NEW ZEALAND HOSPITAL PHARMACISTS' ASSOCIATION

Standards of Practice for New Zealand Hospital Clinical Pharmacy Services

June 2019

Executive Summary

Medicines are the commonest intervention used in healthcare. They are effective but not without the potential for harm. Formed in 1952, the New Zealand Hospital Pharmacists' Association (NZHPA) is a not-for-profit voluntary organisation representing over 470 pharmacists and pharmacy technicians. NZHPA functions to:

- **Improve** the quality and equity of care by encouraging the rational and effective use of medicines
- **Establish** and promulgate standards and guidelines in relevant areas of pharmacy practice
- **Represent** the views of and advocate for hospital pharmacy
- **Provide** opportunities for training and professional development
- **Lead** and support high quality research and evidence informed pharmacy practice

Hospital clinical pharmacy services improve medicines use and patient health outcomes. Despite this, hospital clinical pharmacy services across Aotearoa NZ's twenty District Health Boards (DHB) vary in the extent and quality of service uptake and provision.

With a view to improve medicines-related patient health outcomes, and lead equitable and high quality medicines use across hospitals through the uptake of high quality clinical pharmacy services, NZHPA commissioned the development of an evidence-informed Standards of Practice (the Standards) document. The Standards detail NZHPA's view of exemplary clinical pharmacy services which hospitals across NZ should aspire to, within the remits of available resourcing. The Standards are broadly comprised of two parts:

1. **General recommendations** on:
    - Staffing levels and resources
    - Pharmacy technician utilisation
    - Hours of work
    - Specialty services
2. **Standards of Practice for Core Clinical Pharmacy Services**:
    - Medicine history obtainment
    - Medicine reconciliation
    - Inpatient medication chart review
    - Medicines optimisation
    - Documenting in the clinical record
    - Therapeutic Drug Monitoring (TDM)
    - Medication safety surveillance
    - Medicines information provision for patients/clients/service users
    - Participation in clinical ward rounds or equivalent
    - Pharmacist prescribers working in a collaborative setting
    - Discharge and transfer of care collaboration
    - Medicines and clinical information support for the healthcare team
    - In-service education provision
    - Medicines guideline and protocol development
    - Stewardship and medicines safety programmes
    - Clinical research

The Standards draw from contemporary research, policy and practice and have been refined based on extensive feedback from NZHPA members and partner organisations. It is intended that the document is continuously improved over time to align with current professional knowledge, technological advances, priorities and evolving models of care. With this is mind it is anticipated that future versions will seek to incorporate any evidence specific to Aotearoa NZ, and to make adjustments as needed to better support the resolution of equity issues within healthcare.

The NZHPA Standards ought to be of interest to policymakers, clinicians, funders and managers responsible for high quality and safe medicines use and should be used to guide hospital pharmacy service development and planning.

Ariel Hubbert

NZHPA President

Endorsed by the following Organisations

Project team and acknowledgements

Project team

Project Lead: Fiona McNabb
Executive Sponsor: Dr Jerome Ng

Advisory Committee

1. Dr Jerome Ng
2. Fiona McNabb
3. Annie Egan
4. Truc Nguyen
5. Jessica Nand
6. Rachel Hooker

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Disclaimers

[1] SHPA Committee of Specialty Practice in Clinical Pharmacy. SHPA standards of practice for clinical pharmacy. Journal of Pharmacy Practice and Research. 2005 Jun; 35(2):122- Updated May 2013. https://www.shpa.org.au/resources/standards-of-practice-for-clinical-pharmacy-services

Overview

Purpose

To clearly articulate the New Zealand Hospital Pharmacists' Association Standards of Practice for New Zealand Hospital Clinical Pharmacy Services.

To provide evidence based recommendations for clinical pharmacy service workforce staffing levels, where possible

Scope

The Standards update and supersede the NZHPA Clinical Pharmacy Guidelines (2007)[2] and are consistent with existing national and regulatory competency and professional frameworks.[3]

Workforce staffing level recommendations and the rationale for each of the Standards are consistent with relevant international evidence, targeting activities that when delivered by pharmacists for hospital patients, increase the likelihood of desired health outcomes.

The Standards comprise detailed descriptions of specific areas of practice with a focus on **core clinical services** provided by NZ hospital pharmacy services and pharmacists working within a hospital setting:

1. Medicine history obtainment
2. Medicine reconciliation
3. Inpatient medication chart review
4. Medicines optimisation
5. Documenting in the clinical record
6. Therapeutic Drug Monitoring (TDM)
7. Medication safety surveillance
8. Medicines information provision for patients/clients/service users
9. Participation in clinical ward rounds or equivalent
10. Pharmacist prescribers working in a collaborative setting
11. Discharge and transfer of care collaboration
12. Medicines and clinical information support for the healthcare team
13. In-service education provision
14. Medicines guideline and protocol development
15. Stewardship and medicines safety programmes
16. Clinical research

The following are outside the scope of the Standards but may be added to in future iterations:

- Specialised clinical pharmacy practice (e.g. Intensive Care, Oncology/Haematology)
- Training requirements and guidance
- Implementation and assessment of the Standards
- Clinical practice standards for pharmacy technicians

[2] NZHPA Clinical Pharmacy Guidelines 2007. http://www.nzhpa.org.nz/media/1379/clinguide_07.pdf

[3] Pharmacy Council of New Zealand Competence Standards for the Pharmacy Profession. http://www.pharmacycouncil.org.nz/Portals/12/Documents/standardsguidelines/CompStds2015

The Standards are intended to be a **living document** and will need to be reviewed regularly in order to be reflective of industry, technology or evidence based practice change.

Intended audience

The Standards are intended for policymakers, funders, managers and clinicians responsible for:

- The safe and quality use of medicines in hospitals
- Hospital Pharmacy Services

Approach

NZHPA used a pragmatic and evidence-informed approach to develop the Standards based on and in alignment with:

- Published research and practice and grey literature;
- Key legislative, regulatory and professional frameworks;
- Treaty of Waitangi and;
- NZHPA member expertise and experience.

Where existing and well-developed guidance has already been developed and is in place (e.g. medicines reconciliation), these are referenced within the Standard to ensure consistency at a national level.

Glossary

Patient	Any person receiving health and/or disability services
Adverse drug event	Any medicine related event that results in harm. Can include but is not limited to over/under dosing, sensitivity or immune system reactions, undesired or adverse effects, medicine administration error, incompatibility or stability error.
Clinical record	Documented medical notes which includes, but is not limited to, hard copy (paper), electronic (e.g. e-HR, e-progress notes), and hybrid clinical patient record/notes where a dual hard copy and electronic record form the total clinical patient record
Clinical pharmacist	A New Zealand registered pharmacist delivering a clinical service such as described in the standards. Where 'pharmacist' has been used, the reader should interpret this as 'clinical pharmacist'
e-chart	Electronic medication chart
e-patient portal record	All electronically available patient information records that are accessible either via direct access or via secure data repositories for approved practitioners including (but not limited to) personal patient health record, community pharmacy dispensing record, laboratory data, primary care clinical records
Pharmacovigilance	The science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problem. (World Health Organisation. 2019)
Polypharmacy	**Appropriate polypharmacy:** Multi-medicine regimen for complex conditions or multiple co-morbidities in circumstances where medicines use has been optimised and where the medicines are prescribed according to best evidence.

	Problematic polypharmacy: Inappropriately prescribed multi-medicine regimen where there is a net harm for the patient and/or the intended benefits of the medicines are not realised.

Acronyms

ADR	Adverse Drug Reaction
ADE	Adverse Drug Event
ASHP	American Society of Hospital Pharmacists
BPAC	Best Practice Advocacy Centre (NZ)
DHB	District Health Board
e-HR	Electronic Health Record
MICP SIG	Medicines Information and Clinical Pharmacy Special Interest Group
NHI	National Health Identifier
NHS	National Health Service
NZHPA	New Zealand Hospital Pharmacists' Association
PHARMAC	Pharmaceutical Management Agency (NZ)
PMR	Patient Medical Record
PSNZ	Pharmaceutical Society of New Zealand
RPS	Royal Pharmaceutical Society
SHPA	Society of Hospital Pharmacists of Australia
SOP	Standard Operating Procedure
TDM	Therapeutic Drug Monitoring

Contents

Executive Summary 3
Endorsed by the following Organisations 4
Project team and acknowledgements 5
Project team 5
Advisory Committee 5
Acknowledgments 5
Disclaimers 5
Overview 6
Purpose 6
Scope 6
Intended audience 7
Approach 7
Glossary 7
Acronyms 8
Section One: Introduction 11
Background 11
New Zealand Hospital Pharmacists' Association 11
Rationale 11
Key principles 12
Addressing inequities of access 12
Strategic alignment 13
Section Two: Recommendations 14
Staffing Levels 14
General recommendations 17
Section Three: Standards of Practice for NZ Hospital Clinical Pharmacy Services 19
Overview 19
1. Medicine history obtainment 20
2. Medicine reconciliation 27
3. Inpatient medication chart review 29
4. Medicines optimisation 34
5. Documenting in the clinical record 36
6. Therapeutic Drug Monitoring (TDM) 38
7. Medication safety surveillance 40
8. Medicines information provision for patients/clients/service users 42

9. Participation in clinical ward rounds or equivalent 47
10. Pharmacist prescribers working in a collaborative setting 48
11. Discharge and transfer of care collaboration 50
12. Medicines and clinical information support for the healthcare team 53
13. In-service education provision 57
14. Medicines guideline and protocol development 59
15. Stewardship and medicines safety programmes 59
16. Clinical research 63

Section One: Introduction

Background

New Zealand Hospital Pharmacists' Association

Formed in 1952, the New Zealand Hospital Pharmacists' Association (NZHPA) is a not-for-profit voluntary organisation with a membership of 470 pharmacists and pharmacy technicians working across Aotearoa New Zealand (NZ) healthcare settings. Our members have expertise in managing medicines for patients who require general, critical or specialist care (e.g. cancer, cardiology, mental health), medicines stewardship, pharmaceutical budget management, education and health informatics. NZHPA functions to:

- Improve the quality and equity of care by encouraging the rational and effective use of medicines
- Establish and promulgate standards and guidelines in relevant areas of pharmacy practice
- Represent the views of and advocate for hospital pharmacy
- Provide opportunities for training and professional development
- Lead and support high quality research and evidence informed pharmacy practice

Rationale

Core clinical pharmacy services, such as medication chart review and medicines optimisation, individualise medicines use for better patient health outcomes. Research consistently demonstrates the **effectiveness of clinical pharmacy services** in improving patient health outcomes such as reduced hospital mortality rates. [4,5,6,7]

Hospital pharmacy services **strive to provide a quality service with high standards**. However, despite the known benefits in safeguarding patients, the extent of hospital clinical pharmacy services provided in NZ hospitals across twenty District Health Boards (DHB) is **inconsistent and variable**.

Factors affecting variances are multifactorial including workforce funding, individual pharmacy service, hospital or DHB level priorities, the size and complexity of hospital services requiring clinical pharmacist input, experience and clinical expertise of pharmacists and individual practice.

New Zealand hospital pharmacy services have previously had to rely on international standards of practice for guidance.

The healthcare environment In Aotearoa NZ however, has unique patient populations, and legislative, regulatory, funding and healthcare resourcing models which make the application of international standards in the New Zealand setting challenging.

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[4] Bond CA, Raehl CL, Franke T. Clinical pharmacy services and hospital mortality rates. Pharmacotherapy 1999;19 (5):556–64.

[5] Borja-Lopetegi A, Webb DG, Bates I, Sharrott P. Association between clinical medicines management services, pharmacy workforce and patient outcomes. Pharm World Sci 2008; 30:418–20

[6] O'leary KM, Stuchbery P, Taylor G. Clinical pharmacist staffing levels needed to deliver clinical services in Australian hospitals. Journal of Pharmacy Practice and Research. 2010 Sep;40(3):217-21.

[7] Stuchbery P, Kong DC, DeSantis GN, Lo SK. Clinical pharmacy workload in medical and surgical patients: effect of patient partition, disease complexity and major disease category. International Journal of Pharmacy Practice. 2010 Jun;18(3):159-66.

NZHPA aims to reduce variability of practice by providing national standards of practice (Standards) that support a clear model for exemplary hospital clinical pharmacy services. The Standards will also provide a platform by which hospital clinical pharmacy services can be evaluated and improved.

With a view to achieving better medicines related health outcomes through the quality use of medicines, this document outlines NZHPA's recommendations for:

- **General clinical pharmacy service levels and access in NZ hospitals**
- **Standards of Practice for NZ Hospital Clinical Pharmacy Services (Standards)**

It should be emphasised that the Standards of Practice outlined in Section 3 are aspirational.

The NZHPA recognises the importance of digital technologies, governance and strategic planning as part of improving the quality use of medicines. The Standards focus on core clinical pharmacy service components and are intended to be a living document that can be modified as services develop, health strategies evolve and new technologies become available.

The NZHPA Standards ought to be of interest to policymakers and clinicians charged with ensuring high quality and safe medicines use in hospitals and funders and managers responsible for hospital pharmacy service development and planning.

Key principles

The Standards should be read with the following key principles in mind:

- The intention of the NZHPA is to set aspirational Standards of Practice that reflect best international and national practice. Current staffing levels and resourcing in New Zealand hospitals may not enable a service to deliver the full clinical practice as described in the Standards.
- The Standards presume that pharmacists will act in a way that is consistent with best professional, ethical, and competency practices as defined by the New Zealand Pharmacy Council, New Zealand health and privacy legislation and codes of practice.
- Inequities exist in the provision and quality of medicines-related services in Aotearoa NZ and these contribute to disparities in health outcomes. The Standards set out pharmacist-related actions which can contribute to achieving health equity at both individual and population based levels.
- While the NZHPA supports extended roles for pharmacy technicians,[8] the Standards do not describe pharmacy technician or intern pharmacist roles; those intern pharmacists and pharmacy technicians working in a clinical pharmacy service must be supervised in line with industry training standards and organisational policy and procedures.

Addressing inequities of access

The NZHPA acknowledges that the principles and intent of the Treaty of Waitangi are fundamental to fulfilling the collective healthcare system responsibility to support the rights of Māori and to work to reduce inequities of access and care in health.

