MEDICINES ADMINISTRATION

29

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THIS CHAPTER COVERS

- Medicine optimisation and holistic person-centred care
- Administering medicines
- Calculating the right dose

REQUIRED KNOWLEDGE

- It is essential to have a basic understanding of pharmacology, including how medicines act on the body, and an awareness of commonly used groups of medicines, such as analgesics, antipyretics, antihistamines, steroids, antibiotics and medicines used in cardiac arrest.

> I am 10 and I have asthma and eczema – I am allergic to everything! To stop my skin from itching, I have to have a lot of creams and for my asthma I have inhalers. I can do these myself now, which is good because I need to have them at school. Last month I had a bad asthma attack and ended up in hospital again for three days and had lots of inhalers and medicines, and my mum stayed with me.
>
> **Cheng Lei, patient**

> Cheng is 10 years old now and has been a patient since he was a baby. He has to take a lot of medication. When he was a little boy, we taught his mum to give him his medicines and worked with the community nursing team so that he could be managed at home. Cheng's mum is great – she has learned how to manage his care holistically and flexibly at home and to recognise the signs of an asthma attack so they can take action quickly. We still give him his medicines if he is admitted to hospital and he is very unwell, but as his condition improves we are working with Cheng and his family to support him as he learns to manage his condition more independently.
>
> **Martin, registered child nurse**

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INTRODUCTION

Cheng's story outlines the wide-ranging care you will provide as a nurse to ensure your patients receive their medicines optimally. His story identifies that you may work in a hospital or in the community, possibly as a school nurse or in a community outreach service. Cheng's story also illustrates one example of the changing relationship which you may have with your patients, depending on whether they are assessed as independent and able to self-medicate, need some assistance or are completely dependent on nursing care. This may be due either to the medication to be administered or to your patient's capacity to manage independently, because of their developmental stage or their mental capacity.

This chapter intends to focus on the core skills surrounding the administration of medicines as this remains an essential of nursing practice through which students begin their clinical learning in the area of medicines management. Registrants of nursing will need to take further many concepts of medicine management by the time they reach registration and these additional components will be introduced in this chapter, with reading signposted to support further learning.

Medicine administration is identified by the Nursing and Midwifery Council (NMC) as:

> an important part of the professional practice of persons whose names are on the Council's register. It is not solely a mechanistic task to be performed in strict compliance with the written prescription of a medical practitioner (or independent or supplementary prescriber). It requires thought and the exercise of professional judgement. (NMC, 2004, cited in NMC, 2007: 3)

This concept is critically important, as the media-inspired perception of nurses as focused on giving out pills, liquids and injections is often evident when people are asked what it is they think that nurses do. However, it may be that the full extent of this role – the knowledge required to effectively enable and evaluate treatment and to be able to fully integrate medicines holistically within a person's life – is not fully appreciated. In the future, newly qualified nurses may require the knowledge and skills to be ready to prescribe medicines and this will require further development of your understanding of the whole arena of medicines management.

This chapter will help you to understand your fundamental role as a nursing student in supporting medicines assessment and administration, and prepare you to achieve the NMC requirements for registration as you progress through your studies. The complementary element of **nurse prescribing** will be introduced and resources will be signposted to assist in your learning. However, it must always be remembered that, as a nursing student, you must never administer or supply medicinal products without direct supervision (NMC, 2007). Throughout this chapter, you will be guided to consider what medicine administration means to patients and their families or carers, exploring your role and appreciating how it changes as your knowledge increases and you become a registered nurse.

MEDICINE OPTIMISATION AND HOLISTIC PERSON-CENTRED CARE

As individuals, patients will have personal preferences and it is important for you to use your knowledge about their medication to be able to empower them. For example, your patient may want to take their medicine before breakfast each morning. This may be possible, but could become more complicated if one of their prescribed medicines includes the instruction 'take *after* food' in order to protect the stomach lining. You may be able to suggest that they take their tablets with a glass of milk

in this case, but this would need to be considered in respect of all other treatments if they are taking more than one, because another prescription might require administration before food. This illustrates how a clear understanding of the fundamental principles of pharmacology is a prerequisite for administering medicines. Clearly, if you can work together with a patient to find a routine which suits their lifestyle and the medicines they are taking, you will be better able to optimise both the effects of the medicines and the likelihood that the patient will take them as intended, thus reducing the risk of harm. The above example describes a situation relating to medicines management which involves managing the medicinal treatment and the outcome. This is identified by NICE (2015) as 'medicines optimisation'.

In nursing, you always aim to find solutions through partnership with patients. However, the concept of medicines optimisation also includes compliance with prescription as an outcome, and sometimes negotiation is impossible if your patient will not accept the required prescription. This is challenging, as it involves patient rights and their capacity to consent to or refuse treatment. The outcome of such a situation may differ depending on the field of nursing in which you are practising:

- For capable adults, the choice to refuse ultimately belongs to the patient and the most you could do would be to ensure that the patient is aware of the implications of their choice.
- For children, individuals with a learning disability or those with mental health concerns, however, you may have more considerations.

It is also your role in all areas to understand the patient's viewpoint, to assess their capability for informed consent and to explore the options for those who refuse a prescribed treatment with medicines.

