia or hypo) or too high (hyperglycaemia).

The blood glucose target range is often not the same as the reportable blood glucose range used in residential age care facilities.

Hypoglycaemia, a serious side-effect of GLM and hyperglycaemia, affect the individual's mental function, safety and quality of life.

Prescription medicines, pharmacist only medicines and complementary medicines can contribute to hypo- and hyperglycaemia, It is important to document any complementary medicines the person is using in their medical record and medicine list.

Blood Glucose Targets

- Must be individualised. The McKellar Guidelines suggest 6–15 mmol/L is a safe blood glucose range for many older people with diabetes.
- Hypoglycaemia – generally occurs when the BG is less than 6 mmol/L, especially in frail older people and is a very serious side effect of GLM see pages 30–31.

In general, a safe blood glucose range depends on the individual's health status, generally between 6 and 15 mmol/L.

Hyperglycaemia – BG levels are consistently greater than 15 mmol/L (McKellar Guidelines 2014).

People with type 1 diabetes are prescribed insulin. People with type 2 diabetes might be prescribed one or more of the GLMs described in section 3 of this booklet. However, over time some people with type 2 diabetes need insulin.

People with type 2 diabetes do not become type 1 when they need insulin.

Older people with diabetes often take two or more GLMs. In addition, they often take medicines for heart disease, to control blood pressure and blood fats and for other conditions such as arthritis, which means people with diabetes often take many medicines. Many people also use non-prescription medicines and/or complementary and alternative medicines (CAM) to treat common conditions such as pain and colds and 'flu.'

Using five or more medicines per day is called polypharmacy.

Polypharmacy

'Poly' means many and 'pharmacy' means medicines.

Generally, older people with diabetes take an average of seven different types of medicines per day and usually they take more than one dose of each medicine per day. The more medicines they take the easier it is to forget a dose or make mistakes with their medicines. It also means there is more risk the medicines can interact with each other.

Medicines do not replace a healthy balanced diet and regular activity suited to the individual older person's age, nutritional and health status.

Making mistakes with medicines can be dangerous. If you make a mistake when you are administering medicines the older person may need to go to the emergency department or to hospital. For example, many visits to the emergency department are a result of insulin errors, that is, too much or not enough insulin. It is important to notify the nursing staff/doctor and make a record of medicine mistakes in the individual's medical record and report the incident. Follow the policies for reporting incidents with medicines in your organisation.

Mistakes should be reported as soon as possible so the problem can be managed.

It is no longer appropriate to talk about 'diabetic diet'.

Everybody should eat a healthy balanced diet including health professionals.

Managing medicines for/with older people

It is important that Personal Care Workers know or can access and follow organisational policies when administering medicines to lower the risk of causing medicine errors.

Errors can occur at any time, for example:

Preparing the medicines

- Being interrupted or distracted when preparing the medicines.
- Crushing medicines that should not be crushed.

Administering the medicines

- Administering the wrong medicine or dose.
- Administering the medicines to the wrong person.
- Not staying with the older person to ensure they actually take the medicines, particularly older people with dementia.
- Not administering the medicines or not administering the medicines at the right time.
- Not following the organisation's policies and procedures.
- Being interrupted/distracted when administering the medicine.

Communicating about medicines

- Inadequate communication among the healthcare team: doctor, nursing staff, hospital, pharmacist and family member/carer about the older person's
  - Medicines.
  - Medicine errors.
  - Changes in health status.
  - Care goals and care team expectations.
  - Problems such as hypoglycaemia, hyperglycaemia, falls and pain, especially when the older person is transferred between services.

Ideally, Personal Care Workers should only administer medicines if they have completed an accredited medicine education unit as part of Certificate III or IV training.

It is important to report medicine adverse events.

Anyone can report a medicines adverse event using the Therapeutics Goods Administration 'Blue Card' which can be downloaded from http://www.tga.g ov.au/pdf/forms/ problem-medicines-forms-bluecard-140311.pdf

Main types of medicines

There are four main types of medicines:

- Prescription medicines.
- Non-prescription medicines.
- Pharmacy only medicines.
- Complementary medicines/herbal medicines.

Prescription medicines can only be obtained with a prescription from a doctor or a nurse practitioner. Glucose lowering medicines are prescription medicines. Prescription medicines are only available from pharmacies.

Non-prescription medicines are available from pharmacies, supermarkets and other shops and can be purchased without a prescription. They are called 'non-prescription medicines' or 'over-the-counter' medicines.

Pharmacist only medicines are only available from a pharmacist. They are not available in supermarkets and other shops and the person has to ask the pharmacist for them.

Complementary medicines such as herbal medicines and vitamin and minerals are available from pharmacies, supermarkets and a range of other places. Usually a prescription is not required to buy complementary medicines.

Medicines bought on the Internet

Many medicines can be purchased on the Internet: however, many Internet sites are unreliable and give incorrect or misleading information. The medicines might not be manufactured safely. Some medicines bought on the Internet might not suit the older person's needs or be safe, and should be reviewed by the doctor or a pharmacist as part of a medicines review. The pharmacist might undertake a Home Medicines Review (HMR) if the older person lives in the community and the doctor refers the person for an HMR. See page 22 for more details about HMR.

Ways Personal Care Workers can help older people with diabetes

Personal Care Workers can talk about medicines with older people to help them understand how to use their medicines safely. Personal Care Workers should document the medicine the older person uses and note any changes in the medicines, any errors or new medicines used and report any issues to the older person's doctor or nurses as soon as the problem is identified. Knowing about the older person's medicines, noticing a change and reporting the change could help prevent a medicines error or adverse event and keep the older person safe.

Knowing about the older person's medicines, noticing a change and reporting the change could help prevent a medicines error or adverse event and keep the older person safe.

Medicine names

It is important to know the names of the medicines you administer so you give the right medicine.

Medicines usually have two names: a chemical or generic name and a brand name, which is also known as the trade name.

The chemical name is the name of the ingredient in the medicine that makes the medicine work.

Some medicines have more than one active ingredient.

The brand name is the name the manufacturer gives the medicine when it is released on the market. Often several manufacturers make their own version of the medicine so there can be many brand names for medicines that contain the same active ingredient.

For example:

Metformin is the chemical or generic name.

Brand names for Metformin include Diabex, Metex, and Diaformin.

Generally, brand name medicines all work in a similar way but some brand name medicines have individual variations such as how long before they begin to act after you administer them, how long they work for, and what they look like.

Understanding the medicine's chemical name can help you learn about the action of the medicine, that is, how the medicine works. Understanding the medicine action can help you understand if the medicine is actually working or not working or causing side-effects.

Generic medicines

Generally when medicines are first released on the market the pharmaceutical company that developed the medicine can take out a patent on the medicine, which prevents other companies from producing the medicine.

The patent usually last for a number of years.

Once the patent expires, other companies can produce the medicine and usually give it a different generic name.

Generic medicines are usually cheaper than brand name medicines.

Generic medicines contain the same active ingredient as the brand name medicine and work the same way, but sometimes they can contain different fillers and colours.

Generic medicines must meet the same strict quality and safety standards as the original medicine and any other medicine.

Understanding generic medicines could help you support older people to choose medicines. Choosing generic medicines can help reduce some of the costs associated with their medicines.

Other ingredients in medicines

There are a number of ingredients in medicines beside the active ingredient. The other ingredients have an important role and include:

Binders hold the ingredients in the tablets together. Binders are often sugars such as lactose, sucrose, and sorbitol, but these sugars generally do not have much effect on blood glucose.

Modified release and slow release medicines should not be crushed.

Coatings are put on the outside of large tablets to make them easier to swallow. Coatings also prevent the tablet from being damaged by moisture. Some coatings also stop the medicine from breaking down until it reaches a specific organ in the body, for example the stomach. Some coatings make the medicine taste better.

The coating helps the medicine work in the right place in the body. The letters ‘MR’ meaning modified release or ‘SR’ meaning slow release on medicine labels mean they are slow release. MR and SR medicines should not be crushed.

Fillers and diluents add bulk to some medicines and make very small active chemicals easier to take.

Preservatives are used to stop medicines becoming out-of-date. The use-by date is usually printed on the label.

Colours are added to medicines to make them easier to tell apart, which can be helpful to people who take a lot of medicines and can help Personal Care Workers tell one medicine from another.

Complementary medicines (CAM)

Complementary and alternative medicines (CAM) include vitamins, minerals and herbs. Some CAM therapies such as meditation, acupuncture and psychological therapies can help manage pain, stress and anxiety but not all CAM therapies or medicines have been carefully tested, especially in older people.

Many people with diabetes use CAM. Some people use CAM to improve their health and well-being to treat pain and to help control their blood glucose. If glucose lowering CAM are used with prescription glucose lowering medicines the person may be at risk of hypoglycaemia.

Commonly used glucose lowering CAM includes Fenugreek, *Ginseng panax*, bitter melon and cinnamon. These CAM can interact with glucose lowering medicines and cause hypoglycaemia.

