2016 Pharmacist Competency Framework & Domain-specific Frame of Reference for the Netherlands

2016 Pharmacist Competency Framework &
Domain-specific Frame of Reference for the Netherlands

CONTENTS

Domain-specific Frame of Reference for Pharmacy in the Netherlands

Pharmacist Competency Framework

Foreword

The Domain-specific frame of reference for Pharmacy in the Netherlands and the 2016 Pharmacist Competency Framework address the changing role of the pharmacist. Since 2007 pharmacists have been included within the scope of the Dutch Medical Treatment Contracts Act (Wet op de geneeskundige behandelingsovereenkomst (WGBO)). As such, their role as health professionals is anchored in law. At the same time innovative medicines such as biologicals require more detailed knowledge of products and molecular biology. The relatively new field of pharmacogenetics calls for knowledge of genetics, and an understanding of pathophysiology is essential for pharmacists to accurately assess renal function and other patient-specific clinical parameters in the provision of pharmacotherapy.

These developments necessitate close collaboration between pharmacists and prescribers. Like physicians, pharmacists have to learn to deal with the element of uncertainty inherent in clinical practice as an inevitable component of clinical reasoning.
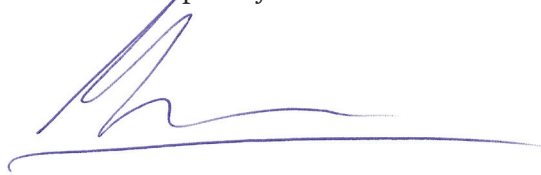
This transition requires a reorientation of the pharmacy curriculum. Where possible, medical and pharmacy education will include joint training for pharmacists and physicians. Foundation-level pharmacy education must also prepare students for subsequent specialisation as a community or hospital pharmacist.

The learning outcomes specified in the 2016 Pharmacist Competency Framework were defined by the joint Bachelor and Master of Pharmacy degree programs at the universities in Groningen, Leiden and Utrecht, with the Royal Dutch Pharmacists Association (KNMP) playing a facilitative role. The competency framework was developed within the context of the Domain-specific frame of reference for Pharmacy in the Netherlands, which outlines the pharmacist's primary areas of expertise, social and professional developments that affect the practice of pharmacy and the relevant legal frameworks.
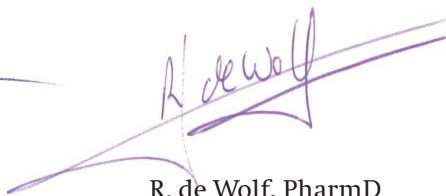
The competencies identified in the CanMEDS framework have been adopted throughout the care continuum in many parts of the Western world. In line with this approach, pharmacists must now possess measurable professional and communication competencies, they must collaborate with other health professionals in the delivery of integrated care, they must demonstrate leadership skills, be proficient in the use of IT, and adhere to ethical standards.

The frame of reference and competency framework are designed to be elaborated and implemented by individual degree programs as they see fit to achieve the specified outcomes. They also serve as a clear guideline that safeguards the quality of pharmacy

education, so patients know what they can expect from a newly registered pharmacist. For the next ten years, the guidance provided by the competency framework will be used to develop pharmacy education that prepares pharmacists in the Netherlands to meet society's needs for pharmaceutical care and product knowledge in the delivery of multidisciplinary care.

Professor H.J. Haisma, PhD
Chair of the 2016 Pharmacist Competency
Framework Project Group

R. de Wolf, PharmD
Chair of the 2016 Pharmacist Competency
Framework Steering Committee

Summary

A Domain-specific Frame of Reference for Pharmacy in the Netherlands and the Pharmacist Competency Framework

Developments in pharmacy require a review of the pharmacy curriculum in the Netherlands. This was the key recommendation arising from a number of working conferences on the future of pharmacy education in the Netherlands in 2013 and 2014. Educators from both the Bachelor and Master of Pharmacy degree programs participated in the conferences together with representatives from the Royal Dutch Pharmacists Association (KNMP).

In 2015 the above-mentioned parties expressed the need for a document describing developments in pharmacy and an update of the 2006 Pharmacist Competency Framework. In 2016 this resulted in the publication of two documents:
1   A domain-specific frame of reference that describes the current status of pharmacy in the Netherlands and
2   A competency framework that specifies required learning outcomes for pharmacists graduating from universities in the Netherlands.

The Domain-specific frame of reference for Pharmacy outlines the current status of pharmacy in the Netherlands. It also describes developments in pharmacy and the purpose and legal framework of pharmacy education in the Netherlands.
A pharmacist's professional expertise can be divided into Product expertise, Pharmacology expertise and Pharmacotherapy expertise. This expertise is required to perform the pharmacist's professional duties and responsibilities in the areas of Product Care, Patient Care, Medication Policy, Quality Assurance, and Research, Education and Innovation.

In the last few decades, pharmacy has evolved from a product-oriented to a patient-oriented profession. The fact that pharmacists now assume a more active role in direct patient care requires a certain reorientation of the pharmacy curriculum. Future developments in the domain of pharmacy are also factors that need to be considered. These include new pharmaceutical forms and routes of administration, cell and gene therapy, demand for precision medicine, and the changing relationship between the patient and the health professional, with the pharmacist acting as a knowledge manager. This means that new basic subjects, such as molecular biology and psychology, need to

be added to the curriculum. Attention also needs to be devoted to the development of 'new' competencies, such as leadership.

Pharmacists add value to the care continuum through their knowledge of the interaction between medicines and the human body and drug-drug interactions. To become licensed as a pharmacist, students must obtain a bachelor and master degree in pharmacy.

The 2016 Pharmacist Competency Framework outlines the content of these degree programs. The use of the title of 'Pharmacist' is regulated by Dutch and EU law. Individuals wishing to practice pharmacy in the Netherlands must be listed in the register maintained in accordance with the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)). This register is generally referred to by its acronym as the BIG-register.

Competency frameworks for pharmacy education are now being developed through transnational collaboration. The Netherlands' decision to define outcome-based competencies is very much in line with these international developments. The 2016 Pharmacist Competency Framework describes the national set of standards (learning outcomes) for the training of pharmacists. Its purpose is to safeguard the level of competence of newly registered professionals. The framework outlines the pharmacist's areas of responsibility and knowledge and defines the competencies of the pharmacist in terms of measurable learning outcomes. The framework is primarily intended for pharmacists working in primary or secondary care, whose core competencies are described in the Dutch Individual Healthcare Professions Act (Wet BIG).

Societal demands for more patient-oriented pharmacy have led to a major shift in standards with respect to patient care. To meet these demands, the learning outcomes specified in the framework are also aligned with the legally recognised specialisation as a hospital or community pharmacist. The framework also provides a sound basis for a pharmaceutical career in government or industry.