[8] NZHPA Position Statement. Extended roles for pharmacy technicians. November 2013

Access and equity of healthcare for Māori, Pacific Island and other priority populations must be a key focus for clinical pharmacy service delivery. [9, 10]

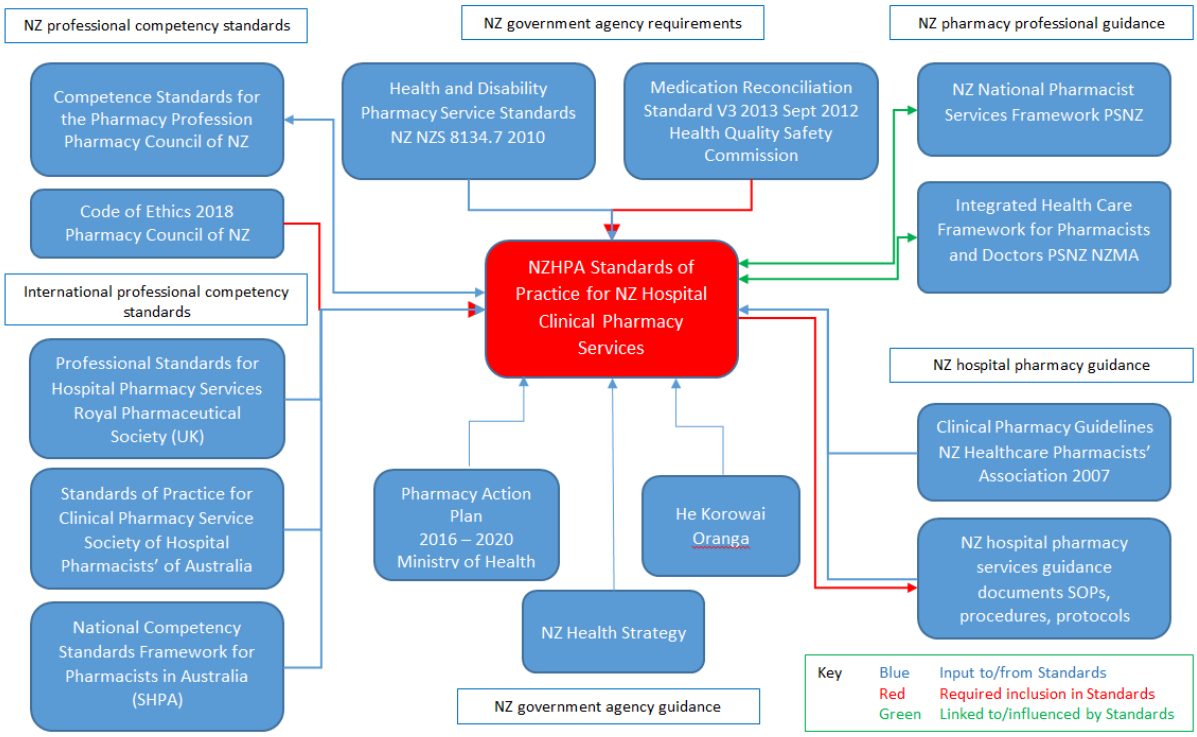
Understanding and respecting the Māori health view is critical to meaningful engagement with Māori about their health and health goals.[9]

The NZHPA intends that the Standards will support clinical pharmacists to contribute to reducing health inequities for Māori and other target groups.

Strategic alignment

The Standards are aligned with, and in support of, the Ministry of Health's (MoH) NZ Health Strategy goal for all New Zealanders to live well, stay well and get well,[11] Pharmacy Action Plan 2016 – 2020[12] and other key New Zealand strategic policies and frameworks (Figure 1) especially the Maori Health Strategy, He Korowai Oranga.[9]

Figure 1: The interrelationships between the NZHPA Standards of Practice for New Zealand Hospital Clinical Pharmacy Services and other key influencing documents



[9] Ministry of Health. He Korowai Oranga. 2014.
[10] Ministry of Health. 'Ala Mo'ui: Pathways to Pacific Health and Wellbeing 2014–2018
[11] Ministry of Health Statement of Strategic Intentions 2017 – 2021.
[12] Ministry of Health. 2016. Pharmacy Action Plan 2016 to 2020. Wellington: Ministry of Health. https://www.health.govt.nz/system/files/documents/publications/pharmacy-action-plan-2016-to-2020.pdf

Section Two: Recommendations

Staffing Levels

Evidence to describe pharmacist to patient resourcing is best represented by the work that underpins the SHPA Clinical Pharmacy Practice Standards 2013.[6, 7] Other work from the US, completed since 2013, is broadly in line with the SHPA 2013 staffing levels recommendations.[13] Resourcing recommendations from the RPS (UK) include competency banding classifications that are difficult to apply in the New Zealand setting but have been included below as an example of competency based resourcing methodology. There is no comprehensive body of work within NZ that can be included.

The NZHPA acknowledges that resourcing constraints and differing requirements based on case-mix at each individual DHB makes applying one standard recommendation to every situation challenging.

However as the most current evidence relevant to the NZ workforce is congruent in estimating pharmacist to bed or patient ratios, [6, 7, 13] the NZHPA makes the recommendation that the ranges stated in column four of tables 1. and 2. be considered the *minimum* clinical pharmacist staffing levels to deliver *a full clinical service as described in Section Three* and has the following qualifiers:

- 95% bed occupancy
- average length of stay of 6 days for general medical and surgical patients
- average length of stay of 12 days for palliative care patients, 18 days for rehabilitation patients and 20 days for geriatric evaluation and management
- 5-day service with an 8-hour day (Table 1.) 7-day service with an 8-hour day (Table 2.)
- minimal dispensing or medicines supply activities
- a small component of clinical supervision only e.g. undergraduate on hospital pharmacy clinical placement, postgraduate pharmacy students and intern pharmacists
- an allowance for attending ward / clinical unit rounds, multidisciplinary team (MDT) meetings, pharmacy staff meetings, and liaison with other pharmacy staff (e.g. clarification of prescriptions)

Bed to pharmacist ratios need to be ***reduced*** if any of the following apply:

- length of stay is less than 6 days
- additional activities are included in role (e.g. dispensing, , extended clinical supervision or teaching or other non-patient facing tasks e.g. management activities, drug protocol/guideline development, stewardship activities i.e. DUE/clinical audit, research, or formal medicine information service activities)

Additional resource must be allocated to provide cover for leave (annual, study, sickness).

The SHPA resourcing framework, describing resourcing by clinical service type has been utilised to display the relevant recommendations, with the insertion of the UK and US work where it applies.

[13] Gibson GA et al. Pharmacy practice model transformation from medication focus to patient-centred care. (The Hospital of the University of Pennsylvania). ASHP Best Practice Award. In Health-System Pharmacy 2013

Table 1: Summary of evidence for pharmacist staffing ratios for 5 day week, no weekend service

Service	Source	Evidence	Number of beds to 1FTE clinical pharmacist 5 days/week*
Specialist Units e.g. Haematology, Immunology and Infections, Medical Oncology, Renal Medicine, Transplantation, Qualified Neonates *Penn University data unpublished [13]	SHPA (2013) [1] Penn University (2013)*	1:15 1:16	15 - 16
Medical e.g. General Medical units, Cardiology, Interventional Cardiology, Dermatology, Endocrinology, Gastroenterology, Chemotherapy, Neurology, Psychiatric, Respiratory Medicine, Rheumatology, Pain Management, definitive Paediatric Medicine *Penn University data unpublished [13]	SHPA (2013)[1] Penn University (2013)* Penn University (2013) Cardiology*	1:20 1: 24 1:20	20 - 24
Surgical e.g. General surgical units and Breast Surgery, Cardiothoracic Surgery, Colorectal Surgery, Upper GIT Surgery, Head and Neck Surgery, Neurosurgery, Orthopaedics, Plastic and Reconstructive Surgery, Urology, Vascular Surgery *Penn University data unpublished [13]	SHPA (2013)[1] Penn University (2013)*	1:25 1:22	22 - 25
Palliative Care	SHPA (2013)[1]	1:25	25
Minimal change to medicines e.g. Ear, Nose Throat (ENT), Gynaecology, Obstetrics, Unqualified Neonates, Perinatology	SHPA (2013)[1]	1:30	30
Longer stay admissions e.g. Drug and Alcohol, Non Acute Geriatric, Geriatric Evaluation and Management (GEM), Palliative Care, Rehabilitation	SHPA (2013)[1]	1:30	30

SHPA data only: Service on a weekend (assuming few admissions and discharges and medication chart review only) would require an additional 2 - 2.5 hours per day of service

Table 2: Summary of evidence for pharmacist staffing ratios for 7 day week

Service	Source	Evidence	Number of beds to 1FTE clinical pharmacist *per day*
ED	SHPA (2015) [14]	1:40 Assumes one patient in four	40

[14] Society of Hospital Pharmacists of Australia Standards of Practice in Emergency Medicine Pharmacy Practice 2015. Journal of Pharmacy Practice and Research (2015) 45, 423–430 doi: 10.1002/jppr.1144

Service	Source	Evidence	Number of beds to 1FTE clinical pharmacist *per day*
		will require pharmacist review	
Short Stay Unit	SHPA (2015)[14]	1: 10	10
Critical Care Units, high dependence on medicines e.g. All critical care units, extensive burns, tracheostomy, Extra-corporeal oxygenation in lung transplant (ECMO) *Penn University data unpublished [13]	SHPA (2013)[1] 1:10 Penn University (2013)* **Medical** Penn University (2013)* **Surgical** Royal Pharmaceutical Society (UK) (2017)[15]	1:10 1:8 1:14 Consultant pharmacist led team for 100 beds: 1FTE Band 8c consultant, 1FTE Band 8b senior, 2 – 3 FTE Band 8a + 3-4 FTE Band 7 pharmacists	8 - 14
Review and advice on medicine usage – *with urgency* e.g. Emergency† (ED), Medical Assessment and Planning Units (MAPU), Short stay acute medical assessment units <48hours	SHPA (2013)[1]	1:10	10
Review and advice on medicine usage – *ambulatory* e.g. Pharmacists providing review and advice on medicine usage services in Allied Health and / or Clinical Nurse Specialist Interventions clinics [1]	SHPA (2013)[1]	1:5	5
Review and advice on medicine usage – *outreach services* e.g. Pharmacists providing review and advice on medicine usage services in Allied Health and / or Clinical Nurse Specialist Interventions clinics[1]	SHPA (2013)[1]	1:3	3
Same day admission e.g. Day surgery beds, Diagnostic GI, Endoscopy, Ophthalmology, Dentistry, Oncology, Renal Dialysis Hospital in the Home (HITH)	SHPA (2013)[1]	1:22	22

[15] Royal Pharmaceutical Society UK. Professional Standards for Hospital Pharmacy Services Dec 2017

Service	Source	Evidence	Number of beds to 1FTE clinical pharmacist *per day*
Outpatient Clinics e.g. Pharmacists participating in Medical Consultation clinics[1] Pharmacists providing services in Allied Health and / or Clinical Nurse Specialist Interventions clinics[1]	SHPA (2013)[1]	1:22	22

† Figure presented on the basis of admitted patients only but allowance for workload for some patients discharged from ED. Based on admission rate of 27%

General recommendations

1. Utilise pharmacy technicians

- Utilisation of technicians in the ward environment to undertake tasks e.g. obtaining a medicine history, that free up pharmacist time to complete more complex clinical tasks.
- When pharmacists and pharmacy assistants or technicians work as a team, the time the pharmacist has to deliver clinical services to individual patients is increased.[1]

2. Extended hours

- Limiting services to business hours and five days per week reduces the timeliness of service delivery and may impact on patient care. Pharmacy services should ideally be available within the hospital seven days per week and for extended hours during the day. [1]
- Twenty four hour clinical pharmacist service provision for Emergency Department should be considered to reduce potential patient harm and increase cost avoidance.[1,16]
- Extended hours are not usual practice in Aotearoa NZ. The resourcing and logistical implications of increased services need to considered before pharmacy services are extended.

3. Specialty pharmacists for specialty services

- Speciality clinical services should have access to clinical pharmacists with advanced specialty level training.[1, 17, 18]
- Specialty clinical areas include, but are not limited to: transplant, paediatric and neonatal care, critical care, antimicrobial stewardship, oncology/haematology, renal, immunology, endocrine, neurology, mental health, cardiology, infection, pain management, palliative care, biological therapies.[1]

[16] Aldridge VE, Park HK, Bounthavong M, Morreale AP. Implementing a comprehensive, 24-hour emergency department pharmacy program. American Journal of Health-System Pharmacy. 2009 Nov 1;66(21):1943-7.
[17] Ragucci KR, O'Bryant CL, Campbell KB, Buck ML, Dager WE, Donovan JL, Emerson K, Gubbins PO, Haight RJ, Jackevicius C, Murphy JE. The Need for PGY 2-Trained Clinical Pharmacy Specialists. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2014 Jun;34(6):e65-73.
[18] Dalton K, Byrne S. Role of the pharmacist in reducing healthcare costs: current insights. Integrated pharmacy research & practice. 2017;6:37.

4. Additional resources for additional roles and cover for leave

- Staffing recommendations for clinical pharmacist activities outlined in section 3 are made on the basis of a 5-day week, 8-hour day and do not include after hours, weekend or public holiday work.[1]

- Additional resource therefore must be allocated for leave (annual, sick, study) so workload is covered adequately without re-allocation to other team members.

- Non patient-facing tasks must be allocated resource separate to clinical tasking. This includes, but is not limited to, management activities, drug protocol/guideline management, stewardship activities i.e. DUE/DUR, clinical audit, training and education, research, involvement in any dispensing or supply activities.