CASE STUDY 29.1: JULIA [COMMUNITY]

Julia is 25 and has recently been diagnosed as having episodes of psychotic behaviour. Following a period in hospital, she is now being cared for in her own home and the community mental health team visit twice a week. It is imperative that Julia receives her medication to manage her psychosis, but she is currently refusing any treatment, as she says that she is better and does not need it any more.

- What would be your priority?
- What specific additional assessments and actions would you perform to ensure Julia's safety?
- What steps could the community mental health team take if Julia continues to refuse treatment?

Your role in medicines administration

Medicines administration practice occurs in the period after an order for a medicine (prescription) has been made. In respect of prescription, this chapter focuses mostly on **patient-specific directions (PSD)** – which refers to only those prescriptions and medicines orders written specifically for one patient; it is important to know that the administration of medicines may also use **patient group directions (PGD)** where medicines may be prescribed to a group of patients. Medicines may also be prescribed today by a range of professionals (both medical and non-medical staff, including nurses, midwives and other health practitioners who have met strict criteria for prescribing) and your course of study is likely to include learning in this as you progress towards registration as a nurse.

There are three aspects of medicines administration, which are:

- ensuring the safe and effective storage and administration of medications to patients (or the support of patients or their carers to self-medicate)
- evaluating the impact and effectiveness of the medication given and assessment of any untoward effects
- recording the administration and the outcome.

These may seem quite simple when summarised, but the rest of this chapter will show you that medicine administration is a complex process which requires considerable knowledge and skills to achieve effectively. Your role as a nurse is also a small component of a bigger role undertaken for your patients by the multi-disciplinary team, which is called medicines management.

Medicines management

While medicine administration is mostly subject to professional requirements (NMC, 2007), many of the wider aspects of 'medicines management' are bound by law (MHRA, 2013). As a registered nurse, administering medicines within the wider context of medicines management, it is your role to understand how the complementary parts are bound by core pieces of legislation. These laws are grouped together with other regulations under the umbrella of the Medicine Regulations (2012):

- **1968 Medicines Act** – governs the manufacture, sale and supply of medicines. Medicines can be categorised as:
    - General Sales List (GSL), which can be purchased in retail outlets such as supermarkets
    - Pharmacy Only (P), which can only be purchased in a pharmacy
    - Prescription Only (POM), which must be prescribed by a health professional who is authorised to prescribe
- **1971 Misuse of Drugs Act** – defines medicines within schedules which are restricted further through their danger in public use
- **2001 Nurses and Midwives Act** – enabled nurses (and midwives) to prescribe drugs
- **2006 The Health Act and the Controlled Drugs (Supervision of Management and Use) Regulations** – changed the requirements for controlled drug management.

Storage and supply of medicines

Medicines should always be kept in locked drug cabinets or fridges. The only exception to this is medications required in an emergency, such as during a cardiac arrest. To enable rapid access to these, they are normally kept in a special container (or drug box) that is sealed with a band or easily cut tag. Individual prescriptions and patients' own medications may be kept within a locked cabinet beside a patient's bed or within the ward trolley or cabinet. When not in use and therefore away from continuous attendance, drug cabinets and trollies should be locked and secured to a wall so that they cannot be removed. Keys should be the responsibility of the nurse in charge of the area, who should know where they are at all times. It is your role in practice to ensure the medicines that patients receive are stored safely. This is to protect the patient and other people. For example, it is important to keep insulin in a locked fridge. Doing this protects the insulin from deteriorating, as it must be kept cool; it also protects patients or others from taking the medication inappropriately (for example, in children's areas) and ensures a regular supply is available, as supplies are likely to be maintained by the pharmacy.

ACTIVITY 29.1: CRITICAL THINKING

You and your practice educator have moved the drug trolley to the middle of a patient area and are administering the 18.00 drugs to patients you have been helping him care for. The cardiac arrest bell goes off and you hear a staff member call for help in the next room.

- What should your practice educator do?

Controlled medicines

For some medicines, controlled under the Misuse of Drugs Act 1971 schedules, there are strict rules around storage and administration in accordance with the Controlled Drugs (Supervision of Management and Use) Regulations 2006. In all nursing fields in acute (hospital) settings, it is necessary to have an identified accountable officer and a set of standardised operating procedures (SOPS) to which practitioners must adhere. This practice is regularly audited and should be managed in accordance with the latest guidance (NICE, 2016).

The SOPS include exact details of processes to which you must adhere. For example, controlled medicines must be transported in a specially sealed pack and the seals must remain intact until the destination is reached. Once delivered to a patient care area, controlled medicines must be counted by an authorised practitioner and kept in a special locked cabinet within a locked drug cupboard. Controlled medicines must be counted daily and on each occasion that any medicine is either supplied by the pharmacy or taken from the cupboard to be used. When a controlled medicine is administered, the record made must include the patient's name and the amount given. If any medication is to be wasted, then the amount discarded must also be recorded. All activities must be completed by an authorised and specifically prepared practitioner, and be witnessed.

