

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



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

The second 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 *Personal Care Workers***

Disclaimer

Glucose Lowering Medicines and Older People with Diabetes: Information for Registered and Enrolled Nurses was designed to help nurses make clinical decisions about managing glucose lowering medicines prescribed for older people with diabetes based on a comprehensive assessment. 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 Group 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 Registered and Enrolled Nurses 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 Registered and Enrolled Nurses.

It is essential that the information in Glucose Lowering Medicines and Older People with Diabetes: Information for Registered and Enrolled Nurses is used within local policies and service structures and resources.

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 Registered and Enrolled Nurses. No fees were paid to the authors or the Expert Advisory Group in connection with the Glucose Lowering Medicine and Older People with Diabetes: Information for Registered and Enrolled Nurses except Sam Korn from January 2014 to June 2015 and Nicole Duggan who were employed as project manager and research assistant respectively through the study.

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How Registered and Enrolled Nurses can use the Glucose Lowering Medicines and Older People with Diabetes information

Nurses can use the information to:

- Support older people with diabetes (OPWD) to:
 - Be informed about their Glucose Lowering Medicines (GLM).
 - Safely self-administer their GLM.
- Safely administer to and manage GLM and other medicines for OPWD.
- Proactively identify, monitor and manage side effects, adverse events and other risks associated with GLM.
- Delegate to and support care staff to safely administer GLM to OPWD.
- Achieve National Safety and Quality Health Service Standards (NSQHS) and organisational accreditation standards.

Strategies for using the information

Nurses are encouraged to:

Read and become familiar with the information to enhance their knowledge about:

- Medicines safety.
- Their role and scope of practice when managing medicines and delegating medicine-related tasks.
- GLM and other medicines.
- GLM-related risks.
- Factors that affect blood glucose levels.

Use relevant strategies to enhance safe practice when managing GLM in various settings:

- Acute.
- Community.
- Residential.

Consider the OPWD's preferences, functional category, social circumstances and care needs:

- Independent.
- Requiring assistance.
- Dependent.

Develop an individualised GLM management plan:

- Target blood glucose range.
- GLM peak action.
- Nutrition intake.
- Blood glucose monitoring regimen.
- Hypoglycaemia and Sick Day Management Plans.

Personalising glucose lowering medicine information, education and care for older people with diabetes

Individual older people with diabetes (OPWD) are unique and have different needs, experiences and expectations. Care for OPWD must be comprehensive and tailored to suit the individual's needs and preferences.

OPWD want information about GLM and need nurses and care staff to carefully consider how they give the OPWD the Glucose Lowering Medicines: Information for Older People with Diabetes and their families.

The Glucose Lowering Medicines: Information for Older People with Diabetes and their families is comprehensive and OPWD could need nurses and care staff to:

- Spend time with them to explain how to use the information.
- Identify relevant areas applicable to the individual OPWD by placing a marker/sticker on the relevant page.
- Explain and clarify information they ask about.
- Provide reassurance.
- Provide follow-up appointments to answer any questions the OPWD may have after they read the information.

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 devices 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 pharmacy (including those in residential aged care facilities), preparing the medicine, checking the medicine dose and the individuals' 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

How to use the information in this book

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

You can use it to check information about glucose lowering medicines and as self-directed learning.

You only need to read the information that is relevant to your work and the older people with diabetes you care for.

The information can help you delegate medicine tasks to other staff safely and responsibly.

It can help you detect adverse glucose lowering medicine-related adverse events and to document and report them.

You can mark relevant sections so you can read them at a later time and/or discuss them with your colleagues.

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 interact with other medicines so all of the individual's medicines need to be considered when developing care plans. GLMs work in various ways to lower blood glucose. The actions of the main types of GLMs are described in Section 3, page 31.

Registered and Enrolled Nurses (hereafter referred to as nurses) are responsible for:

- Ensuring they have the up-to-date knowledge, education and competence to administer medicines.
- Asking supervisors, pharmacists and/or general practitioners about any medicine information they are not sure about.
- Understanding their role, responsibilities and duty of care when administering medicines.
- Monitoring the effects of medicines e.g. testing blood glucose at an appropriate time.
- Working with the care team to identify, assess, report and plan strategies to reduce medicine-related risks 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 medicine, see pages 28 and 29.
 - Hypoglycaemia risk assessment tool, see page 26 and 27.
 - The McKellar Guidelines (2014) include a Diabetes-specific falls risk assessment tool and a Diabetes-specific pain risk assessment tool.

It is essential to assess the individual before you administer their medicines to make sure it is safe to administer the medicine at that time e.g. ensure the person with diabetes' blood glucose is not in the hypoglycaemic range (below 4 mmol/L) and the meal will not be delayed.

