Knowledge and skills reference guide for professional development in diabetes

A companion to the FIP diabetes handbook for pharmacists

2022

FIP Development Goals

Diabetes

FIP Practice Transformation Programme on NCDs

ADVANCING PHARMACY WORLDWIDE

Colophon

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Contents

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1 Background

Diabetes mellitus is a group of metabolic diseases characterised by chronic hyperglycaemia that can result in long-term damage and failure of diverse organs, especially kidneys, eyes, nerves, heart and blood vessels.[1] With one in 10 adults living with diabetes worldwide, it has become one of the fastest-growing global health emergencies of the 21st century.[2]

The number of patients with diabetes has more than tripled over the past 20 years, mainly due to the increasing prevalence of obesity and physical inactivity. The World Health Organization (WHO) estimates that by 2045, 700 million people will be living with diabetes.[3] Type 2 diabetes particularly impacts low and middle-income countries, where 90% of people with diabetes are undiagnosed.[2,3]

While premature mortality from other noncommunicable diseases (NCDs) is decreasing; early deaths caused by diabetes increased by 5% between 2000 and 2016. The challenge of diabetes presents a serious risk to achieving the United Nation Sustainable Development Goal target 3.4, to reduce premature mortality from NCDs by one-third. To tackle this issue, the WHO is pressing to improve efforts to reduce inequity in accessing diagnosis and treatment for diabetes and offer equitable, comprehensive, affordable and quality care.[4]

Being the most accessible healthcare professional in a community, pharmacists are in an ideal position to contribute to decreasing the burden of this condition.[5]Studies show that collaborative diabetes management that includes a pharmacist can improve glycaemic control, blood pressure, lipid control, and medication effectiveness and adherence, and minimise adverse drug effects.[5–7] Moreover, pharmacists' contribution led to improved quality of life and important cost-savings (USD 8–85,000 per person per day) versus usual care.[8] Any health programme should take advantage of pharmacists' knowledge and skills to promote and optimise pharmacist direct patient care services to support people with diabetes in achieving the expected optimal health outcomes.[4]

Since 2006, the International Pharmaceutical Federation (FIP) has been advocating the role of pharmacists in the prevention and treatment of chronic disease in its Statement of Policy. The 2010 FIP Statement of Policy on collaborative pharmacy practice stressed the need for multidisciplinary collaboration and states that the expertise and skillset of pharmacists make their "contribution to the healthcare team important to both optimise therapy and to prevent medication-related problems". The 2019 FIP Statement of Policy reiterates the crucial role of pharmacists to support the global effort to tackle the growing issue of diabetes.[4]

In 2021, FIP developed "A handbook for pharmacists on diabetes prevention, screening and management", which describes all the interventions by pharmacists in diabetes that are supported by robust evidence and can contribute not only to reducing the prevalence of diabetes, but also to improving the health and quality of life of people living with diabetes.[4] The handbook emphasises that pharmacists are uniquely positioned and have the necessary skills and knowledge to provide a wide range of services to prevent and identify diabetes and to manage people with the condition as well as support the care provided by other members of the healthcare team.[4]

This Knowledge and Skills reference guide to support professional development in diabetes is intended to help pharmacists with the increasingly necessary competencies they may have to acquire in managing patients with diabetes. These roles range from prevention and screening to clinical management. Some barriers and regulations may prevent pharmacists in some countries from performing certain services as outlined in the diabetes handbook or listed in this guide, but the incorporation of pharmacists into multidisciplinary diabetes care teams should always be strongly considered by clinicians and health policymakers.[6] By expanding the full potential of pharmacists in the delivery of diabetes care and associated services, we get closer to offering optimal health services to patients making sure that no one is left behind.

Building on the need to support pharmacists worldwide in providing services and offering interventions in diabetes, this guide aims to:

- Outline the knowledge and skills recommended in diabetes for practising pharmacists;
- Provide a structure to support and enhance pharmacists' continuing professional development (CPD) in diabetes; and

- Highlight key considerations of CPD provider in diabetes.

2 FIP global competency and professional development frameworks

As medication experts, pharmacists are key members of a patient's health care team. Pharmacists must nevertheless maintain and continuously update their competence to practise and remain responsive to the increasingly complex healthcare environment, through continuing professional development (CPD). FIP defines CPD as "the responsibility of individual pharmacists for systematic maintenance, development and broadening of knowledge, skills and attitudes, to ensure continuing competence as a professional, throughout their careers".[9] One approach to developing and maintaining competence is to embrace competency-based training, which is a structured approach to training and assessment that is directed toward achieving specific outcomes. Through such an approach, pharmacists must be assisted to acquire skills and knowledge to enable them to perform a task to a specified standard under certain conditions. In competency-based training, the outcomes to be achieved are clearly stated so that learners know exactly what they must be able to do, trainers know what training or learning is to be provided and organisations know the skill levels required of their people. The emphasis in competency-based training is on "performing" rather than just "knowing".[9]

With wide acceptance on implementing competency-based training and education in health professions, competency frameworks are deemed essential in organising educational curricula, regulating career entry, benchmarking standards of practice and facilitating expertise development.[9] FIP developed two global frameworks that describe the generic competencies for foundation and advanced pharmacy practice, respectively: the FIP Global Competency Framework[10] and the FIP Global Advanced Development Framework.[11]

The FIP Global Competency Framework (GbCF), updated in 2020, is a set of competencies and core behavioural statements that are intended to be generally applicable for the pharmacy workforce worldwide, particularly targeting early-career (foundation-level) pharmacists.[10] The GbCF includes 124 behavioural statements grouped under 23 competency domains and four broad competency clusters: pharmaceutical public health, pharmaceutical care, organisation and management, and professional and personal competencies.

The FIP Global Advanced Development Framework (GADF) is a complementary framework to the GbCF.[11] The GADF intends to support the professional development and recognition of pharmacists and pharmaceutical scientists and maps broad-based advanced practice stages across developmental competencies. Six developmental competency clusters are in the GADF: expert professional practice, working with others, leadership, management, education, training and development, and research and evaluation.

The GbCF and the GADF are intended to act as mapping tools for individuals to progress towards effective and sustained performance and to pave the way into advanced and specialist practice to enable flexibility and transfer of key knowledge and skills and wider competencies.