> "I have never been in a community setting and encountered patients holding on to lots of old and out of date medication but if I did I would ask the person if they knew they had a lot of old medication in their home or if it was medication that was no longer needed I would want to know if they were still taking it. I would want to get the permission of the individual to dispose of the medication safely and to go through with them what they are taking and what they are for. I would also want to assess whether the individuals are able to continue to administer their own medication or whether a medipack may be more suitable."
>
> **Samantha Vanes, NQ RNMH**

Community settings

In community care, where patients are being cared for in their own homes, the rules are different since the medicines are the patient's own prescriptions, but those involved in care should still adhere to NICE guidelines (2016). Nevertheless, it remains part of the nurse's role to ensure that the medicines are optimally stored so that they do not deteriorate, and kept safely away from children or those who may abuse them. A large part of your role will involve educating the patient about using the prescriptions they have been given properly, and making sure they are not stockpiling medicines. This is done for two reasons. The first is to ensure patient safety, because medicines do deteriorate. There may also be an increased risk of misuse or unsafe use of medicines; for example, in patients where there is a suicide risk or where children may easily access medicines. The second reason is that it is wasteful.

WHAT'S THE EVIDENCE?

FURTHER READING: MEDICINES OPTIMIZATION

National Institute for Health and Care Excellence (NICE) (2015) Medicines Optimisation: The safe and effective use of medicines to enable the best possible outcomes. Available at: www.nice.org.uk/guidance/ng5live.

A scoping exercise undertaken by NICE (2015) found the following:

The cost of waste prescription medicines in primary and community care in England is estimated to be £300 million a year, with up to half of that figure likely to be avoidable. An estimated £90 million worth of unused prescription medicines are retained in people's homes at any one time.

Patients and their carers often have inadequate information about their medicines. Up to half of all patients may not be taking their medicines as recommended by the prescriber.

Reflect on the care of a patient you have been involved with in the community setting:

- Did the nurse check what medicines the patient was taking?
- Did they ask how the patient took their medication?
- Did they check whether the patient understood what their medicines were for?
- Did they ask whether the patient had any medicines which they were not using?

Now read the report and consider how you can apply the findings to your practice.

ADMINISTERING MEDICINES

A number of 'rights' are identified to aid you to optimise the medicinal treatment received by patients. While they can really only be considered as a starting point for you as you prepare to administer medicines, they can act as a useful aide memoire for the main features of clinical practice. We will use Hall's (2002) version, which includes eight rights, as this is viewed to be comprehensive, applicable to all settings and all patients, and simple to apply.

THE RIGHT MEDICATION
is given to
THE RIGHT PATIENT
at
THE RIGHT TIME
on
THE RIGHT DATE
in
THE RIGHT DOSE
via
THE RIGHT ROUTE
in
THE RIGHT PREPARATION
and
THE RIGHT DOCUMENTATION
is completed

Figure 29.1 Eight rights of medicine administration

Source: Hall (2002)

ACTIVITY 29.2: REFLECTION

Reflect on an experience when you have assisted your practice educator to administer medication to a patient:

- Did they apply the eight rights of medication?
- If not, did they use another, similar system?
- How do the eight rights, or other systems, assist nurses to administer medication safely?

Administering medication to a patient

When administering medication, safety and accuracy are of fundamental importance. As previously identified, there are three stages of the nurse's role with respect to medication. Following the steps outlined in Clinical Skill 29.1, which relate to these stages, will enable you to safely administer medication, either orally or by **topical application**.

CASE STUDY 29.2: GUY, HIS MUM AND BENJI

Guy is 42 and has a moderate learning disability. He lives with his mum, who is his main carer, and requires only minimal assistance with his daily activities. Guy doesn't like to socialise, preferring to spend most of his time caring for and walking Benji, his dog, a 2-year-old Irish Wolfhound.

Over the last three months, Guy has been feeling increasingly unwell and he has recently been diagnosed with diabetes. He has been prescribed tablets to control his blood sugar, but is very confused about when he should take them and why. His mum has been searching the internet to find out information about diabetes, but she is confused about what she has found and is unclear as to how Guy's condition will be improved by the tablets.

Guy has been up all night because he is very worried about who will look after Benji if he becomes ill, as 'Benji is too big and naughty for Mum to manage'. Guy's mum has brought him to see the practice nurse at his GP surgery, to help her and Guy understand his treatment.

- What type of information is it necessary to share with Guy and his mum to help them to understand his medication?
- Who else could be involved in offering Guy and his mum the support they require?

CALCULATING THE RIGHT DOSE

When administering any medication, it is fundamentally important to calculate the right dose. It is often very much easier to calculate medicines in practice because you have non-verbal cues to help you. Some universities use computer-aided or pictorial packages to help you too. It is good practice to assist your practice educator to work out doses, so you can become experienced in pouring out and measuring the correct amounts. Numeracy for medicines does not end at simply getting the calculation correct, as the medicine still needs to be accurately measured and given to the patient.

There are many ways to work out the calculation and each person may choose a different method. Indeed, you might choose different methods of calculation depending on the complexity of the equation.

STEP-BY-STEP CLINICAL SKILL 29.1: ADMINISTERING MEDICATION (ORAL OR TOPICAL ROUTE)

☑ Essential equipment

- Drug to be administered
- Medication pots (or suitable vessel) to take the drug to the patient in
- Jug of water and clean glasses
- Medicine Administration Record (MAR)

☑ Field-specific considerations

When caring for patients, it is important to remember that many have needs which cross the boundaries of the fields of nursing, so consider all of this information as potentially relevant to the patients you may care for.