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.

Principles of delegation and supervision

Registered nurses are responsible for managing GLMs including insulin in aged care facilities and often in the person’s home. They can delegate specific medicine management tasks such as administering a medicine 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.

Delegating a task and accepting the delegated task require professional judgment and understanding of duty of care. Delegation is a core nurse responsibility.

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 GLMs.
- 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.

It is important to administer medicines according to relevant legislation.

Always practice safely according to your knowledge level, role and scope of practice.

Only delegate medicine tasks to people with the required knowledge and competence and scope of practice.

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 risks associated with prescription medicines and pharmacist only medicines. However, the risk associated with many complementary medicines (CAM) is less clear. People with diabetes frequently use CAM for a range of reasons, so it is important to document any CAM medicines the person is using in their medical record and medicine list.

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). Hypoglycaemia is the most serious side-effect of insulin and sulphonylureas. Hypoglycaemia affects the individual's mental function, safety and quality of life. Risk of serious hypoglycaemia increases with increasing duration of diabetes and increasing age. Hyperglycaemia can arise from under-prescribing GLMs as well as intercurrent illnesses and stress.

Blood Glucose Targets

- Must be individualised, but a safe BG range for many older people with diabetes is 6–15 mmol/L.
- Hypoglycaemia can occur when the BG is less than 6 mmol/L, especially in frail older people and is a serious side effect of GLM. See pages 26 and 27.
- Hyperglycaemia—BG levels consistently greater than 15 mmol/L (McKellar Guidelines 2014).

15mmol/L is the level at which glucose can be detected in the urine and when cognition begins to be affected. However, it is acceptable for some older people with diabetes to have blood glucose up to 15mmol/L. For example frail older people, those at high risk of hypoglycaemia and when Palliative Care and End of Life becomes the focus of care to enhance safety, comfort and quality of life (Guidelines for Managing Diabetes at the End of Life, 2010).

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

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

People with type 1 diabetes need insulin. People with type 2 diabetes might be prescribed one or more of the GLMs described in section 3 of this book. However, over time many people with type 2 diabetes need insulin because beta cell function declines with increasing duration of diabetes and the beta cells do not respond to Sulphonylureas and some of the other classes of GLMs may not be suitable for older people.

People with type 2 diabetes do not become type 1 when they commence insulin. They become insulin-requiring type 2.

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 CAM to treat common conditions such as pain and colds and 'flu'.

Using five or more medicines per day is called polypharmacy.

Polypharmacy

Generally, older people with diabetes take an average of seven different types of medicines per day and they usually take more than one dose of each medicine per day. The more medicines they take, the greater the medicine burden and 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.

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.

Many visits to the emergency department result from insulin errors. If an insulin error is made, it is important to:

- Notify the relevant nursing staff/doctor.
- Make a record of the insulin error in the individual's medical record.
- Report the incident in programs such as Riskman as early as possible.
- Ensure the older person is assessed and monitored and prepared for transfer to emergency/hospital if required.

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

It is no longer appropriate to use the term 'diabetic diet'. *Everybody* should eat a healthy balanced diet, including staff, nurses and other health professionals.

Managing medicines *for or with* older people

It is important for nurses to be aware of, have access to and follow relevant legislation and organisational policies when administering medicines to minimise medicine errors and adverse events.

Errors can occur at any time in the medicine management pathway: prescribing, dispensing, administering and monitoring medicines.

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.
- Administering the incorrect formulation of the medicine.
- Crushing medicines that should not be crushed.
- Not administering the medicines or not administering the medicines at the right time.
- Delegating medicine administration to staff who do not have the required knowledge, skills or scope of practice.
- Being interrupted/distracted when administering medicines.

Communicating about medicines

Inadequate communication with the individual/family and among the healthcare team can lead to adverse events, especially during transitions among health services and/or providers, doctor, nursing staff, hospital, pharmacist and family member/carer. It is important to document and communicate about:

- Medicines.
- Medicine errors.
- Changes in health status.
- Care goals and care team expectations.
- Problems such as hypoglycaemia, hyperglycaemia, falls and pain especially during transitions within a service or among services.

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.gov.au/pdf/forms/problem-medicines-forms-bluecard-140311.pdf>

You don't need to be sure the older person is experiencing an adverse event; you just need to be concerned that an adverse event could have occurred.

Make sure you access quality and trustworthy information when you source medicine information on the Internet. Reliable sites subscribe to Health on the Net Principles and codes and are entitled to use the Hon Code symbol depicted below on their site.



Main types of medicines

There are four main types of medicines:

- Prescription medicines; S3 and S4.
- Non-prescription medicines.
- Pharmacy only medicines.
- Complementary medicines; herbal medicines, vitamins and minerals.