The Bachelor of Pharmacy degree program offers students a broad foundation in the pharmaceutical and natural sciences. The learning outcomes for the bachelor degree are formulated in accordance with the Dublin Descriptors in terms of knowledge and understanding, expertise and professional conduct. The further development of the learning outcomes in the Master of Pharmacy degree program builds on these initial learning outcomes. The Master of Pharmacy is a fully accredited, graduate-entry degree

leading to eligibility for registration as a pharmacist. Since the emphasis is on the development of competencies, the learning outcomes in the framework are formulated as such. They are based on the internationally utilised CanMEDS model, which was originally developed in Canada for specialist medical education programs. The model consists of seven overlapping areas of competence, each of which is broken down into sub-competencies. The pharmacist's core competence of Pharmaceutical Expertise draws on the competence areas of Communication, Collaboration, Knowledge and Science, Health Advocacy and Social Responsibility, Leadership and Organisation, and Professionalism. Sub-competencies have been formulated for each of these areas of competence, emphasising the importance of incorporating into the curriculum competencies that extend beyond the strictly pharmaceutical. Such competencies include verbal and written communication, psychology, quality assurance and the development of professionalism and leadership qualities.

The introduction of the role of medical leader rather than medical manager represents an important change in the revised CanMEDS model in 2015. This change has also been incorporated within the 2016 Pharmacist Competency Framework by changing the name of the respective competency from 'Organisation' to 'Leadership and organisation'. It is now up to pharmacy schools in the Netherlands to develop this new leadership model as part of their pharmacy curriculum. Greater collaboration between pharmacy students and medical students during their training will be an inevitable consequence of the inclusion of Collaboration as a competency.

The framework outlines five stages (I through V), which define the learning outcomes expected of pharmacy students in the Netherlands. At the two highest stages (IV and V), the pharmacy student is verifiably capable of performing professional activities at a certain level of independence, in real settings or carefully simulated situations. This requires that pharmacy schools in the Netherlands incorporate competency-based learning into the curriculum. At the same time, the acquisition of expert knowledge and skills must remain a vital part of pharmacy education.

Domain-specific Frame of Reference for Pharmacy in the Netherlands

T. Schalekamp, PhD
Utrecht University

Professor H.J. Haisma, PhD
University of Groningen

Contents

1. Introduction

This frame of reference was established by the Bachelor and Master of Pharmacy degree programs[1] in the Netherlands in consultation with the Royal Dutch Pharmacists Association (Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie (KNMP)), partly in response to feedback from five working conferences on the future of pharmacy education in the Netherlands.[2] The primary task of Dutch pharmacy schools is to provide academic education that prepares graduates to enter the profession as pharmacists. The profession also spans the fields of community, hospital and industrial pharmacy. Pharmacy education also prepares students for careers in scientific research and pharmaceutical roles in public and private sector organisations.

This document is structured as follows:

- The knowledge domain of pharmacy
- The pharmacist's areas of responsibility
- Developments in pharmacy in the Netherlands
- Future developments in the domain of pharmacy
- Complementarity of pharmacists and physicians
- The purpose and nature of the Bachelor and Master of Pharmacy degree programs
- The legal framework of pharmacy education
- International benchmarking.

2.   The knowledge domain of pharmacy

Pharmacy is the knowledge of medicines in the broadest sense, both inside and outside the human body. The knowledge of medicines outside the human body includes product characteristics in terms of storage and use, development, production and quality control of medicines and control of biopharmaceutical properties, such as bioavailability and absorption. The knowledge domain of pharmacy also includes knowledge and understanding of the effects of medicines inside the human body and the implications for the use and administration of medicines. This means that knowledge of the human body and human behaviour in illness and health are also included within the knowledge domain of pharmacy. Knowledge of the human body requires integrated knowledge of anatomy, physiology and pathophysiology that enables the pharmacist to develop a clear understanding of the actions and effects of medicines in the body. Human behaviour is an important factor in the provision of pharmacotherapy, therefore pharmacists also need to have an understanding of human behaviour.

When it comes to the knowledge of the use and effects of medicines, there is inevitably a certain overlap with the domain of medicine. Given that this is the case, it is important for Dutch pharmacy schools to define the complementarity of pharmacists and physicians in this area of the knowledge domain. This is discussed in more detail in Chapter 6.

The domain of pharmacy can be divided into three primary areas of expertise. These are described in brief below. The basic subjects relevant to the respective area of expertise are specified in each case.[3]

I   Product Expertise

In this context the term 'product' means a biologically active (medicinal) substance (drug substance, active pharmaceutical ingredient or pharmacon) prepared in a pharmaceutical form that achieves the desired pharmacotherapeutic effect.

Production and quality control of medicines are the oldest and most traditional tasks of pharmacy practice. Accurately determining shelf-life and appropriate storage of medicines is part of this core role.

Manufacturing (designing a pharmaceutical dosage form for a pharmacon) is also a core function of pharmacy. Increasingly complex pharmaceutical forms are being developed to deliver pharmacologically active compounds to their sites of action. New classes of biologicals (high-molecular-weight medicines and pharmaceutical proteins) are taking manufacturing and compounding to new levels. In many cases achievement of the

intended pharmacotherapeutic effect depends on the integrity of the pharmaceutical formulation remaining intact. Partly for this reason, it is essential that pharmacists possess sufficient product expertise, especially now that most pharmacists are no longer personally involved in the production and quality control of medicines.[4] Product Expertise requires thorough knowledge of chemical, physicochemical and biological properties of medicines and auxiliary substances. The development of high-molecular-weight (protein-based) medicines means that molecular biology now needs to be included as a basic subject. Knowledge of biopharmacy (the discipline that studies the action of a medicine from the moment it is administered until it starts to take effect) is essential when designing pharmaceutical forms.

Product knowledge must also include knowledge of medicine packaging materials, how packaging materials affect medicines and knowledge of medical devices in the broadest sense.

Basic subjects:[5] organic and inorganic chemistry, physical chemistry, analytical chemistry, (molecular) biology.
Integrated subjects: biopharmacy, pharmaceutical technology.

II Pharmacology Expertise

Pharmacology Expertise is based on knowledge of basic pharmacology and pharmacotherapy. Basic pharmacology includes both the study of the action of medicines in the body (pharmacokinetics: absorption, breakdown, metabolism and elimination) and the interaction between a medicine and the binding site (pharmacodynamics). To have a clear understanding of medicine interactions and their binding sites, the pharmacist must have sufficient knowledge of biochemistry, cell biology, human anatomy and physiology, and the pathophysiology of the most common health conditions.
Basic pharmacotherapy includes knowledge of the main groups of medicines and the pharmacotherapy treatment options for the most common health conditions.