Section Three: Standards of Practice for NZ Hospital Clinical Pharmacy Services

Overview

The following are deemed by NZHPA as core clinical pharmacy services:

1. Medicine history obtainment
2. Medicine reconciliation
3. Inpatient medication chart review
4. Medicines optimisation
5. Documenting in the clinical record
6. Therapeutic Drug Monitoring (TDM)
7. Medication safety surveillance
8. Medicines information provision for patients/clients/service users
9. Participation in clinical ward rounds or equivalent
10. Pharmacist prescriber working in a collaborative setting
11. Discharge and transfer of care collaboration
12. Medicines and clinical information support for the healthcare team
13. In-service education provision
14. Medicines guideline and protocol development
15. Stewardship and medicine safety programmes
16. Clinical research

In this section, each core clinical pharmacy service is outlined as follows:

- **Definition:** a description of what the core service is (i.e. what)
- **Rationale:** evidence for the service as part of high quality medicines use (i.e. why)
- **Activities:** best practice tasks performed as part of the core service (i.e. how)

1. Medicine history obtainment

Definition

A medicine history is a record of all the medicines actually taken by the patient in the period before presentation or admission for the current episode of care and includes information about previous adverse drug reactions (ADRs), adverse drugs events (ADEs) and allergies, and any recently ceased or changed medicines. [19]

Rationale

Pharmacists are experts in collection of medicines information from patients when compared to doctors, nurses and patients themselves.[20] [21]

Accuracy of the current medicine history is essential for the caring teams to be able to make the best possible decisions in relation to present and future care. Accuracy of the list must be verifiable through a process of reconciliation and take into consideration the reliability of the source.

The patient and/or their carers should always be included as a primary source of information except where that patient has presented in a state of reduced consciousness or confusion, is a child, has communication or cognition difficulties, is admitted under isolation protocol, or has current specific risks around violence or aggression and presents without any support person available to verify medicines information accurately.

Institutional or pharmacy service level policy must be clear about approvals and conditions for intern pharmacists and pharmacy technicians to participate in the process of compiling a Medicine History.

Activities

1.1 Identify patient/client/service user

To correctly identify a patient, all of the following are required: [22]

- National Health Identifier (NHI)
- Surname
- First name(s)
- Date of birth
- Gender (gender preference)

[19] Society of Hospital Pharmacists of Australia. Standards of Practice for Clinical Pharmacists 2016. 1.4.1 Obtain the best-possible medication history

[20] Dooley MJ, Van de Vreede M, Tan, E. Patient-completed medication histories versus those obtained by a pharmacist in a pre-admission clinic. J Pharm Pract Res 2008; 38: 216–18.

[21] De Winter S. et al. Pharmacist- versus physician-acquired medication history: A prospective study at the emergency department October 2010. Quality and Safety in Health Care 19(5):371-5

[22] Health Quality Safety Commission New Zealand. Medicines Reconciliation Standard Version 3 2012.

Check patient identification bracelet information (where possible) matches the identifying information on all records accessed for the purposes of compiling the medicines history.

Where patient identification bracelets are not in use, check with ward staff to confirm identity.

A patient identification label may be used on medicine history collection forms once all patient details have been verified.

1.2 Review background information

For the purposes of determining and defining the most accurate medicines list, a brief scan of the patient background is necessary so that the pharmacist may form a mental picture of the patient and note any key elements that should be addressed during the patient interview.

It is important that pharmacists are economical with their time at this stage of the process or the time to formulate a medicines list may unnecessarily extend.

A more in depth review may be appropriate when pharmacists are conducting a medicines review (see 3. *Inpatient Medication Chart Review* and 4. *Medicines Optimisation*), but the details of all possible components that may apply to any patient are included here. Pharmacists should consider only those that apply to the patient care episode in question.

Sources of information may include:

- The patient or family, whanau, parent, guardian or carer(s) – verbal information
- Medicines list recorded by the patient
- Hospital discharge patient Medication Card
- Community pharmacy medicines list
- GP referral or e-referral record
- Hospital hard copy or e-patient record i.e. Patient Medical Record (PMR)
- Ambulance records
- Transfer record from other facility e.g. rest home, other hospital, hospice
- Electronic data source (e-patient portal record) e.g. personal patient health portal, electronic data repository, primary care clinical record, community pharmacy dispensing record
- Laboratory results
- Discharge summary, medicines reconciliation or clinical record from a previous presentation.

Source data must be current. Use of historical records for inclusion in the current episode of care carries the risk of inaccuracy due to undocumented changes that may have occurred since. Pharmacists accessing this data are accountable for its inclusion in the medicines history as accurate and current.

Table 1. Background information to be considered where appropriate	
Age	Include gestational age if appropriate
Gender (gender preference)	Gender description of choice
Height	In centimetres
Weight	In kilograms
Pregnancy status	Trimester or post-natal details
Lactation status	Breastfeeding, bottle or enteral feeding
Immunisation status	
Ethnicity	
Ability to communicate	Include language comprehension, hearing, visual, speech and cognitive deficits
Ability to take medicines as prescribed	Current status in relation to formulation of medicines needs i.e. preferred or necessary route of administration for this episode of care. History of adherence, need for memory aids or blister packing, attitudes/beliefs regarding medicines
Social background and/or supports	Living environment, supports, work status, social status
Presenting condition(s)	
Primary diagnosis	
Medical history (co-morbidities)	
Family history	Relevant to patient medical history
General observations relevant to episode of care	Heart rate, blood pressure, oxygen sats, temperature etc.
Functional reports	Bowel charts, spirometry , fluid balance/output etc.
Relevant laboratory findings	• Renal function • Liver function • Electrolytes • Full blood count • Cardiac markers • Coagulation markers • Relevant previous therapeutic monitoring results

1.3 Conduct a structured patient/client/service user interview

A medicine history should be compiled preferably within 24 hours of presentation or admission.[1]

A face to face interview with the patient and/or carer(s) should be conducted as part of the collection of primary information i.e. verbal information, the patient's own medicines or medicines list. A face to face interview may be conducted where the patient and the pharmacist are in the same physical space or in a virtual space via the use of video communication tools.

Where this is not possible, telephone contact is acceptable.

Pharmacists need to be skilled in the art of communication and alert to areas of the interview that may need more in depth questioning in order to discover the full clinical picture.

If it becomes apparent during the course of the interview that the patient is not an appropriate source of information about their medication it is appropriate to bring the interview to an early close and utilise alternative sources of information as discussed in section *1.2 Review background information.*

The key elements of an ideal structured interview are as follows:

- Greet the patient/carer, where possible use greetings in the patient's preferred language
- Confirm the patient's identity.
- Ideally, use the AIDET framework: Acknowledge the patient by name; Introduce yourself by name and profession and tell the patient how you can help them; tell them how long you will be talking to them (Duration); Explain what you are doing and Thank the patient at the conclusion of the interview.
- Explain the purpose of the interview (other health professionals may have already performed a medication history, so it may be necessary to explain the reason for a pharmacist-obtained medication history).
- Confirm that the time is convenient. Consider the need for privacy and whether an alternative to a bedside conversation is necessary.
- Consider the needs of family and whanau to be present and if possible arrange a time when all who need to be involved are present.
- Respect the patient's right to decline an interview. [If declining document this in the clinical record in line with *4. Documenting in the clinical record*].
- Identify and attempt to remedy any communication barriers. Consider hearing, vision, language and cognitive barriers.
- Establish a rapport with the patient.
- Identify any beliefs that will play an important role in the patient's preference for treatment.
- Determine who is responsible for administering and managing the patient's medicines at home.
- Identify any physical barriers to taking medicines e.g. swallow issues, dexterity issues that may hinder opening of medicine containers or unit dose packaging e.g. blister packs.
- Use an interview manner that will portray professionalism, empathy and interest.
- Be polite, attentive, maintain eye contact, avoid interrupting the patient or appearing rushed, and be non-judgemental.
- Speak using a speed and volume that suits the patient's needs.
- Use non-verbal signals to check that the patient is following the conversation and if unsure check the level of understanding.

- Use open-ended questions to encourage the patient to explain and elaborate and move to close-ended questions to systematically minimise omissions.
- Be proactive to keep the interview moving and make use of time effectively.
- Thank the patient at the close of the interview.

Use of a formal checklist (electronic or hard copy) to ensure capture of all relevant information is preferable, a hand written list is acceptable.

1.4 Compile an accurate Medicines History

1.4.1. Allergies and Adverse Drug Reactions (ADRs)

- Verify with patient or carer the validity of any documented allergies or ADRs. Where the occurrence is beyond reliable memory of date or nature of reaction, document as “unable to recall details”.
- Document any new allergies or ADRs that may have occurred at this care episode. Include:
    - Drug or substance responsible
    - Date of occurrence
    - Nature and severity of reaction
- Where no allergy or ADR is reported, note “No known allergies” or “No known ADRs”.
- Where it is not known whether allergies or ADRs exist, note “Unknown”
- Complete, or ensure that a CARM report has been completed in conjunction with the caring physician for any new occurrences of ADR or allergic reaction.
- Where there is an electronic allergy or ADR alert system in place, verify any information received at this episode of care is included and that all information from sources accessed are reconciled.

1.4.2. Prescription medicines

- View/sight patient’s medicines if they are available
- Ask about the use of topical preparations (ear/eye/nasal drops, sprays, creams, ointments, patches), inhalers and nebulised medicines, use of vaginal or rectal preparations and periodic medicines e.g. depot injections, monthly cholecalciferol, bisphosphonates.
- Ask about treatments taken as part of a formal medication trial (research) as these will not usually appear on lists provided by GP surgeries or pharmacies.
- Document medicines by name, dose, frequency, formulation, route and duration of therapy as a minimum.
- Generic name should be used but in the case of multi-ingredient products e.g. multi-vitamins, or high risk medicines e.g. insulins use of brand name is preferable.

- Document source(s) of medicines information. Where information has been collected via phone, include name and role of the person (e.g. practice nurse, pharmacist) who provided information.
- Where information is extracted from an electronic repository or record, follow institutional policy for verification of authenticity and accuracy.
- Check with patient or carer about current use of medicines and any recent changes to medicines that may be different to what has been prescribed or dispensed. Pay particular attention to variations the patient may have made to timing of doses or changes of dose. Ask also about behaviours related to crushing, breaking tablets or opening of capsules to aid swallowing.
- Ask how medicines are stored in the home.

1.4.3. Non-prescription medicines

- Follow assessment and enquiry process as described above for prescription medicines. These may include (but are not limited to): OTC purchases or medicines obtained from others, herbs, nutritional supplements, ethnic medicines and ngā rongoā rakau (NZ-native flora herbal preparations), homeopathic remedies, flower essences and recreational drug use.
- Assess patient preference for use of non-prescription medicines, substances or other therapies rather than prescription medicines
- Assess how the use of non-prescription medicines or may compliment or impact the management plan for this episode of care and future health goals.

1.5 Assess patient understanding and health beliefs in relation to current care plan

Every person holds beliefs that influence their behaviours in relation to medical therapies.[23] Pharmacists have a key role in assisting patients with understanding about their condition and related treatments and thus must be cognisant of beliefs that the patient holds in relation to medicines.

Pharmacists also need to understand the baseline level of knowledge that a patient has about their condition, the treatments and managements that are being proposed, what the goals of treatment are and what the possible adverse effects of treatment are so they may be identified and reported appropriately.

Assessment of patient understanding and health beliefs can include the following approaches:

- Ask the patient to describe the medicines or other treatments they are currently taking.
- Ask the patient about what they know about what is happening for them (physiologically) and in relation to past medical history.
- Note the language used by the patient as an indication of the baseline knowledge and the level of language that the rest of the conversation should be conducted in. Pharmacists must be able to individualise their approach for each patient and adjust their language to suit each patient's needs.

[23] Hirani SP, Newman SP. Patients' beliefs about their cardiovascular disease. Heart. 2005 Sep 1;91 (9):1235-9.

- Assess the need for an interpreter or family or whanau member to be present to help relay information where there is a significant language, memory or cognition barrier.
- Assess the patient's ability to read and understand typical dispensed medicines labels or medicines and health information.
- Assess the patient's understanding and attitude to current and previous medication therapy including:
    - indication
    - perceived effectiveness
    - perceived problems attributed to medicines
    - current monitoring
    - reasons for changes to medicines.
- Assess the patient preference for how they would like to receive information about their medicines and show examples of each option available. These may include (but are not limited to) printed medication information cards, printed health information, access to online website information, video information, newsletters and support groups.
- Ask the patient about behaviours related to adherence to current or historical medicines or therapies. Note any behaviours that need to be taken into consideration when recommending timing/prescription of doses. These may include (but are not limited to) pattern of work (e.g. night shift versus day time work), need for support in the home (e.g. medicines oversight programme), behaviour of family and whanau members in the household (e.g. family smokers for a patient attempting to quit smoking) and negative beliefs about prescription medicines.

Assess any physical barriers to taking medicines including (but not limited to):

- Visual or hearing impairment
- Ability to swallow. Alert physician or nursing team for referral to Speech Language Therapist if concerned
- Physical limitations e.g. dexterity in relation to opening containers or the use of other medicine packaging systems

Assess any cognitive barriers to taking medicines including (but not limited to):

- Level of comprehension
- Memory
- Ability to follow instructions e.g. measure paediatric doses accurately
- Complexity of medicines regimen

Assess barriers related to access to medicines e.g.

- Cost

- Transport or distance
- Communication tools e.g. lack of phone or means to contact local pharmacy and/or healthcare team

Note all relevant information and recommendations as part of Medicine History documentation.

Ensure all information is clearly documented in the patient record.

2. Medicine reconciliation

Definition

Medicines reconciliation is the process of comparing the most accurate, current, medicines history including allergies and Adverse Drug Reactions (ADRs) information, with that patient's documented hospital medicines record with the objective to identify and resolve any discrepancies.

Rationale

Medicine reconciliation has been shown to reduce adverse drugs events related to insufficient or incorrect documentation,[24] and reduce the potential for patient harm from medication errors due to medicine information discrepancies.[25] Pharmacist-led medicines reconciliation programmes at transitions of care reduce adverse drug related hospital re-presentations.[26]

Medicines reconciliation in New Zealand is governed by the Health Quality and Safety Commission (HQSC) Medicine Reconciliation Standard Version 3 (2012).[22] The document has been endorsed by the Health Information Standards Organisation (HISO), a committee that reports to the National Health IT Board for use in the health disability sector.

The goal set by HQSC is that the medicine reconciliation process should be completed for all patients within 24 hours of transfer of care within in the New Zealand health and disability sector.[22]

Medicines reconciliation should ideally occur at all points of transfer of care in the patient journey through a healthcare system.[24]

In some cases, institutional policy may direct that medicines reconciliation should be prioritised to certain patient groups and not others. Pharmacists should act in accordance with local policy and directives.