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 also called '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 vitamins 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 receives a referral from the individual's GP.

Ways nurses can help older people with diabetes manage their medicines

Nurses should talk about medicines with older people to help them understand how to use their medicines safely. They should document the medicine the older person uses and note any change in the medicine such as increased or decreased doses, any errors or new medicines used and discuss any issues with the older person's doctor or nurses as soon as the problem is identified. Knowing about the older person's medicines, encouraging the person to check their blood glucose, noticing a change and reporting the change could help prevent a medicines error or adverse event.

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. It is called the active ingredient.

Some medicines have more than one active ingredient. The name of the active ingredient can be difficult to pronounce thus manufacturers give the active ingredient a name that is easier to remember.

The brand or trade name is the name the manufacturer gives the medicine. 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:

The active ingredient in Metformin is Biguanide. 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 what they look like.

Knowing the medicine's active ingredient can help you understand the action of the medicine, that is, how the medicine works.

Understanding how the medicine acts can help you decide whether the medicine is working or not working or causing side-effects.



Long acting medicines such as modified release (MR) and sustained release (SR) medicines should not be crushed.

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 lasts 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 named medicines.

Generic medicines contain the same active ingredient as the original 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 ingredients in tablets together. Binders are often sugars such as lactose, sucrose, and sorbitol, but these sugars generally do not have much effect on blood glucose.

Coatings are put on the outside of large tablets to make them easier to swallow and mask the taste of the active ingredient. Coatings also prevent the tablet from being damaged by moisture. Some coatings also stop the medicine from breaking down until it reaches a specific target site of action for example, the stomach. 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 improve the shelf-life and 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 help people with diabetes who take a lot of medicines and nurses distinguish one medicine from another.

Complementary and Alternative 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 include Fenugreek, *Ginseng panax*, bitter melon and cinnamon. These CAM can interact with glucose lowering medicines and cause hypoglycaemia.

Nurses should ask the older person they are caring for, or the older person's family, whether the older person is using CAM and the type of CAM. If the older person is using CAM, the nurse could discuss their CAM use with the older person's doctor and/or pharmacists to ensure it is safe for the older person to use CAM and that risks such as hypoglycaemia are identified and minimised.

Reading medicine labels

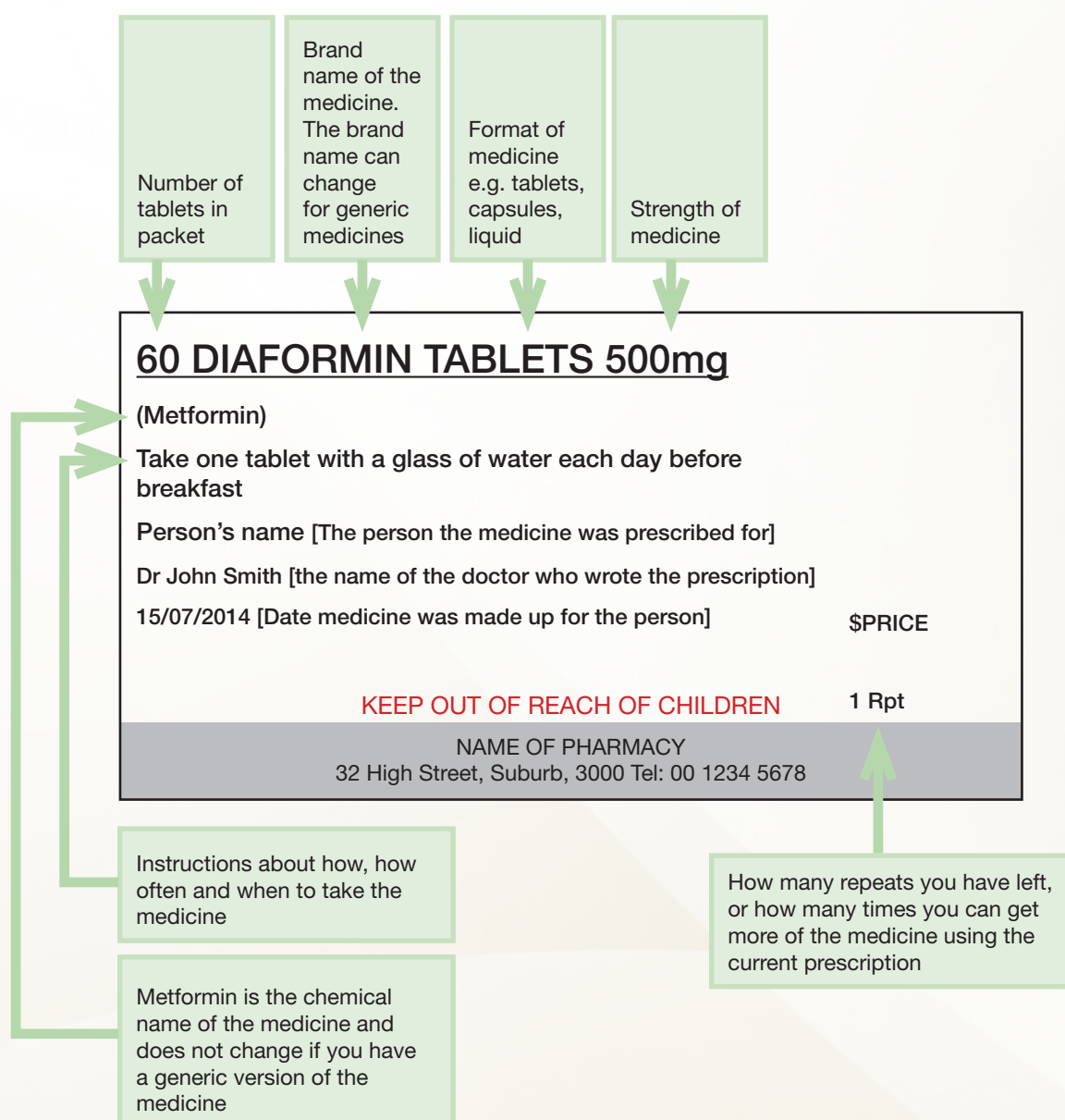
Medicine labels contain information that can help you administer the medicine to the person with diabetes including:

- 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.

Sometimes pharmacists place useful information on medicine labels when they dispense the medicine e.g. shake before use.

The figure on the next page highlights important information written on a medicine label.

The figure shows key information usually included on prescription medicine labels. Each coloured box explains what the information on the medicine label means and can help you explain the medicine to older people with diabetes and their families.



Medicine dose administration aids

Medicine dose administration aids can help older people with diabetes manage their medicines unaided as well as help nurses administer medicines to older people.

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 simplify the medicine regimen and be less confusing.
- Working with older people with diabetes and families to develop ways 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.

Nurses can help older people understand and manage their medicines by being informed about medicines and by observing which medicine 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.

Nurses need to know how to use dose administration aids and the similarities and differences among dose administration aids and how to explain them to older people with diabetes. Several types of medicine dose administration aids are available including:

- Dosette boxes that have compartments for the medicines and are refillable.
- Blister or bubble packs, 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 usually packs the medicines into Webster Packs and sachets but the individual or their carers often fill their dosette boxes at home.

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

It is important to check the medicines in dose administration aids before administering them to older people with diabetes.

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 and the expiry date 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.

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. Nurses 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. Nurses 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 test blood glucose

Needles and lancets are 'sharps' and must be disposed in sharps containers to prevent needle stick injuries. Sharps containers for home use are provided by some health organisations and local councils.

It is important that nurses encourage older people living in the community to use appropriate sharps containers to prevent needle stick injuries.

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

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.

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. Nurses can help older people keep track of their medicines by helping them record their medicines in a diary or electronic format suitable for the individual.

The National Prescribing Service provide paper, e-list and phone 'app' options to support people to complete and maintain their medicine list and keep it up-to-date. Information about the National Prescribing Service medicines list 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. Nurses could regularly ask the individual about their medicines and check their medicines against their medicines list to note and record changes and discuss changes with the doctor/health care team.

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

Medicines are often listed in a table like the table on page 21.

Medicine lists can help nurses 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.

Nurses can help identify/avoid unsafe situations/practices such as the person using out-of-date or other people's medicines, out-of-date prescriptions if a new dose was prescribed, using the incorrect medicine dose or taking medicines at an incorrect time. If a nurse finds an older person is taking a medicine that is not listed on the person's medicine list they should inform the person's doctor /health care team.

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

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

It is important to ensure any medicine allergies and any previous medicine-related adverse events are documented.

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

Home Medicines Review

Home Medicines Review can enhance QUM and reduce medicine-related adverse events. A Home Medicines Review occurs 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 that need to be considered.

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.

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

- Medicines are in-date and stored correctly.
- The person is at risk of medicine interactions.
- Other types of medicines that could benefit the older person.
- Any medicine doses that could be changed or medicines that could be stopped.
- The older person's knowledge about their medicines and how to use them safely.
- Whether 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.

Nurses can watch for changes in the older person's medicines regimen and/or changes in the older person's health status, behaviour or cognition that could be caused by their medicines. They can discuss any concerns with the older person. The nurse can also discuss whether a Medicines Review is indicated. Nurses can also check whether the GP has signed to indicate he/she read the review. The review can be undertaken in the person's home (Home Medicine Review) or in their RACF.