It is important at all times to empower all patients with respect to medicine administration.

Learning disability – ensure that the patient and their main carers, as appropriate, are informed about their medicine and about how it assists them. To do this you need to undertake an assessment of the individual's capability. Some people with a learning disability will be able to manage their own medications, while others may need varying amounts of support. The use of preloaded and timed pill boxes may be useful in some cases to establish a regular routine and to ensure that your patient takes the correct medicine. Medication administration records which include a photograph of the individual are frequently used in community settings as they provide a safe method of identifying an individual (as identity bands are unlikely to be worn). Another method can be the use of two identifiers (for instance, name and date of birth as well as photo or ID band).

Mental health – the use of physical and psychological supportive techniques and a good understanding of how your patient feels about their medications will assist you in appreciating the extent to which the monitoring of medications and support is required. Remember that some patients will be receiving treatment under the Mental Health Act, so may not wish to comply with this. It is also important to consider different models of health belief and self-care in establishing the best care possible for your patient. The therapeutic relationship you have with your patient will influence the information they share in respect of their drug treatment. Remember that other forms of treatment, such as psychotherapy, counselling or cognitive behavioural therapies, may be in effect simultaneously with medication. For some patients with mental health problems, including those who are severely depressed or with suicidal tendencies, when administering medicines you must ensure any medicines given to your patient have been taken. It is important to be aware that medicines may be hidden in the mouth and then secretly stockpiled.

Child – encourage, assist and educate children of all ages, as well as their parents or carers, to be involved in the administration of medicines. This will enable you to determine the capabilities the child may have, their likely behaviour and their understanding of the situation. Ensure you tailor your communication skills to reflect the needs of different age groups. An awareness of pharmacology and calculation skills to work out patient-specific drug doses is necessary in all fields, but as many drug dosages are determined by a child's weight in kilogrammes it is essential in this field of nursing. It is important that any medication administration is always undertaken away from 'safe' areas, such as the playroom or bedside, especially if the medicine administration is unpleasant. For neonates or in specialised circumstances, you may also need to learn to calculate very small doses using microgrammes.

Adult – in adult nursing, all of the above might apply, and your role involves assessing a diverse range of individuals who need your care. While most adults will be able to actively participate in their treatment, you will certainly encounter patients with dementia and those who are confused.

☑ Care-setting considerations

It is possible for medications to be administered orally or topically in all care settings.

☑ What to watch out for and action to take

Monitor the effectiveness of the treatment by pre- and post-administration observations. For example, has the patient's temperature reduced? Is the patient still in pain, or feeling nauseous, following the administration of medication?

Ensure you are aware of the therapeutic application of the medicine to be administered, its normal dosage, side-effects, precautions and contraindications before you administer it. Ensure you refer to an up-to-date version of the British National Formulary (BNF) to ascertain this information before administering any medicines with which you are unfamiliar.

Monitor for any reactions to the medication, report any concerns to your practice educator or a registered nurse and ensure they report this to the person prescribing the drug without delay. All drug reactions need to be treated appropriately as soon as they become apparent.

Contact the person prescribing the drug if an assessment of the patient indicates that the medicine is no longer suitable or the patient declines to take it.

☑ Helpful hints

- Gloves and aprons must be worn if contact with blood/body fluids/excreta is anticipated or the patient is in isolation.
- Gloves should be worn if contact with the medication is potentially harmful to the nurse – for example, in the case of topical steroid preparations.
- Hand hygiene must be performed before touching a patient, before clean/aseptic procedures, after body fluid exposure/risk, after touching a patient and after touching a patient's surroundings.
- Waste should be disposed of in a clinical waste bag if it is contaminated with blood/body fluids/excreta.

To aid you to administer oral medications safely, always follow the top tips below.

Top tips for administering oral medications (Hall, 2002)

- Check the prescription chart and the BNF for any special instructions relating to how to administer medications, such as:
  - administer with food, before food or after food
  - any possible interactions with other medications, substances such as herbal medicines or grapefruit juice
  - 'slow-release' tablets must be swallowed whole to allow the medication to be released gradually.
- Do not crush coated tablets as in doing this you are making their use unlicensed.
- Do not break tablets that are unscored as you are likely to be giving an inaccurate dose.
- If medication is to be administered via a **nasogastric (NG)** or percutaneous endoscopic gastrostomy (PEG) tube, ask the pharmacist to dispense a suspension which will not block the tube.
- If a medication is in liquid form, shake the bottle before you pour it out to ensure it is evenly concentrated.
- When using a medicine pot to measure a liquid, place it on a flat surface and ensure you are at eye level to it in order to read the graduations accurately.
- As well as being ingested via an oral route, tablets may be administered via the
  - sublingual route, which means they are placed under the tongue
  - buccal route, which means they are placed between the cheek and the upper gum.
- Liquids can be administered via a nasogastric (NG) or percutaneous endoscopic gastrostomy (PEG) tube.