As such, FIP recommends that individuals use its knowledge and skills reference guides alongside the FIP competency and developmental frameworks to identify the knowledge, skills and behaviours that will be relevant to support them in developing their practice (Figure 1). It is expected that pharmacists will need to harness knowledge, skills, attitudes and values previously acquired and crosscut other competency areas to perform the tasks at hand. A FIP reference guide provides guidance on knowledge and skills on a specific topic. In this way, cross-learning and transfer of key knowledge and skills is encouraged and embedded. The tools provided by FIP, which include competency frameworks and knowledge and skills reference guides, inform CPD practices such as self-assessment of one's practice as part of registration or licensing requirements, professional development or self-directed learning.

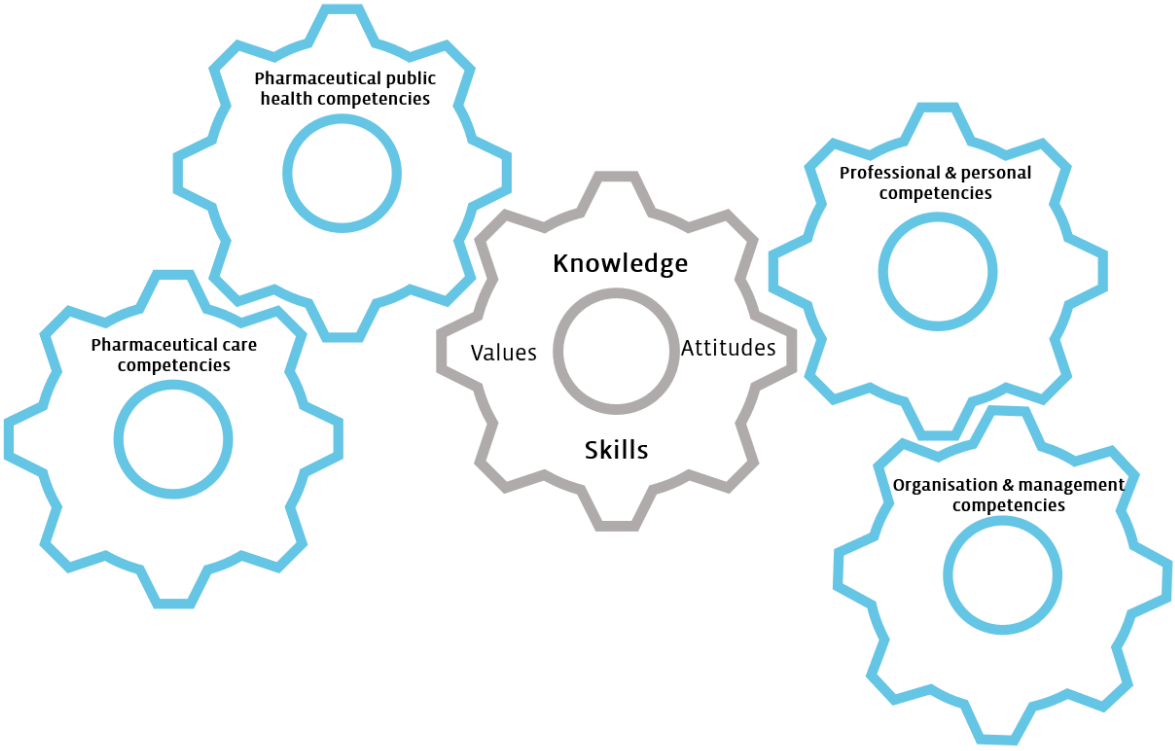

Figure 1. Competencies encompass an array of knowledge, skills, attitudes and values to enable effective performance. Competency clusters are based on the FIP Global Competency Framework.[10]

3 Pharmacist professional development: knowledge and skills reference guide

3.1 About the guide content

This knowledge and skills reference guide provides a comprehensive list of required knowledge and skills in pharmaceutical and related care to support pharmacists to develop, upskill and refresh knowledge and skills for managing patients with diabetes. The guide supplements the FIP Diabetes prevention, screening, and management: A handbook for pharmacists and was developed in consultation with a global reference group (see acknowledgments).

Tables 1 and 2 below have built on existing FIP resources on to date,[4,12] current learning and teaching tools, curricula and expert review through a reference group. The reference group, made up of educators and practitioners with experience in professional development in diabetes, reviewed the statements in the tables and agreed on the content.

3.2 How is the information organised?

The guide is organised in two parts.

The first part (Table 1) describes the knowledge required by pharmacists in diabetes. In the knowledge guide, topics are grouped into three categories (Figure 2):

- Broad topic area — includes main categories such as body systems, pharmaceutical care, public health and advocacy, ethics and collaborations. Many of these categories are linked to the GbCF competency clusters.
- Core topics — identifies key topic areas (knowledge areas) related to the roles and services provided in the management of diabetes.
- Specific topics — describes specific topics stemming from the core topics.

The second part (Table 2) describes skills required by pharmacists in diabetes care.

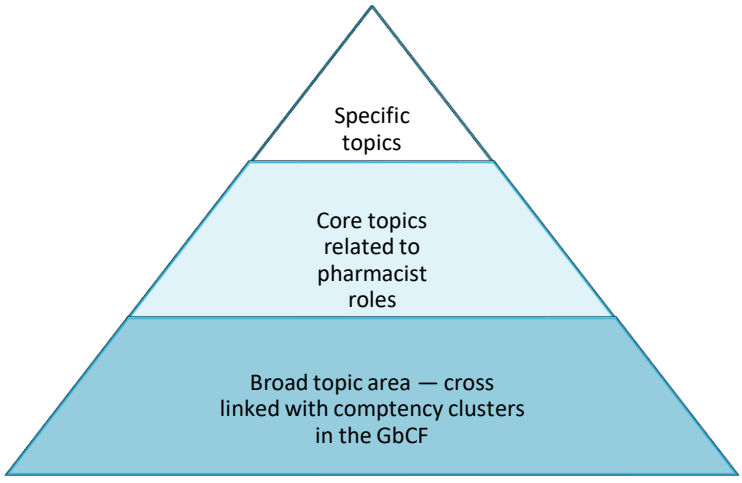

Figure 2. Hierarchy of topic grouping in the knowledge guide

3.3 Who is it for?

This reference guide is intended to guide practice in diabetes care, rather than to be a prescriptive list that has to be adhered to in all cases. It is relevant to pharmacists focusing on a specific area(s) of practice and may be relevant at any stage of professional development depending on the pharmacist's role. It is intended to support pharmacists' in performing diabetes-related services and interventions safely and effectively.