Basic subjects: biochemistry, cell biology, pharmacokinetics, pharmacodynamics, anatomy, physiology, immunology, pathophysiology.

III Pharmacotherapy Expertise

Delivery of pharmacotherapy – at individual and population level – is the pharmacist's third primary area of expertise. This area of expertise is based on seven pillars.

The first pillar is biopharmaceutical certainty that administration of a medicine will effectively result in the right amount of active substance being delivered to the site of action at the right speed for the right length of time.

The second pillar is integrated basic pharmacological and medical knowledge, which results in a clear understanding of desired therapeutic effects, predictable pharmacological side effects (Type A side effects), toxicity, medicine interactions and their potential consequences, and predictable undesirable interactions between medicines and health conditions (contraindications) and their consequences.

Following logically from the first two, the third pillar is delivery of clinically appropriate pharmacotherapy, taking into account factors such as comorbidity, comedication and biomarkers such as clinical chemical parameters and pharmacogenetic information.

The fourth pillar is the knowledge of treatment and care guidelines, especially the background to and rationale of the guidelines.

The fifth pillar is knowledge of scientific evidence of efficacy, safety, risks and cost-effectiveness. This requires a well-developed ability to assess and interpret pharmaceutical and related medical research.

The sixth pillar is knowledge of human behaviour in illness and health and the translation of this understanding into the delivery of optimal pharmacotherapy.[6]

The seventh and last pillar is communication with patients and collaboration with other health professionals. The delivery of appropriate pharmacotherapy ultimately results from the exchange of information between several parties, first and foremost health professionals and the patient. To effectively contribute to the correct use of a medicine, the pharmacist must also be well educated in communication skills and effectively prepared to collaborate with other health professionals.

In addition to this, basic knowledge of the relevant aspects of Dutch pharmaceutical and medical legislation is required for all areas of pharmaceutical expertise.

Basic subjects: psychology, epidemiology, statistics.

Integrated subjects: pathology, medical terminology, pharmacotherapy, clinical chemistry, clinical toxicology, pharmacogenetics, research methods (evidence-based medicine), communication science, health science, pharmacoepidemiology, pharmacovigilance, ethics, legislation.

3.   The pharmacist's areas of responsibility

The primary areas of expertise summarised in the previous chapter play a major role in the day-to-day activities of the pharmacist in the three main domains of pharmacy: community, hospital and industrial pharmacy. Pharmacy education is designed to provide students with competencies in five areas of responsibility. These are described in brief below.[7]

- **Product Care**. This area of responsibility relates to product knowledge: one of the pharmacist's primary areas of expertise. Included within this area of responsibility are the core competencies of compounding, storing, preserving and distributing medicines, and assessing the quality of medicines, as defined in the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)).[8] Another important aspect of this area of responsibility is patient-centred product care, which involves the core competency of assessing the quality, safety and efficacy of medicines and components of medicines, as defined in the Dutch Individual Healthcare Professions Act (Wet BIG).
- **Patient Care**. This area of responsibility encompasses the competencies required to ensure effective and safe use of medicines by individual patients. This involves medication monitoring, knowledge of the patient's behaviour, and opportunities to counsel and coach the patient. It applies to both prescription medicines and advising on self-care. Included within this area of responsibility are the core competencies of dispensing, and counselling and educating the patient on the use, effects and side effects of medicines, as defined in the Dutch Individual Healthcare Professions Act (Wet BIG).[9]
- **Medication Policy**. This area of responsibility relates to Pharmacotherapy Expertise at population level and includes the core competencies of assessing the efficacy and safety of medicines, and assessing the suitability of medicine assessment methods and systems, as defined in the Dutch Individual Healthcare Professions Act (Wet BIG).[10]
- **Quality Assurance**. This area of responsibility focuses on the skills that enable pharmacists working in different domains of pharmacy to ensure quality assurance and management. A pharmacist must ultimately be capable of developing a quality assurance policy.
- **Research, Education and Innovation**. Pharmacists are academically qualified professionals who possess knowledge and skills in the field of research methodology.

The ability to assess various forms of research is essential in all of the areas of responsibility listed above. It is also necessary in order to accurately evaluate new developments (innovation) in pharmacy. Science and research are fundamental in enabling pharmacists to practice at the requisite academic level. Pharmacists must also be capable of conducting various forms of research, including a research of the literature and current practice. To provide quality assurance for example, a pharmacist must be able to develop a strong research question, form a hypothesis, gather and analyse data and draw valid conclusions. Naturally, their research findings must be suitable for presentation in a report or scientific publication. Pharmacists also have an important role as educators: in virtually all domains of pharmacy, pharmacists share and transfer knowledge to peers, students, other health professionals and, of course, patients. In addition to this, pharmacists are expected to engage in self-directed lifelong learning.

4.   Developments in pharmacy in the Netherlands

In the last few decades, pharmacy has evolved from a product-oriented to a patient-oriented profession. The significant increase pharmacotherapy treatment options, the growing understanding of the mechanism of action of medicines and the pathophysiology of health conditions have enabled pharmacists to advance their professional skills as medicines experts. In both hospital and community pharmacy this has led pharmacists to assume a far more active role in direct patient care. Pharmacists participate in hospital medicine and formulary committees, play a leading role in regular pharmacotherapy consultations with physicians, frequently intervene as part of medication supervision and have a legally established responsibility to educate patients on the use, effects and side effects of medicines.[11]

However, this advancement of the skills of the profession means that the pharmacy curriculum has to meet different needs in terms of equipping students with more extensive medical knowledge and the ability to apply clinical reasoning.

As the profession has become more patient oriented, pharmacists working in healthcare settings now interact more closely with the patient. There was of course always a relationship between the pharmacist and the patient, but, within this relationship, the pharmacist's responsibility was primarily to dispense medicines prescribed by a physician, with availability and product quality being the main concerns. The assumption of responsibility for pharmacotherapy outcomes, and therefore the need to ensure correct use of medicines by the patient, through providing usage instructions and conducting medication consultations and medication reviews, have intensified the relationship between the pharmacist and the patient and require the pharmacist to possess communication skills which, until recently, were not considered to be the domain of pharmacy.