Pharmacists, medical practitioners, nurses and midwives may hold accountability for parts of, or the entire process of medicines reconciliation. Intern pharmacists, pharmacy technicians or enrolled nurses may only participate in medicines reconciliation under the supervision of a relevant registered healthcare practitioner or within defined scopes of practice [22]

[24] World Health Organisation. 2007. Assuring Medication Accuracy at Transitions of Healthcare. Patient Safety Solution Volume 1, Solution 6.

[25] Associate Minister of Health, Minister of Health. Actioning Medicines New Zealand 2010. Wellington: Ministry of Health 2010. www.health.govt.nz/publication/actioning-medicines-new-zealand

[26] Mekonnen AB, McLachlan AJ, Jo-anne EB. Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a systematic review and meta-analysis. BMJ open. 2016 Feb 1;6(2):e010003.

Activities

The reconciliation process has three steps: [22]

1. Collect
2. Compare
3. Communicate

2.1 Collect

Collect the most accurate list of medicines, allergies, and adverse drug reactions (ADRs) using a minimum of two source types - refer to 2. *Medicines History obtainment*

2.2 Compare

Compare the collected medicine, ADR and allergy information with the patient medication chart or e-chart record.

Identify and document any discrepancies.

Identify discrepancies as *intended* where documented evidence demonstrates this clearly e.g. a note in the patient clinical record, or in all other cases, as *unintended* until resolved.

2.3 Communicate

Communicate any discrepancies to the prescriber and ensure all discrepancies are resolved.

Ensure any information elicited during the patient/carer interview that may have an impact on adherence including language or literacy barriers, cognitive, visual, hearing or physical (e.g. dexterity) impairment, issues related to beliefs about medicines, barriers due to the cost of medicines, transport or other issues inhibiting access to medicines and/or follow-up after discharge are communicated clearly to the healthcare team.

Assess the appropriateness of extra adherence aids and/or educational resources that may contribute to reducing the barriers to engaging with treatment and communicate clearly to the healthcare team

2.4 Document

Medicine reconciliation information should be documented on a standard form or e-record that is well recognised within the hospital. In the absence of either type of form, clear and detailed notes should be written into the clinical record in line with *4. Documenting in the clinical record.*

All information collected for the purposes of medicines reconciliation “must be complete, accurate, relevant and current”.[22] Pharmacists are accountable for the accuracy, completeness, and currency of information included in their medicines reconciliation process.

At all points of care, any changes to the patient’s medicines, ADRs or allergies must be documented in the patient record, in a way that communicates those changes clearly in relation to continuation, temporary withholding, discontinuation or changes to medicine dose, frequency, route or formulation. It may be necessary to seek clarification from prescribers if this information is not present in the patient’s clinical record.

Mechanisms must be in place to alert healthcare practitioners that intended changes have occurred. Hand written annotations on hard copy records or electronic flags in an e-record are desirable e.g. “new” or “dose increased” or “dose decrease”.

Where medicines reconciliation occurs at discharge, the information recorded must be reconciled also against the discharge summary information before that information is communicated to primary care health professionals or the patient.

All hospital health care practitioners with a care role for a patient must have access to the patient record of documented medicines, ADR and allergy information and medicines reconciliation and be able to identify which member of the health care team made a change and when. Pharmacists must ensure they include their identification details with any entry they have made in the patient record.

The *patient record* encompasses all electronic, hard copy or hybrid systems of documentation and includes but is not limited to a medication chart, clinical hard copy patient notes, e-patient record, patient e-portal health record and any system that may be accessed by approved health professionals that contains clinical information related to the patient.

3. Inpatient medication chart review

Definition

The act or practice of reviewing in-patient records of prescribed medicines and therapies with the objective of ascertaining appropriateness of treatment, minimisation of medicines related patient harm, individualisation and optimisation of medicines use in the context of patient care.

Rationale

Clinical pharmacist review of patient medicines reduces medicines related errors,[27] adverse effects and events[5], facilitates de-prescribing[27] and reduces medicine related readmission rates.[5, 28]

Activities

Clinical review of medicines involves pharmacists using their expert knowledge and appropriate reference resources to critically appraise individual patient medicines and therapies including evaluation of the patient's response to medicine therapy and the detection and management of potential or actual clinical problems. See also *4. Medicines optimisation.*

3.1 Background information (see also *1.2 Review background information*)

Access the patient clinical record to review background information including:

- Presenting complaint
- Medical, social and family and whanau history
- Results of laboratory or other diagnostic or functional tests
- Current medical plan

[27] Huiskes VJ, Burger DM, van den Ende CH, van den Bemt BJ. Effectiveness of medication review: a systematic review and meta-analysis of randomized controlled trials. BMC family practice. 2017 Dec;18 (1):5.

[28] Scullin C, Hogg A, Luo R, Scott MG, McElnay JC. Integrated medicines management–can routine implementation improve quality?. Journal of evaluation in clinical practice. 2012 Aug;18(4):807-15.

3.2 Complete record

All details in the medication chart (hard copy or electronic) must be legible and unambiguous and must meet the requirements of the Health Quality Commission New Zealand Medication Charting Standard V3 2012.[29]

Pharmacists should clarify any illegible entries on medication charts they are reviewing with the prescriber and annotate or document clarifications as appropriate.

Check all relevant medication charts (hard copy or electronic) are available and included in the review.

Where the record is a hard copy form, check the X of X field, and Supplementary Chart section on the front sheet to confirm the number and type of charts in use.

3.3 Patient details

Ensure identifying information is legible, patient labels on hard copy medication charts or patient details in the e-record are consistent across all sources, patient labels or handwritten details are applied to all pages of a hard copy forms that are in use and match the patient wrist band identifier (where used) including:

- NHI
- Name
- Age
- Sex
- Gender (gender preference)
- Date of birth, including gestational age if relevant
- Address
- Contact details

Where identifying information is incorrect or inconsistent, pharmacists should alert nursing and medical staff to clarify and correct.

3.4 Allergy and ADR information

Confirm allergy and ADR fields are complete and in line with institutional policy.

Verify accuracy and relevance of allergy or ADR information documented within the patient record and supporting documentation e.g. medication chart, e-chart, medicines reconciliation record, medicine history record, e-patient portal record.

Annotate the medication record with any details that are missing and ensure that all other institutional and national sources are updated as per institutional policy. See *3.10 Annotation on the medication chart or e-record.*

[29] Health Quality & Safety Commission New Zealand. Medication Charting Standard Version3, September 2012. https://www.hqsc.govt.nz/assets/Medication-Safety/Med-Rec-PR/Medication_Chart_Standard_v3.pdf

3.5 Weight and height

Confirm patient weight (kg), height (cm), BSA (m^2) and date (dd/mm/yy) of measuring is recorded according to institutional or specialty policy. Where the patient is a child and under the care of the paediatric service, weight as a minimum must be recorded.

3.6 Special Care

Check for information related to special care e.g. hepatic/renal function, pregnancy, breast-feeding and/or other clinical risk factors.

3.7 Prescribing

Check that:

- For every item on the medication chart or e-chart there is a:
    - date of prescribing, and for IV fluids also the time of prescribing
    - recognisable signature or electronic identifier of a registered prescriber
- Medicine names are generic except where institutional or national medicine safety policy dictates that brand names should be used
- Medicine names are written in full and abbreviations are not used except where institutional or national medicine safety policy allow use
- Each field for medicine name, dose, units, frequency, route is complete
- Where medicines are prescribed for “as required” or “prn” use, that a maximum dose for 24 hours and indication are recorded
- Duration or stop date for short course medicines is documented

3.8 Clinical review

Review the entire medication regimen including fluids and assess appropriateness of each item in relation to the background information for the patient.

Pharmacists should consider all of the following:

- Patient concerns and preferences
- Current and historical allergies and ADRs
- Contraindications and co-morbidities
- Clinical indication for every medicine or fluid prescribed
- A treatment is prescribed for every clinical indication or a reason for no treatment is clearly documented or understood
- All treatments are in line with current therapeutic guidelines (when applicable)
- Laboratory results for Therapeutic Drug Monitoring tests
- Observation chart values e.g. blood pressure in relation to dose of antihypertensive medicines, Early Warning Signs (EWS)
- Functional reports e.g. bowel charts, spirometry

- Fluids review (include enteral and parenteral fluids), fluid balance/output
- Appropriateness of formulation – see also *3.9 Formulation and route*
- Duplication of therapy
- Drug-drug interactions
- Drug – fluid incompatibilities
- Drug- equipment incompatibilities or warnings e.g. administration requirement for low-sorbing tubing for some medicines
- Drug-disease interactions
- Appropriateness of any oxygen prescription
- Any medicine supply restrictions including institutional or national policy or protocol e.g. antimicrobial stewardship policy, clozapine supply
- Availability and estimated time to supply medicine if relevant
- Any medicine funding restrictions and relevant processes, such as the Pharmaceutical Schedule and Hospital Medicines List (HML) restrictions
- Possible primary care supply or funding restrictions in relation to preparation for discharge

3.9 Formulation and route

Consider appropriateness of medicines formulations and route in relation to current patient condition including:

- State of consciousness
- State of agitation or refusal of medicines
- Swallowing difficulties
- Fluid restrictions
- Timing of doses in relation to:
    - other medicines
    - nursing routines
    - meal times and other nutritional regimens (including enteral/parenteral feeding)
    - scheduled investigations or procedures
    - Therapeutic Drug Monitoring requirements

Pharmacists should advise appropriate actions to be taken where formulation changes are to be made including (but not limited to):

- crushing of tablets or capsule contents including admixing with liquids or soft foods

- dilution of oral or parenteral liquids
- extemporaneous preparation options
- dose variations due to changes in bioavailability
- off-label use subsequent to altering the manufacturer's formulation

3.10 Annotation on the medication chart or e-record

Annotations are notes made on the medication chart or entered into the e-medication record to clarify an entry or relay a message, warning or alert to users of that record. Annotations are made in addition to communication with relevant members of the multi-disciplinary team, not instead of.

Annotations should be identifiable, legible and comply with institutional policy, procedures and SOPs.

Pharmacists must complete sample signature/initial sections and identify their annotations by an initial as a minimum, on hard copy medication charts.

Electronic medication chart use must incorporate compulsory identification of the pharmacist by name and role as a minimum.

Annotations serve as part of the auditable record of the clinical pharmacist medication review.

Annotations should be kept to a minimum to increase likelihood of being noticed and diminish "alert fatigue".

Annotations must be meaningful for the healthcare team members for whom the annotations are intended.

Mechanisms to alert users of the medication chart or e-chart to an annotation must comply with institutional or speciality policy.

Best practice is where clinical pharmacy services have an agreed, documented description of all annotations to be used (including those for specific specialty or service use), the clinical pharmacist team are consistent in their use of those annotations and members of the multi-disciplinary team are informed about the meaning of annotations that are in use.

Recommendations from the Health Quality & Safety Commission NZ in relation to high risk prescribing practice should be followed by pharmacists when highlighting inappropriate prescribing e.g. use of abbreviations for medicine names, trailing zeros and acronyms identified as high risk e.g. 'OD' or 'QD' for 'Once daily'.[30]

[30] Health Quality and Safety Commission New Zealand. Medication Safety Programme. Error prone abbreviations, symbols and dose designations not to use. Accessed 6th August 2018 https://www.hqsc.govt.nz/our-programmes/medication-safety/publications-and-resources/publication/455/

4. Medicines optimisation

Definition

A person-centred approach to safe and effective medicines use, to ensure people obtain the best possible outcomes from their medicines.[31]

Rationale

A medicines optimisation approach should always be applied when conducting a medication chart review.

Individualisation of therapy involves interpreting and applying the most appropriate pharmacotherapy evidence base to the individual circumstances and clinical condition of a patient.

Pharmacists need to apply clinical expertise, a well formed knowledge of the relevant evidence base for treatment and a clear understanding of relevant patient factors and preferences in their decision making.[1]

Shared decision-making, taking into account the patient's needs, goals, preferences and values is essential to optimise medicines and achieve the best possible therapeutic outcomes.[32]

Interdisciplinary communication and relationships are key to achieving the best possible clinical decisions. [33]

A collaborative and integrated professional relationship between doctors and pharmacists is integral to optimisation of clinical decision making and patient centred care.[33]

Activities

See also section *3. Inpatient medication chart review*

4.1 Identify therapeutic goals

Consult the patient record and note any documented plan from the care team.

Where there are any uncertainties, consult with the care team, especially prescribers and nurses to confirm the therapeutic goals and care plan in light of the person's overall healthcare needs and prognosis.

4.2 Evaluate therapeutic options

Consult the medicines record and any associated notes to understand any barriers to medicines adherence that have been identified.

Review medicines list *(as in 3. In-patient Medication Chart Review)* with the view to identifying the most appropriate medicines regime for the patient taking into account:

- Diagnosis
- Therapeutic goals
- Patient goals including consent and any barriers to treatment

[31] National Institute for Health and Care Excellence (NICE). Medicines optimization: the safe and effective use of medicines to enable the best possible outcomes. NG5 March 2015.
[32] Ahmad N, Ellins J, Krelle H, Lawrie M. Person-centred care: from ideas to action. Health Foundation; 2014 Oct. https://www.health.org.uk/sites/default/files/PersonCentredCareFromIdeasToAction.pdf
[33] Pharmaceutical Society of New Zealand and New Zealand Medical Association. An Integrated Framework for Pharmacists and Doctors. Wellington, New Zealand. April 2017

- Barriers to supply of medicines as prescribed

4.3 Identify medicine-related problems

Identify actual or potential medicine-related problems.