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MEDICINE ADMINISTRATION GUIDELINES

ENSURING SAFE AND EFFECTIVE STORAGE AND ADMINISTRATION OF MEDICATION TO PATIENTS

1. **Introduce yourself to the patient, explain the procedure and gain their consent**
Adapt communication style to meet the needs of the individual patient and their family or carers
Patients should be involved as desired in decisions relating to their medicines. Fully informed consent may be difficult if the patient is a child or has severe mental health issues or learning disabilities, but every effort should be made to explain the procedure in a way the patient can understand. This is respectful of individual human rights, supports informed participation and reduces anxiety. For patients unable to provide consent because they are unconscious, advice should be sought from your practice educator or another qualified nurse

2. **Gather required equipment**
Ensure cleanliness
Reduces risk of cross-infection and maintains patient and nurse safety

3. **Identify an appropriate place to prepare medications, away from interruptions and distractions**
Clear sufficient space within the environment where the drug is administered
Ensures patient safety, as interruption is associated with medication error

    Enables clear access for the patient and the nurse to safely administer the medication

4. **Wash your hands with soap and water before you start administering medication. Ensure your use of Personal Protective Equipment (PPE) such as gloves and disposable aprons is appropriate by considering the individual patient situation and the risk presented**
Wearing an apron and gloves as part of PPE is standard infection-control procedure when dealing with body fluids or patients in isolation. When administering medications, you may need to wear gloves to protect yourself from exposure to the drug (such as when applying topical skin preparations)

5. **Follow local policy for the administration of medicines. This may mean you must observe rather than participate in administration directly yourself. As a nursing student, you must ensure you are supervised by a registered nurse when administering medication**
To ensure patient safety and support your learning

    To meet local policy guidance requirements which ensure employees and students are fully insured for the care that they give

6. **Before you give any medication, you will need to complete a full assessment of your patient's medication needs. This involves:**

    a. **Checking the patient's care plan for specific requirements**
    b. **Checking the Medicine Administration Record (MAR) to determine the correct medicine to be given to the correct patient, taking account of all eight rights of medicine administration (see Figure 29.1)**

To ensure patient safety

    You need to be aware of the patient's plan of care to ensure no changes have been made and that the medication administration remains appropriate

    To ensure the drug is administered accurately and safely

    Medicines must be given in a timely manner in order to ensure optimum benefits from treatments

    It is dangerous to administer a medication which is not specifically **licensed** for a particular route

7. **If a number of medicines need to be given at the same time, prioritise which one to administer first**
Some medicines require specific conditions for best effect
If the medications are to be administered orally, it may be possible to take them to the patient simultaneously provided they do not interact with one another. If medication is required via different routes (e.g. injection and oral), then this will need to be managed to enable optimum treatment. Seek advice from the pharmacist

8 **Decide if there is reason not to administer the medicine at this time and record and report accordingly**

If there has been a change in the patient's condition, a medication may no longer be appropriate, or the patient may be unable to take it. If a patient is 'nil by mouth', check with the drug prescriber whether any of their oral drugs still need to be given (for example, cardiac drugs), possibly by a different route

9 **Locate medicine to be administered, ensuring it is:**

a. in date
b. the correct formulation for the route to be given and appropriate for your patient's preferences
c. the correct dose strength for the prescription
d. the correct medicine according to the prescription

a. The quality of an out-of-date medicine may have deteriorated
b. To prevent error and ensure the best possible outcome in terms of patient care
c. To ensure safe practice, as medicines are available in different strengths
d. You must check that the prescription and the label on the medicine are both clearly written and are the same to ensure patient safety

10 **If your patient is a child or the drug dose is calculated according to the patient's weight, check that the prescribed dose is correct for the patient's current weight or BMI**

To ensure patient safety, the dose must be checked using accurate patient weight. Some adult drugs are prescribed according to patient weight to ensure accuracy of treatment. Patient weights can change considerably through the illness process

Children's medicines are calculated on the basis of milligrams per kilogramme per day. Some specialised areas use BMI and surface area for drug doses. A calculator can be found on the BNF website

11 **Calculate the amount of medicine to administer and measure the required amount accurately**

An accurate amount of medication must be given to the patient

Medicine must always be measured accurately using appropriate equipment. For example, measuring a dose of 5 ml using a 50 ml medicine pot makes accuracy difficult. The difference of even a few ml can cause problems. Always use the smallest appropriate measuring device

12 **Ensure medication is placed in an appropriate receptacle for administration to the patient**

To make taking the medicine as easy as possible for the patient

13 **Medication which is not needed must be returned to its place of secure storage or disposed of in accordance with local policy and legal requirements**

Safe disposal of medicine is important to keep patients, families, carers and staff safe from unwanted effects. Controlled medicines and highly toxic materials will have specific handling and disposal guidelines

14 **Complete final checks, which always include patient identity and allergies, but may also include specific checks for individual drugs. Provide patients with necessary information regarding their medication, using an appropriate means of communication to aid explanation**

To ensure patient safety:

a. be certain of the identity of the patient to whom the medicine is to be administered
b. check that the patient is not allergic to the medicine before administering it
c. before administering some drugs, cardiac ones for example, it is necessary to check that the patient's heart rate or blood pressure is within acceptable parameters