Of course the domain of pharmacy also involves product care as it pertains to medicines. In addition to production and quality control, this includes the therapeutic rationale and safety of medicines. The Dutch Individual Healthcare Professions Act (Wet BIG) defines the manufacturing and compounding of medicines as falling within the pharmacist's area of expertise. However, in hospital and community pharmacies, there is a trend for manufacturing and compounding to be concentrated in a few central locations. Pharmacists are dispensing fewer individually compounded medicines, partly because, now more than previously, they consider it part of their job to assess the therapeutic rationale of a compound before proceeding to prepare and dispense it. Only a small number of pharmacists working in healthcare settings will deal directly with the *practical* aspects of the compounding process. However,

other aspects of patient-centred product care will become more important. These include assessment of the rationale of non-registered preparations, the demand for bioequivalence and pharmaceutical alternatives when commercial preparations are not available, issues involved in preparing medicines for administration, questions and problems regarding pharmaceutical forms and routes of administration, and questions and problems regarding auxiliary substances in pharmaceutical forms. Nevertheless, the pharmacist's knowledge of storage, product characteristics and processing of pharmaceutical products remains equally important. In other words, extensive product expertise is still required, albeit with less emphasis on practical skills. A development now well established in pharmacy is the growing proportion of high-molecular-weight (biotechnology) medicines in relation to low-molecular-weight medicines. An understanding of the production and quality control aspects of protein-based medicines requires detailed knowledge of molecular biology, a basic subject not yet listed in the current regulations on pharmacy education.[12]

There is a clear trend in pharmacy in the Netherlands, certainly in extramural pharmacy, that the provision of care is increasingly becoming the primary concern. This is evident from, among other things, a recent letter from the Dutch Minister of Health, Welfare and Sport to the Dutch House of Representatives, which states that the delivery of quality care requires pharmacists who are, first and foremost, health professionals.[13] The letter explicitly mentions the need for close collaboration with general practitioners and prescribers in secondary care to advise and assist with more effective prescribing of medicines, the swift application of changes in medicines, and patient education, counselling and assistance to ensure better use of medicines. The minister considers it crucial that pharmacy education is brought into line with these developments and that patients' medical and medication records are electronically accessible to facilitate exchange of information.
With the increase in polypharmacy, due to the wider choice of treatment options, precision medicine (see Chapter 5) and the ageing of the population, societal demand for pharmacists who are equipped to provide product and patient care is an important reference point for pharmacy schools in the Netherlands.

5.   Future developments in the domain of pharmacy

This chapter describes several significant new developments in pharmacy. This is by no means an exhaustive overview, but serves mainly to illustrate the need to prepare the pharmacy curriculum for the (near) future.

–   **New advanced pharmaceutical forms**. These include nanoparticles used in nano-medicine: the medical application of nanotechnology. By developing medicines that bind to nanoparticles it is possible to deliver medicines to the site of action far more accurately, thereby increasing efficacy and reducing undesirable effects. Few pharmacists will be directly involved in the development and production of pharmaceutical forms such as these. However, most pharmacists will have to deal with aspects such as storage, and need to know the effects and side effects of these medicines and must therefore be conversant with the underlying technology and the properties of the materials to which the medicines are bound.

–   **Advanced-therapy medicinal products**.[14] These are new medical products based on genes (gene therapy), cells (cell therapy) and tissues (tissue engineering). Gene therapy is defined as a method that modifies the expression of an individual's genes or corrects abnormal genes. Cell therapy is the administration of live cells or maturation of a specific cell population in a patient for the treatment of a disease. The use of gene therapy is limited to a small number of (monogenic) disorders. At the moment Glybera® (alipogene tiparvovec), used to treat lipoprotein lipase deficiency, is the only gene therapy product registered in the European Union. The recent Ebola outbreak rapidly accelerated clinical evaluation of genetic vaccines. The emergence of new technologies has made gene correction a particularly significant new development. (Stem) cell therapy has been used for some time, mainly in the form of bone marrow transplants. The development of induced pluripotent stem cells (iPSCs) combined with gene correction appears promising. It is reasonable to anticipate that gene and stem cell therapy will be more widely applicable in the not too distant future. Pharmacists will need to know about and understand this form of therapy. Knowledge of health conditions that can be treated with gene and cell therapy, problems with gene transfer and knowledge of gene vectors (at the moment these are generally modified viruses) is essential in this respect. Other developments in this area include encapsulated nanochips and cell modification and reimplantation.

–   **Precision medicine**. The concept of precision medicine will probably be one of the main challenges for the pharmacists of the future.[15] Precision medicine aims

to provide the best treatment for a patient, by taking into account individual variability in genes, environment and lifestyle, with biomarkers such as clinical chemical parameters and other characteristics at a molecular biological or cellular level. When treating health conditions with pharmacotherapy it is not unusual for subpopulations to experience an adverse reaction or excessive side effects when taking commonly prescribed medicines. This is partly because many illnesses currently defined as a single condition on the basis of certain symptoms or other characteristics, can actually be subdivided into several (sub) disorders on the basis of pathophysiological characteristics.

The rapidly growing understanding of molecular pathophysiological mechanisms may enable a more nuanced characterisation of health conditions. This will make it possible to provide far more specific and therefore more effective and safer treatments. A number of diseases, including cancer, can now be treated with targeted polypharmacy by intervening at different points in the pathophysiological pathway. Pharmacists must be able to assess the rationale and monitor the safety of this form of polypharmacy, taking into account comedication and other patient characteristics.

Supervision of precision medicine requires more detailed knowledge of biological mechanisms of health conditions, molecular diagnostics and pharmacotherapy binding sites than has been required thus far. Pharmacy students must be properly prepared for this development.

– **Different ways of making new medicines available to patients (adaptive pathways).** The traditional process of making medicines available through a registration procedure after research has been conducted on efficacy and safety may change. Pressure from patient organisations and other stakeholders for promising medicines to be made available sooner than the current regulatory processes allow will enable the introduction of 'adaptive pathways' that allow early patient access to medicines. A far better understanding of disease processes makes it possible to identify certain (sub) groups of patients for whom a new medicine is likely to be both more effective and safer. Limited (controlled) availability of medicines that have completed stage II clinical trials, involvement of patient organisations in the decision-making regarding acceptable levels of uncertainty, benefit-risk ratios and targeted prescribing to clearly predefined (sub)groups of patients will change the way medicines are made available in the future. The pharmacists of the future will be required to play an important advisory and guiding role in these developments.

- **Patient self-management and the changing relationship between the patient and the health professional.** Although this does not involve a specific change in the knowledge domain of pharmacy, increasing opportunities for patients to gain knowledge about their health condition(s) and treatment options and self-manage their disease will affect the pharmacists of the future and are therefore relevant to pharmacy education. In addition assessing the reliability of (online) information sources, the pharmacists of the future will also have to learn to deal with the fact that, especially when it comes to rare health conditions, patients will sometimes know more about their disease than they do. Self-testing enabled by facilities such as DNA diagnostic services will require flexible adaptation to a rapidly expanding arsenal of knowledge. These developments illustrate the changing relationship between the patient and the pharmacist: rather than being the person who unilaterally proposes a solution based on their knowledge, the pharmacist will identify a solution together with the patient and supervise the implementation of the solution and the changes it involves. This ability to direct a process requires leadership skills. The changes in the societal context in which pharmacists operate outlined in this chapter form an important reference point for pharmacy schools in the Netherlands and emphasise the need to develop leadership skills and the ability to rapidly acquire new knowledge (in order to act as a 'knowledge manager') as part of one's training.