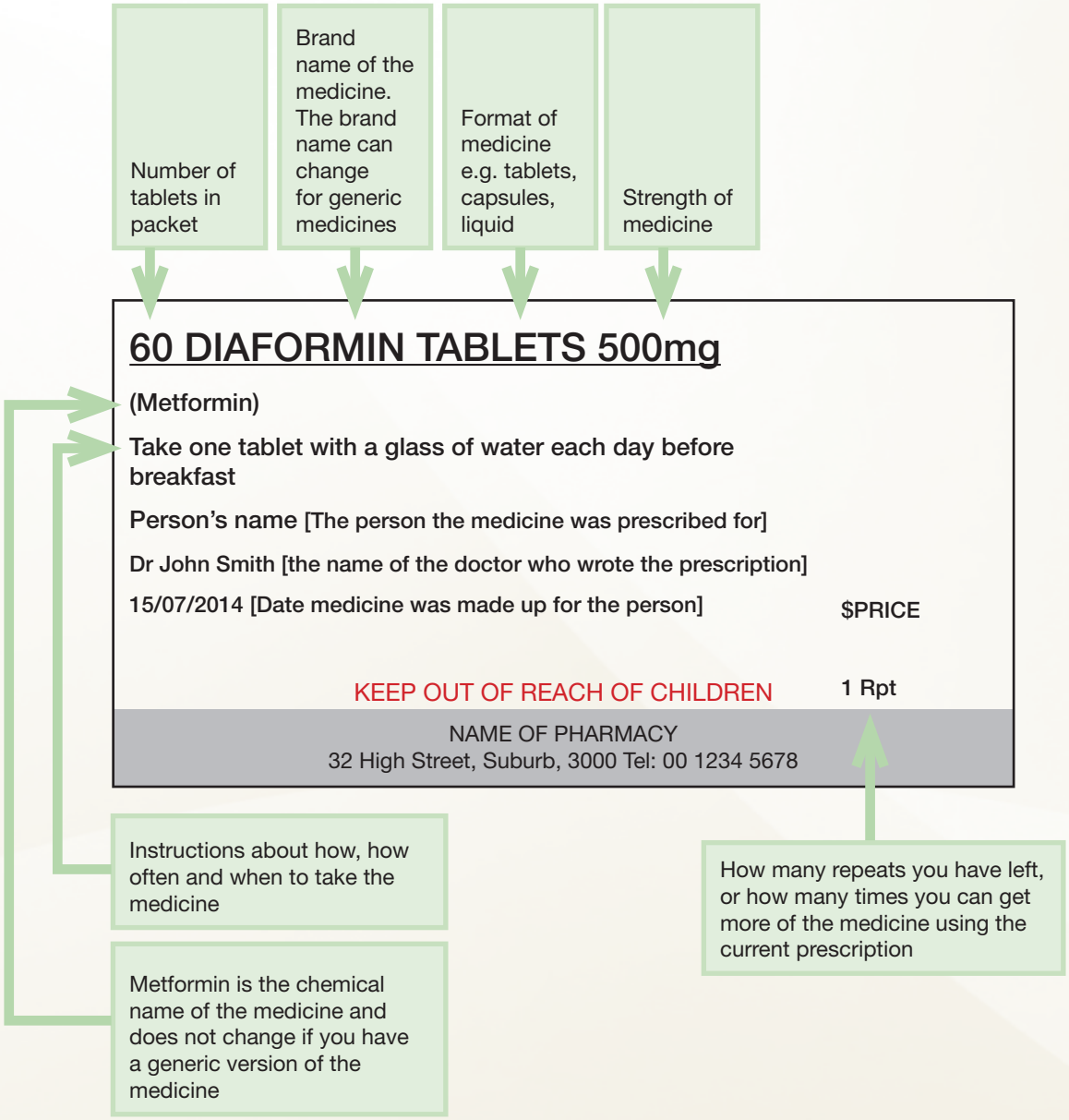
Personal Care Workers should ask the older person they are caring for, or the older person's family, if the older person is using CAM and the type of CAM. If the older person is using CAM, the Personal Care Workers could talk with nursing staff or the older person's doctor to ensure it is safe for the older person to use CAM and that risks such as hypoglycaemia are identified and care planned to lower the risk.

Reading medicine labels

Medicine labels contain information that can help you administer the medicine to the person with diabetes including:

- The name of the person the medicine is prescribed for.
- The name, dose and how often to administer the medicine.
- The prescriber's name and manufacturer's contact details. The information is important if you need to report a side-effect or adverse event.

Each coloured box explains what the writing on the medicine label means. The figure below highlights important information you will find on a medicine label.



Medicine dose administration aids

Medicine dose administration aids can help older people with diabetes manage their medicines and can help Personal Care Workers administer medicines to older people. Medicine dose aids can also help older people take their medicines unaided.

Medicine dose administration aids are widely used in aged care settings and are very helpful for some older people, but they are not suitable for all older people and should only be used if they will be helpful.

Some experts suggest other methods should be tried before using a dose aid. These methods include:

- Consulting with the doctor to assess whether stopping some medicines the older person uses will be less confusing.
- Working with older people with diabetes and families to help older people with diabetes take medicines safely.
- Encouraging the older person to develop reminder systems such as taking medicines with a particular meal, using an alarm or alert when the medicine is due.

Personal Care Workers can help older people understand and manage their medicines by:

- Being informed about medicines.
- Observing what is working well or what does not work.
- Identifying issues and discussing these issues with the older person, their carer and doctor and other health professionals involved in caring for the older person.

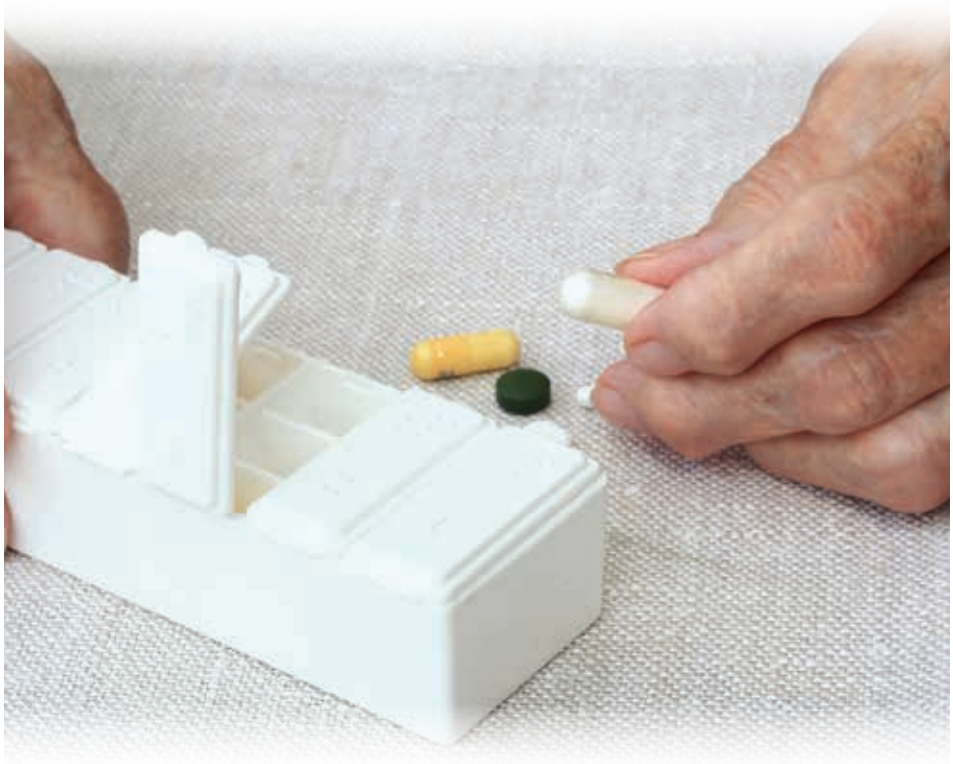
Medicines should be kept in their original container unless they are packed into a dose administration aid by a pharmacist.

It is still important to check the medicines before administering them when they are packed in dose administration aids.

Personal Care Workers need to know how to use dose administration aids and the similarities and differences between dose administration aids to explain to older people with diabetes and their families how to use the dose administration aid safely. Several types of medicine dose administration aids are available including:

- Boxes with compartments for the medicines e.g. Dosette boxes, which are refillable.
- Blister or bubble packs for example, Webster Pack, which are similar to dosette boxes but the packs are disposable once all the medicines are administered.
- Sachets in which the medicine is packed and the sachet is rolled up.
- Automated medicine dispensers, which are available in some aged care facilities.

A pharmacist often packs the medicines in blister packs and sachets dose administration aids.



Storing medicines

All medicines, including CAM, should be stored according to the manufacturer's instructions and organisational policies and procedures; usually in a locked cupboard out of reach of children and confused older people.

Heat, light and moisture can affect the active ingredient in the medicine. If that happens the medicine might not work the way it should. It is important to inspect medicines before you administer them to look for any obvious damage or discolouration and talk with the doctor, pharmacist and/or senior nurse if you think the medicine is damaged.

Some medicines such as insulin need to be kept cool. Insulin vials or pen devices should be refrigerated but should not be frozen. Medicine cold packs can be used to keep medicines cool when travelling. They are available from Diabetes Australia and many pharmacies.

Usually the insulin in use is not stored in the refrigerator but must be kept in a cool place.

Disposing of unused medicines

Unused medicines and medicines that are past their use-by-date must be disposed of safely so the chemicals in the medicine do not damage the environment, which can happen if the medicines are flushed down the toilet or put into the garbage.