Consider:

- any concerns identified by the patient or their family and whanau
- medicines that have no clear indication
- untreated conditions
- omission of clinically indicated medicines
- inappropriate medicines, route or doses, taking patient factors e.g. organ function, state of consciousness, weight, age etc. into consideration.
- therapeutic duplication
- clinically significant interactions
- potential or actual medicines related ADR issues
- potential for genetic polymorphism resulting in variations that alter the effects of medication (beneficial or adverse)
- potential effects on pregnancy, breastfeeding or fertility, and the patient's hopes or expectations in relation to this
- impact on lifestyle, observances or occupation (e.g. diabetes mellitus treatments for commercial drivers, observance of Ramadan, vegan diet)
- complexity of medicines regimen in relation to patient ability and willingness to adhere to the regimen
- appropriate versus problematic polypharmacy (for definitions, see Glossary page 4)[34, 35]

4.4 Individualise treatment options

The clinical pharmacist role is to support the patient and the care team with accurate evidence based information and clinical expertise.

Together with other members of the care team, and the patient, identify achievable goals for treatment e.g. cure, symptom control, prevention or a choice of no treatment.

Weight each treatment choice against patient factors, patient preference, the evidence for efficacy and safety, cost and availability.

Consider opportunities to “de-prescribe” or rationalise medicines regimen to reduce ‘pill burden’.

[34] Cadogan CA, Ryan C, Hughes CM. Appropriate polypharmacy and medicine safety: when many is not too many. Drug safety. 2016 Feb 1;39 (2):109-16.

[35] The King’s Fund. Polypharmacy and medicines optimization: making it safe and sound. https://www.kingsfund.org.uk/publications/polypharmacy-and-medicines-optimisation 2013

4.5 Monitor outcomes

Monitoring plans should be tailored to:

- Therapeutic goals
- Safety
- Patient needs, preferences and convenience
- Cost to patient and the health system
- Care facility tasking and capability e.g. nursing and laboratory workloads
- The likelihood that results from any additional tests will have a meaningful impact on treatment decisions

Pharmacists should advise on availability of monitoring in the primary care setting when developing discharge plans that include ongoing monitoring.

5. Documenting in the clinical record

Definition

The act of adding information to the patient health record.

The patient health record may be a hard copy, electronic, or hybrid record and may include written or typed text, diagrams, audio or video recordings, scanned or direct link diagnostic images (e.g. X-rays, scans).

Rationale

Pharmacists work as part of the multi-disciplinary team. Communication about the patient needs to be in a format that is available to all members of the team that have a role in caring for the patient.

Information gathered as part of clinical pharmacist activities that is relevant to the multi-disciplinary team must be recorded to enable:

- Effective communication amongst all team members
- An auditable record of relevant information, recommendations and/or alerts

Activities

5.1 Patient identification

Prior to documentation in the clinical record, pharmacists must confirm that the patient identifiers on the clinical record (NHI, full name, date of birth) match those of the patient concerned.

5.2 Timeliness

Documentation must occur at the time of collection of the information or as soon as possible afterwards.

The documented record should not be relied upon as the sole conduit for communication and should be augmented by verbal or other electronic or text alert communication especially

where there is an urgent need to raise an alert or reach agreement about treatment or supply plans.

5.3 Consistent with institutional or national policy

All documentation in the clinical record by pharmacists must be in accordance with institutional policy and the provisions of the Privacy Act 1993[36] and the Health Information Privacy Code 1994.[37]

National policy may supersede local policy and pharmacists must be aware of such possibilities e.g. where a national safety alert has been issued with recommendations that are relevant to documentation in the clinical notes, but have yet to be incorporated into local policy documents.

Any abbreviations used to document in the clinical record must be in accordance with institutional policy.

5.4 Approved

Intern pharmacists and pharmacy technicians may only enter into the clinical record where institutional or pharmacy service level policy allows.

5.5 Identifiable

All entries in the clinical record must be legible and identifiable and must include:

- Date and time of entry
- Name
- Role
- Registration number and/or contact detail

5.6 Chronological

All entries in the clinical record must follow the most recent previous entry, or clearly state the date and time that the entry was made.

5.7 Clear, factual and accurate

Information should be documented succinctly in a manner that follows a logical flow and or organisational communication standards. An acceptable approach is to:

- Identify the problem
- Describe a recommendation
- Document the actions required

Recommendations must be definitive, detailed, accurate and unambiguous.

Comments and recommendations must be factual, constructive, non-judgemental and must not criticise or infer criticism of other health professionals, the patient or the patient's carers.

[36] http://www.legislation.govt.nz/act/public/1993/0028/232.0/DLM296639.html
[37] https://www.privacy.org.nz/assets/Files/Codes-of-Practice-materials/HIPC-1994-2008-revised-edition.pdf

5.8 Permanent record

All entries into the clinical record are permanent; no entry may be altered, erased or removed from the record. Where the record is electronic, version control may allow alterations to be recorded.

Where documentation has been entered in error (e.g. written into the notes of another patient, or a factual error in an otherwise correct entry), follow institutional policy on how to highlight and resolve. Identifying the offending passage or error and noting it as "entered in error" with a brief explanation is acceptable.

Any clarifications of entries must be accompanied by identifiable initials or signature, date and time of correction.

6. Therapeutic Drug Monitoring (TDM)

Definition

To measure concentrations of a medicine (or a surrogate marker) in body fluids, where there is a known relationship between measured concentrations and medicine effect, for the purpose of optimising patient medicine therapy, minimising toxicity or informing diagnosis.[1]

Rationale

The principles of pharmacokinetics (PK) and pharmacodynamics (PD) underpin TDM.

Analysis of samples taken at intervals defined by the predictable pharmacokinetics of the medicine can inform individualisation of dose and administration intervals, including loading dose calculations where relevant.

Interpretation of test results requires skilled knowledge of medicine PK and PD characteristics and consideration of many patient related factors.

TDM may be particularly valuable where a patient is critically ill or clinically unstable and usual dosing protocols are rendered inadequate due to marked and/or rapid changes in physiological state and consequentially altered absorption, distribution, metabolism and excretion behaviours of the medicine.

Activities

6.1 Assess indication for TDM

Any of the following may indicate a need for therapeutic drug monitoring: [1]

- suspected toxicity due to a medicine and/or metabolite
- a suboptimal response to medicine therapy
- assessment of potential drug interactions
- assessment of therapy where the patient is not clinically stable
- assessment of therapy following initiation or change to a regimen
- previous adverse drug reactions or toxicity
- post overdose or poisoning and determination of antidote dose needed

- evaluation of patient adherence
- a medicine with a narrow therapeutic index
- large degree of patient variability in pharmacodynamics including genetic variables

6.2 Consider altered physiological state

TDM may be indicated for patients who have an altered physiological status that infers likely changes in PK and PD including (but not limited to):

- renal or hepatic impairment
- renal dialysis and haemofiltration
- decompensated cardiac function
- significant loss of fluid balance e.g. dehydration, oedema
- pregnancy
- extremes of age i.e. elderly or paediatric (especially neonates)
- altered body weight e.g. obesity, low weight, diminished muscle mass
- altered serum proteins likely to affect protein binding
- extensive burns or area(s) of compromised epidermis
- cystic fibrosis and other specific polymorphisms
- rapidly changing physiological state
- clinical or haemodynamic instability

Before initiating TDM a risk versus benefit consideration should be applied.

Consider the impact of blood collections on the patient and the likely impact that TDM could make on the clinical course of actions e.g. continuing to extract a blood sample where access is very difficult or initiating sampling in advanced stages of palliation.

6.3 Interpreting results

Attention must be applied to many factors that could influence test results.

Where a test result is significantly outside of expected ranges, the possibility that an error in the collection or identity of the sample should be ruled out before continuing with analysis.

The most appropriate action may be to repeat the test to rule out such an error.

When interpreting results, consider the following factors:

- right patient, right sample, right time and method of collection of sample
- extent of correlation between serum concentration and effect
- likelihood of medicine being at steady state or not
- method of administration e.g. could adsorption to tubing or inappropriate crushing of tablets be responsible for the result

- formulation administered
- indication for treatment
- duration of current regimen
- adherence to regimen
- time of last dose
- time of sampling
- time of last food or other ingested substances in relation to dose
- local laboratory parameters – ensure all results are comparable
- prior drug monitoring and other relevant laboratory results
- patient-specific factors e.g. renal and hepatic function, cardiac status, age, weight, etc.
- critical illness
- relevant pharmacokinetic and pharmacodynamic properties of the drug
- potential for drug interactions
- other environmental factors such as smoking, recreational drugs
- pharmacogenomics and genetic markers especially as they relate to drug handling and monitoring of suitability of certain drugs for particular patients.

6.4 Pharmacokinetic calculations and simulations

Assumptions of unknowns are made in all PK modelling and calculations

All assumptions that have been employed should be included in reporting of assessments or recommendations.

Assessments and interpretations of results should be made in a timely manner that is responsive to the urgency of the clinical situation.

All recommendations must be recorded in the patient clinical record. *See 5. Documenting in the Clinical Record*

7. Medication safety surveillance

Definition

Monitoring the use of medicines with a specific view to identifying and preventing adverse effects and events that may be directly or indirectly attributable to the taking of medicines.

Rationale

Pharmacovigilance, medication safety programmes and adverse drug/medicines reactions monitoring and management are all components of medication safety surveillance activities.

Activities

7.1 Medication safety programmes

The Health Quality and Safety Commission supports and encourages all DHBs to have a mechanism for capturing, reviewing and reporting adverse drugs events and have in place communication processes to relay recommendations to healthcare staff.

Programmes should also include proactive review of healthcare practice with the view to reducing the number of patients harmed by medication errors.[38]

Pharmacists have a responsibility to be aware of all institutional and national level recommendations, alerts and directives in relation to medicines safety.

Hospital staff, including pharmacists, are encouraged to be pro-active in identifying and reporting adverse drugs events and near misses.

Pharmacists should also be vigilant in identifying and reporting systems or processes within the healthcare organisation that could contribute to iatrogenic adverse events or unsafe practice with respect to medicines.

7.2 Adverse drug/medicines reaction management

Adverse drug reactions include idiopathic allergic responses, known side effects of medicine action and toxic effects of medicines.

Adverse drugs reaction management involves the detection, assessment, mitigation, documentation and prevention of adverse drug reactions.[1]

The emphasis of management should be on the prevention of adverse drug reactions and preventing re-exposure of patients who have already experienced an adverse drugs reaction.

Adverse drug reactions may occur in patients with no history of adverse drugs reactions and where a medicine has previously been taken without precipitation of an adverse effect.

Pharmacists should be involved in detecting adverse drug reactions through routine medicine monitoring, identifying and monitoring susceptible patients and identifying patients who have experienced previous adverse drug reactions.[1] See also *1. Medicine history obtainment.*

Pharmacists should pay particular attention to those patients who have an elevated risk of adverse reactions to medicines:

- known genetic predisposition for adverse drugs reaction(s)
- known previous adverse drugs reaction(s)
- family history of adverse drugs reaction(s)
- multiple disease processes
- large number of medicines and/or other non-medicine remedies
- renal or hepatic impairment
- older persons or paediatric patients, especially neonates

[38] Health Quality and Safety Commission. National medication safety programme. Accessed 6 August 2018. https://www.hqsc.govt.nz/our-programmes/medication-safety/

- medicines with known high incidence of adverse effects
- medicines with known associated serious adverse effects
- medicines with a low therapeutic index
- medicines with the potential for multiple interactions
- abnormal investigation results

7.3 Reporting adverse drugs effects

Any reactions or adverse drugs events that are identified should be reported to the Centre for Adverse Reactions Monitoring (CARM). (*See electronic reporting form*[39])

The Medicines Adverse Reactions Committee (MARC) reviews published material, all fatal reports and selected reports of significant, unusual or serious reactions reported to CARM.

MARC will direct agencies that are responsible for communicating alerts and notifications to health professionals, Medsafe NZ and the Health Quality and Safety Commission, to issue appropriate warnings. The Pharmacy Council of New Zealand, Pharmaceutical Society of New Zealand may also issue warnings, recommendations or directives related to medicines.

Pharmacists must ensure they are aware of all medicine safety alerts from all sources and implement recommendations.

8. Medicines information provision for patients/clients/service users

Definition

To provide patients with evidence based information and advice that promotes safe and appropriate medicine use, optimises patient care and encourages self-management.

Rationale

Providing information to patients about their health conditions and treatments is a determinant of patient satisfaction, recall, understanding and adherence. [40]

Beliefs and attitudes guide behaviour and are influenced by more than just the health information that patients receive. Interpretation of health information, prior experience and the influence of others are also strong drivers of behaviours.[23, 41]

Successful transfer of health knowledge and information requires considerable skill and an understanding of the principles of health literacy. [42]

[39] New Zealand Pharmacovigilance Centre, Centre for Adverse Reactions Monitoring (CARM) online reporting form. Accessed 12 Feb 20 https://nzphvc.otago.ac.nz/report/

[40] Kinnersley PR, Edwards AG, Hood K, Cadbury NL, Ryan R, Prout HC, Owen D, MacBeth F, Butow P, Butler CC. Interventions before consultations for helping patients address their information needs. The Cochrane database of systematic reviews. 2007 Aug 1;18(3).

[41] Hunter J, Franken M, Balmer D. Constructions of patient agency in healthcare settings: Textual and patient perspectives. Discourse, Context & Media. 2015 Mar 1;7:37-44.

[42] Hunter J, Franken M. Health literacy as a complex practice. Literacy and Numeracy Studies. 2012 May 30;20(1):25-44.

In Aotearoa NZ, knowledge of the Māori health view and the beliefs and viewpoints of the multi-cultural population is essential in order to individualise communications with patients.

To provide accurate and relevant medicine information, pharmacists require critical literature searching and evaluation skills, an awareness and understanding of the available medicines information resources and their limitations, as well as competence in interpersonal communication techniques.[1]

Activities

8.1 Format of information

Provision of medicines information may involve the production and/or provision of patient information leaflets, medication cards or adherence aids and other relevant medicine related information.[1]

Digital technology, where available, may provide patients with extra choice of mediums through which to receive medicines or health information.

Where there is choice between formats, patient preference should guide how information is provided. Examples are (but not limited to) written hard copy, online access to files, audio or video files, or digital applications.

Video enabled communication between pharmacist and patient may enhance or extend the possibilities for interaction beyond physical face to face discussions.

Providing links for patients to consumer health groups and their associated networks for information dissemination may also be useful.

Educational displays in the hospital environment may provide additional opportunities for patients, families and whanau to receive health information.

8.2 Prioritisation

Medicines information and education should ideally be provided to all patients who are prescribed medicines, and to family and whanau where appropriate.