Medicines and safety

Nurses 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 miss-use of dose administration aids and report these issues to supervisors, the older person's doctor and or the pharmacist.

Table 1: Example of a medicine list used to record all the medicines the older person with diabetes is prescribed. The information about Metformin 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.					

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

Important medicine-related information nurses need to know to administer medicines safely

Nurses need to know the following information to safely administer medicines to older people or to help them administer their own medicines. You can find more information about glucose lowering medicines on page 31 in Section 3 or you can ask the other nurses, doctor or pharmacist providing services where you work about glucose lowering medicines.

Information about the specific medicine:

- The chemical name, which describes the molecular structure of the medicine, a generic or official name and a brand name, which is the propriety or trademark 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 whether they have a Sick Day Care Plan: if not, talk with the doctor and/or health care team about preparing a *personalised* 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.

Other 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 e.g.

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

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

The change can be temporary due to intercurrent illness or investigations or due to permanent change in health status.



Know whether the 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 26 and 27 to assess the older person risk of hypoglycaemia and the risk of having problems with GLM tool on pages 28 and 29 to assess the older person's risk of a GLM-related adverse event.

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

A medicine side-effect is an unwanted effect 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 metabolised and excreted.

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 risk assessment tools on the following pages to decide risk of:

- Hypoglycaemia.
- Glucose lowering medicine problems.

Nurses should monitor older people for medicine-related side-effects by:

- Checking the person's risk of having medicine side-effects regularly because the risk can change over time.
- Monitoring the older person for medicine 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.
 - Knowing hypoglycaemia is the most significant side effect of many GLMs and is associated with adverse outcomes including death.
- 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.
- Testing 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 doctor/health care team.
- Documenting the plan to reduce medicine side-effects in the older person's medical record.

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.

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.

Hypoglycaemia

Hypoglycaemia is the most significant adverse event associated with GLMs in older people. The hypoglycaemia risk increases with long duration of diabetes and increasing age. Hypoglycaemia increases 12 month mortality after a hospital admission for hypoglycaemia and increases falls risk.

If the blood glucose falls lower than 4–6 mmol/L the older person's problem-solving and decision-making is impaired and they may not be able to self-treat the hypoglycaemia or ask someone to help them.

Some older people might present with symptoms such as sweating, trembling and rapid heartbeat that warn you that the person's blood glucose is too low. However, other things can also cause these symptoms, therefore 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 or present with 'behaviour changes.' Such mental changes indicate a blood glucose test might be warranted.

It is also important to try to keep the older person's blood glucose stable and in a safe range for them. For many older people that is between 6 and 11–15 mmol/L.

Some sources of information about hypoglycaemia are listed in section 3.

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

The symptoms of hypoglycaemia change over time and older people might not feel these symptoms.

Hypoglycaemia risk assessment tool

Hypoglycaemia (hypo) risk

How to complete the form:

- Each box represents a risk of having a 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.

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

☐ Has the older person had a recent hypo?

Does the older person:

☐ Take insulin (see page 53).

☐ Take a sulphonylurea such as Gliclazide, Glimepiride, Glipizide (see page 37).

☐ Take insulin and a sulphonylurea.

☐ Have kidney problems?

☐ Have liver damage?

☐ Have trouble remembering things?

☐ Have food-related issues such as:

- eat meals with very little carbohydrate e.g. bread, cereals, vegetables.
- not eat regular meals.
- difficulty swallowing.
- stomach problems such as coeliac disease or irritable bowel syndrome.
- diarrhoea or vomiting.
- losing weight.

☐ 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: _____

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:

- Deciding 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.
- Deciding on a blood glucose monitoring plan that matches the times the glucose lowering medicines are working at their peak.
- Identifying when low blood glucose levels are most likely to occur, for example during activity, gardening.
- Planning to administer glucose lowering medicines, especially insulin, with meals.
- Planning what to do if the older person needs to go without food for a procedure such as a blood test or surgery.
- Encouraging 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 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 30.

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 test their blood glucose before they drive and to keep their blood glucose above 5mmol/L.

Risk of having problems with glucose lowering medicines

How to complete the form:

- Each box represents a risk of a medicine problem.
- Place a cross (X) in the box if the information applies to the older person with diabetes.
- The more boxes crossed the greater the risk of a medicine problem.

- ☐ Blood glucose is often low, for example less than 4–6mmol/L.
- ☐ On a sulphonylurea such as Gliclazide, Glimepiride, Glipizide (see page 37).
- ☐ On insulin (see page 53).
- ☐ 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 test 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: _____

What to do to manage the glucose lowering medicine risk

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

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

- Have a plan to reduce risk of hypoglycaemia (too low).
- Have a plan to manage days when the older person is sick and does not feel like eating.