3.4 How to use it?

This reference guide can be used:

- To support pharmacists to upskill in the area of diabetes and as part of their course of career development;
- To help pharmacists with an interest to provide diabetes-related services in their area of practice; and
- To guide the design and delivery of education and training programmes by CPD providers.

3.5 Contextualisation, and regulatory and training requirements

It is crucial to recognise that pharmacists will have to follow their local, national and jurisdictional requirements for training, certification and regulatory/professional and ethical standards to fulfil their specified roles. These may include:

- Appropriate training relevant to their scope of practice and level of specialisation in the management of diabetes;
- Codes of conduct;
- Nationally developed certificate training programmes or board certification;
- Registration or licensure status;
- Professional affiliations; and
- Healthcare jurisdictions (laws) regarding the education, competencies and responsibilities of pharmacists and other healthcare professionals.

Table 1. Knowledge guide for pharmacists in diabetes: [4,5,7,9,13–24]

Therapeutic area	
Body system and disease area	**Demonstrate knowledge and understanding of:**
Endocrine system	• The basic anatomy of the endocrine system, including organs of the endocrine system (pituitary, thyroid, parathyroid, adrenal, pineal and thymus glands, the pancreas, and the gonads), their functions, and their role in maintaining body homeostasis. • The basic physiology of the endocrine system through hormones and the major processes they control such as: reproduction, growth and development; mobilising the body's defences against stressors; maintaining electrolyte, water and nutrient balance of the blood; and regulating cellular metabolism and energy balance including blood glucose. • Pathophysiology of prediabetes and diabetes (type 1, type 2, gestational, drug-induced, latent autoimmune diabetes in adults [LADA]), including cause, signs and symptoms and diagnostic criteria.
Diabetes mellitus	• Diabetes (type 1, type 2, gestational, alcohol or steroid induced), including cause, signs and symptoms, basic diagnosis, prevention, risk factors and exacerbating factors. • The management of diabetes (type 1, type 2, gestational, alcohol or steroid induced), including rationale for drug use, commonly used drugs, usual doses and routes of administration, place in therapy of each drug with regard to guidelines and evidence, the mechanism of action and pharmacokinetics of drugs used, adverse effects and appropriate action to manage or prevent them. • The monitoring of diabetes (type 1, type 2, gestational, alcohol or steroid induced), including monitoring parameters, prioritising monitoring parameters, and suitable actions to ensure appropriate monitoring. • The use of medicines in diabetes (type 1, type 2, gestational, alcohol or steroid induced), including: drug-drug, drug-patient (e.g., drug handling in the elderly) and drug-disease interactions and their identification, prioritisation and management; treatment targets and their identification, prioritisation and management; optimising patient concordance; and the impact and effects of drugs on blood glucose with regard to mortality and morbidity.
Public health and advocacy	
Prevention strategies	**Demonstrate knowledge and understanding of:**
Risk factors	• Diabetes modifiable and non-modifiable risk factors that increase the risk for developing pre-diabetes and type 2 diabetes. • Diabetes-related morbidity and mortality, particularly related to cardiovascular risk factors, such as smoking, hypertension, dyslipidaemia and excess weight.
Lifestyle	• Evidence-based lifestyle changes that have the strongest potential to prevent type 2 diabetes, including weight reduction, healthy eating and physical activity.
Epidemiology	• Global and local prevalence of diabetes.
Advocacy	• Nutritional recommendations, physical activity, weight loss, managing stress and smoking cessation. • The role of motivational counselling in creating positive behavioural change. • Structured diabetes prevention programmes and campaigns, and support groups for people living with diabetes.
Vaccine-preventable diseases	• Vaccines recommended for people with diabetes, including COVID-19, influenza, pneumococcal, Diphtheria, Tetanus, and Pertussis (Tdap), hepatitis B (Hep B) and zoster vaccines.
Screening	**Demonstrate knowledge and understanding of:**

Screening and referral	• Risk factors, signs, and symptoms for developing diabetes, and high-risk groups in the community. • National guideline-based screening tests specific to the country; if not available, the most recent international screening guidelines. • Diabetes screening tests and the various factors that may influence the accuracy of glucose testing and glycosylated haemoglobin (HBA1c) results. • Testing devices and test strips and their use, storage and calibration. • Blood glucose and HbA1c result interpretation to determine if patient could potentially have pre-diabetes or diabetes and require referral to another member of healthcare team for diagnosis and confirmation testing. • The referral network and system in their area of practice.
Assessing risk factors, signs and symptoms	• Cardiovascular risk factors, such as smoking, hypertension, dyslipidaemia and excess weight (e.g., monitoring Body Mass Index [BMI]).
Cultural considerations	• The emotional, spiritual, cultural and social preferences of individuals' self-management practices. • The behaviours and health beliefs that affect adherence to medication.
Pharmaceutical care	
Monitoring parameters	**Demonstrate knowledge and understanding of:**
Laboratory	• Laboratory indicators, including glucose (blood and urine), HbA1C, fructosamine, urinary albumin excretion, creatinine/urea, proteinuria and plasma lipid profile.
Medicines	**Demonstrate knowledge and understanding of:**
	• The pharmacological management of diabetes (type 1, type 2, gestational, drug induced, LADA) and treatment targets.
Oral diabetes medicines	• The use of medicines in diabetes (type 1, type 2, gestational, alcohol or steroid induced), including: drug-drug, drug-patient (e.g., drug handling in the elderly) and drug-disease interactions and their identification, prioritisation and management; treatment targets and their identification, prioritisation and management; optimising patient concordance; and the impact and effects of drugs on blood glucose with regard to mortality and morbidity. • Commonly used drugs, including metformin, sulfonylureas, meglitinides, alpha-glucosidase inhibitors, thiazolidinediones, SGLT2, and DDP-4 inhibitors.
Insulins	• The availability, affordability and usage of the various insulin devices, including syringes, insulin pens, insulin pumps, patch pumps, connected insulin pens and jet injection. • All aspects of insulin, including mechanism of action, pharmacology, pharmacokinetics, pharmaceutical aspect, adverse effects, contraindications and interactions, usual doses and routes of administration, place in therapy, drug-drug and drug-food interactions, and monitoring requirements. • Information related to storage and handling of all insulin devices, including dose preparation, injection site and technique.
Non-insulin injectable medicines	• The availability and affordability of the various non-insulin injectable medicines, including GLP-1 receptor agonist and amylin mimetic. • All aspects of the various available non-insulin injectable medicines, including: mechanism of action, pharmacology, pharmacokinetics, pharmaceutical aspects, adverse effects, contraindications and interactions, usual doses and routes of administration, place in therapy, drug-drug and drug-food interactions, and monitoring requirements. • The storage and handling of non-insulin injectable medicines, including dose preparation, injection site and injection technique.
Treatment targets	• Treatment targets and individualised approaches in adjusting treatment targets (e.g., blood glucose and HbA1c).