Provision of information related to new medicines started during the episode of care, high risk medicines,[43] [44] [45] and medicines that require monitoring after discharge should be prioritised.

If resourcing doesn't allow for all patients to receive personalised, face to face discussions with a pharmacist, those patients who are at the highest risk of medicine error or poor self-management should be prioritised.

Patients at high risk are those who: [1]

- have medication misadventure as the known or suspected reason for the patient's presentation or admission to the health service organisation
- are aged 65 years or older

[43] Institute for Safe Medication Practices (ISMP). ISMP's List of High-Alert Medications. 2012. Available at http://www.ismp.org/Tools/highalertmedications.pdf.

[44] Institute for Healthcare Improvement (IHI). 2012. How to Guide: Prevent Harm from High-risk Medications. IHI, Cambridge, MA. Available at www.ihi.org.

[45] Health Quality and Safety Commission. Medication Alerts. Available at www.hqsc.govt.nz/assets/Medication-Safety/Alerts-PR.

- take five or more medicines
- take more than 12 doses of medicines per day
- take a medicine that requires therapeutic monitoring or is a high-risk medicine
- have had clinically significant changes to their medicines or treatment plan within the last three months
- have suboptimal response to treatment with medicines
- have difficulty managing their own medicines because of literacy or language difficulties, dexterity problems or impaired sight, confusion/ dementia or other cognitive difficulties
- have impaired renal or hepatic function
- have problems using medication delivery devices or require an adherence aid
- are suspected or known to be non-adherent with their medicines
- have multiple prescribers for their medicines
- have been discharged within the last four weeks from or have had multiple admissions to a health service organisation.

Prioritisation should be guided by institutional policy or expert clinical judgement where no prioritisation directives exist.

8.3 Individualisation

The provision of medicines information to patients should be tailored to the individual according to their preference, ability, needs, and include an assessment of their comprehension of the information that has been provided.

Pharmacists must be able to tailor education discussions for the patient and to adjust their delivery to allow for differences of cognition, literacy, health literacy, language, ability to concentrate or comprehend and physical abilities e.g. hearing, vision and dexterity.

Pharmacists should be aware of medicines, stress and the impact of the current state of health of the patient that may adversely affect the patient's ability to participate in an education session.

It may be appropriate to time the provision of information to include family or whanau members, carers or support persons especially if they take responsibility for administering the patient's medicines.

Unless lacking capacity (e.g. delirium, EPOA activated) patients must be consulted and have consented to the inclusion of others in their health education discussions in line with privacy policy and legislation.

8.4 Medicines education delivery

Patient understanding and retention of information will be optimised if education occurs throughout the episode of care.[1]

Messages about medicines must be consistent, and delivered if possible in the patient's preferred language. If this is not possible, an interpreter (who may be a family member) should be used to provide information.

The patient's level of understanding should be assessed throughout the education interview, by observation of level of engagement, the questions being asked by the patient and responses to questions from the pharmacist.

Visual cues may be useful in ascertaining understanding. Pharmacists should be aware of cultural differences that may be influential e.g. head nodding does not always indicate affirmation.

Attend to a patient's need for privacy. Where possible accommodate those needs in order to make the patient as comfortable as possible.

Avoid times when there is a high risk of interruptions e.g. meal times or medicine rounds.

Pharmacists should fully review the patient medical background and medicines list and have a clear objective before delivering an education session.

Visual aids or videos may be useful adjuncts to discussion.

8.5 The education session

Introduction and approach:

After determining the ability of the patient to communicate, choose an appropriate location and adopt a suitable position to enable the session to take place comfortably and effectively:

- greet the patient/carer, where possible use greetings in the patients preferred language
- provide your name, role and reason for the session
- establish the identity of the patient/carer
- confirm that the time is convenient
- respect the patient's right to decline education
- identify and attempt to overcome any communication barriers (use an interpreter if necessary)
- establish rapport with the patient/carer to support ongoing communication
- deliver information in a logical sequence
- respond to questions and concerns expressed by the patient or their family and whanau
- provide a medicine list as an aid to understanding.

8.6 Medicines counselling:

Provide information on all that apply:

- generic and brand names of the medicine, physical description and strength

- intended purpose and expected action of treatment
- administration advice
- special directions or precautions
- common adverse effects, ways to minimise them and action required if they occur
- storage advice
- relevant interactions
- techniques for self-monitoring therapy
- medicines monitoring requirements and arrangements
- intended duration of therapy
- ongoing supply and follow-up arrangements
- any funding issues or arrangements
- action to be taken in the event of a missed dose or overdose
- use of administration aids
- ceased medicines and relationship to new medicines
- new medicines or medicines with changed dose or dose forms
- a written medicines list or medication information card as required
- contact details or appropriate points of contact

8.7 Concluding the education session

Assess the patient's level of comprehension and any need for further discussion, information or follow-up.

Where appropriate:

- Consider referral to other agencies e.g.
    - medicines counselling services in primary care
    - medicines oversight services
    - medicines use review services
    - transition care services
    - specialist health consumer support groups
- Consider links to electronic information via patient portals, web providers or other health service information
- Communication of relevant strategies or perceived problems to relevant healthcare team members

8.8 Document relevant findings

Include all relevant details, arrangements for follow-up, recommendations or alerts in the patient's clinical record. *See 5. Documenting in the Clinical Record*

9. Participation in clinical ward rounds or equivalent

Definition

Clinical ward rounds are led by the caring physician team to review and plan patient care. Attendees may include nursing and other clinicians from various disciplines including (but not limited to) physiotherapists, occupational therapists and pharmacists.

Rationale

The frequency and duration of medication errors[46], cost of prescribed medicines[47], cost of preventable adverse drug events and average length of stay[48, 49] are reduced when clinical pharmacists participate in medical rounds.[50]

Improvements in the accuracy of medicine history documentation and benefit/cost ratio have also been demonstrated after inclusion of clinical pharmacists in ward rounds.[46, 47, 48]

A pharmacist's presence on clinical ward rounds influences prescribing at the time of prescribing.[50]

Activities

9.1 Participation

Pharmacists participating in clinical ward rounds should have well developed clinical, communication and interpersonal skills.

Commitment to regular attendance on a ward round is required to be considered a vital part of the team. A decision to commit to providing pharmacist input in clinical rounds must therefore include assigning appropriate pharmacist resource.

9.2 Preparation

Pharmacists must be well prepared before attending a clinical ward round in order to make accurate, meaningful contributions.

Pharmacists must be familiar with the patient clinical record, medical history, relevant diagnostic test results and medicines list.

Bed-side access to and familiarity with relevant digital reference material, applications, calculators and treatment guidelines will facilitate accurate and timely contributions.

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[46] Leape LL, Cullen DJ, Clapp MD, Burdick E, Demonaco HJ, Erickson JI, et al. Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. JAMA 1999; 282: 267–70.

[47] Fertleman M, Barnett N, Patel T. Improving medication management for patients: the effect of a pharmacist on post-admission ward rounds. BMJ Quality & Safety. 2005 Jun 1;14 (3):207-11.

[48] Chen CC, Hsiao FY, Shen LJ, Wu CC. The cost-saving effect and prevention of medication errors by clinical pharmacist intervention in a nephrology unit. Medicine. 2017 Aug; 96 34).

[49] Hohl CM, Partovi N, Ghement I, Wickham ME, McGrail K, Reddekopp LN, Sobolev B. Impact of early in-hospital medication review by clinical pharmacists on health services utilization. PloS one. 2017 Feb 13;12(2):e0170495.

[50] Kucukarslan SN, Peters M, Mlynarek M, Nafziger DA. Pharmacists on rounding teams reduce preventable adverse drug events in hospital general medicine units. Archives of internal medicine. 2003 Sep 22;163(17):2014-8.

Where further research is required to answer a clinical query, an agreement with the clinical team must be reached regarding acuity and timing.

9.3 Opportunities

Clinical ward rounds offer the pharmacist opportunities to:

- Build and/or maintain a rapport with the other members of the team
- Understand the wider clinical care plans
- Make suggestions for the selection and monitoring of medicines
- Clarify medicine reconciliation discrepancies
- Provide technical pharmacological advice
- Prevent medication prescribing errors at the point of prescribing
- Provide medicines-specific information on funding, supply and access issues
- Understand and contribute to planned changes to medication regimens
- Understand further medicines education needs for the patient
- Contribute to discharge planning

Allocation of pharmacists to ward rounds needs to be weighed against other service delivery options.

9.4 Follow-up

Follow-up outcomes from clinical ward round meetings assigned to the pharmacist should be followed up in a timely and professional manner.

Information and recommendations provided as follow-up must be documented in the patient clinical record. See *5. Documenting in the Clinical Record*

10. Pharmacist prescribers working in a collaborative setting

Definition

Pharmacist prescribers practice clinical pharmacy as defined by these practice standards with the additional competency and accreditation for prescribing.

Pharmacists are authorised to prescribe as designated prescribers under the Medicines (Designated Pharmacist Prescriber) Regulations 2013 and are registered in the Pharmacist Prescriber scope of practice.[51]

Pharmacist prescribers must practice in line with the Health Practitioners Competence Assurance Act 2003, (updated 2013) and the Pharmacy Council of New Zealand Code of Ethics for Pharmacist Prescribers.

[51] Pharmacy Council of New Zealand. Pharmacist Prescriber Scope of Practice 2017

The Pharmacy Council of New Zealand defines and governs pharmacist prescribing competencies, training (including pre-requisites for entry into training), accreditation, activities and area of practice.[52, 53, 54]

Pharmacist prescribers must:

- prescribe within the limits of their professional clinical and cultural expertise and competence and ethical codes of practice.
- work in a collaborative prescribing team and are not to be the primary diagnostician.

Rationale

Pharmacist prescribers are recognised as valuable members of the healthcare team who can contribute to reducing medication errors and adverse drugs effects, and supplement the capacity of physician prescribers to meet the needs of the expanding healthcare patient population.[55, 56, 57]

"Evidence has shown that the use of pharmacists and other new prescribers is safe, is acceptable to consumers and other clinicians, and has benefits such as improving access to medicines, providing more flexible, people-centred care and making better use of clinical workforce skills".[12]

Activities

10.1 Services

Pharmacist prescribers may provide a range of services that include but are not limited to:

- writing a prescription for a patient in their care to initiate or modify therapy, including discontinuation or continuation of a therapy initiated by another prescriber
- ordering and interpreting diagnostic investigations including laboratory and other tests
- assessing and monitoring a patient's response to therapy
- providing education and advice to a patient and their family and whanau about their medicine therapy

Pharmacist prescribers are accountable for the care they provide.

Pharmacist prescribers working in secondary care facilities may practice in a variety of environments and specialties.

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[52] Pharmacy Council of New Zealand. Standards and Guidance for Pharmacist Prescribers

[53] Pharmacy Council of New Zealand. Statement on Pharmacist Prescribers and Medicines Management Services 2014

[54] Pharmacy Council of New Zealand. Pharmacist Prescriber: Prescribing Competency Framework and Standards 2010

[55] Roughead L, Semple S, Rosenfeld E. Literature review: medication safety in Australia. Australian Commission on Safety and Quality in Health Care. 2013 Aug.

[56] Raghunandan R, Tordoff J, Smith A. Non-medical prescribing in New Zealand: an overview of prescribing rights, service delivery models and training. Therapeutic advances in drug safety. 2017 Nov;8(11):349-6

[57] Latter S, Blenkinsopp A, Smith A, Chapman S, Tinelli M, Gerard K, Little P, Celino N, Granby T, Nicholls P, Dorer G. Evaluation of nurse and pharmacist independent prescribing. https://eprints.soton.ac.uk/184777/1/ENPIPkeypoints.pdf

Area of practice for a newly registered pharmacist prescriber is usually narrow, but as further training and experience is gained, application may be made to the Pharmacy Council of New Zealand to have an area of practice expanded.

10.2 Collaborative care

The pharmacist prescriber must work as an integrated member of a multi-disciplinary healthcare team.

Pharmacist prescribers are involved in and contribute to the sharing of patient information in the team environment including (but not limited to) diagnosis, test results, medication history, treatment plans, and progress notes that enable the pharmacist to make informed decisions about the patient's treatment and care.

Pharmacist prescribers take an active role in decision making about treatment options and plans with respect to initiation and changes to medicines.

10.3 Communication of activities

Pharmacist prescribers must communicate prescribing decisions to other healthcare professionals caring for the same patient.

Pharmacist prescribers must document all relevant observations, recommendations and actions in the patient clinical record in a timely manner. See *5. Documenting in the Clinical Record.*

10.4 Maintaining professional standards

Pharmacist prescribers are required to actively participate in the review and development of their prescribing practice, and in the critical appraisal of information to improve patient care.

Pharmacist prescribers must maintain specific competency standards set by the Pharmacy Council of New Zealand and remain up to date with the latest clinical developments in their designated area of practice.

11. Discharge and transfer of care collaboration

Definition

Clinical pharmacy input and support for the patient and the healthcare team in the period leading up to a patient being discharged or transferred from one institutional area or facility to another.

Rationale

Medicines related prescribing errors are increased at points of transition within healthcare systems.[58]

While errors of medicines prescribing occur more frequently at admission than at any other point in the patient journey,[59] the discharge interface is a critical stage in facilitating transfer to primary health care.[60]

[58] Nicholls J, MacKenzie C, Braund R. Preventing drug-related adverse events following hospital discharge: the role of the pharmacist. Integrated pharmacy research & practice. 2017; 6:61.

[59] Ashcroft DM, Lewis PJ, Tully MP, Farragher TM, Taylor D, Wass V, Williams SD, Dornan T. Prevalence, nature, severity and risk factors for prescribing errors in hospital inpatients: prospective study in 20 UK hospitals. Drug safety. 2015 Sep 1; 38(9):833-43.