Personal Care Workers can advise older people with diabetes and families to return unused or out-of-date medicines to the pharmacy for disposal.

Most pharmacies participate in a free Australia-wide service, the *Return Unwanted Medicines Project* and dispose of unused/out-of-date medicines.

Information about the Return Unwanted Medicines Project (The RUM Project) can be found at: http://www.returnmed.com.au

Personal Care Workers can check with local pharmacies to ask whether they participate in the project and let older people and their families know about local pharmacies that participate in the project.

It is important to refer to your organisation's policies and procedures to ensure you dispose of unused medicines safely including removing all identifying information from the medicines that have expired or medicines no longer needed and returning them to the pharmacy for disposal.

Disposing of used insulin needles and lancets used to check blood glucose

Needles and lancets (called 'sharps') must be disposed in sharps containers to prevent needle stick injuries. Sharps containers are usually provided by health organisations and local council offices.

Most health organisations have polices to reduce the risk of needle stick injuries and some organisations provide staff with safety devices such as the BD Autoshield™ Duo Safety pen needle to use with insulin pen devices.

Dispose of used sharps into a sharps container.

It is important Personal Care Workers use appropriate sharps containers to prevent needle stick injuries and encourage older people to use sharps containers.

The older person's medicine list

The pharmacist, doctor or a nurse practitioner will usually prepare a list of medicines for the person with diabetes when they prescribe a medicine.

It is important to make sure each individual's medicine list and medication chart is up-to-date.

In RACFs and some other health care settings, including hospitals, the medicines will be prescribed on the individual's medication chart. Community-dwelling older people should have an up-to date medicines list provided by their doctor, nurse practitioner, diabetes educator or other health care provider. Personal Care Workers can help older people keep track of their medicines by helping them record their medicines in a diary or booklet or format suitable for the older person.

The complete medicine list should be checked each time a new medicine is prescribed or stopped.

The National Prescribing Service provides paper, e-list and phone apps to support people to write their medicine lists and keep them up-to-date. Information about the National Prescribing Service medicines list and smart phone apps are available at:

http://www.nps.org.au/topics/how-to-be- medicinewise/managing-your-medicines/medicines-list/medicinelist-smartphone-app

It is important to make sure the individual's medicine list and medicine chart is up-to-date and readable. An accurate medicines list should be sent to and received from the emergency department or hospital if the individual needs these services. Personal Care Workers could regularly ask the individual about their medicines and check their medicines against their medicines list to note and record changes and then discuss with the nurse or doctor.

It is important to make sure all the medicines the individual is taking are documented on their medicine list and chart including any medicines the individual uses without a prescription: pharmacy only, over-the-counter or self-prescribed and complementary medicines.

Medicine lists are often a table like the table on page 24.

Medicine lists can help you learn about medicines. They can help the doctor, nurse and pharmacist decide what possible medicine interactions or adverse events could occur so they can plan care to reduce the risk.

Personal Care Workers can help identify/avoid unsafe situations/practices such as the person using out-of-date or other people's medicines, using the incorrect medicine dose or taking medicines at an incorrect time. If a Personal Care Worker finds a medicine is not listed on the person's medicine list, the Personal Care Worker should tell the nurse or doctor.

Home Medicines Review

A Home Medicines Review is when a pharmacist visits the person in their home, looks at and documents all the person's medicines and prepares a Home Medicines Review report for the older person's doctor about the medicines used and any safety issues.

A Home Medicines Review could be needed if the older person:

- Is using more than five medicines.
- Visits more than one doctor because getting prescriptions from several doctors increases the risk of medicine interactions, side-effects and adverse events.
- Has functional and cognitive problems, which could indicate the older person might not be able to administer their medicines safely.
- When they are prescribed a new medicine.

Information about a Home Medicines Review can be accessed from: http://www.health.gov.au/inte rnet/main/publishing.nsf/Content/medication_management_reviews.htm

The pharmacist checks the older person's medicines and doses when they perform a Home Medicines Review including checking whether:

- Medicines are in-date and stored correctly.
- The person is at risk of medicine interactions.
- There are other medicines that could benefit the older person.
- Medicine doses that could be changed or medicines that could be stopped.
- The older person has knowledge about their medicines and how to use them safely.
- The older person is using any CAM and/or over-the-counter or self-prescribed medicines the general practitioner and other doctors might not know about.

Personal Care Workers can look for changes in the older person's medicines regimen and/or changes in the older person's behaviour or cognition that could suggest problems with their medicines and talk with the older person, their doctor and the health care team about organising a Home Medicines Review.

Medicines and safety

Personal Care Workers are in a unique position to observe the way the older person uses their medicines and to identify issues such as out-of-date medicines or medicines lists, incorrect medicine doses or misuse of dose administration aids and report these issues to nursing staff and doctors.

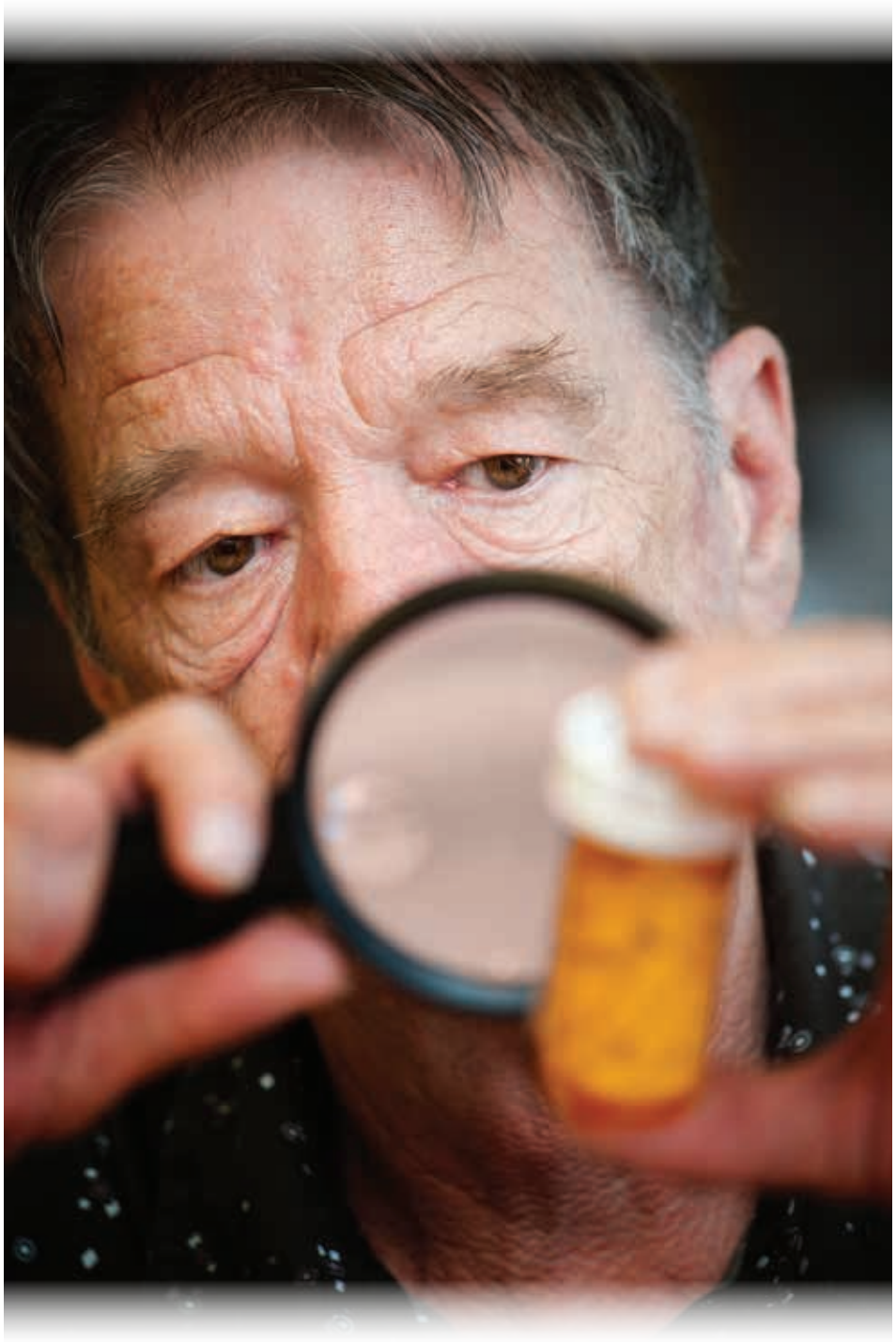


Table 1: Example of a medicine list nurses could use to keep a record of all the medicines the older person with diabetes is prescribed. The information about Meformin in the second row of the table is an example of how medicines are listed. Such lists do not take the place of medicine forms in some organisations.

Chemical name	Brand name	Dose	When to take	What the medicine is for	Possible side effects
Metformin	Diaformin	500 mg every day	Take one 500 mg tablet with a glass of water each day before breakfast	To control blood glucose	Nausea Diarrhoea Bloating Upset stomach
Allergies: Write any allergies or sensitivities the older person with diabetes has to any medicines in this space.					