6. Complementarity of pharmacists and physicians

Knowledge of the action and breakdown of medicines in the body falls within the domain of pharmacy. The Dutch Individual Healthcare Professions Act (Wet BIG) states that pharmacists independently provide pharmacotherapy for patients based on a diagnosis made by a health professional who is licensed to prescribe medicines.[16] There is a certain overlap between the area of pharmacy concerned with the delivery of pharmacotherapy and the domain of medicine. For the purposes of both pharmacy and medical education, it is important to define the complementarity of pharmacists and physicians.

Physicians and pharmacists play the following roles in the care process: the physician makes a diagnosis and, after discussing the options with the patient, recommends a choice of treatment; the pharmacist then advises on the translation of the treatment into a suitable pharmacotherapy product for the patient.

The complementarity of pharmacists and physicians can therefore be summarised as: contribution of knowledge and understanding of the interaction between medicines and the human body and between different medicines. The knowledge that pharmacists are required to provide as part of the care process can be divided into two main categories: 1) knowledge of biopharmacy and the pharmacokinetics of medicines and 2) knowledge of pharmacodynamics: the mechanism of action of medicines. With regard to the first of these categories, the pharmacist's expertise is undisputed. Pharmacists understand better than anyone that a pharmacologically active substance is not a medicine and that the method of administration largely determines the extent to which the right amount of active substance is delivered to the right site of action. Knowledge of pharmacokinetics (absorption, distribution, breakdown and elimination in the body) and the implications in terms of establishing the right dosage and route of administration are also fundamental components of pharmaceutical expertise. When it comes to the mechanism of action of medicines, the pharmacist's expertise is not as widely recognised, despite the fact that, generally speaking, pharmacists are more educated in this area than physicians. The pharmacist's understanding of the mechanisms of action of medicines enables him to evaluate and predict both the effect and undesirable (Type A) side effects of medicines. Many low-molecular-weight medicines, in particular, are so-called 'dirty' drugs that bind to different molecular targets and receptors in the body, which causes them to have not only desirable effects and, but also often explicable undesirable effects.

It is not uncommon for patients to be prescribed medicines by different specialists. These medicines may interfere with each other – both pharmacokinetically and

pharmacodynamically. They may have cumulative or convergent side effects or they may not be sufficiently effective. In this situation, the pharmacist's task is to:
- identify medication interferences and common causes of medication interactions,
- identify cumulative or convergent side effects of medicines in different pharmacotherapeutic groups based on a clear understanding of mechanisms of action,
- make well-reasoned adjustments if a medicine is not sufficiently effective.

In the latter case: if a medicine prescribed in accordance with medical or pharmacotherapy guidelines is less desirable or less effective in the context of comedication, the pharmacist can often select a different medicine based on pharmacological reasoning. This understanding of pharmacology combined with biopharmaceutical knowledge enables the pharmacist to provide a pharmacotherapy service that complements the services provided by the physician.

The pharmacist's added value as a pharmacotherapy generalist is especially relevant in situations where various medical professionals are involved in prescribing the patient's medication. The same applies to broad areas of specialisation such as general practice. The pharmacist's understanding of medicines can also be of benefit to the patient in the direct interaction with the patient in that the pharmacist's explanation of medicines can work synergistically with information provided by the physician.

From the above it is clear that, in terms of the practice of pharmacy, delivery of the priorities in patient-centred product care and pharmacotherapy requires a clear understanding and extensive knowledge of the effects of medicines, biopharmacy and pharmacokinetics. To enable effective collaboration and communication with physicians, pharmacists also need to have a certain level of clinical knowledge. The Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker)[17] lists 'knowledge of medical terminology' as a subject that should be included in pharmacy education, but this alone is not enough. To facilitate a more effective exchange of views on pharmacotherapy and mutual understanding of each other's competencies, it would be advisable to provide joint learning opportunities for pharmacy and medical students, in working groups for example, as part of their training.

7. The purpose and nature of the Bachelor and Master of Pharmacy degree programs

A pharmacy degree primarily prepares students for positions in the three main domains of the profession: community pharmacy, hospital pharmacy and industrial pharmacy. Hospital and community pharmacy are officially recognised areas of specialisation that require the completion of four or two years of postgraduate training of respectively. At this point there is no specialisation pathway for industrial pharmacy. Pharmacists who join a pharmaceutical company tend to be given specific further training appropriate to their role.

The 2016 Pharmacist Competency Framework defines the learning outcomes for the Bachelor and Master of Pharmacy degree programs. It also specifies the standard required per area of responsibility and per competency.

The Bachelor of Pharmacy degree program provides a broad science education with a strong emphasis on pharmaceutical science. The program is taught at an academic level and prepares pharmacy students for both the Master of Pharmacy degree program and any pharmaceutical or pharmaceutical-related research master program. Physical chemistry, analytical chemistry, organic chemistry, biochemistry, molecular biology, anatomy, physiology, pathophysiology and pharmacology are all subjects that have an important place in the Bachelor of Pharmacy degree program. The bachelor program is designed to introduce the student to all aspects of the pharmaceutical sciences and provide sufficient understanding of the different areas and aspects of the profession to enable the student to make a thought-out decision as to whether to embark on the Master of Pharmacy degree program and a particular area of specialisation.

The learning outcomes formulated for the Bachelor of Pharmacy degree program are based on the Dublin Descriptors, which identify knowledge and understanding, application of knowledge and understanding, evaluation and judgement, communication and learning skills as required competencies.

The learning outcomes of the Master of Pharmacy degree program are modelled on the CanMEDS Competency Framework developed by the Royal College of Physicians and Surgeons of Canada for specialist medical education programs.[18] The model identifies seven overlapping Roles or areas of competence of the medical specialist, the core competence being the Medical Expert Role.[19] In the case of pharmacy education, the core competence is Pharmaceutical Expertise. The other areas of competence are Knowledge and Science, Communication, Professionalism, Health Advocacy and Social Responsibility, Collaboration, and Leadership and Organisation. These pharmacist competence areas are in the process of being internationally aligned (see Chapter 9).

The 2016 Pharmacist Competency Framework defines learning outcomes for each area of competence as a set of competencies and sub-competencies.