Administration	• The factors to be taken into consideration when advising on diabetes medicines dose calculations and adjustments in adults, including weight and age, and an ability to calculate doses from relevant parameters. • Diabetes medicine formulation, including: (i) the formulation factors that will determine the suitability of a product for administration to a specific patient; (ii) the role of excipients and preservatives in formulations, their pharmacological actions, their adverse effects, and related factors that should be considered before administering a medicine to a patient (e.g., lactose intolerance etc); and (iii) advice on the manipulation of diabetes medicine formulations to maximise compliance and effectiveness.
Medicines information	**Demonstrate knowledge and understanding of:**
	• The common information sources used when answering enquiries about diabetes medicines, including administration of medicines, adverse medicines reactions, alternative medicines, medicines interactions, compatibility of parenteral medicines, together with their advantages and disadvantages. • How to effectively search trusted sources, such as textbooks, databases, websites, journals and reports, for evidence-based information, and their advantages and limitations. • The effective use of interviewing to gather all relevant background information from patients in order to establish the nature of the medicine enquiry, and to be provide the best and most individualised answer. • The structure of medicines information service provision within the area of practice.
Self-management in diabetes	**Demonstrate knowledge and understanding of:**
Education	• Education about self-management in diabetes.
Lifestyle modifications	• Important lifestyle modifications, including healthy diet, regular physical activity, stopping smoking, adequate sleep and managing stress. • The multidisciplinary approach to achieve the desired lifestyle modifications.
Dietary approaches	• Dietary approaches, such as calorie reduction, glycaemic index monitoring, and meal planning (Mediterranean, low-carbohydrate, plant-based).
Self-management education	• The various evidence-based self-care skills, including healthy coping, healthy eating, being active, taking medicines, self-monitoring, reducing risk and problem solving. • Multidisciplinary referral systems, including referral to dieticians, nutritionists, exercise physiologists, diabetes educators, psychologists or structured group programmes. • The four critical times when diabetes self-management education or referral should be provided, namely: (i) at diagnosis; (ii) annually and when not meeting treatment targets; (iii) when complicating factors develop; and (iv) when transitions in life and care occur.
Psychosocial well-being	• Psychological disorders and diabetes, which commonly occur concurrently. • How to assess patients for diabetes distress or other mental health conditions so appropriate supports and treatment can be started.
Patients with diabetes	**Demonstrate knowledge and understanding of:**
Patient assessment	• The factors that could contribute to an individual patient's medication non-adherence, including socio-economic, health system- or health care team-related, condition-related, therapy-related and patient-related factors. • Effective strategies that can improve medication adherence, such as counselling techniques, motivational interviewing, teach-back methods. • Symptoms of concern that indicate the patient's diabetes is not well-controlled or that they are experiencing potential complications.
Developing and implementing diabetes management plans	• Diabetes management plans and how they should be prepared in partnership with each patient and as part of the patient's general health management plan, incorporating all aspects of their health care, not only those relating to diabetes.

	• The rational use of medicines, i.e., the medicine appropriate to fit the clinical needs of an individual patient with diabetes, in doses that meet their own requirements, for adequate periods and at the lowest cost to the patient and their community.
Monitoring a care plan	• Monitoring of diabetes (type 1, type 2, gestational, drug-induced), including identifying monitoring parameters, prioritising monitoring parameters and suitable actions to ensure appropriate monitoring. • Monitoring parameters, e.g., ketones, weight, blood glucose, HbA1c, lipids, blood pressure, kidney function, weight, waist circumference, BMI, and medication adherence. • Patient record keeping tools and systematic approaches for writing patient case notes.
Digital tools	• The assortment of and recommended digital products for glucose monitoring, insulin solutions, cloud-based data management systems, portable electronic medical records and mobile applications.
Prevention and management of diabetes-related complications	**Demonstrate knowledge and understanding of:**
Hypo/hyperglycaemia	• The prevention and management of hypo/hyperglycaemia, including causes, warning signs and symptoms, prevention, risk or exacerbating factors, use of appropriate monitoring equipment to confirm hypo/hyperglycaemia, treatment options and seeking medical help.
Diabetic ketoacidosis	• The prevention and management of diabetic ketoacidosis, including causes, signs and symptoms, prevention, risk or exacerbating factors, use of blood glucose and ketone (urine or blood) monitoring devices to confirm diabetic ketoacidosis (including continuous glucose meters or continuous ketone meters), treatment options and indications for referral to healthcare providers or calling for an ambulance.
Cardiovascular diseases	• The pathophysiology, risk factors, symptoms, screening and monitoring parameters for cardiovascular diseases and the mechanism of action, pharmacology, and pharmacokinetic of the medicines used to treat or prevent cardiovascular diseases.
Diabetic neuropathy	• The pathophysiology, risk factors, symptoms, screening and monitoring parameters of diabetic neuropathy and the mechanism of action, pharmacology, and pharmacokinetic of the medicines used to treat diabetic neuropathy.
Diabetic foot ulcer	• The pathophysiology, risk factors, symptoms, screening and monitoring parameters of diabetic foot ulcers, the importance of diabetes foot screening to prevent lower extremity amputations, and the triage and optimal treatment routes for the different stages of diabetic foot ulcers.
Diabetic retinopathy and eye complications	• The pathophysiology, risk factors, symptoms, screening and monitoring parameters of diabetic retinopathy, recommendations regarding frequency of eye examination specific to diabetes type 1 and 2, and the different treatment routes for retinopathy and eye complications.
Periodontal disease	• The pathophysiology, risk factors, symptoms and monitoring of periodontal disease, including gingivitis and periodontitis, and the mechanism of action, pharmacology and pharmacokinetics of the medicines used to treat periodontal disease.
Diabetic nephropathy	• The pathophysiology, risk factors, symptoms, screening and monitoring parameters of diabetic nephropathy and the different treatment options for the different stages of diabetic nephropathy, including the mechanism of action, pharmacology and pharmacokinetics of the medicines used to treat diabetic nephropathy.
Intercurrent illness and infections	• Diabetes management during intercurrent illness or infection including: (i) the impact of hyperglycaemia on intercurrent illness and infections; (ii) awareness