(Continued)

Patients and carers must be aware of the main features of the medicines given and how to manage them effectively and **concordantly**. They need to know what to do if the medicine is taken inappropriately and the implications of missing doses

15 **Ensure your patient is fully prepared for the administration of the medication and is in an appropriate position. Provide protective clothing or tissues if needed, or a drink, etc. An infant may need to be held securely**
Patients should be in a position which ensures both comfort and safety

Protective clothing can maintain dignity through avoiding spills

16 **Ensure medication is administered in accordance with the prescription, local policy and patient preferences (see Clinical Skill 29.1). If given orally, ensure medication has been swallowed**
To ensure patient safety and involvement and that the medication is received as prescribed

RECORDING ADMINISTRATION AND OUTCOME

17 **Record that the medicine has been administered on the Medication Administration Record to ensure a legal record of the medicine administered**
You must make a clear, accurate and immediate record of all medicine administered, or any intentionally withheld or refused by the patient. You must ensure your signature is valid and is clear and legible. If local policy has allowed you to administer the medication, ensure the registered nurse supervising you countersigns your signature

EVALUATION OF THE IMPACT AND EFFECTIVENESS OF THE MEDICATION AND ASSESSMENT OF ANY UNTOWARD EVENTS

18 **Document relevant information on the patient's observation chart and/or in the patient's notes as necessary**
Monitor the effectiveness of the medication and any reactions, reporting these to a registered nurse and the medication prescriber and instigating treatment as appropriate
Maintains patient safety and accurate records. Failing to complete documents may mean a patient could receive the medication on more than one occasion

Ensure you are fully aware of the therapeutic uses of the medicine to be administered, its normal dosage, side-effects, precautions and contraindications

Adverse reactions to medications can range from discomforting to life-threatening. By administering a medicine, you undertake to ensure that you are aware of any possible reactions and know what to do in response

Ensure you advise patients of any signs to watch out for and identify how they can inform you

19 **After the medication administration has been completed, ensure the patient is in a comfortable position, with drinks and call bells available as necessary**
Promotes patient comfort and ensures they are well nourished and hydrated

20 **Discard PPE, any single-use equipment and other used materials as per policy. Clean any equipment used as per the relevant policy every time it is used and perform hand hygiene**
Prevents cross-infection and maintains equipment in working condition

Source: BNF (2014); NPC (n.d.); NMC (2007); Westbrook et al. (2010); WHO (2009)

This is perfectly acceptable as long as you know how your method works and that it produces the correct answer. The following steps can be used as guidelines to assist you to administer the correct dose.

1. Identify the component parts of the calculation:
   - What is the required dose prescribed on the prescription?
   - What is the dose of the medicine you have available?
   - What is the volume in ml (if a liquid)?
2. Identify an estimated amount of drug required.

This will help to ensure your calculation is accurate and may allow you to work out the required dose without resorting to a calculation. For example, if the dose prescribed is 75 mg and:

- the available dose is 100 mg
- in a volume of 10 ml

your estimate would begin by recognising that the required dose is not more than 100 mg, therefore **not more** than 10 ml.

- A little more consideration would enable you to also recognise that the required dose of 75 mg is more than half of the stock requirement – so will be **more than** 5 ml.

At this point, you have some **parameters** and may decide to carry on using maths facts or to use a formula for calculation, depending on the complexity of the sum.

The maths facts route

In this method, you would gather together useful knowledge about the equation and complete your calculation through reasoning:

- Some further thinking might identify two other maths facts. First, 75 is three quarters of 100. If you apply this to 10, three quarters is 7.5 ml.

OR

- If there is 100 mg in 10 ml, then every 1 ml must contain 10 mg because 10 mg × 10 mg = 100 AND 10 × 1 ml = 10 ml.

75 mg must therefore be 10 mg × 7 = 70 mg (= 1 ml × 7 = 7ml) + 0.5 ml = 5 mg = 7.5 ml

The formula route

Through this route you would use the same information, but it can be set into an equation using the formula.

What you want (dose required by prescription) x What it is in (volume)

What you have got (the available dose).

So the equation would be:

What you want = 75 mg × What it is in = 10 ml

What you have got = 100 mg

which becomes 75 × 10

and can be calculated as: 75 × 10 becomes 750 (divided by) 100

Answer is **7.5 ml**

ACTIVITY 29.3: CRITICAL THINKING

Mr Jones is prescribed 1 g of paracetamol, which comes in 500 mg tablets:

- How many tablets would you give him?

Lizzie, a 3-year-old patient, is prescribed 250 mg of ampicillin, which comes in liquid form in 50 mg per ml:

- How many ml would you give her?

You need to give Mr Singh a 50 mg dose of oral morphine. You have a bottle of morphine elixir at a concentration of 2 mg/ml:

- How much should you give him?

The dose of a drug required is 1 g and the solution available has 50 mg per ml:

- How many ml are required for the dose?

Miss MacTavish weighs 50 kg. The dose of a drug prescribed for her is 10 mg per kg and the medicine strength is 50 mg per ml:

- How many ml are required for a single dose?

An injection contains 200 mg in 10 ml and the dose required is 60 mg:

- How many ml should be injected?