The specialisation pathway for graduates wishing to practice as a community pharmacist is also based on the CanMEDS model. In this case, the core competence is Pharmaceutical Expertise and the other areas of competence are Knowledge and Science, Communication, Professionalism, Health Advocacy and Social Responsibility, Collaboration, Leadership and Organisation. Each of these areas of competence is broken down into four competencies.[20] The specialisation pathway for graduates wishing to practice as a hospital pharmacist will also be based on this model in the near future. The use of the CanMEDS model in the Master of Pharmacy degree program and the specialisation pathways makes it easier to align the pharmacy degree programs with post-academic specialisation courses.

The transition from pharmacy education to specialisation as a community or hospital pharmacist can be understood as follows: pharmacy education ensures that students who graduate as pharmacists are equipped with the required competencies in the areas of responsibility and knowledge listed above to be able, under the supervision of a community or hospital pharmacy educator, to perform most general tasks within the respective area of specialisation. For each area of competence, the competency framework defines specific areas of knowledge and competence that need to be further developed during the course of the specialisation pathway.

8. The legal framework of pharmacy education

In the Netherlands, use of the title of 'Pharmacist' is governed by Dutch and European legislative frameworks. Inclusion in the BIG-register is mandated by Dutch law. The core competencies and core skills required to practice as a pharmacist are defined in article 6c of the Regulation laying down rules regarding periodic registration in accordance with the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)). These are reflected in the learning outcomes of the education process as it pertains to periodic registration, and also help to clarify the area of expertise.

Certain of the activities of BIG-registered pharmacists, such as compounding and dispensing medicines, are performed in the provision of individual healthcare. Others are product-oriented activities, such as pharmaceutical research, and testing, assessing and monitoring the safety and quality of medicines.

Statutory provisions that establish requirements for professional practice

The following regulations play an important role in setting out the statutory provisions that establish the requirements for pharmacy education:

1. *Higher Education and Research Act (Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek (WHW)) of 8 October 1992*
   a. Article 7.4a (Study load for science education programs), subclause 6, states that the study load of the Master of Pharmacy degree program is 180 credits.
   b. Article 7.2 states that, with a few exceptions, teaching and examinations are conducted in Dutch.
2. *Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker) of 3 September 1997*
   a. Article 2: Education as defined in Chapter 7 of the Higher Education and Research Act (WHW) is required for inclusion in the BIG-register as a pharmacist.
   b. Article 3: The education requirements consist of theoretical and practical instruction and an internship of at least six months in a community or hospital pharmacy. (See the respective appendix in the Dutch version of this document for a list of subjects.)
   c. Article 4 describes the knowledge and skills acquired.
3.A. *Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)) of 11 November 1993*

a. Article 22 refers to the Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker). Education as defined in Chapter 7 of the Higher Education and Research Act (WHW) is required for inclusion in the BIG-register as a pharmacist.

b. Article 23 describes the areas of expertise of the pharmacist and refers to the Dutch Medicines Act (Geneesmiddelenwet) for the dispensing of medicines.

3.B. *Regulation laying down rules regarding periodic registration in accordance with the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)) of 18 Mach 2009*

a. The periodic registration certificate is issued by an educational institution that provides education leading to a degree that confers the right to inclusion in the register of pharmacists. The periodic registration certificate is issued to pharmacy professionals who clearly possess all of the core competencies required by the profession.

b. Article 6c describes the core competencies and core skills required by the pharmacy profession.

c. Article 7.6 describes tasks that are equivalent to duties involved in the practice of pharmacy: the provision of education in core aspects of the pharmacy profession.[21]

3.C. *Assessment Framework (Dutch Individual Healthcare Professions Act (Wet BIG)) and Appendix 2a for Pharmacists, March 2015*

a. Paragraph 2.1.1: Health professionals are required to prove that they still meet the licensing requirements of their chosen profession every five years.

b. Paragraph 3.2 specifies the areas of expertise of the pharmacist as described in the Dutch Individual Healthcare Professions Act (Wet BIG).

c. Appendix 2a elaborates on the area of expertise of the pharmacist.

d. Appendix 2a, paragraph 8.3 (Delineation of the area of expertise), states that the profession of pharmacist differs from the other healthcare professions listed in article 3 of the Dutch Individual Healthcare Professions Act (Wet BIG) in the sense that the diploma awarded on completion of a Pharmacy degree affords access to two different forms of professional practice. Certain tasks, such as compounding and dispensing medicines, are performed in the provision of individual healthcare. Others are product-oriented activities, such as pharmaceutical research, and testing, assessing and monitoring the safety and quality of medicines.

4. *Dutch Civil Code, Book 7, Part 5 (The Medical Treatment Contract)*
   a. Article 446 provides a definition of the treatment contract.
   b. Article 459 states that visual observation of treatment of the patient by the pharmacist by others is permitted.
5. *Dutch Medicines Act (Geneesmiddelenwet) of 8 February 2007*
   a. Article 61.1: Prescription and 'pharmacist-only' medicines may only be dispensed by pharmacists (or general practitioners with a dispensing licence, or persons designated by the Ministry).
   b. Article 61.6: Inclusion in the register of established pharmacists is only possible if the applicant is listed in the register maintained in accordance with the Dutch Individual Healthcare Professions Act (Wet BIG)).
6. *Directive 2005/36/EC on the Recognition of Professional Qualifications of 7 September 2005*
   a. Article 44: The title of 'Pharmacist' is awarded on completion of at least five years of education, including four years of practical and theoretical instruction and a six-month internship in a public pharmacy or in a hospital. (Knowledge and capabilities are described in the respective appendix in the English version of this document.)
   b. Article 45 describes the duties of the pharmacist (see the respective appendix in the English version of this document).
   c. Appendix V 5.6.1 describes the education program for pharmacists.
   d. Appendix 5.6.2 (Title of Pharmacist) states that in the Netherlands the title is awarded by the Faculty of Pharmacy on successful completion of the Pharmacist Qualifying Examination.
7. *Directive 2001/83/EC on the Community Code relating to Medicinal Products for Human Use of 6 November 2001*
   a. Article 48 describes the need for companies that are licensed to produce medicines to employ a 'qualified person'.
   b. Article 49 describes the minimum requirements for a 'qualified person', including, for example, at least four years of education that includes both theoretical and practical instruction in pharmacy. (The basic subjects are listed in the respective appendix in the English version of this document.)

9. International benchmarking

The title of 'Pharmacist' awarded on completion of pharmacy education in Europe must be officially recognised in all European countries (Directive 2005/36/EC on the Recognition of Professional Qualifications, see Chapter 8). The free movement of newly registered professionals applies not only to pharmacy, but to all professional qualifications awarded on completion of higher education in Europe. The need to align academic qualifications led to the Bologna Declaration (by European Ministers of Education in 1999). The ongoing Bologna Process aims to create a system of academic degrees that are easily recognisable and comparable and a European Higher Education Area (EHEA). The Dublin Descriptors are generic statements of standards associated with academic qualifications.