	that the medicine used during intercurrent illness or infection can impact on blood glucose; and (iii) symptoms that must be closely monitored during an intercurrent illness and that may require seeking urgent medical advice or admittance to hospital, e.g., ketonuria, dehydration, and vomiting.
Obesity and dyslipidaemia	• The pathophysiology, risk factors, symptoms, screening and monitoring parameters of obesity and dyslipidaemia, and the mechanism of action, pharmacology, pharmacokinetics and clinical use of treatments for dyslipidaemia.
Mental health conditions	• Risk factors for mental health conditions in diabetes patients, including diabetes distress and burnout, and the importance of seeking mental health professional referral.
Special population groups	**Demonstrate knowledge and understanding of:**
Acute illness or trauma	• Acute conditions (e.g., infection, trauma, myocardial infarction, stroke, coma) that can worsen control of diabetes, and the importance of monitoring blood glucose concentration and testing for ketones. • Treatment alternatives and protocols in instances where glycaemic control is inadequate (e.g., replacing non-insulin antidiabetic drugs with insulin).
Children	• The specific precautions needed to treat and monitor children with diabetes, including signs and symptoms, target blood glucose concentrations, rare complications and associated conditions (e.g., juvenile cataracts, necrobiosis lipoidica, Addison's disease, or coeliac disease).
Pregnant or lactating women	• Specific precautions needed to treat and monitor pregnant women with diabetes, including signs and symptoms, diagnosis of diabetes during pregnancy, target blood glucose concentrations and individual management plans, issues involved in a pregnancy complicated by diabetes, medicines contraindicated in gestational diabetes, postnatal HB1Ac follow-up, and the need for pre-conception care where diabetes has previously existed during pregnancy. • Blood glucose control and recommendations, especially at the time of conception and early pregnancy.
Travellers	• Specific precautions that patients with diabetes should observe when travelling, including vaccines, pre-departure medical checking, appropriate packing supplies, airport security and customs information, oral medicines and insulin timing adjustments to local time zones, self-monitoring during travel, hypoglycaemia care during travel, and access to proper health care facilities upon arrival.
Post organ transplant patients	• New onset diabetes post organ transplant and its therapeutic management using immunosuppressants. • Immunosuppressants used in the management of new onset diabetes, such as prednisone, cyclosporine and azathioprine, including mechanism of action, pharmacology, pharmacokinetics, pharmaceutical aspects, adverse effects, contraindications and interactions, usual doses and routes of administration, place in therapy (taking into account national guidance for each agent) and monitoring requirements.
Drugs affecting blood glucose concentration	• Drugs affecting blood glucose concentration (by increasing risk of either hypoglycaemia or hyperglycaemia), including alcohol and supplementary medicines such as herbs and vitamins.
Surgery	• Local or institutional protocols (e.g., hospital protocols), where they exist, to manage and control blood glucose levels. • The specific precautions needed to treat and monitor patients with diabetes undergoing surgery, taking into consideration the effect of surgical stress and anaesthesia on glucose homeostasis.
End-of-life care	• The protocols and recommendations needed to manage end-of-life care for patients with diabetes, including optimal target ranges of blood glucose,

	preventing discomfort and recognising that palliative care may vary depending on time and environment.
Patient education	**Demonstrate knowledge and understanding of:**
Communication	• The importance of language strategies on core attitude change, social perception, understanding of diabetes, treatment outcomes, and psychosocial well-being of the individual. • Methods of questioning and resources available to properly educate or assess a patient's needs regarding diabetes information, including use of shared decision making. • The various elements to take into consideration when communicating with patients with diabetes, including cultural/ethnic, socioeconomic, gender, literacy/numeracy, behavioural, time and urgency factors.
National diabetes services	• National diabetes services and programmes, local supportive schemes and community and patient groups for patient with diabetes.
Organisation and management	
Budget and reimbursement	**Demonstrate knowledge and understanding of:**
	• The appropriate sources for service and medicines reimbursement. • Business principles to support financial sustainability of programmes and services related to diabetes care and education.
Quality control of medicines	**Demonstrate knowledge and understanding of:**
	• The terms "quality assurance", "quality control", "good manufacturing practice", and how they apply to the production of diabetes medicines. • The requirements for the safe storage and transport of medicines (including cold storage items) and how deviation from recommended practice should be assessed and managed.
Supply, storage and stability of medicines	**Demonstrate knowledge and understanding of:**
	• The availability and affordability of the various oral diabetes medicines, including metformin, sulfonylureas, meglitinides, alpha-glucosidase inhibitors, thiazolidinediones, SGLT2, DDP-4 inhibitors, and their combinations. • The factors influencing the stability of medicines, including factors relating to the packaging of medicines, how these relate to the determination of product shelf life, and how the stability of medicines impacts on their storage and supply.
Professional	
Multidisciplinary care approach	**Demonstrate knowledge and understanding of:**
Interprofessional collaboration	• The expertise, roles and responsibilities of each colleague and member of the healthcare team regarding diabetes care and management, including diabetes care education specialists, dietician nutritionists, nurse educators, exercise and rehabilitation specialists, and mental health care providers.
Family members, peers and caregivers	• The importance of family members and peers as a resource for ongoing support.
Individualisation of treatment plans	• Individualised diabetes treatment plans based on age, sex, patient history, the person's preference and special needs.
Professional development in a multidisciplinary approach	• The need for continuous education and professional development on diabetes care and management and to stay up to date with current diabetes local and international recommendations.
Ethical practice	**Demonstrate knowledge and understanding of:**

	• the pharmacy code of ethics and how it applies to pharmacist-patient interactions, informed consent and access to patient data.
Policies, regulations and guidelines	
Policies, regulations and guidelines	**Demonstrate knowledge and understanding of:**
	• Relevant policies, regulations and guidelines to support provision of services in diabetes.
Medicines safety	**Demonstrate knowledge and understanding of:**
	• Relevant safety alerts regarding adverse events following the administration of diabetes medicines, and implementing best practice in accordance with local policy. • Local and national incident reporting processes to pharmacovigilance authorities, and how to identify when it is appropriate to report incidents. • The common errors associated with pharmaceutical packaging and labelling, and their causes. • The pharmaceutical risks associated with the prescribing, supply, storage and administration of diabetes medicines in clinical area(s).
Healthcare systems	**Demonstrate knowledge and understanding of:**
	• Healthcare systems regulations regarding diabetes to facilitate uninterrupted access to medicines, devices and supplies necessary to treat and self-manage diabetes and related complications.