Important information Personal Care Workers need to know to administer medicines safely

Personal Care Workers need to know the following information to:

- Safely administer medicines to older people.
- Help them administer their own medicines.

You can find more information about glucose lowering medicines on page 37 in Section 3 or you can ask the nurses, doctor or pharmacist providing services where you work about glucose lowering medicines.

Knowing the action, duration and side-effects of medicines you administer could help prevent side-effects and adverse events.

Information about the specific medicine:

- The chemical name and brand name of the medicine.
- What the medicine does.
- How long it takes for the medicine to start working.
- How long the medicine works for.

Information about administering the medicine:

- When the medicine should be started.
- The strength of the medicine.
- The dose of the medicine.
- The number of doses each day.
- When the dose should be taken.
- When the dose of the medicine should be changed or the medicine stopped.
- Whether the older person should avoid eating any foods or taking any other medicines at the same time.
- Whether it is safe to drink alcohol while taking the medicine.
- Whether it is safe to drive while taking the medicine.
- What to do if:
  - A dose is missed.
  - The older person is sick and cannot take the medicine, for example check they have a Sick Day Care Plan, if not, talk with the doctor and/or health care team about preparing a Sick Day Care Plan.
  - The older person's blood glucose goes too low.
  - The older person's blood glucose goes too high.
  - The older person has difficulty swallowing.

Information about side-effects:

- The side-effects the medicine can cause.
- The signs the older person may be having a side-effect.
- What to do if you think the older person has a side-effect, see page 27.

It is important to regularly check the older person's risk of having a medicine side-effect because risks of medicine side-effects can change over time.

Other helpful information:

- How the medicine should be stored.
- How to dispose of any unused medicines.
- How to administer medicines, including what the medicine-related abbreviations (symbols) mean:

PO	by mouth or orally
SC	subcutaneous
IM	intramuscular
PRN	as needed
BD	twice a day
TDS	three times a day
QID	four times a day
AC	before meals
PC	after meals.

- How to calculate the medicine dose and what the dose measurements mean:

mcg	microgram
mg	milligram
g	gram

Assessing whether the individual is at risk of medicine side-effects

A medicine side-effect is an unwanted sign/symptom that occurs when using medicines. The doctor or nurse practitioner assesses the benefits and risks of prescribing a medicine for each individual older person with diabetes, including the likelihood the person will have a side effect, before they prescribe a medicine. However, side-effects can still happen.

It can be difficult to predict whether a person will have a medicine side-effect because side-effects can occur at any time the person is using the medicine, not only when the medicine is started, and because ageing has different effects on the body and the way medicines are broken down and removed from the body.

Where possible, prescribers start medicines at a low dose and increase the dose gradually, if needed, to reduce the risk of the person having a side-effect.

Medicine side-effects can be unnoticed or the signs can be misinterpreted. For example nausea or diarrhoea from an antibiotic could be mistaken for food poisoning or gastroenteritis.

You can use or help older people with diabetes and their families use the checklists on the following pages to decide risk of:

- Hypoglycaemia.
- Glucose lowering medicine problems.

Personal Care Workers can monitor older people for medicine-related side-effects by:

- Regularly checking the person's risk of having medicines side-effects because their risk can change over time.

Know whether the older person you are caring for is at risk of having a side effect or other adverse event from their GLM e.g. use the hypoglycaemia risk assessment tool on pages 30 and 31 to assess the older person's risk of hypoglycaemia and the risk of having problems with glucose lowering medicines tool on pages 32 and 33 to assess the older person's risk of a GLM-related adverse event.

Talk with the doctor/healthcare team to plan ways to reduce the risk.

- Monitoring the older person for medicines side-effects by:
  - Being aware of the potential side-effects for the medicines you administer to older people.
  - Recognising physical changes in the person such as nausea, and trying to determine whether the change is due to an illness, for example gastroenteritis or a medicine side-effect.
- Recognising cognitive or behavioural changes such as confusion, irritation or wandering - this could be hypoglycaemia, hyperglycaemia or due to other causes such as infection or illness.
- Checking the older person with diabetes' blood glucose, monitoring their blood glucose pattern, noticing changes and talking to their family, doctor and healthcare team.
- Talking about side-effects with the older person's family and reporting possible side-effects to the nurse or doctor.
- Documenting the signs of the medicine side-effects in the older person's medical record.

NOTE

Some people with diabetes can have difficulty affording their medicines, which could affect how often they take them, get scripts filled or the doses they take.

Who is most likely to have problems with their medicines?

People who:

- Use five or more medicines.
- Have problems managing their medicines because of arthritis, vision problems or forgetfulness.
- Were discharged from hospital in the past four weeks.
- Become unwell or confused, fall or are in pain.
- Take certain types of medicines such as warfarin and other blood thinners, digoxin and glucose lowering medicines.

Hypoglycaemia

Hypoglycaemia means the blood glucose is too low. If blood glucose falls lower than 4 - 6 mmol/L the older person cannot function and they are more likely to have a fall and/or become confused or unconscious. That is why The McKellar Guidelines recommend keeping the blood glucose above 6 mmol/L but lower than 15 mmol/L for older people with diabetes prescribed glucose lowering medicines.

Hypoglycaemia means the blood glucose is too low.

Use the hypoglycaemia risk assessment tool on pages 30 and 31 to determine the older person's hypo risk.

They could have symptoms such as sweating, trembling, and rapid heartbeat that warn you that the person with diabetes' blood glucose is too low. However, other things can also cause these symptoms so it is important to check the older person's blood glucose.

Another important thing to know is that the symptoms of hypoglycaemia change over time and older people might not feel these symptoms. They might feel weak, tired and confused.

It is also important to try to keep the older person's blood glucose in a safe range for them, that is, between 6 and 12–15 mmol/L for many older people.

Some sources of information about hypoglycaemia are listed in section 4.

Hypoglycaemia risk assessment tool

How to complete the form:

- Each box represents a risk factor for hypo.
- Place a cross (X) in each box that applies to the older person you are caring for.
- The more boxes you cross the greater the older person's risk of having a hypo, but even one risk means they could have a hypo.

☐ Can the older person tell when they are having a hypo? If they cannot tell, put a cross in the box.

Does the older person:

- ☐ Take insulin (see page 59).
- ☐ Take a sulphonylurea such as Gliclazide, Glimepiride, Glipizide (see page 43).
- ☐ Take insulin and a sulphonylurea.
- ☐ Have kidney problems?
- ☐ Have liver damage?
- ☐ Had a recent hypo?
- ☐ Have trouble remembering things?
- ☐ Have food-related issues such as:
  - eating meals with very little carbohydrate e.g. bread, cereals, vegetables.
  - not eating regular meals.
  - having difficulty swallowing.
  - having stomach problems such as coeliac disease or irritable bowel syndrome.
  - often having diarrhoea or vomiting.
- ☐ Take medicines to help them sleep?
- ☐ Take any complementary medicines, especially to control blood glucose?

☐ Admitted to hospital or discharged from hospital in the previous 3-4 weeks?

☐ Drink alcohol.

Risk Score:_____

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What to do to manage the hypo risk

Discuss the hypo risk with the older person, their doctor, health care team and family to decide how to reduce the risk by:

- Decide on a safe blood glucose range: between 4 and 10 mmol/L for healthy older people living in the community but 6 and 15 mmol/L is safer for frail older people and older people at high risk of having a hypo.
- Decide on a blood glucose monitoring plan that matches the times the glucose lowering medicines are working at their peak.
- Identify when low blood glucose levels are most likely to occur, for example during activity, gardening.
- Plan to administer glucose lowering medicines, especially insulin, with meals.
- Plan what to do if the older person needs to go without food for a procedure such as a blood test or surgery.
- Encourage the older person to wear a 'Medic Alert' and keep the telephone numbers of the people they can call for help with them at all times or in 'automatic dial' on their telephones.

Ask the doctor or pharmacist to undertake a Medicines Review if the older person:

- has kidney or liver problems.
- has hypos frequently.
- eats less than usual and/or does more activity than usual.
- is taking any of the medicines that can lower blood glucose on page 34 and 35.

Work out the older person's hypoglycaemia risk when/if they have a hypo and as part of the annual diabetes health check.

Encourage the older person with diabetes to check their blood glucose before they drive and to keep their blood glucose above 5mmol/L.

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Risk of having problems with glucose lowering medicines

How to complete the form:

- Each box represents a risk factor for a medicine problem.
- Place a cross (X) in the box if the information applies to the older person with diabetes you are caring for.
- The more boxes crossed the greater the risk of a medicine problem but even one risk means they could have a problem.

☐ Blood glucose is often low, for example less than 4–6mmol/L.

☐ On a sulphonylurea such as Gliclazide, Glimepiride, Glipizide (see page 42).

☐ On insulin (see page 57).

☐ On both a sulphonylurea and insulin.

☐ Underweight or losing weight because the older person might not have enough glucose stored in their muscles and liver to help raise the blood glucose if it goes too low.

☐ Does not feel the symptoms of low blood glucose.

☐ Has difficulty remembering things.

☐ Has high blood pressure.

☐ Takes five or more medicines.

☐ Takes more than 12 medicine doses per day.

☐ Does not check their blood glucose very often.

☐ Blood glucose is mostly high, more than 15 mmol/L.