The European Association of Faculties of Pharmacy (EAFP), an important international reference body, launched a project to investigate pharmacy education in European countries. The purpose of the PHARMINE project (2011) was to explore the possibilities of applying the principles of the Bologna Declaration in pharmacy education and align education with future needs in the three domains of pharmaceutical expertise: community, hospital and industrial pharmacy. The PHARMINE project was funded with the support of the European Commission through the Lifelong Learning Programme of the European Union. The results of the PHARMINE project indicate that there is significant variability in pharmacy education in Europe (*Identifying and defining competencies. Exploitation of results – recommendations on competency curriculum for professional pharmacists,* Pharmine, 2011). The results also show that the contact hours of pharmacy education in the Netherlands correspond to European averages in the different disciplines (chemistry, physics, mathematics, computing, statistics, biology, biochemistry, pharmacognosy, pharmacy, technology, medicine, pharmacology, toxicology, law, social pharmacy and generic competencies) (Atkinson, J. Heterogeneity of Pharmacy Education in Europe. *Pharmacy* 2014, 2, 231-243). Comparison of course content in 1994 and 2011 also showed that pharmacy qualifications in the EU now include more clinical knowledge, with an increase in contact hours in the area of medicine at the expense of chemistry. This change in pharmacy education is consistent with the main changes in Dutch and European legislation. In the EU Directive, for example, the pharmacists' duties have been expanded to include the provision of information and advice about (correct use of) medicines and personalised guidance for patients who self-administer their medicines.

The International Pharmaceutical Federation (FIP) is another important international reference body for pharmacy schools in the Netherlands.[22] The FIP Education Initiative

(FIP*Ed*), a directorate set up to advance pharmacy education in 1993, is committed to developing a global competency framework for pharmacists similar to that for physicians. The World Federation for Medical Education (WFME) was the first to establish a global competency framework for medical education to ensure that physician competencies are globally applicable and transferable, accessible and transparent. WFME has defined international standards for medical education, taking into account country-specific variations due to differences in teaching, culture, socioeconomic conditions and health systems. FIP*Ed* is now developing an equivalent framework to support the development of pharmacy education worldwide. The first version of this Global Competency Framework was published in 2012 (FIP Education Initiatives: Pharmacy Education Taskforce. *A Global Competency Framework. Version 1*. 2012).

The FIP categorises competencies in four domains: Pharmaceutical Public Health, Pharmaceutical Care, Organisation and Management, and Professional/Personal.

In the *Educational Outcomes 2013* report published by the Center for the Advancement of Pharmacy Education USA (CAPE), the American Association of Colleges of Pharmacy notes a change in educational results in the direction of patient-centred care and sees a role for the pharmacist as a health professional. Learning outcomes are linked to the domains of foundational knowledge, essentials for practicing pharmacy and delivering patient-centred care, effective approaches to practice and care, and the ability to develop personally and professionally.

The Accreditation Standards for Pharmacy Programs in Australia and New Zealand published by Australian Pharmacy Council Ltd in December 2012 describes six learning domains for pharmacy education: The Healthcare consumer, Medicines: drug action, Medicines: the drug substance, Medicines: the medicinal product, Healthcare systems and the roles of professionals, and The wider context.

In the United Kingdom it is possible for a pharmacist to qualify as a prescribing pharmacist. On successful completion of brief additional training, a pharmacist can register as a non-medical prescriber (NMP) and then assumes responsibility for clinical assessment of the patient, establishing the diagnosis and prescribing the necessary medicines. The role of prescribing pharmacist appears to be confined to Anglo-Saxon countries: there is no indication that the role will be introduced in other (European) countries.

It is clear from the above that, in terms of educational content, pharmacy schools in the Netherlands are aligned with international standards. One significant difference is the duration of the education, which is six years in the Netherlands and five years

elsewhere in Europe. Pharmacy education takes longer in the Netherlands due to the greater emphasis on science in the form of a research internship. Competency frameworks for pharmacy education are now being developed through transnational collaboration. The Netherlands' decision to define outcome-based competencies (based on the CanMEDS model) is very much in line with these international developments.

List of Abbreviations

Wet BIG   Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg). The purpose of this Act is to promote and safeguard the quality of healthcare by, among other things, defining procedures that may only be provided by licensed health professionals qualified in the respective discipline and specifying requirements for retraining and Continuing Professional Development.

CanMEDS   Canadian Medical Education Directives for Specialists. A model developed by the Royal College of Physicians and Surgeons of Canada that defines competencies needed for all domains of medical practice. The Master of Pharmacy degree program and specialisation pathways for community and hospital pharmacists in the Netherlands are (or will be) based on this model (www.royalcollege.ca).

CAPE   Center for the Advancement of Pharmacy Education USA.

EAFP   European Association of Faculties of Pharmacy. Committed to facilitating the sharing of best practice in pharmacy education and the harmonisation of pharmacy schools in Europe (www.eafponline.eu).

FIP   International Pharmaceutical Federation (originally known as Fédération International Pharmaceutique). A global organisation representing pharmacy schools and pharmacists associations worldwide. Seeks to harmonise professional and scientific standards in pharmacy (www.fip.org).

FIP*Ed*   FIP Education Initiative. The directorate that encompasses all of the pharmacy education initiatives within the FIP.

KNMP   Royal Dutch Pharmacists Association (Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie) (www.knmp.nl).

NMP   Non-medical prescriber. An individual licensed to prescribe medicines who does not have a medical degree. The role only occurs in Anglo-Saxon countries and may be performed by a pharmacist (with additional medical training).

WGBO   Dutch Medical Treatment Contracts Act (Wet op de geneeskundige behandelingsovereenkomst). Defines the rights and responsibilities of patients.

Notes

1   A three-year bachelor degree program and a three-year master degree program (= pharmacy education).

2   These working conferences were initiated by KNMP and attended by representatives from the universities in Groningen, Leiden and Utrecht, KNMP and pharmacy profession stakeholders.

3   See also the Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker) in Chapter 8.

4   See also Chapter 4 (Developments in pharmacy in the Netherlands).

5   In this document a basic subject is a subject that serves as a foundation for (applied) pharmaceutical and medical disciplines, such as pharmaceutical technology and clinical pharmacology.

6   In this context knowledge of human behaviour in illness and health includes aspects such as acceptance of medicines as part of daily life in the case of chronic health conditions, physical and mental ability to manage this independently or with supervision, and recognition and perception of effects and side effects.

7   The pharmacist's areas of responsibility are discussed in more detail in the competency framework. The concise description included in this chapter simply serves to clarify the Domain-specific frame of reference.