Table 2. Associated skills in diabetes

Laboratory monitoring parameters	
Laboratory test values	• Interpret laboratory test values and ranges that are used to diagnose pre-diabetes and diabetes.
Public health	
Advocacy	• Propose healthy diet recommendations or refer patients to a nutritionist or dietician for more individualised counselling when needed. • Propose physical activity recommendations and weekly goals in accordance with guidelines to achieve proper diabetes prevention. • Measure, record and track overweight and obesity parameters (such as BMI and waist circumference). • Motivate and counsel patients who wish to make and sustain healthy lifestyle changes. • Increase motivation to quit and assist patients who are ready to quit smoking. • Actively educate and remind patients of the potential ways of preventing the development of diabetes through pamphlets, flyers or general education. • Participate in and refer individuals to available structured prevention programmes to prevent the onset of diabetes. • Educate other healthcare professionals and care workers on the risks factors for developing diabetes. • Promote and participate in diabetes awareness campaigns.
Screening and referral	• Identify and comprehensively assess an individual's risk of developing diabetes using a valid risk assessment tool. • Effectively identify individuals eligible for screening. • Assess patients for modifiable and non-modifiable diabetes risk factors. • Be able to conduct all actions related to diabetes screening, including educating patients on the test, preparing screening material, making sure that the device and test strips are properly stored, ensuring the device is properly calibrated, conducting the test according to the instructions of the specific device used, counselling patient on their results and identifying next steps, if needed. • Use different strategies to assess the performance and accuracy of a glucometer. • Teach testing procedures to patients with diabetes and educate them or their carers on interpreting their results. • Communicate population trends on diabetes and screening results to key stakeholders.
Cultural interventions	• Identify and assess cultural influences, social determinants of health, health beliefs and learning preferences and barriers, literacy and numeracy to adapt communication and education approaches accordingly.
Pharmaceutical care	
Medicines	
Diabetes medicines	• Apply pharmacotherapeutic knowledge and be the medicine therapy expert on the diabetes health care team • Work with patient and multidisciplinary diabetes care teams to simplify treatment regimens and find lower medicines cost opportunities, where a need is identified. • Thoroughly assess patient medicines and determine whether patients are experiencing any adverse effects that may be related to the medicine. • Identify, discuss and implement strategies that address patients' concerns about their medicines. • Assess and communicate to patients the risks and benefits of medicines. • Educate patients on safe and effective insulin and non-insulin injectables storage, dosage preparation, and administration techniques. Also review safe disposal of syringes and lancets.

	• Refer patients to the educational resources developed by the manufacturer of a particular insulin device or any online resource, and assist as needed. • Adequately stock, store and dispense diabetes medicines according to evidence-based guidelines and required standards to ensure quality, safet, and efficacy of all diabetes medicines.
Medicines information	• Counsel patients with diabetes on the safe and rational use of medicines and devices, including use, contraindications, storage, and side effects of their medicines • Identify sources, and evaluate, assess and provide appropriate medicines information according to the needs of patients with diabetes. • Evaluate, assess, and develop diabetes literacy education and counselling on medicines and specific healthcare needs for patients with diabetes. • Support the patient's use of health information technologies, digital communication and health solutions.
Medicines use and supply	• Educate patients on proper storage conditions for diabetes medicines, especially insulin and non-insulin injectables that require strict cold chain standards. • Ensure that diabetes medicines are stored appropriately by checking most important stability parameters, including humidity, temperature and expiry date. • Make sure that information on appropriate medicines, routes, times, doses, forms, documentation is delivered to each diabetes patient under your care.
Self-management in diabetes	
Self-management education	• Identify patient's physical and cognitive abilities to perform daily self-management activities and propose strategies to facilitate effective self-management. • Identify family member or carer's ability to manage patient with diabetes if the patient is unable to carry out self-care. • Identify the various situations when a patient needs or lacks diabetes self-management education, including at diagnosis, where treatment targets are not met, where complicating factors develop, and when transitions in life or care occur. • Demonstrate and explain the purpose of available tools used for monitoring, including self-monitoring of blood glucose, continuous glucose monitoring and mobile applications. • Educate patients with diabetes how to interpret and act on data generated from monitoring tools. • Educate and demonstrate proper techniques for measuring blood pressure, administering insulin, obtaining fingerstick samples for blood glucose monitoring, operating blood glucose devices, and performing monofilament foot testing. • Identify sources for education and ongoing support, including new techniques, technological and digital devices, and updated information. • Identify and address barriers affecting participation in diabetes self-management education following referral, including physical limitations, level of family support, financial and work status, and learning preferences. • Assess patients for diabetes distress or other mental health conditions so appropriate supports and treatment can be started.
Lifestyle changes	• Advise and educate on lifestyle and dietary interventions. • Promote healthy, evidence-based and behavioural changes. • Follow-up and provide encouragement to support sustaining lifestyle changes. • Modify recommendations based on factors such as pregnancy, age, body mass index, weight goals, and existing complications.
Dietary approaches	• Apply nutrition knowledge to educate people with diabetes on healthy eating habits and explain components of healthy eating patterns. • Partner with other healthcare providers to manage diabetes in people undergoing enteral feeding.