WEBLINK: DRUG CALCULATIONS AND CONVERSION

For some further practice, the Queens University Belfast website offers a useful resource with short video clips included alongside practice tests focusing on specific aspects of arithmetic related to medicine administration:

www.qub.ac.uk/elearning/public/NumeracySkillsforDrugCalculations/Year1FinalExam/BasicDrugCalculations

www.qub.ac.uk/elearning/public/NumeracySkillsforDrugCalculations/Year1FinalExam/Conversions

For more real-life practice, you may like to try the www.nursingnumeracy.info exemplar assessment, which allows you to read a medicine prescription, make a calculation and place the right number of tablets in a pot (see www.nursingnumeracy.info/page11/page5/page5.html)

Numeracy and technical skills

As a nursing student, it is necessary to:

- have a good conceptual understanding of maths

This is a 'demonstration of competence and confidence with regard to judgements on whether to use calculations in a particular situation and, if so, what calculations to use, how to do it, what degree of accuracy is appropriate, and what the answer means in relation to the context' (NMC, 2010, Annex 3: 2). This means that you must realise why you are making a calculation and how accurate you need to be. You will use calculations every day within nursing and some will need to be more specific than others. Pouring a drink, for example, needs to be more accurate for someone with a kidney disorder than a healthy adult. In respect of medicines, this will depend on the prescription order. Some medications are prescribed in small volumes using small units, while others may be in much larger and less specific units.

It is also critical to ensure that you have a working appreciation of volume. This can help to protect against errors of magnitude (for instance, giving ten times the dose prescribed), which is a common error resulting from poor arithmetical ability combined with poor conceptual understanding of maths. Realising that 100 millilitres is about half a cup of fluid will often prevent a medication prescribed at 10 millilitres being wrongly concluded. As a new student, it is helpful to pour out different volumes of fluid and describe them – for example, 0.1 ml, 1 ml, 10 ml, 20 ml, 50 ml, 100 ml, 1 litre. Think about where you might see these different volumes and have to measure them. Examples might include maintaining a fluid balance record in a child or adult acute hospital setting, which might include measuring urine output as fluid input, drawing up a vaccination in a GP clinic, or in a mental health setting determining the volume of an injectable antipsychotic medication.

- have arithmetic ability

This means you must be able to undertake multiplication and division, addition and subtraction accurately and with confidence and be able to use formulae. You must also be competent in the conversion of decimals and fractions, be able to use Standardised International (SI) units with confidence (be able to convert milligrammes to microgrammes or grammes) and be able to input information into a calculator according to a formula and know if the answer is wrong.

- have good technical measurement skills

This means you must be able to use measuring equipment (such as syringes and medicine pots) properly. This is important because, once you have correctly calculated a dose of medication, if you are unable to accurately draw this amount up in a syringe or measure it in a medicine pot, the patient will not receive the correct amount of medication.

> The key to developing your numeracy and technical skills when dispensing medications is practice. As a student I always had a notepad in my pocket; I wrote down medication names and doses that I can came across, as well as the calculations to work out doses. I asked my placement practice educators, when appropriate, if I could work out dose calculations with them whenever the opportunity arose.
>
> **Charlie Clisby, NQN**

ACTIVITY 29.4: CRITICAL THINKING

Aodhan is six months into his nursing programme and has enjoyed his first placement, apart from feeling very confused as to how to calculate drug doses. He is convinced he is not able to get the correct answers and is concerned that he may give the wrong amount of a drug to a patient.

- What advice would you give Aodhan?

CONCLUSION

As individuals, patients will have personal preferences, and it is important for you to use your knowledge about their medication to empower them. To do this, you need a clear understanding of the fundamental principles of pharmacology, and to be able to understand the patient's view, assess their capability for informed consent and explore the options for those who refuse prescribed treatment with medicines.

There are three stages of the nurse's role in medicine administration, namely ensuring the safe and effective storage and administration of medications to patients (or supporting patients or their carers to self-medicate), recording the administration of the medication and the outcome, and evaluating the impact and effectiveness of the medication given and assessing any untoward effects.

Although the administration of medicines is mostly subject to professional requirements, many of the wider aspects of 'medicines management' are bound by law, which your practice must uphold. In order to assist you to ensure your practice is effective and optimises the medicinal treatment patients receive, always consider Hall's eight rights of medication (2002) during administration, as this will promote patient safety.

When administering any medication, accuracy and safety are fundamentally important. This includes calculating the right dose. There are many ways to do this, and each person may choose a different method. Indeed, you might choose different methods of calculation depending on the complexity of the equation. This is perfectly acceptable as long as you know how your method works and that it produces the correct answer.

CHAPTER SUMMARY

- Medicine administration is a holistic and integral patient-caring activity within all fields of nursing.
- The safe storage and management of medicines is an important aspect of the nurse's role.
- As a nursing student, you must always be supervised by a registered nurse when administering medications.
- Applying the eight rights of medication will aid you to optimise the medicinal treatment patients receive.
- You must never give a medicine without being certain that the dosage (relating to the patient's weight where appropriate), the method of administration, the route and the timing are all correct.
- Patient empowerment with regard to their medication is fundamentally important.
- Nurses need both the technical skills to accurately dispense medications and the mathematical skills to calculate the correct dose.