☐ Uses complementary medicines as well as prescription medicines. CAM medicines such as fish oils, St John's Wort, and some cranberry preparations can react with aspirin or warfarin and cause bleeding.

☐ Takes warfarin or other blood thinners, or digoxin or insulin.

☐ Has kidney problems.

☐ Has liver problems.

☐ Has heart disease.

☐ Has allergies or sensitivities.

☐ Drinks alcohol regularly.

☐ While the older person is in hospital and after discharge from hospital.

Risk Score:_____

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What to do to manage the risks

Discuss the risk assessment with the doctor/health care team so they can develop a care plan to reduce the risk of an adverse event.

Monitor blood glucose and note when the blood glucose goes too high or too low.

- Have a plan to reduce risk of hypo (too low).
- Have a plan to manage days when the older person is sick and doesn't feel like eating.

Encourage the older person to have their HbA1c, kidney and liver function checked.

Ask the nurse or doctor to arrange for the pharmacist to check the older person's medicine list at least once per year and when the older person starts a new medicine and to check whether they are on any medicine that increases or lowers blood glucose (see pages 34–35).

Seek advice if you notice any of the side effects described for individual glucose lowering medicines in section 3 for the glucose lowering medicines the older person takes.

Ask for help to administer medicines if you worry about making mistakes.

Encourage the older person to wear a 'Medic Alert' and keep the telephone numbers of the people you will call for help with them at all times.

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Commonly used medicines that can affect blood glucose

Some commonly used medicines can increase blood glucose levels and others can lower blood glucose levels.

Some commonly used medicines that can *increase* blood glucose

- Antipsychotic medicines such as Olanzapine, Clozapine, Risperidone.
- Corticosteroids such as Dexamethasone, Hydrocortisone, and Prednisone.
- Cyclosporin.
- Immunosuppressants such as Sirolimus and Tacrolimus.
- Diuretics such as the Thiazides, Hydrochlorothiazide and Spironolactone.
- Nicotinic acid.
- Phenytoin.
- Dilantin.
- Tricyclic antidepressants such as Endep, Anafranil and Dothep.

Some commonly used medicines that *lower* blood glucose

- Beta Blockers such as Atenolol, Propranolol and Metoprolol can mask hypoglycaemic symptoms.
- Fibrates such as Gemfibrosil.
- Quinine.
- Trimethoprim with Sulfamethoxazole.
- *Large* doses of Salicylates such as Aspirin.

Some commonly used complementary medicines that can affect blood glucose

CAM herbal medicines that lower blood glucose can interact with prescribed GLMs and put the person at risk of hypoglycaemia as well as increasing the risk of medicine interactions e.g.:

- Fenugreek.
- Ginseng.
- Slippery elm.
- Fish oils.

Some experts suggest Glucosamine can increase blood glucose. If the older person is using Glucosamine it is important to check or to encourage them to check their blood glucose, especially when they begin to take Glucosamine to see whether it affects their blood glucose.

It is important to ask older people with diabetes whether they use CAM and discuss their CAM use with the doctor or diabetes educator to reduce the risk of problems occurring.

If an older person is using CAM you need to know where to get information about how the CAM works, what the side-effects are and how the CAM could interact with other medicines.

Section 3

Information about the main types of Glucose Lowering Medicines

Section 3 contains information about the main types of glucose lowering medicines.

The main classes of glucose lowering medicines are:

- Biguanides: Metformin is the only biguanide available in Australia.
- Sulphonylureas, sometimes spelt sulfonylurea.
- Alpha-glucosidase inhibitors (Acarbose).
- Thiazolidinediones, which are also known as TZDs or Glitazones.
- Incretin hormones, there are two types:
  - Glucagen-like peptide-1 or GLP-1 agonists.
  - DPP-4 inhibitors.
- Sodium Glucose Co-transporter-2, also known as SGLT-2.
- Combination medicines (contain more than one active ingredient/medicine type).
- Insulin.

Glucose lowering medicines reduce HbA1c by 0.5%–2% depending on the individual and the GLM.

Each type of medicine is described on the following pages.

Very important glucose lowering medicines-specific issues

Glucose lowering medicines are generally very effective and safe; however some glucose lowering medicines can cause hypoglycaemia and can become unsafe as people age. Increasing age can contribute to organ changes especially in the kidneys and liver and affects the counter-regulatory response to hypoglycaemia and hyperglycaemia and leads to changes in the symptoms associated with these conditions. Therefore, the individual may not recognise or treat low or high blood glucose.

Note:
People with type 1 diabetes need insulin. People with type 2 diabetes often start on glucose lowering tablets but need insulin over time.

You can obtain more detailed information about medicines from the Consumer Medicines Information (also called CMI) leaflets, which come with all prescription medicines.

All people using glucose lowering medicines should be carefully monitored and have an individualised blood glucose range and blood glucose monitoring plan. Older people with cognitive changes and dementia are particularly at risk.

Personal Care Workers can use the Glucose Lowering Medicines information to:

- Learn about glucose lowering medicines, how they work and their side-effects.
- Check the glucose lowering medicines are administered at the right time e.g. with meals.
- Help understand the older person's hypoglycaemia risk.
- Check the older person's blood glucose level and talk with the doctor/health care team about the blood glucose levels.
- Determine whether the blood glucose pattern is mostly within the older person's target range.
- Notice any 'changes' in the older person and talk with the older person and their doctor/healthcare team about whether the 'changes' could be caused by glucose lowering medicines.

Metformin

Chemical name	Some common brand names
Metformin	Diabex Diaformin Metex

Metformin

Metformin comes as a tablet and liquid form, but the latter is not used in Australia. Most people take tablets. The liquid form is sometimes used for older people who have difficulty swallowing but is more expensive than tablets.

Metformin may need to be stopped for a short time if the older person has severe vomiting and/or diarrhoea or cannot keep fluids down.

What does Metformin do?

Metformin stops the liver from making too much glucose. The liver releases glucose into the blood between meals; but if there is not enough insulin in the blood the glucose cannot get out of the blood stream and into the tissues, where it is used for energy.

Metformin also stops the body absorbing some glucose from the gut.

It helps insulin move glucose out of the blood stream into muscle and fat cells.

It helps improve cholesterol levels and has a mild effect reducing the appetite.

Emerging research suggests Metformin is protective against some cardiovascular and oncology conditions and neurodegenerative diseases including Alzheimer's and Parkinson's Disease.

When should Metformin be taken?

Metformin should be taken with or immediately after food to reduce gastrointestinal effects.

Main side effects

Metformin might not be safe for older people with serious kidney problems, liver problems or who drink alcohol. Metformin can contribute to weight loss, which might be undesirable in older people because they lose protein stores, which affects muscle strength and contributes to falls risk.

The most common side effects of Metformin are nausea, diarrhoea, bloating and upset stomach. These problems usually occur when Metformin is first started and often go away over time. These side effects are less likely to occur if a low dose is used to start with and then gradually increased to suit the individual's needs.

Metformin does not usually cause hypoglycaemia, but there is a risk of hypoglycaemia if the person also takes other glucose lowering medicines such as a Sulphonylurea or insulin as well as Metformin.

Using Metformin for a long time might reduce the absorption of vitamin B_{12} from the gut, which can contribute to anaemia, especially if the person has kidney disease.

Lactic acidosis is a very rare but serious side effect. Lactic acidosis is more likely to occur if the person has:

- Serious kidney disease.
- Becomes seriously ill.
- Has a heart failure or breathing problems.
- Drinks too much alcohol.

The list of signs and symptoms on page 41 could indicate the older person has lactic acidosis.

Usually the doctor checks whether these problems are present before prescribing metformin.

Personal Care Workers can use the information to:

- Regularly check the older person's:
  - Weight, because weight loss and symptoms such as nausea, vomiting and diarrhoea could be side effects of Metformin. Weight loss can put older people at risk of falls because they lose protein stores and muscle strength.
  - Blood glucose pattern especially if the older person is taking other glucose lowering medicines.
- Help the older person plan to have their Annual Cycle of Care checks.

The following signs and symptoms might suggest the person is developing lactic acidosis, but they can also be signs and symptoms of other problems. **Lactic acidosis is very rare** but if it does occur it is serious. If you note any of the following signs and symptoms talk with the doctor/healthcare team.

- Increased weakness and tiredness.
- Nausea and vomiting.
- Feel very cold.
- Trouble breathing.
- Muscle problems.
- The person has an upset stomach.
- The person's heart suddenly begins to beat rapidly or the heartbeats feel irregular.

Metformin may need to be stopped before the older person has investigations such as special X-rays where dye is injected into a vein or an operation. The doctor or nurse practitioner is responsible for stopping Metformin in these situations, and to explain why it was stopped to the individual.

Sulphonylurea

Pronounced Sul-foh-nil-yoo-ree-uh.
It is sometimes spelt Sulfonylurea

Chemical name	Common brand names
Gliclazide	Gliclazide MR Diamicron
Glibenclamide	Daonil Glimel
Glipizide	Melizide Minidiab
Glimerpiride	Amaryl Diapride

What do Sulphonylureas do?

Sulphonylureas help the body release insulin from the beta cells in the pancreas. Insulin lowers blood glucose because it allows glucose to move out of the blood stream into the cells where it can be used for energy.