	• Refer patients to other members of the healthcare team such as dieticians, nutritionists, exercise physiologists, nurse educators, other diabetes educators, or involve people in structured group programmes for additional guidance and support.
Patients with diabetes	
Patient assessment	• Evaluate the overall health status and lifestyle habits of patients and propose strategies for addressing gaps in care. • Consider cultural, socioeconomic considerations, and person's preferences when assessing meal plans and lifestyle modifications. • Identify, respond appropriately and report health incidents in accordance with local and national policies. • Identify, prioritise and resolve medicines management problems (including medication errors). • Evaluate patient adherence to medication and treatment plans through refill records, direct conversation or other appropriate methods. • Identify the underlying cause of non-adherence and use appropriate methods to work with patients to codevelop strategies for uninterrupted medicines use. • Identify and assess any possible drug interactions. • Where permissible, conduct glucose point-of-care testing to monitor patients with diabetes.
Developing and implementing a care plan	• Collaboratively with primary care providers, recommend the initiation, dose adjustment or discontinuation of medicines in response to evolving patient needs. • Support the treatment plan outlined by primary care provider by monitoring medication-related outcomes. • Practise rational use of medicines in diabetes.
Monitoring care plans	• Working collaboratively with patients and members of the multidisciplinary team, design monitoring care plans to assess medicines safety and efficacy. • Offer technology-based options as appropriate, such as continuous glucose monitoring, insulin pump therapy, connected insulin pen, digital health tools, etc. • Monitor and evaluate care plans ensuring they help patients reach their therapeutic goals. • Provide information and support to encourage independent self-management and informed choices. • Educate patients to properly monitor their blood glucose in accordance with their care plan and instructions from their primary care provider. • Analyse a patient's blood glucose or continuous glucose monitoring results and follow through with the management plan as needed. • Work with patients to encourage home-based blood glucose testing. • Share any important information obtained through patient assessments with primary care providers. • Appropriately refer patients with diabetes to specialist areas of care, if needed. • Implement, conduct and maintain a reporting system of pharmacovigilance (e.g., report adverse drug reactions).
Digital tools	• Where available and possible, implement digital solutions and interventions to support people in managing their diabetes optimally.
Diabetes emergencies	• Identify and manage people with diabetes at high risk of hypoglycaemia, hyperglycaemia or ketoacidosis and provide advice on adjustment therapy accordingly. • Discuss hypoglycaemia, hyperglycaemia, ketoacidosis and their possible causes with the patient or their carer. • Educate patients to identify symptoms and signs of hypoglycaemia, hyperglycaemia and ketoacidosis. • Ensure episodes of hypoglycaemia or hyperglycaemia are followed up appropriately by the primary care provider or diabetic educator.

	• Encourage patients to follow their individualised and agreed care plans to prevent hyper/hypoglycaemia. • Access and administer appropriate treatment for hypoglycaemia, hyperglycaemia and ketoacidosis according to evidence-based guidelines and legislative permissions.
Prevention and management of diabetes complications	• Appropriately refer patients presenting with diabetes-related complications. • Identify ways to reduce cardiovascular disease risk, in particular smoking cessation and blood pressure–lowering and lipid-modifying drug treatment, if appropriate • Explain the basis of nutrition and physical activity as a therapeutic modality to prevent diabetes complications. • Recommend dietary interventions to support optimal glycaemic control and weight loss (when indicated). • Educate patient with diabetes on management of sick days including: increasing glucose level testing, checking for weight loss, monitoring body temperature, and hydration. • Provide patients with diabetes educational material (pamphlets, flyers) and counselling. • Educate patients and their carers on the importance to plan appropriate injury prevention strategies, especially for geriatric population to minimize the incidence of motor vehicle crashes and falls. • Answer questions and provide emotional support to the person with diabetes complication and/or their care givers. • Encourage personal strategies to address psychosocial issues and concerns to people living with diabetes. • Use HbA1c measurement as an assessment of a patient's risk for developing long term complications from diabetes. • Perform a comprehensive foot examination using a monofilament, if permissible according to local and national regulations.
Special population groups	
Children	• Educate children with diabetes and their family members using an appropriate communication style. • Perform monitoring of weight and height of children and adolescents living with diabetes. • Talk to families about complications that may occur in children with diabetes. • Refer children and adolescents with diabetes to appropriate education and support programmes and groups. • Identify signs related to mental health and refer to appropriate mental health professionals. • Evaluate and discuss options for digital and technological solutions, such as continuous glucose monitoring (CGM), insulin pumps and automated insulin delivery systems.
Pregnant and lactating women	• Provide appropriate education about gestational diabetes and its management to women diagnosed with this condition. • Be involved in implementing management plans that ensure safety and efficacy of diabetes medicines for pregnant women with diabetes. • Use appropriate protocols in caring for and monitoring of pregnant women with diabetes. • Advise on proper diabetes medicines dosage and regimens pre-conception, in early pregnancy, during pregnancy and after delivery. • Support pregnant women to screen for gestational diabetes. • Assess and identify any medicines contraindicated during pregnancy or lactation.

Travellers	• Refer individuals with diabetes for pre-departure health evaluation. • Educate individuals on the necessary supplies to pack, including medicines, insulin, glucometer, testing supplies, glucose tablets and snacks. • Encourage people with diabetes to obtain an emergency identification card. • Educate patients on the proper storage and transport of insulin and other medicines when travelling. • Educate patients on performance of glucose-monitoring and the possible errors in glucometers and CGM at high altitudes. • Inform patients about security and customs precautions related to medicines, insulin devices and CGM devices within aircraft. • Educate patients and accompanying travellers on prevention and management of in-flight diabetes emergencies, including hypoglycaemia, hyperglycaemia and deep vein thrombosis. • Advise patients on administration times of oral medicines or insulin injections during long travel and changing time zones. • Advise on healthy eating and physical activity. • Encourage patients to get familiar with the healthcare facilities available abroad in case of any medical emergencies.
Post organ transplant patients	• Educate patients on the risk of post organ transplant diabetes (new-onset diabetes) • Monitor adherence to medicines and follow-up on glucose levels.
Drug affecting blood glucose concentration	• Identify and closely monitor patients receiving medicines that are known to alter glucose levels. • Collaborate with the multidisciplinary team to make all the necessary changes of glucose management strategy for patients taking a medicine that can alter blood glucose levels.
Surgery	• Follow local or institutional protocols (e.g., hospital protocols), where they exist, to manage and control blood glucose levels. • Collaborate with the multidisciplinary team to make all the necessary changes of glucose management strategy for patients with diabetes during the perioperative period. • Accompany patients' transitions back to their normal glycaemic management protocol after surgery.
End-of-life care	• Monitor people with diabetes during the end-of-life stage by prioritising comfort and collaborating with members of the multidisciplinary team to suggest deprescribing. • Be less stringent about end-of-life patients' glucose levels.
Patient education	
Communication	• Use neutral, non-judgmental, fact-based, inclusive and person-centred language. • Use proper questioning methods to identify and address the needs of patients with diabetes. • Tailor communications to suit patients' cultural, socioeconomic, gender, literacy, numeracy, behavioural, time and urgency factors.
Organisation and management	
Budget and reimbursement	• Ensure financial transparency regarding the cost and reimbursement of diabetes medicines and monitoring devices. • Use robust evidence-based references for medicines and service reimbursement.
Professional	