CRITICAL REFLECTION

Holistic care

This chapter has highlighted the wider importance of providing holistic care in administering medicines to patients. Review the chapter and note down some instances in which you think assessing and empowering an individual in meeting their need for medicine treatment could help to address their wider physical, emotional, social, economic and spiritual needs. Try to think of a variety of different patients across the fields, not just within your own field. You may find it helpful to make some notes to refer back to the next time you are in practice, and then write your own reflection after your practice experience.

GO FURTHER

Books

Baileff, A., Davis, J. and Davey, N. (2012) 'Managing medicines', in I. Bullock, J. Macleod-Clark and J. Ryecroft-Malone (eds), *Adult Nursing Practice: Using Evidence in Care*. Oxford: Oxford University Press. pp. 378–94. A good review of the evidence underpinning medicine administration to adults.

Hall, C. (2010) 'Medicines administration', in A. Glasper, M. Aylott and C. Battrick (eds), *Developing Practical Skills for Nursing Children and Young People*. London: Hodder Arnold. pp. 148–66. This book chapter covers the administration of medicines to children in considerable depth and provides a protocol for reading the Medication Administration Record, which applies to all fields, and a table which outlines the main routes of medicine administration.

Mutsatsa, S. (2011) *Medicines Management in Mental Health Nursing*. Exeter: Learning Matters. An excellent textbook which will develop your knowledge of medicines administration and management in mental health nursing. This book also includes a good section on administering injections.

Journal articles

Dickens, G., Doyle, C. and Calvert, J. (2006) 'Reducing medication administration errors in learning disability nursing', *Nurse Prescribing*, 4(11): 470–4. This article applies considerations around the safe administration of medicines to those caring for patients with a learning disability specifically. In this field, there are particular concerns, since these patients may be less likely than others to identify if the medications they are receiving are not correct, and in severe situations may not be able to tell you their name or provide you with other details which would help you to identify them.

Hutton, B.M., Coben, D., Weeks, K., Hall, C., Rowe, D., Sabin, M., et al. (2010) 'Numeracy for nursing, report of a pilot study to compare outcomes of two practical simulation tools: An online medication dosage assessment and practical assessment in the style of objective structured clinical examination', *Nurse Education Today*, 30(7): 608–14. This article looks in considerable detail at the component parts of medicine calculation, identifying why you may be getting wrong answers! It is important to understand this when trying to improve your numeracy skills, and you may like to share this with those who are helping you to learn too.

Westbrook, J., Woods, A., Rob, M., Dunsmuir, W. and Day, R. (2010) 'Association of interruptions with an increased risk and severity of medication administration errors', *Archives of Internal Medicine*, 170(8): 683–90. This article underlines the point that simple interruptions while in practice settings can leave patients vulnerable to medication error.

Weblinks

FURTHER READING: WEBLINKS

Go to https://study.sagepub.com/essentialnursing2e for weblinks related to this chapter. If you are using the interactive ebook, simply click on the book icon in the margin to go straight to the resource.

www.bnf.org.uk – this site offers comprehensive information about medicines licensed for use within the UK. It provides information about the pharmacology, dose of the medication, its brand and its generic name. They are very useful resources for nurses in practice and your clinical practice areas will also have access to copies of these. British National Formulary Child (BNFC) is for those caring for children and young people, while British National Formulary (BNF) is for those caring for adult patients, including those with a mental health need.

www.nice.org.uk/Search.do?searchText=medicines&newsearch=true&x=14&y=23 – NICE provides a range of guidance and evidence relating to the optimisation of medicines treatment for patients. A simple search using medicines as a keyword will produce a useful starting point for further exploration.

www.nmc-uk.org/Documents/NMC-Publications/NMC-Standards-for-medicines-management.pdf – this NMC pdf offers the professional standards for the administration and management of medicines which must be adhered to by every qualified nurse.

www.nursingnumeracy.info/page11/page5/page5.html – this website includes an example of a short, free interactive test, which allows you to calculate medicines and prepare them for the patient, including measurement. The visual cues show you how the same calculation can look different in practice, as compared to undertaking a calculation using formulae on paper.

ACE YOUR ASSESSMENT

ONLINE QUIZZES

Review what you have learned by visiting the book's online resources at: https://study.sagepub.com/essentialnursing2e If using your interactive ebook, just click on the icon in the margin to go straight there.

- Test yourself with multiple-choice and short-answer questions.
- Revise key terms with the interactive flash cards.

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Nursing and Midwifery Council (NMC) (2007) *Ratified 2008 Standards and Guidance for Medicines Management*. London: NMC.

Nursing and Midwifery Council (2010) *Standards and Guidance for the Delivery of Pre-registration Nursing Education*. London: NMC.

Westbrook, J., Woods, A., Rob, M., Dunsmuir, W. and Day, R. (2010) 'Association of interruptions with an increased risk and severity of medication administration errors', *Archives of Internal Medicine*, 170(8): 683–90.

World Health Organization (WHO) (2009) WHO Guidelines on Hand Hygiene in Health Care. Available at: http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf (accessed 7 March 2018).