Check the older person's self-care capacity, cognitive function, HbA1c, kidney and liver function regularly.

Ask the doctor or pharmacist to check the older person's medicine regimen at least once per year and when the older person starts a new medicine or stops a medicine and to check whether they are on any medicine that increases or lowers blood glucose (see page 30).

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.

Arrange help for the individual if they are likely to make mistakes managing their medicines.

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.

It is important to ask older people with diabetes whether they use CAM especially when they live at home.

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.

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 CAM 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 hypoglycaemia e.g.:

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

Some, but not all studies, suggest Glucosamine can increase blood glucose. If the older person is using Glucosamine it is important to monitor or to encourage them to monitor their blood glucose, especially when they begin to take Glucosamine to see whether it affects their blood glucose.

Section 3

Information about the main types of Glucose Lowering Medicines

Section 3 provides 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:
 - Glucagon-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 glucose lowering 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 older person may not recognise or treat low or high blood glucose.

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.

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 (CMI) leaflets, which come with all prescription medicines.

Nurses can use the Glucose Lowering Medicines information to:

- Learn about glucose lowering medicines, their action profile and their side-effects.
- Check that 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 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, their family 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.

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.

Metformin should be taken

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

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.

Metformin

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 B¹² from the gut, which can contribute to anaemia, especially if the person has kidney disease.

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

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

The list of signs and symptoms on page 35 could indicate the older person has lactic acidosis.

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

Nurses can use the information on page 35 to:

- Ask the person and their family or doctor about the older person's medical history especially heart, kidney and liver function and discuss whether Metformin is the best glucose lowering medicine option.
- Regularly check the older person's:
 - Weight because weight loss and symptoms such as nausea, vomiting and diarrhoea could indicate side-effects.
 - Blood glucose pattern especially if the older person is taking other glucose lowering medicines.

Help the older person plan for their Annual Cycle of Care checks.

Metformin

The following signs and symptoms might suggest the person could be developing lactic acidosis, but they can also be signs and symptoms of other problems. Lactic acidosis is 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.

Key prescribing and monitoring issues in older people

There are many contraindications to Metformin in older people with comorbidities.

The extended release formulation causes fewer gastrointestinal side effects but must not be crushed.

Metformin is contraindicated with $\text{eGFR} < 30 \text{ mL/min/1.73}^2$.

Starting Metformin in older people with diabetes with an eGFR between $30\text{--}45 \text{ mL/min/1.73}^2$ is not recommended.

It is important to know the older person's eGFR before initiating Metformin and at least annually or more frequently if clinically indicated.

If the older person's eGFR falls $< 45 \text{ mL/min/1.73}^2$, assess the benefits and risks of continuing Metformin.

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 before an operation. The doctor or nurse practitioner is responsible for stopping Metformin in these situations, but nurses might need to explain why Metformin was stopped to the individual.



Sulphonylurea 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 stimulate insulin release 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 the glucose is used for energy.

It is important to know that over time, the beta cells 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 are often prescribed with Metformin and other glucose lowering medicines.

When to take

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

Sulphonylureas can become less effective over time.

Sulphonylureas can cause hypoglycaemia that requires hospital admission.

Older people who have Sulphonylurea-induced hypoglycaemia are likely to be readmitted to hospital with hypoglycaemia in the following 30 days.

Sulphonylureas should be administered with a meal.

Sulphonylurea

Main side effects

Hypoglycaemia is the most important side effect of Sulphonylurea. 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.

People who have kidney or liver disease are more likely to have hypoglycaemia because the medicine is metabolised 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 prescribed Sulphonylureas develop skin rashes, gain weight or report stomach upsets.

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

Nurses can use the Hypoglycaemia risk assessment tool on pages 26 and 27 and the Glucose Lowering Medicine (GLM)-related adverse event risk assessment tool on pages 28 and 29 to assess the older person's risk of a diabetes-related adverse event and plan care to minimise the risk.

Nurses can use the information to:

Check the older person's:

- Blood glucose testing frequency e.g. at least twice a day at alternating times and more frequently if the older person is unwell.
- Blood glucose pattern to see if there are any high or low blood glucose levels recorded and note the time of the day they occur.
- That they have a meal with their sulphonylurea to reduce the risk of hypoglycaemia.
- They have a Hypoglycaemia Management Plan in place and have access to quick and longer acting carbohydrates to treat hypoglycaemia.