Pharmacists collaborating with other healthcare team members at discharge are effective in identifying and reducing medication prescribing errors and adverse events related to medicines and reducing hospital readmissions.[61]

The pharmacist's role in facilitating transition between care settings is to achieve continuity of medication management for the patient.[1]

Activities

The goals of pharmacist involvement in discharge or transition of care activities are to ensure:

- that patients are prescribed the correct medicines and have ongoing access to medicines
- accurate, patient-specific, medicines-related information is provided to all relevant persons involved in the patient's ongoing care
- patients at risk of medication misadventure are followed-up, monitored and receive any adherence aids required

11.1 Medicines reconciliation at transfer of care

Best practice is that medicines reconciliation occurs at all points of transition in the healthcare system to ensure clear communication about changes to medicines since admission and the reasons for those changes.[1] (*See 2. Medicines reconciliation*)

Where resourcing for clinical pharmacists does not allow this to occur for all patients, patients with the highest risk for medicines related error should be prioritised – see *9. Medicines information provision for patients/clients/service users; 9.2 Prioritisation.*

Use of standardised discharge checklists is recommended.

11.2 Provision of medicines information at discharge

The principles of providing medicines information or education for patients as in *9. Medicines information provision for patients/clients/service users* applies to provision of medicines information at discharge.

Discharge information for patients should include information about all changes to pre-admission medicines list that have occurred during the episode of care, noting those that have been discontinued or initiated during the episode of care, and any alterations of dose, formulation, brand, route or frequency to medicines the patient was previously taking.

Patients should be provided with an accurate medicines list or electronic access to a digital record that includes all medicines the patient is to take following discharge including easy to understand instructions.

Where institutional or service level policy or protocols prescribe a role for pharmacists in post-discharge follow-up, pharmacists should act in line with those policies and protocols.

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[60] Cao J, Ng K. Medication Incidents Associated with Hospital Discharge. Institution for Safe Medication Practices Canada. ISMP Canada Safety Bulletin Volume 17, Issue 1. January 31, 2017

[61] Zemaitis CT, Morris G, Cabie M, Abdelghany O, Lee L. Reducing Readmission at an Academic Medical Centre: Results of a Pharmacy-Facilitated Discharge Counselling and Medication Reconciliation Program. Hospital pharmacy. 2016 Jun; 51(6):468-73.

11.3 Medicines supply for ongoing care

Any issues related to funding or timely access to medicines should be discussed with the patient and resolved prior to discharge, and a plan put in place for the patient and relevant primary care healthcare providers to follow after discharge.

Where institutional policy or protocol allows, pharmacists should return patient's own medicines to them before discharge.

Any medicines that have been discontinued should be removed for destruction, with the patient's permission.

If the patient refuses to consent to the removal of ceased medicines pharmacists may separate the ceased medicines from the current medicines and clearly mark them as ceased and no longer part of the current therapy.

Pharmacists should refer to the prescribing team if there are any concerns.

11.4 Liaison with primary care health providers

Pharmacists can play an integral role in supporting patient adherence and success in taking medicines after discharge by facilitating information flow to relevant healthcare providers in primary care.

The patient's wishes and privacy should be respected when sharing information with other healthcare professionals in line with the Health Information Privacy Code 1994.

Relevant activities may involve but are not limited to:

- Communication with:
    - The patient's family, whanau or carer(s)
    - the patient's usual General Practitioner, practice pharmacist or other staff member
    - community pharmacies or medicines dispensing agencies about issues related to medicines or requests for adherence packaging or aids
    - transition care or specialty care facilities e.g. rest home, residential care or hospice
- Liaison on behalf of the patient for:
    - medicines counselling services in primary care e.g. community pharmacist, primary care clinical pharmacist, Medicines Use Review service
    - specialist pharmacy monitoring services e.g. Community Pharmacy Anticoagulation Monitoring Service (CPAMS)
    - medicines oversight services
    - specialist health consumer support groups – with agreement from patient.
- Providing links to electronic information via patient portals, web providers or other health service information

Resourcing for clinical pharmacists may limit the time available to engage in liaison activities. Those patients who are most at risk of medication error or adverse drugs events should be prioritised for pharmacist involvement in the discharge or transition of care process - see *8. Medicines information provision for patients/clients/service users/8.2 Prioritisation*

Pharmacists may have a role in approving or "signing-off" medicines information in electronic discharge processes.

Pharmacists should follow institutional or service level policy and protocols with regard to their involvement in discharge planning and liaison or electronic discharge processes.

11.5 Communication

Information and recommendations provided as part of discharge input by pharmacists must be documented in the patient clinical record. See *5. Documenting in the Clinical Record*

12. Medicines and clinical information support for the healthcare team

Definition

The provision of independent, accurate, evidence-based information and advice that supports best practice and enables optimisation of medicines use.

Medicines information provision may be reactive, in response to request for information, or proactive where information is provided to actively promote and support optimal medicines use. [62] It ranges from ad hoc advice offered by an individual clinical pharmacist utilising up to date knowledge and clinical judgement, to in-depth research of the evidence base and the outputs of a Medicines Information Centre.

A Medicines Information Centre is a formal clinical service that meets the requirements for operation, facilities, personnel, information resources and quality assurance outlined in the New Zealand Hospital Pharmacists' Association (NZHPA) Medicines Information Centre Guidelines.[62] Trained staff integrate pharmacological and pharmaceutical knowledge, information retrieval and critical analysis with clinical experience and individual patient context to help solve medication-related problems and optimise medicine therapy.

Rationale

Provision of information about medicines is a core professional activity for clinical pharmacists.[1]

Clinical pharmacists are expected to provide leadership, advice, support and education to other clinicians and support staff about safe, cost effective medicines use.[1]

Information and advice provided by pharmacist-led Medicines Information Centres have been shown to make a positive impact on patient care, clinical outcomes and medication safety. [63]

[62] New Zealand Hospital Pharmacists' Association Guidelines for Medicines Information Centres March 2018.

[63] Innes AJ, Bramley DM, Wills S. The impact of UK Medicines Information services on patient care, clinical outcomes and medicines safety: an evaluation of healthcare professionals' opinions. Eur J Hosp Pharm Sci Pract. 2014;21(4):222-8.

Activities

Medicines Information Centres may not be available in all hospitals. In some cases, medicines information support may be accessed by arrangement with another facility that does operate such a service.

Where there is no local or external access to a Medicines Information Centre, clinical pharmacists may undertake skilled research to answer medicines related queries in accordance with their scope of practice and expertise.

12.1 Training

The NZHPA Medicines Information Training Workbook is available for foundation training for all pharmacists providing medicines information and clinical information support.[64] The workbook covers receipt of questions, optimal search strategies for different types of question, and communication of answers.

All pharmacists providing medicines information advice should be competent in or proactive in gaining competence in search strategy and practice and complete, as a minimum, the 'required' sections identified in the NZHPA New Zealand Medicines Information Training Workbook. [64]

Training requirements for pharmacists working in a formal Medicines Information Centre are addressed in the NZHPA Guidelines for Medicines Information Centres.[62]

12.2 Responding to requests for medicines and clinical information support

A systematic approach should be taken when responding to medicines information requests or meeting information needs rising in a pharmacist's own clinical practice.[65, 66]

This includes gathering relevant background information on receipt of a question, performing a search for information, analysing the information, communicating a response, and following up when appropriate.

Clinical pharmacists field requests for information and advice on all matters related to medicines, including prescribing, medicines use and supply. Response may be simple provision of information e.g. cost of a medicine, or may require considerable investigation and deliberation before a recommendation can be made.

Typical information requests may relate but are not limited to:

- Appropriateness of medicine options for a patient according to their individual needs
- Cost-effectiveness of medicines options
- Medicines selection
- Prescribing in line with stewardship programmes
- Adverse reactions to medicines
- Access to medicines including supply, cost and/or funding mechanisms

[64] NZHPA New Zealand Medicines Information Training Workbook 2nd Edition 2011.
[65] Nathan JP. Drug Information – The systematic approach. Journal of Pharmacy Practice 2013; 26(2): 78-84.
[66] Ghaibi S, Ipema H, Gabay M. ASHP Guidelines on the pharmacist's role in providing drug information. Am J Health Syst Pharm. 2015;72(7):573-7

- General clinical, pharmacological or pharmaceutical information
- Safe administration of medicines
- Storage of medicines
- Stability and compatibility of medicines
- Medicines monitoring and/or analysis of monitoring data
- Medicines legislation
- Technical prescribing advice

Requesters may be (but are not limited to):

- Prescribers
- Nurses
- Other clinicians e.g. dietitians, physiotherapists, occupational therapists
- Healthcare support staff e.g. social workers, kaitiaki or Māori health support workers
- Primary care healthcare providers involved in transitions of care
- Healthcare administrators and managers

Responses may be generated from:

- Clinical knowledge or experience
- Reference to current local, national or international clinical guidelines, procedures or protocols
- Current clinical reference texts
- Reference to databases, specialty advisory services e.g. NZ National Poisons Centre, calculators or electronic cross-checking services e.g. medicine interaction checker
- An in-depth literature search for and analysis of clinical evidence

Service users for Medicines Information Centres include those as above and may also include:

- Pharmacists
- Healthcare policy makers
- Organisational medicine safety or quality use of medicines programmes

Activities of Medicines Information Centres include the information request types outlined above but may also include:

- Publication of medication-related newsletters or bulletins
- Provision of medicines information training for pharmacists and intern pharmacists
- Management of medicines-related information for the hospital on an intranet and/or the internet

- Medicines utilisation analysis at service, organisational or DHB level (*see 15.2 Drug Use Evaluation*)
- Guideline, procedure or protocol development (*see 15. Medicines Guideline and protocol development*)
- Medicines use awareness campaign development (*see 15.3 Medicines use campaigns*)
- Healthcare team medicines or pharmacological education (*see 14. In-service education provision*)
- Participation in the reporting of adverse drug reactions (*see 7. Medication safety surveillance*)

12.3 Knowledge of information resources

As time and technology advance, new methods of access to information arise. Clinical pharmacists must be proactive in maintaining their knowledge of current sources of evidence-based information.

The NZHPA Recommended Resources List for Medicines Information[67] provides guidance on suitable information resources for Medicines Information Centres, hospital pharmacies, and community pharmacies.

Pharmacists must remain up to date with the most recent developments in the evidence base in order to provide the most relevant, accurate clinical advice.

Pharmacists acting in specialist roles must be familiar with all sources of clinical information relevant to that specialty including the clinical research literature, reference texts and applications, guidelines, medicines safety alerts and warnings and local protocols and procedures.

12.4 Documentation

Responses to requests for information may be provided verbally where appropriate.

Pharmacists are accountable for discerning the need for written response over a verbal response. Examples of appropriate documentation include:

- Documentation in the patient's clinical record
- Email containing information/response
- Email with formal response as attached document

Recommendations provided should be concise, accurate, clear and actionable.

Documentation in the clinical record where recommendations are made should follow standard protocol (*see 5. Documenting in the clinical record*) and include supporting references where applicable.

For more in-depth enquiries, pharmacists should consider retaining a record of their search strategy, analysis of data or calculations and answer provided. Medicines Information centres must keep a record of all enquiries received, references used, and answers provided within an electronic database.

[67] NZHPA Recommended Resources List for Medicines Information June 2017.

13. In-service education provision

Definition

Professional training or staff development education programmes conducted in the work place for clinical peer groups e.g. pharmacists, nurses, doctors, dieticians, healthcare assistants and other allied health professionals.

Rationale

Pharmacists are medicines experts and as such are well placed to provide professional education about medicines for others in the healthcare team. [1]

Activities

13.1 Informal education provision

Clinical pharmacists provide education through their participation in clinical decision making and within the multi-disciplinary healthcare team.[1]

Informal peer to peer learning should be fostered in the healthcare setting where clinical pharmacists have the opportunity to interact with many different professional healthcare groups and provide ad hoc clinical education.

13.2 Structured education provision

Clinical pharmacists may have roles in designing, developing, and/or delivering clinical education programmes in hospitals that include (but are not limited to):

- Clinical in-service presentations e.g. for nursing staff
- Formal presentations or lectures e.g. Grand Round, conference/workshop presentations
- Orientation programmes for clinical employees
- Clinical pharmacist training supervision or mentorship
- Intern pharmacist preceptorship
- Extern pharmacist supervision
- Pharmacy technician and assistant learning programmes
- Pharmacy undergraduate students

Clinical pharmacists may also be expected to provide advisory input to specialist committees or forums as representatives of the pharmacy service.

13.3 Providing education programmes

Education and training for the provision of clinical pharmacy services should be designed to follow adult learning principles where the learning is within the learner's control and a clinical education pharmacist is available for support and guidance.[1]

Training should be structured, with learning goals and outcomes documented and allow for students to reflect on their learning.[1]

Education and training must provide up to date information that reflects the current principles of best clinical practice.

13.4 Training for pharmacists as educators

Pharmacists undertaking educator or clinical training roles must have relevant clinical experience and knowledge and be actively engaged in ongoing professional and clinical learning of their own.

Pharmacists involved in training others require additional skills in communication, the transfer of knowledge and mentorship.

Wherever possible, clinical pharmacists involved in an educator role should have formal training in clinical supervision.[1]

Where a role requires specific training and accreditation, e.g. intern pharmacist preceptorship, a pharmacist may only engage in the role once fully accredited. Pharmacists must maintain accreditation requirements in order to continue performing the role.

Where training is prescribed by an accrediting body, e.g. Pharmaceutical Society of New Zealand Evolve Intern Training Programme, the pharmacist engaged in delivering that training must fulfil all requirements for delivery of the designated programme.

Designated clinical education roles are standard practice in many international hospital clinical pharmacy services. Establishment of formal educator roles supports the standardisation of delivery of education content and the delivery of orientation, preceptor and clinical training.[1]

Recommended ratios (SHPA, 2013) to use as a guide are one (1FTE) clinical education pharmacist for every 10 intern pharmacists or every 50 pharmacists.[1]

13.5 Assessment and quality assurance

The NZHPA National Career Framework provides guidance for the necessary core skills and practice domains across all levels of experience for pharmacists, intern pharmacists, pharmacy technicians and assistants.[68, 69, 70] Core Domain 3. *Education and training of others* defines the expected activity level and skill set required to perform at all levels of experience from intern pharmacist to pharmacy manager.

Pharmacy services should have a documented education, assessment, review and career or credentialing plan for all their clinical pharmacists and this should be supported by pharmacy and hospital managers.