Sulphonylureas can become less effective over time.

It is important to know that over time, the beta calls can no longer make enough insulin to keep the blood glucose in the normal range, even when the older person eats a healthy diet, exercises and takes their medicines. These changes are a normal part of ageing. When insulin production decreases sulphonylureas medicines will no longer be effective and insulin injections will be needed to replace the older person's own insulin.

Sulphonylureas can cause hypoglycaemia.

Sulphonylureas are often prescribed with Metformin and other glucose lowering medicines.

When to take

Sulphonylureas should be administered with a meal to reduce the risk of hypoglycaemia.

Sulphonylureas should be administered with a meal.

Main side effects

Hypoglycaemia is the most important side effect of Sulphonylureas. Hypoglycaemia is more likely to occur if:

- A meal is delayed after you administer a Sulphonylurea.
- The person does not eat enough.
- If the person does extra activity such as gardening, playing golf, walking or wandering.

Hypoglycaemia can take a while to correct if it is caused by a Sulphonylurea.

People who have kidney or liver disease are more likely to have hypoglycaemia because the medicine is broken down in the liver and excreted from the body through the kidneys. If these organs are damaged more sulphonylurea stays in the blood and works for a longer time.

Some people develop skin rashes, gain weight or report stomach upsets when they take Sulphonylureas.

Sulphonylureas may not be appropriate for people who are allergic to sulphur medicines and should be prescribed with caution for such people.

People who have a hypo on a Sulphonylurea are more likely to be readmitted to hospital within 30 days.

Alpha-glucosidase inhibitors

Pronounced Alfa-gluco-side-ase in-hib-it-or

Acarbose

Chemical name	Common brand names
Acarbose	Glucobay

The chemical name of the most commonly used Alpha-glucosidase inhibitor is acarbose.

What does Acarbose do

Acarbose helps slow the breakdown of carbohydrate to glucose in the digestive system by changing the action of some enzymes, which helps stop the blood glucose rising too high after a meal.

Acarbose is often prescribed with Metformin and other glucose lowering medicines.

When to take

Acarbose should be administered before a meal. It should not be crushed.

If using Acarbose and other GLM the older person is at risk of hypoglycaemia.

Hypoglycaemia can last a long time.

If an older person using Acarbose and another GLM has a hypoglycaemic episode, the hypoglycaemia must be treated with glucose (Lucozade, Jelly Beans, Glucogel) because Acarbose delays the absorption of carbohydrate.

Main side effects

Stomach or gastrointestinal problems are the main side effects of Acarbose, for example, flatulence, diarrhoea, indigestion and abdominal pain and distension because Acarbose slows the action of some chemicals in the intestine and slows the absorption of glucose into the blood.

Acarbose should not be prescribed for people who have serious gastrointestinal disorders such as diverticulosis, a stoma or inflammatory bowel disorders because digestion is already impaired in people with these conditions. Acarbose does not normally cause hypoglycaemia unless it is taken with other glucose lowering medicines such as sulphonylureas and insulin.

Acarbose might not be safe for people with kidney and liver disease. It is important to monitor the person's liver function and stop Acarbose if liver enzyme tests are high.

Personal Care Workers can use the information to:

Personal Care Workers can check the older person:

- Takes their Acarbose with a meal.
- Has glucose available to treat hypoglycaemia.
- Checks their blood glucose 2- 4 hours after a hypoglycaemic episode.

Thiazolidinedione

Pronounced THY-uh-ZOHL-ih-deen-Di-own

Chemical name	Common brand names
Pioglitazone	Actos
Rosiglitazone	Avandia

Thiazolidinediones are often called TZDs or Glitazones because the name is so hard to pronounce!

There are two main types of TZDs: Pioglitazone (e.g. Actos) and Rosiglitazone (e.g. Avandia).

TZDs can be used with other glucose lowering medicines but not insulin because of an increased risk of heart failure.

TZDs are not prescribed for people with type 1 diabetes.

TZDs should not be used for people with heart failure or people who use insulin.

TZDs are not used for people with type 1 diabetes.

What do TZDs do

TZDs make liver, muscle and fat cells more sensitive to the insulin produced by the beta cells and help the liver release glucose into the blood appropriately. Some TZDs improve blood fats and lower blood pressure.

It sometimes takes several days before the person's blood glucose changes after they start taking TZDs. Most people start on a low dose and the dose is gradually increased to suit their needs.

When to take

TZDs should not be crushed. Administer with a glass of water before a meal.

Main Side Effects

People often put on weight when they take TZDs because they can cause fluid to accumulate in the abdomen and legs. TZDs can cause heart failure or make heart failure worse: they should not be used by people who have heart disease.

Rosiglitazone has been associated with heart attack but the risk is small and is more likely to happen in people who have heart disease. The person's individual risk of heart disease should be considered carefully before prescribing Rosiglitazone.

TZDs might make macular oedema, a common eye problem in older people, worse and regular eye review is recommended.

TZDs are associated with a small risk of fractures in the arms and lower leg especially in women, which may be a problem for older women, especially if they are at risk of falls and have osteoporosis.

Some studies suggest pioglitazone increases the risk of bladder cancer, but the risk is very small and bladder cancer is more likely to occur in people with a personal or family history of bladder cancer.

If the person you are caring for is prescribed a TZD seek help from the nurse, nurse practitioner or GP if you notice the older person has the following signs because they could indicate heart failure:

- Swelling for example: ankles, legs or abdomen.
- Rapid weight gain in a short time.
- Trouble breathing.
- Coughing.
- Abnormal tiredness or fatigue.

Personal Care Workers can use the information to check:

- Insulin is not being used with TZD.
- The person does not have heart failure.
- TZD is administered with a meal.
- Glucose is available to treat hypoglycaemia and blood glucose is checked for 2–4 hours after a hypoglycaemic episode.
- The person for swelling or weight gain and vision changes and inform the nurse or doctor.
- The person's risk of falling using the general and diabetes-specific falls risk assessment (The McKellar Guidelines, pp. 50–51) and other general falls risk assessments see Section 4.
- Plan care to reduce the risk of falling.

Regularly check the older person's:

- Legs and stomach for swelling (oedema).
- Breathing (respiratory problems).

The incretin hormones

Pronounced In-cre-tin

There are two main types of incretin hormones:

GLP-1 agonists	
Chemical name	**Common brand names**
Exenatide	Byetta Bydureon Victoza

DPP-4 inhibitors	
Chemical name	**Common brand names**
Sitagliptin	Januvia
Saxagliptin	Onglyza
Linagliptin	Trajenta

What incretin hormones do

GLP-1 agonists

GLP-1 agonists stimulate a response. They slow the rate at which food leaves the stomach so glucose takes longer to enter the blood, which means the blood glucose does not rise too high after meals.

They reduce the secretion of glucagon from the liver. Glucagon is a hormone that helps increase blood glucose when it goes too low.

GLP-1 also reduces appetite and might help with weight loss, however weight loss might not be appropriate for older people.

GLP-1 might not be as effective for people who have had inadequate diabetes control (mostly high blood glucose) for over 10 years.

GLP-1 medicines are given by subcutaneous injection:

- Byetta: up to one hour before a main meal and the injections must be given at least six hours apart if more than one dose is prescribed per day.
- Victoza is injected once a day.
- Bydureon is injected once a week.

DPP-4 inhibitors

DPP-4 inhibitors slow the action of a hormone called Dipeptidyl peptidase-4, which reduces the secretion of GLP-1.

Thus, DDP-4 medicines increase the amount of GLP-1 in the blood after a meal, which helps lower blood glucose.

DPP-4 inhibitors are taken by mouth with or without food.

Main side effects

The Incretins have only been on the market for a few years so the long term effects are not known.

They can cause digestive problems such as indigestion, bloating and wind, nausea, vomiting, diarrhoea, constipation and pain when the medicine is first started, however these symptoms usually resolve over time.

They can cause respiratory infections.

People who have kidney or liver disease might not be able to take Incretin medicines.

People who have a history of pancreatitis should not use Incretin medicines.

Hypoglycaemia can occur if Incretin medicines are used with a sulphonylurea, so the Sulphonylurea might need to be stopped or the dose might need to be reduced.

Personal Care Workers can use the information about Incretin medicines to:

- Learn how an Incretin medicine works and their side effects.
- If authorised to administer Incretin medicine, administer the dose before meals OR with meals.
- Regularly talk to the older person and their family about Incretin medicines side-effects.
- Check whether the older person's blood glucose is within their target blood glucose range and talk to the nurse or doctor if needed.
- Make sure hypoglycaemia treatment is available and used if needed.
- Talk to the older person's nurse or doctor about any 'changes' in the older person.

Sodium-glucose cotransporter-2 inhibitors

Pronounced:
So-de-um-glucose co-transporter-2 inhibitors

These medicines are often called SGLT-2 inhibitors because it is easier to pronounce.

Chemical name	Common brand names
Dapagliflozin	Forxiga

What SGLT-2 inhibitor medicines do

SGLT-2 inhibitor medicines are a new group of medicines that have only been used for a few years. They help the kidneys excrete glucose in the urine.

When to take

SGLT-2 inhibitor medicines should not be crushed and should be administered before a meal.