Continuing education	• Actively pursue continuing education to keep knowledge and skills related to diabetes up to date and improve the quality of life of people at risk or affected by diabetes and diabetes complications.
Interprofessional collaboration	• Communicate effectively with health and social care staff, support staff, patients, caregivers, and relatives using lay terms and checking understanding. • Works collaboratively with other healthcare professionals to identify gaps in the plan of care and improve outcomes for the patient. • Serve as medicines expert for the multidisciplinary team and organisation and as a resource for topics related to diabetes care and education. • Recognise the value of the pharmacy team and the multidisciplinary team. • Mitigate risk of medicines shortages and stock-outs through liaison and appropriate communication with healthcare staff, healthcare stakeholders and patients.
Family members and caregivers	• Include family members and caregivers in the diabetes education process and facilitate their involvement in supporting patient with diabetes.
Individualisation of treatment plans	• Participate in, collaborate and advise on therapeutic decision-making, and use appropriate referral networks within multidisciplinary teams. • Engage in collaborative practice, research and service provision to optimise patient health outcomes.
Professional development in a multidisciplinary approach	• Identify international and national learning resources and programmes, databases and websites available to update diabetes-related information. • Stay up to date with local, national and international diabetes guidelines.
Ethical practice	• Maintain privacy and confidentiality (with the patient and other healthcare professionals)
Policies, regulations and guidelines	
Policies, regulations and guidelines	• Identify, implement, and monitor new services (according to local needs). • Develop and implement contingency plans for shortages of medicines and testing supplies and tools? • Identify and select reliable supplier(s) for diabetes medicines and monitoring devices.
Health systems	• Lead or participate in local, national and international diabetes groups and agencies. • Communicate to stakeholders and policy-makers the local impact of pre-diabetes, diabetes, and diabetes complications. • Participate in the establishment or implementation of initiatives and services designed to improve population outcome for diabetes. • Identify and address system-based barriers that could hinder patients with diabetes from accessing optimal care, including individual factors, cultural practices or economic factors. • Identify organisational and systemic solutions and provide support for overcoming barriers to medication adherence. • Increase population awareness about the pharmacist's role in the community in the management of diabetes.

4 Considerations for CPD providers of courses and programmes in diabetes for pharmacists

4.1 Courses and training programmes in diabetes for pharmacists

FIP recognises that training and professional programmes for pharmacists and health workers play a key role in the development and maintenance of competence in diabetes management and service provision. It is recommended that training and professional programmes, in the form of continuing professional development (CPD), include educational material and training on existing and future pharmacist roles in diabetes. Underpinned by the information in Chapter 4 of this knowledge and skills reference guide, training programmes would focus on diabetes-related roles and services and, at the completion of training, a practitioner should be able to demonstrate knowledge and apply skills in the following areas:

- Advocacy and health promotion;
- Pharmaceutical care services, including digital interventions;
- Screening, prevention, and therapy and disease management;
- Patient-centred care;
- Multidisciplinary care;
- Communication skills for healthcare and motivational interviewing;
- Drug logistics management systems; and
- New technology available for diabetes.

4.2 Considerations for CPD providers and quality assurance of CPD programmes

The following considerations will support the development and implementation of robust training, guidelines, and transformative CPD programmes that are focused on improving the competence and capacity of practitioners in the management of patients with diabetes.

A needs-based approach to addressing education, CPD and training gaps

CPD in diabetes should address local and national needs and reflect individual professional development needs and learning endeavours. The following should be noted:

- The diversity of health systems and contexts may hinder the access to recommended first-line therapies due to costs and supply chain problems. Pharmacists should play a critical role in adequately managing diabetes in the context of their local and national needs.
- CPD is lifelong and must be relevant to one's area of practice. As such, CPD in diabetes should focus on addressing individual professional needs and provide a holistic approach to gaining knowledge, learning skills and embracing attitudes and values that allow pharmacists to execute their roles.

Fostering national and international collaborations on training projects in diabetes

Collaboration on training projects in diabetes for pharmacists allows for:

- Reduction in skill gaps in the management of diabetes between countries of differing economic status;
- Sharing of resources; and
- Increasing the inclusion of relevant international organisations, such as the World Health Organization, the United Nations and FIP, in lobbying key decision-makers to facilitate the

inclusion of well-equipped pharmacists with the knowledge and skills within multidisciplinary healthcare teams to manage patients with diabetes.

Quality assurance and accreditation of training programmes

CPD programmes in diabetes require accreditation to demonstrate that the learning activities have achieved the required standards and benchmarks set by regulatory or professional bodies. Accreditation ensures that the learning value is of high quality and meets the expectations of pharmacists, employers and the community. Certification of training courses and programmes facilitates the standardisation of crucial knowledge and skills required to upskill.

CPD providers and the FIP Seal for programmes

The FIP Provision and Partnerships Programme provides a global platform to help FIP members address professional support and development of the pharmaceutical workforce according to local and national needs and priorities. By offering a global platform for collaboration and partnerships among members and partners, FIP provides an opportunity to bridge training and professional development gaps. FIP can identify with members transformative opportunities to accelerate the advancement of pharmacy across all sectors and roles.

In 2021, following expert consultation and an iterative process, FIP developed criteria to assure the quality of professional development and training programmes and their alignment with FIP's mission, goals and the Development Goals. The FIP Seal recognises the overall quality and alignment of a programme. Application forms and details of the process to be followed are available to interested parties to undertake self-assessment for the FIP Seal upon request (email Dr Dalia Bajis at dalia@fip.org) and in the FIP handbook for providers of programmes.[26]

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