Key prescribing and monitoring issues in older people

Blood glucose should be monitored during acute illness, when the person loses weight and if they eat erratically. It may be safer to discontinue the Sulphonylurea, given their high hypoglycaemia risk.

Monitor people on glipizide or glimepiride for risk of hypoglycaemia if they are prescribed warfarin, especially when warfarin is first commenced.

Alpha-glucosidase inhibitors

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 absorption of carbohydrate in the digestive system by changing the action of some enzymes, which delays the absorption of glucose into the blood and 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 just before a meal or with the first few mouthfuls of food. It should not be crushed.

If using Acarbose and other GLMs the older person may be at risk of hypoglycaemia from the other GLMs.

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

The hypoglycaemic episodes can be prolonged.

Main side effects

Gastrointestinal upsets are the main side effects of Acarbose, for example, flatulence, diarrhoea, indigestion and abdominal pain and distension because Acarbose alters digestive enzymes.

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.

Nurses can use the information to:

- Check the older person is administered/administers Acarbose at the right time e.g. with a meal.
- Have glucose available to treat hypoglycaemia.
- Ensure appropriate hypoglycaemia management including extra blood glucose checking for 2–4 hours after a hypoglycaemia episode.

Key prescribing and monitoring issues in older people

Acarbose:

- Is not used very often in Australia.
- Can cause gastrointestinal side effects so may be contraindicated if the older person has autonomic neuropathy.
- Might be withheld if the person does not eat or is fasting for a procedure or religious reasons.

Thiazolidinedione

Chemical name	Common brand names
Pioglitazone	Actos
Rosiglitazone	Avandia

Thiazolidinediones are often called TZDs or Glitazones because the name is 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.

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 with a meal.

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.

Thiazolidinedione

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 in 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, 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 senior nurse, nurse practitioner or GP if you notice the older person has the following signs because they could indicate cardiac failure:

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

Thiazolidinedione

Nurses can use the information to

Check:

- Insulin is not being used with a TZD.
- The person does not have heart failure.
- Actose is administered at the right time e.g. with a meal.
- Glucose is available to treat hypoglycaemia and extra blood glucose testing for 2–4 hours is undertaken after a hypo.
- The person for swelling or weight gain, breathing problems and vision changes and seek help from the doctor or health care team.
- The person's falls risk by using the Diabetes-specific falls risk assessment (The McKellar Guidelines, pp. 50–51) and other general falls risk assessments and planning care to reduce the risk.

Key prescribing and monitoring issues in older people

There are many contraindications to using TZDs in older people with multiple comorbidities.

The risk of bladder cancer may not be an issue for people with a short life expectancy, but the other side effects must be considered.





The incretin hormones

There are two main types of incretin hormones:

GLP-1 agonists

Chemical name	Common brand names
Exenatide	Byetta Bydureon Victorza

DPP-4 inhibitors

Chemical name	Common brand names
Sitagliptin	Januvia
Saxagliptin	Onglyza
Linagliptin	Trajenta



The incretin hormones

What incretin hormones do

GLP-1 agonists

GLP-1 agonists 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.

It reduces 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 for over 10 years.

GLP-1 medicines are given by subcutaneous injection 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, however one GLP-1, Bydureon, is injected once a week and Victoza is injected daily.

DPP-4 inhibitors

DPP-4 inhibitors reduce the action of a hormone called Dipeptidyl peptidase-4 which is secreted in the intestine, and which reduces the secretion of GLP-1. Thus, DPP-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.



The incretin hormones

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, 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.

Nurses can use the information about Incretin medicines to:

- Learn about how an Incretin medicine works and their side effects.
- Administer Incretin medicines at the right time e.g. before meals OR with meals.

Regularly talk to the older person and their family about Incretin medicine side-effects to check whether the older person has any of the side effects of Incretin.

Key prescribing and monitoring issues in older people

Long term benefit not established.

GLP-1

Need to monitor weight. GLP-1 can contribute to anorexia and weight loss, which leads to loss of muscle mass strength which increases falls risk in older people and can affect micronutrient levels that are needed for metabolic processes.

GLP-1 are given by injection and can be expensive.



Sodium-glucose cotransporter-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 unknown adverse effects or interactions may emerge over time, especially in older people.



Sodium-glucose cotransporter-2 inhibitors

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 can 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 might 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 can test positive for glucose in their urine.

Nurses can use the information about SGLT-2 medicines to:

- Learn about how an SGLT-2 medicine works and their side effects.
- Administer SGLT-2 medicines at the right time e.g. with the first meal of the day.
- Regularly talk to the older person and their family about SGLT-2 medicine side-effects to see if the older person has any of the side effects of SGLT-2 medicines.
- 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, GP and healthcare team if needed.
- Make sure hypoglycaemia treatment is available and used if needed.