SGLT-2 inhibitors are a new group of GLM for people with T2DM and unreported adverse effects or interactions may occur especially in older people.

Main Side effects

SGLT-2 medicines have only been available for a short time, therefore no long term safety data is available.

Research shows these medicines cause urinary tract infections which can exacerbate urinary incontinence.

They can also cause fungal infections in the genital area.

Some people who take SGLT-2 inhibitor medicines produce a lot of urine, which can make urinary incontinence worse and might contribute to dehydration, especially when the blood glucose is high, and in hot weather.

People prescribed a SGLT-2 inhibitor will test positive for glucose in their urine because the medicine stops the kidney absorbing glucose so it goes out in the urine.

Personal Care Workers can use the information about SGLT-2 medicines to:

- Learn about how SGLT-2 medicines work and their side effects.
- Administer SGLT-2 medicine with the first meal of the day.
- Regularly talk to the older person and their family about SGLT-2 medicines side-effects to see if the older person has any of the signs and symptoms of SGLT-2 medicine side effects.
- Talk with the older person about their personal hygiene and encourage more frequent showering/ bathing if necessary.
- Talk to the older person about their water intake and offer frequent drinks especially during hot weather.
- Check whether the older person's blood glucose is within their blood glucose range and talk to the older person, their family, the nurse or doctor if needed.
- Make sure hypoglycaemia treatment is available and used if needed.

Combination medicines

Combination medicines mean two or more medicines are combined in the one tablet or capsule.

Some medicines for type 2 diabetes are available in combination form, for example:

- Glucovance, which contains Glyburide and Metformin.
- Janumet, which contains Sitagliptin and Metformin.
- Kombiglyze, which contains Saxagliptin and Metformin.
- Trajentamet.

Combination medicines can help reduce the number of medicines people need to take and can make it easier to manage medicines regimens.

Main Side effects

It can be difficult to determine which medicine in the combination caused a side-effect.

It is also more difficult to adjust the dose of the individual medicines in the combination, because the doses are fixed in the medicine.

Combination medicines must not be crushed.

Generally combination medicines are not prescribed for an older person who has never had either of the active ingredients before.

Insulin

Pronounced: In-su-lin

Insulin is a hormone that lowers blood glucose.

Insulin is a prescription only medicine used to keep blood glucose in a range that is safe for the individual.

People who have type 1 diabetes need insulin from the time of diagnosis. They often need a basal bolus regimen which means they have a dose of long acting insulin, usually once per day and a dose of rapid acting insulin before each meal.

Many people with type 2 diabetes need insulin as they grow older because their beta cells stop producing insulin. People with type 2 diabetes can use a:

- Basal bolus insulin regimen.
- Premixed insulin regimen.
- Daily or twice daily dose of long acting insulin.

Sometimes people with type 2 diabetes are prescribed oral glucose lowering medicines, especially Metformin, as well as insulin.

Long acting insulin like Lantus cannot be mixed in the same syringe as any other insulin.

They should be injected into a different site from other insulins.

Types of insulin

Several brands of insulin are available in Australia, for example Novo Nordisk, Eli Lilly and Sanofi Aventis.

There are several types of insulin. Generally, insulin names describe how long the type of insulin works for.

- **Rapid acting insulin** is a clear liquid and begins to act about 5 to 10 minutes after insulin is injected and then acts for 2 to 4 hours.
- **Short acting insulin** is a clear liquid and begins to act about 20 to 30 minutes after insulin is injected and acts for 4 to 8 hours.
- **Intermediate acting insulin** begins to act in 2 to 3 hours and continues to act for 12 to 18 hours. Intermediate acting insulins are cloudy and must be gently mixed before use.
- **Long acting insulins** are clear and act for 17 to 23 hours. These insulins cannot be mixed with other insulins.
- **Ultra long acting insulin** Toujeo 300 Units/mL, is clear and acts for 20-24 hours. Toujeo cannot be mixed with other insulins.
- **Premixed insulins** which consist of two different insulins premixed in one container; usually a rapid acting and an intermediate acting insulin, OR a short and intermediate acting insulin and must be gently mixed before use.

Many insulins come in prefilled disposable 'pens' that make administering the insulin easy. The needles are very short and fine, so the injections hurt less than pricking the finger to check blood glucose. However, some people prefer to use an insulin syringe.

Insulin pen devices should only be used up to 28 days after its first use.

Personal Care Workers might sustain a needle stick injury if they remove needles from syringes or insulin pens for older people who can inject their insulin but cannot remove the needle from the syringe or insulin pen.

Insulin is a high risk medicine. You can determine each older person on insulin's risk of hypoglycaemia by completing the Hypo risk assessment tool on pages 30 and 31.

Common insulins available in Australia. Column 4 shows the main hypoglycaemia risk times but hypoglycaemia can occur at any time especially if the person:

- Does not eat.
- Is vomiting.
- Does extra activity.
- Is using a sulphonylurea.
- Has too much insulin.
- Drinks too much alcohol.

Type of insulin and common brand names	What the insulin looks like	When the insulin starts to work	How long the insulin works for	Main hypoglycaemia risk time after you inject insulin
Rapid acting Novorapid Humalog Apidra	Clear liquid	5–10 minutes after injected	3–5 hours	60–90 minutes after insulin is injected
Short acting Actrapid Humulin R	Clear liquid	15–30 minutes after injected	4–8 hours	2–4 hours after insulin is injected
Intermediate acting Protophane Humulin NPH	Cloudy and needs to be gently mixed	2–3 hours after injected	13–15 hours	6–10 hours after insulin is injected
Long acting Levemir Lantus	Clear liquid	1–3 hours after injected	17–23 hours	5–10 hours after insulin is injected
Ultra long acting Toujeo	Clear liquid	1–3 hours after injected	Up to 24 hours	1–6 hours after insulin is injected
Premixed* Humalog Mix NovoMix Humulin Mixtard	Cloudy and needs to be gently mixed	Depends on combination of insulins used	Depends on combination of insulins used	Depends on combination of insulins used

*Premixed insulin is also called Biphasic insulin because it contains two types of insulin, usually intermediate and a short or rapid acting insulin in various proportions. It is important to check when the insulin starts to work and how long it works for to decide the persons risk of hypoglycaemia.

When should insulin be taken?

Most people use insulin pens but some people prefer to use an insulin syringe. Insulin is usually taken before or with meals. The number of doses each individual needs depends on the types of insulin prescribed. Some people have an injection before each meal and an injection at bedtime (Basal bolus). Others have an injection before breakfast and before the evening meal (BD). Others have an injection before breakfast and another before the evening meal or before bed. The person's blood glucose levels are used to guide the:

- Dose of insulin they need.
- How many doses they need each day.

How to inject insulin

It is important to inject insulin into a different site each time you administer an injection (site rotation) so the skin does not become tough and thick called lipohypertrophy. If lipohypertrophy occurs the insulin is not absorbed properly, which affects the person's blood glucose.

Other factors that can change how insulin is absorbed include:

- Injecting into a bruise: bruising indicates the needle has punctured a small blood vessel which will generally heal in time but it is important not to inject into the bruised site.
- Inappropriate injection technique for example:
  - Using the wrong size needles.
  - Removing the needle from the subcutaneous layer too soon after injecting.
  - Reusing needles, which causes trauma and can cause infections.

Insulin

Monitoring people prescribed insulin includes checking the:

- Blood glucose at the 'right' time especially the peak insulin action time. The table on page 61 highlights the main hypoglycaemia risk times for common insulins available in Australia.
- Injection sites for bruising and lipohypertrophy: lumps that can alter the insulin absorption rate.
- Injection technique and ensuring injection sites are rotated.
- Person's food intake to ensure an even distribution of carbohydrate throughout the day.
- Person's activity levels.
- Injection sites for bruising and lumps that can affect insulin absorption.

Main side effects

Hypoglycaemia (hypo) is the most common side effect of insulin. See the Hypoglycaemia risk assessment tool on pages 30–31 to find out the older person's risk of having a hypo and talk with your colleagues about how to plan care to reduce their hypo risk e.g. make sure the GLM is administered with a meal.

Hypoglycaemia is preventable but can occur. See The McKellar Guidelines pages 29–31 for information about how to treat hypoglycaemia.

Hypoglycaemia can cause confusion and the older person may not be able to tell care staff he or she is having a 'hypo'. Significantly, care staff might not recognise the older person is having a 'hypo' because they do not have the 'text book' hypo signs and symptoms. It is important to check the older person's blood glucose if you suspect the older person is having a hypoglycaemic episode to confirm the BG level and if below 4-6 mmol/L treat the hypoglycaemic episode.

If an older person has a hypoglycaemic episode, start hypo treatment. The GP should be notified and should undertake a medicine review, assess the older person's health and decide whether the GLM regimen needs to be altered.

Storing insulin

Insulin needs to be kept cool so it works properly. Unopened insulin vials, pens or bottles should be kept in the refrigerator (2 to 8 degrees). Opened vials, pens or bottles being used can be kept out of the refrigerator but away from heat and light.

When to seek help

Contact the nurse, doctor or diabetes educator if the older person you are caring for:

- Has a consistently low blood glucose level below their target range.
- Feels faint or shaky.
- Has a rapid heart beat.
- Feels tired and has difficulty concentrating.
- Has "behaviour changes".
- Has a cognitive change such as confusion.