Clinical competency and assurance of quality clinical service delivery is the professional responsibility of all clinical pharmacists. Overall responsibility for assessment and maintenance of a quality clinical pharmacy service rests with pharmacy managers or leadership team.

[68] http://nzhpa.org.nz/media/21589/appendix%204%20pharmacist%20profile.pdf
[69] http://nzhpa.org.nz/media/21592/appendix%205%20pharmacy%20technician%20profile.pdf
[70] http://www.nzhpa.org.nz/media/21595/appendix%206%20pharmacy%20assistant%20profile.pdf

14. Medicines guideline and protocol development

Definition

Medicines guideline, procedure and protocol documents guide clinical practice in line with current, accepted, evidence-based knowledge.

Rationale

Pharmacists are medicines experts and as such have a role to play in the provision of clinical guidance for the safe and quality use of medicines. [1, 12]

Activities

Medicines guidelines development may be part of a clinical pharmacist's role or devolved to a specialist Medicines Information service or centre where a healthcare facility has such a service.

Pharmacy services may be solely responsible for the development of guidance documents for medicine use and administration or they may contribute as part of a multi-disciplinary consultation and development team.

Guidance documents must reflect established evidence-based information and best practice.

All guidance documents have a formal review and update process to ensure currency with best practice.

Information provided within guidance documents must be accurate and meaningful for those for whom the document is intended.

Guidelines must be stored in a manner that enables ready access by authorised users.

15. Stewardship and medicines safety programmes

Definition

Stewardship in the healthcare environment is the authorised activities of a service to optimally manage a resource.

A "service" may be a single service, collaborating services, an organisation, District Health Board or nation-wide healthcare service delivery.

"Optimal management" may be necessary for a variety of reasons:

- public safety e.g. emergency supply of medicines in a pandemic
- limited resources e.g. a national medicine shortage
- prevention of an adverse drugs outcome e.g. management of clozapine monitoring
- contribution to local, national and/or international medicine effectiveness preservation e.g. antimicrobial stewardship
- to allocate medicines to those most in need
- to manage medicines expenditure
- to assess whether medicines use reflects current best practice, safety and efficacy outcomes

Medicines safety programmes are those designed to address the quality and safe use of medicines especially those medicines defined as 'high risk'. (Health Quality and Safety Commission New Zealand national medicine safety initiative Haumaru rongoā).[71]

Rationale

Monitoring and assessment of medicines use is a specialised practice. Pharmacists are expected to provide leadership in the evaluation, optimisation and safety of medicines and medicines use.[72]

Access to and analysis of medicine use records enables a service or facility to understand whether the use of medicines reflects best clinical practice and cost effectiveness guidance.

Activities

Stewardship programmes may be designed to focus on many specific elements of medicines use. Such programmes could include opioid analgesic management, clozapine monitoring management, public health initiatives, antibiotic resource management or antimicrobial stewardship and drug utilisation management also known as Medicine or Drug Use Evaluation.

Any stewardship or medicines safety program should incorporate the principles of equity throughout the consultation, design, implementation and dissemination of results.

Three examples only are described in detail below: Antimicrobial Stewardship, Medicines Use/Drug Use Evaluation and Medicines Use Campaigns.

15.1 Antimicrobial Stewardship

Antimicrobial stewardship programmes exist to ensure that:

- antimicrobial agents continue to be available and effective by using them in a "prudent and responsible way".
- knowledge about the development and spread of antimicrobial resistance is improved and applied in order to minimise its development and spread.[73]

Pharmacist leadership is recommended in support of antimicrobial stewardship and the development of antimicrobial use guidelines and pathways, to ensure a robust evidence-based approach to antimicrobial use.[74]

Multidisciplinary antimicrobial stewardship teams should include an antimicrobial stewardship pharmacist,[75] or where such expertise is not locally available, the team should follow the guidance of national advisory groups e.g. PHARMAC, BPAC[76] and Ministry of Health.[77]

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[71] Health Quality Safety Commission. Haumaru rongoā Medication Safety. https://www.hqsc.govt.nz/our-programmes/medication-safety/

[72] Doherty P, Kirsa S, Chao S, Wiltshire S, McKnight D, Maxwell D, Dartnell J, Kaye K, Graudins L. SHPA Standards of Practice for Drug Use Evaluation in Australian Hospitals: SHPA Committee of Specialty Practice in Drug Use Evaluation. Journal of Pharmacy Practice and Research. 2004 Sep;34 (3):220-3.

[73] New Zealand Ministry of Health and Ministry of Primary Industry. New Zealand Antimicrobial Resistance Action Plan. Wellington: Ministry of Health. August 2017.

[74] Royal Pharmaceutical Society. The pharmacy contribution to antimicrobial stewardship Sept. 2017. https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Policy/AMS%20policy.pdf

[75] New Zealand Hospital Pharmacists' Association Position Statement on Antimicrobial Stewardship July 2014.

[76] Best Practice Advocacy Centre NZ. Antimicrobial resistance: Systems and processes for effective antimicrobial medicine use within human health and healthcare in New Zealand. Nov 2017 https://bpac.org.nz/guidelines/3/docs/AntimicrobialStewardship.pdf

Guidelines for antimicrobial use and management should be in place to guide practice in line with local susceptibility data.

For consistency of practice, guidelines should be developed in line with national recommendations.

A healthcare facility/hospital may defer to District Health Board level guidelines.

Whenever a clinical pharmacist undertakes a review of a patient prescribed an antimicrobial agent they should consider the following:[78]

- Empiric treatment and directed treatments are line with local guidelines.
- Treatment is in line with microbiological results.
- The narrowest spectrum agent available has been chosen.
- Where a case is complex or treatment pathways are not clearly defined in guidelines, consultation with a microbiologist or Infectious Diseases specialist prescriber has been considered.
- Dose and frequency of treatment is appropriate for the patient's kinetic profile (including weight, renal and hepatic clearance) and infection (including organism and site).
- Possible interactions with other patient medicines that may affect efficacy of the antimicrobial or impact on that of other medicines.
- Interactions that may lead to adverse effects.
- Requirements for dosing in relation to enteral or parenteral nutrition, fluid or other physiological restrictions e.g. electrolytes, IV access.
- If IV treatment is prescribed, switching to oral therapy is considered and implemented at the earliest appropriate time in accordance with local guidelines.
- Duration of therapy is in line with guidelines.
- Changes of therapy are completed in such a way that provides the best possible antimicrobial cover while reducing the risk of interactions or adverse effects.
- The indication for use and an appropriate duration or review date has been documented in the clinical record.
- Restricted antimicrobials are prescribed and approved in line with local policy and in line with the Hospital Medicines List requirements.
- Sufficient supply is available so that omissions or delays in administration do not occur.

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[77] https://www.health.govt.nz/our-work/diseases-and-conditions/antimicrobial-resistance/minimising-antimicrobial-resistance-information-health-professionals/antimicrobial-prescribing-guidance-and-antibiograms

[78] Clinical Pharmacy Practice Processes. Pharmacy Department Manual. Auckland District Health Board. September 2017

- Where prescribing is not in line with guidelines, or opportunity for optimisation is identified, it is expected that the pharmacist will discuss with the caring prescriber with the view to modifying the order.
- Provision for continuation of therapy after discharge has considered:
    - Funding mechanisms
    - The integrity of supply
    - Administration capabilities e.g. the patient, community nursing, General Practice or other outreach facilities or services
    - Adherence risks

15.2 Drug Use Evaluation (DUE)

Drug Use Evaluation is a systematic quality improvement process focused on optimising medicine use and cost-effectiveness of medicines.[72]

DUE and Drug Use Review are terms that are used interchangeably. Drug Use Evaluation is the preferred term for the purposes of this document.

DUE may be conducted for a singular purpose, but may also be part of a broader, comprehensive and ongoing organisational quality management program. Such programs typically follow the plan-do-study-act (PDSA) methodology cycle with the aim of critically appraising the outcomes of quality improvement change.[79]

DUE is medicine or disease-specific and can be structured so that it will assess (but is not limited to):[80]

- The processes of prescribing, dispensing or administering a medicine
- Monitoring for compliance or appropriate use against accepted guidelines
- Outcomes of treatment
- Cost comparisons between treatment options
- Comparative use of medicines from an organisational, service, demographic or prescriber perspective
- Supply chain logistics, safety and/or security

DUE may be conducted prospectively or retrospectively.

Data collection or scrutiny may occur via (but is not limited to):

- supply chain databases
- automated medicines storage and dispensing cabinets
- electronic prescribing and administration platforms
- the clinical record

[79] https://www.healthnavigator.org.nz/clinicians/p/pdsa-cycle/
[80] WHO http://apps.who.int/medicinedocs/en/d/Js4882e/8.5.html

- national medicines consumption databases

Interrogation of databases requires specialist skills and should be conducted in line with approval processes for access to data.

Ethics approval may be required if the purpose of the data search involves the recording of patient identification details. Researchers should consult with Ethics committee advisors before proceeding with a data collection.

Pharmacists conducting DUE research should be appropriately skilled in relevant research techniques or be working under the supervision of another who is appropriately skilled.

Data must be collected in a manner that ensures a clear line of sight to the retrieval process.

All data must be stored securely and only be accessible to those who are approved for access.

Data analysis and interpretation methods must be clearly documented.

All researcher affiliations and conflicts of interest must be declared.

15.3 Medicines use campaigns

Medicines safety programmes often use specifically designed campaigns to raise awareness of medicines the safe and quality use of medicines.

Pharmacists should be included in the design and planning of organisational medicines awareness campaigns.

Medicines use awareness campaigns may be proactive or in response (but not limited) to:

- Adverse healthcare or medicines event(s)
- Changes to local, national or international guidelines
- Local, or national directives related to the safe use or administration of medicines campaigns
- Medicines cost utility strategies

16. Clinical research

Definition

Research with a focus on clinical outcomes (particularly in relation to the use of medicines); that which aims to advance or improve the practice of clinical pharmacy; or that which may contribute to wider clinical investigations.

Rationale

Clinical research provides the evidence to support or review clinical practice and may provide pathways to quality improvement.[1]

Research is a core domain (*Domain 7: Research, analysis and information delivery*) of the NZHPA Hospital Pharmacists Career Framework, with relevant skills defined at all levels from Pharmacy technician, intern pharmacist to the highest grade, Level 5 pharmacist.[81]

Clinical research is a core skill fundamental to clinical practice. All pharmacists should be competent in or proactive in gaining competence in clinical research strategy and practice.

Activities

Research activities involve the design, development and implementation of research projects, analysis and interpretation of results and presentation of findings.

Research skills as defined by the NZHPA Hospital Pharmacy Career Structure range from the entry level requirement for ***Intern pharmacists*** to understand the basic principles of research, be able to conduct a clinical audit or limited research project, and answer Medicines Information queries under supervision, to ***Level 5 pharmacists*** who are expected to be able to analyse and or interpret complex business data to inform service delivery and development; manage complex high level research projects; undertake strategic/specialist research to inform practice; contribute to national and/or international level research and lead, co-ordinate and implement research and development projects.

Participation in research should be encouraged at all pharmacist skill levels to further individual knowledge of evidence based processes.[1]

In some hospital care facilities, pharmacy services may develop dedicated research capabilities or services. Such services should be linked to academic or other healthcare professional research organisations.

Pharmacists involved in planning and executing research activities should ensure that the objectives are achievable and relevant and that the activity is worthy of the required resources.

Pharmacists must ensure that data used is accurate, reliable and verifiable and that the methodology is appropriate and meets relevant ethics committee criteria.[1]

Where clinical research involves patient information, researchers must comply with the provisions of the Privacy Act 1993 and the Health Information Privacy Code (1994).

Research activities include (but are not limited to):

- Medicine Information – *see 9. Medicines information for patients/clients/service users and 13. Medicines information provisions for the healthcare team*
- Drug Use Evaluation – *see 16.2 Stewardship Programmes, Medicine Use/Drug Use Evaluation*
- Clinical Audits
- Clinical Trials

16.1 Clinical audits

Clinical audits may embrace any element of clinical practice including (but not limited to):

[81] New Zealand Hospital Pharmacists' Association Hospital Pharmacy Career Structure. Pharmacist Profile. February 2017. http://nzhpa.org.nz/media/21589/appendix%204%20pharmacist%20profile.pdf

- Clinical interventions
- Medicine storage and supply chain
- Medicine administration including administration safety mechanisms and software
- Adherence to therapeutic guidelines
- Adherence to prescribing guidelines
- Provision of medicines information
- Delivery of clinical service against organisational Key Performance Indicators (KPIs)
- Benchmarking of clinical service delivery against national standards

Recording interventions made by clinical pharmacists supports understanding of the scope and quality of the role of a clinical pharmacist and the resource required to perform the required tasks.

Clinical Interventions may be required to be routinely recorded, analysed and reported in some healthcare facilities. Other facilities may require clinical pharmacists to record and report on clinical interventions as part of planned, intermittent, limited audits.

Pharmacists should comply with organisational or service level policy with regard to recording of interventions.

Clinical audits may be designed and delivered on behalf of the pharmacy service alone or as part of a wider, multi-disciplinary process. Clinical audit specialist data retrieval and analysis may be conducted by organisational quality management teams in collaboration with clinical pharmacy staff.

16.2 Clinical trials

Healthcare facilities must be registered in order to carry participate in clinical trials. Medsafe New Zealand governs this process under Section 30 of the Medicines Act 1981. [82, 83]

Clinical trial participation and/or management is an advanced clinical practice. Pharmacists responsible for clinical trials involvement should have relevant post graduate research qualifications or relevant onsite training and experience.

Clinical trials managers must be compliant with all requirements of storage, dispensing, supply, documentation and return of unused stock in accordance with each individual trial protocol.

Funding for clinical trials and recruitment of patients and clinician participants must comply with healthcare organisational sponsorship and Ethics Committee policy.

[82] New Zealand Medicines and Medical Devices Safety Authority. Medicines Clinical Trial Sites. Accesses 26th August 2018. http://www.medsafe.govt.nz/regulatory/CSSites.htm

[83] New Zealand Medicines and Medical Devices Safety Authority. Guideline on the Regulation of Therapeutic Products in New Zealand - Part 11: Clinical Trials - Regulatory Approval and Good Clinical Practice Requirements. Ed.1.4 Jan 2015.