Talk to the older person's GP/Healthcare team about any 'changes' in the older person and whether the 'changes' could be caused by SGLT-2 medicines.

Key prescribing and monitoring issues in older people

There is limited evidence for use in older people.

Consider the individual's risk of urinary frequency and incontinence, hypotension and genital infections.

Combination medicines

Combination medicines

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

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

- Glucovance, which contains Glyburide and Metformin.
- Janumet, which contains Sitagliptin and Metformin.
- Kombiglyze, which contains Saxagliptin and Metformin.
- Nesina Met, which contains Alogliptin and Metformin.

Combination medications 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

Insulin

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 insulins like Lantus cannot be mixed in the same syringe as any other insulin. They should be injected into a different site from other insulins.



Insulin is a high risk medicine. You can determine each older person on insulin risk of hypoglycaemia by completing the Hypo risk assessment tool on pages 26–27.

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 insulin** are clear and act for 17 to 23 hours. These insulins cannot be mixed with other insulins. Long acting insulin analogues should not be injected in the same site as rapid acting insulins. Generally, long acting insulin analogues were designed to be administered at the same time each day.
- **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.
- **Ultra long acting insulin** Toujeo 300 Units/mL, is clear and acts for 20-24 hours. Toujeo cannot be mixed with other insulins.

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 test blood glucose. However, some people prefer to use an insulin syringe.

Insulin in bottles and in pen devices should be discarded 28 days after its first use.

Key prescribing and monitoring issues in older people

- High risk medicine and causes hypoglycaemia.
- Warfarin and insulin are the two medicines associated with hospital admissions.
- It can be difficult to match carbohydrate intake with insulin dose if the person eats erratically.

Insulin

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 the peak action time of each type of insulin to decide the persons risk of hypoglycaemia

Administering insulin

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.
- Injecting into scar tissue.
- Inappropriate injection technique, for example:
 - Using the wrong size needles.
 - Removing the needle from the subcutaneous layer too soon after injecting.
 - Reusing needles, which cause trauma and infections.

Monitoring people prescribed insulin includes checking the:

- Blood glucose at the 'right' time especially the peak insulin action time, the table on page 55 highlights the main hypoglycaemia risk times for common insulins available in Australia.
- Injection sites for bruising and lipohypertrophy.
- 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.

People with dementia often eat erratically. Insulin can be given when the person eats to reduce the risk of hypoglycaemia.

Insulin

Main side effects

Hypoglycaemia (hypo) is the most common side effect of insulin. See the Hypoglycaemia risk assessment tool on pages 26 and 27 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 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 test 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 6 mmol/L treat the hypoglycaemic episode.

If an older person has frequent hypoglycaemic episodes, 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 can be kept out of the refrigerator but away from heat and light.

When to seek help

Treat the hypoglycaemia and contact senior staff, 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. Test the person's blood glucose and if it is low treat the hypoglycaemic episode.

Neuroglycopenic symptoms are common presentations of hypoglycaemia in older people.

Hypoglycaemia is preventable however can occur.

See the McKellar Guidelines pages 29–31 for information about how to treat hypoglycaemia.

General sick day care for older people with diabetes

Illnesses, infections such as UTIs, 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 threatening conditions: Hyperosmolar Hyperglycaemic Syndrome (HHS) and Diabetic Ketoacidosis (DKA). These conditions need urgent treatment. You can find out more about them in The McKellar Guidelines, see section 4.

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

If you or the older person tests their blood glucose and it is higher than usual and the person feels unwell start testing 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.

If their blood glucose is getting higher make sure you:

- Encourage the person to drink water and eat small frequent meals if possible.
- Do not stop their glucose lowering medicines especially insulin in people with type 1 diabetes without checking with their doctor or diabetes educator.
- Test their blood ketones every 2–4 hours if you have been taught how to perform the test, especially if the older person has type 1 diabetes or their blood glucose is over 15 mmol/L for two consecutive readings.
- Encourage them to rest and delay strenuous activity such as gardening or cleaning.

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 testing 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.

- Notify the doctor 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 an appointment with a doctor or arrange transport for the older person to go 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.



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.

Monitor ketones in older people with type 1 diabetes during illness. Extra insulin may be required and/or they may need to be admitted to hospital.



Section 4

Other sources of information

Written information

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

Australian Medicines Handbook (AMH). Aged Care Companion. (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. (2014)

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:

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>

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%20%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](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/LTOject_Store/LTOjectSt1.nsf/DDE300B846EED9C7CA257616000A3571/0D638BDD269A209FCA257761001BFAB9/\\$FILE/81-9719a084.pdf](http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTOject_Store/LTOjectSt1.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