These might be signs of hypoglycaemia.

General Sick day care for older people with diabetes

It is important people with diabetes have a plan to manage their diabetes when they are sick. A diabetes educator or doctor can help develop a plan that suits the older person. The following information is general information. People with type 1 diabetes may need slightly different advice from people with type 2 diabetes. For example, it is important that people with type 1 diabetes check for ketones and continue to take their insulin when they are unwell.

Illnesses, infections such as urinary tract infections, pain and stress can cause the blood glucose to go high. It is important to take extra care of the older person if they:

- Feel unwell.
- Are very stressed or unusually agitated or confused.
- Have an infection such as a urinary tract or respiratory infection, gastroenteritis, infected wound or pressure area.
- Have more pain than usual.

If the underlying cause is not identified and treated the blood glucose can continue to rise and lead to life threateming conditions: Hyperosmolar Hyperglycaemic Syndrome (HHS) and Diabetic Ketoacidosis (DKA). These conditions need urgent treatment. You can find out more about them in The McKeller Guidelines. See Section 4.

Older people often ***do not*** have the typical signs and symptoms of high blood gluocse or illnesses such as a high temperature, thirst, and breathlessness. A change in their blood glucose level when you check it might be the first sign that something is not quite right.

If you or the older person checks their blood glucose and it is is higher than usual and the person feels unwell start checking their blood glucose more frequently e.g. every 2–4 hours and note whether it is getting higher or returning to their target blood glucose range.

A rise in blood glucose might be the first sign the older person is unwell.

If you notice the older person's blood glucose is higher than usual and they look or say they feel unwell, start checking their blood glucose more frequently e.g. every 2–4 hours.

Encourage or make arrangements for the older person to see their doctor early if their blood glucose is higher than usual, they are vomiting and cannot keep anything down and you cannot work out why their blood glucose is high.

Develop a Sick Day Care Plan **with** the older person or make an appointment with the older person's diabetes educator to develop a Sick Day Care Plan.

If the older person's blood glucose is getting higher make sure you:

- Encourage them to drink water and eat small frequent meals if possible.
- Do not stop their glucose lowering medicines without checking with their doctor.
- Check their blood ketones every 2–4 hours if you have been taught how, especially if the older person has type 1 diabetes or their blood glucose is over15 mmol/L for two consecutive readings.
- Encourage them to rest and delay strenuous activity such as gardening or cleaning.
- Notify your care coordinator or supervisor and tell the older person's next of kin or a trusted neighbour their blood glucose is higher than normal. Ask that person to check in on the older person within 2–4 hours to see whether they are getting better and what is happening to their blood glucose.
- If their blood glucose is higher than usual, they are vomiting and cannot keep food and fluids down, cannot think straight or cannot take their glucose lowering or other medicines, make arrangements for a medical assessment:
  - if the older person lives in the community make a doctors appointment or take the older person to the emergency department.
  - if the older person lives in residential aged care notify their doctor and prepare the older person for transfer to the emergency department.

Section 4

Other sources of information

Written information

Australian Medicines Handbook (AMH). (2016). Adelaide: Australian Medicines Handbook Pty Ltd.

Australian Medicines Handbook Aged Care Companion (AMH). (2016). Adelaide: Australian Medicines Handbook Pty Ltd.

Braun L, Cohen M. (2014) *Herbs and Natural Supplements: an Evidence Based Guide* (4th edn). Churchill Livingstone, Sydney.

Consumer Medicines Information (CMI) - Package insert, mandatory in Australia with prescription medicines. https://www.tga.gov.au/consumer-medicines-information-cmi

Diabetes Australia. http://www.diabetesaustralia.com.au/

The McKellar Guidelines for Managing Older People with Diabetes in Residential and Other Care Settings. (2014) http://www.adma.org.au/clearinghouse/doc_details/133-the-mckellar-guidelines-for-managing-older-people-withdiabetes-in-residential-and-other-care-settings_9dec2013.html

The McKellar Way - How to use the McKellar Guidelines.(2010) http://www.adma.org.au/clearinghouse/doc_details/156-the-mckellar-way-final_how-to-use-the-mckellarguidelines_e_24-7-14.html

Guidelines for Managing Diabetes at the End of Life (2010) (Under review). http://adma.org.au/clearinghouse/doc_details/35-guidelines-for-managing-diabetes-at-the-end-of-life.html

Document to accompany the Guidelines for Managing Diabetes at End of Life (under review). http://adma.org.au/clearinghouse/doc_details/34-document-to-accompany-the-guidelines-for-managing-diabetes-at-end-of-life.html

Useful Websites

Australian Diabetes Educators Association:

Information about planning for Sick Days:

Sick Day Management for People with Type 1 diabetes:
http://www.adea.com.au/wp-content/uploads/2015/12/sick-day-booklet-type-1-single-page-final.pdf

Sick Day Management for People with Type 2 diabetes:
http://www.adea.com.au/wp-content/uploads/2015/12/sick-day-booklet-type-2-single-pages-final.pdf

Information about Injection Technique:
http://www.adea.com.au/wp-content/uploads/2015/11/Injection-Technique-Final-digital-version2.pdf

Australian Government Department of Health:

Guiding Principles for Medication Management in Residential Aged Care Facilities.
http://www.health.gov.au/internet/main/publishing.nsf/Content/guide-med-mgmt-aged-care

Therapeutic Goods Administration, Blue card adverse reaction reporting form.
https://www.tga.gov.au/form/blue-card-adverse-reaction-reporting-form

Therapeutic Goods Administration, Consumer Medicines Information.
https://www.tga.gov.au/consumer-medicines-information-cmi

Medication management reviews.
http://www.health.gov.au/internet/main/publishing.nsf/Content/medication_management reviews.htm

Australian Diabetes Society (2014) a new blood glucose management algorithm for type 2 diabetes: a position statement. Medical Journal of Australia 201 (11):650-653.
https://diabetessociety.com.au/downloads/20141218%20A%20New%20Blood%20Glucose%20Management%20Algorithm%20for%20Type%202%20Diabetes.pdf

Australian Pharmaceutical Advisory Council (2006) Guiding principles for medication management in the community.
https://www.health.gov.au/internet/main/publishing.nsf/Content/0A434BB6C6456749CA257BF0001A9578/$File/booklet.pdf

Health on the Internet: Basic review of 'Apps'
http://www.healthline.com/health/diabetes/top-iphone-android-apps

Diabetes Australia
http://www.diabetesaustralia.com.au/

National Diabetes Service Scheme (NDSS):
https://www.ndss.com.au/older-people

- Healthy Eating for Older People
- You and Your Health Care Team
- Managing Diabetes As You Age
- Diabetes management in aged care: a practical guide (currently under review).

National Prescribing Service (NPS):

What is consumer medicines information?
http://www.nps.org.au/__data/assets/pdffile/0010/177058/CMI-Fact-Sheet.pdf

Medimate
http://www.nps.org.au/__data/assets/pdf_file/0003/211593/Medimate_English.pdf

Pharma Info (Pharmaceutical Information, Articles and Blogs)
http://www.pharmainfo.net/

Return Unwanted Medicines Project (The RUM Project)
http://www.returnmed.com.au/

Information about Ageing:

My Aged Care
http://www.myagedcare.gov.au/

Council on the Ageing (COTA)
http://www.cota.org.au/australia/

Information about dementia:

Alzheimer's Australia
https://fightdementia.org.au/

Dementia Care Australia
http://www.dementiacareaustralia.com/

'Apps' for Smart Phones/Tablets

- Glucose Buddy™
- Calorie King™
- Diabetes Australia ™
- MedicineList+™ (NPS MedicineWise)

State Medicines Acts and Regulations

Australian Capital Territory – ACT Medicines, Poisons and Therapeutic Goods Act 2008
http://www.legislation.act.gov.au/a/2008-26/

New South Wales - NSW Poisons and Therapeutic Good Act 1966 No. 31
http://www.legislation.nsw.gov.au/viewtop/inforce/act+31

Northern Territory – Poisons and dangerous drugs act
http://www.health.nt.gov.au/Environmental_Health/Poisons_Control/index.aspx#Legislation

Queensland - Health (drugs and Poisons) regulations 1996 and Health Act 1937
https://www.legislation.qld.gov.au/LEGISLTN/CURRENT/H/HealDrAPoR96.pdf, and,
https://www.legislation.qld.gov.au/LEGISLTN/CURRENT/H/HealA37.pdf

South Australia – Controlled Substances Act 1984
https://www.legislation.sa.gov.au/LZ/C/A/CONTROLLED%20SUBSTANCES%20ACT%201984.aspx

Tasmania – Poisons Act 1971
http://www.thelaw.tas.gov.au/tocview/index.w3p;cond=;doc_id=81%2B%2B1971%2BAT@EN%2B20100222140000;histon=;prompt=;rec=;term=

Victoria - Drugs, Poisons and Controlled Substances Act 1981
http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTObject_Store/LTObjSt1.nsf/DDE300B846EED9C7CA257616000A3571/0D638BDD269A209FCA257761001BFAB9/$FILE/81-9719a084.pdf

Western Australia – Poisons Act 1964
http://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_728_homepage.html