8   Wet BIG, articles 6c, 1a and 1c.

9   Wet BIG, articles 6c, 1a and 1b.

10   Wet BIG, articles 6c and 1d.

11   Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)). The legal underpinning of the pharmacist's role as a practitioner is also evident in the inclusion of community and hospital pharmacists within the scope of the Dutch Medical Treatment Contracts Act (Wet op de geneeskundige behandelingsovereenkomst (WGBO)). See Chapter 8 (The legal framework of the degree programs) for further details.

12   For further details, see the Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker) (Chapter 8).

13   See the letter (reference 357184-119358-GMT) at http://www.rijksoverheid.nl/documenten-en-publicaties/ kamerstukken/2014/04/08/kamerbrief-over-results-bestuurlijk-consultation-farmacie.html.

14   See http://ec.Europe.eu/health/human-use/advanced-therapies/.

15   A detailed discussion of this concept can be found in the book Toward Precision Medicine published by the National Council of the National Academies (United States), which can be referred to http://www.ncbi.nlm.nih.gov/books/NBK91503/.

16   Regulation of the Dutch Minister of Health, Welfare and Sport of 18 March 2009, MEVA/BO-2819721, laying down rules regarding periodic registration in accordance with the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)) (see Chapter 8).

17   See Chapter 8.

18   See http:// www.royalcollege.ca/portal/page/portal/rc/canmeds/framework.

19   http:// knmg.artsennet.nl/Opleiding-en-herregistratie/Project-MMV-Home/Rubrieken/CanMEDS.htm.

20   See http://www.knmp.nl/her-registratie/openbaar-apothekers/opleiding.

21   For details of the equivalent tasks, see the appendix with the full text of the Act.

22   The abbreviation is short for Fédération International Pharmaceutique, the original French name of the organisation when it was founded in 1912.

2016 Pharmacist Competency Framework

T. Schalekamp, PhD
Utrecht University

Professor H.J. Haisma, PhD
University of Groningen

Contents

1   Introduction

1.1   The development of the 2016 Pharmacist Competency Framework

The 2016 Pharmacist Competency Framework was developed at the request of the Bachelor and Master of Pharmacy degree programs[1] in the Netherlands in consultation with the Royal Dutch Pharmacists Association (Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie (KNMP)). It replaces the 2006 Pharmacist Competency Framework, which needed to be comprehensively updated in terms of the description of the core roles of the pharmacist and the formulation of the learning outcomes.

The competency framework defines the national standards of pharmacy education in the Netherlands and is primarily intended for pharmacists working in primary or secondary care, whose core competencies are described in the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)). The learning outcomes identified in the competency framework also provide a sound basis for a pharmaceutical career in academia, government and organisations at the interface between medicine and society.

The main purpose of the competency framework is to safeguard the level of competence of newly registered professionals. This applies above all to patient care and product-oriented activities included within the scope of the assessment framework of the Dutch Individual Healthcare Professions Act (Wet BIG) performed by licensed pharmacists. The various levels of pharmacy education are described in Chapter 4. Professional standards in pharmacy are based on the areas of responsibility and corresponding areas of knowledge outlined in Chapter 3 and the competencies articulated in Chapter 5. The standard of the Bachelor of Pharmacy degree program is discussed separately in Chapter 7.

The 2016 Pharmacist Competency Framework is a companion document to the Domain-specific frame of reference for Pharmacy in the Netherlands adopted by the project group on 29 June 2015. The frame of reference describes the knowledge domain of pharmacy, the relevant legal frameworks and the overall purpose and nature of the Bachelor and Master of Pharmacy degree programs. The competency framework defines the areas of responsibility and knowledge of the pharmacist in more detail and specifies pharmacist competencies in terms of measurable learning outcomes. Graduates of pharmacy degree programs in the Netherlands must demonstrate their ability to meet the learning outcomes defined in the competency framework. The individual degree programs are responsible for designing a curriculum that prepares pharmacy students to achieve the learning outcomes and have a certain amount of scope to differentiate their offering on the basis of their educational model and/or content.

The 2016 Pharmacist Competency Framework differs from the 2006 Pharmacist Competency Framework in that learning outcomes are formulated as a set of competencies. In this context a competency is defined as the ability to integrate and apply knowledge, understanding, skills and attitudes in professional situations. This means that assessment of student learning must address competencies and not simply the possession of knowledge and skills. The competency framework does not concern itself with the assessment process, responsibility for which rests entirely with the individual degree programs.

1.2   The process

In 2015 pharmacy schools in the Netherlands and the Royal Dutch Pharmacists Association (KNMP), commissioned the development of a Domain-specific frame of reference for Pharmacy in the Netherlands and a Pharmacist Competency Framework. This decision was prompted by recommendations from a series of working conferences on pharmacy education attended by educators from the Bachelor and Master of Pharmacy degree programs in the Netherlands and KNMP between July 2013 and November 2014. At these working conferences it became apparent that developments in pharmacy needed to be reflected in the curriculums and that a competency framework was the right way to approach this. The decree on the accreditation of the degree programs offered by Utrecht University and the University of Groningen of June/July 2013[2] is explicit in stating that the vision articulated by pharmacy schools in the Netherlands needs to be more closely aligned. Furthermore, greater attention needs to be devoted to meeting the new requirements imposed on pharmacists by current developments in pharmacy and preparing pharmacy graduates for specialisation pathways. The recommendations of the working conferences led to the appointment of the 2016 Pharmacist Competency Framework Steering Committee consisting of representatives of the client institutions. The steering committee commissioned the development of both a Domain-specific frame of reference for Pharmacy in the Netherlands and a new Pharmacist Competency Framework.

The names of the members of the 2016 Pharmacist Competency Framework Steering Committee are listed in Appendix 3.

During the first stage of the project, which ran from February to June 2015, T. Schalekamp, PhD, of Utrecht University and Professor H.J. Haisma, PhD, of the University of Groningen developed a Domain-specific frame of reference for Pharmacy in the Netherlands, which was adopted by the parties involved on 29 June 2015.

The Domain-specific frame of reference for Pharmacy in the Netherlands (DSFR) describes the current status of pharmacy in the Netherlands and defines requirements that need to be met by pharmacy education to prepare pharmacists for current and future developments in pharmacy.

During the second stage of the project, which ran from September 2015 to June 2016, the Pharmacist Competency Framework Project Group was asked to revise the 2006 Pharmacist Competency Framework in light of the considerations summarised above. The primary sources for the revision were: a) the learning outcomes of the degree programs offered by the universities in Groningen, Leiden and Utrecht, b) the Domain-specific frame of reference for Pharmacy in the Netherlands 2015 (see above), c) the 2006 Pharmacist Competency Framework, and d) the competency framework developed for medical education in the Netherlands (Raamplan Artsopleiding 2009).

The following guiding principles were established for the competency framework:
1. The competency framework must be sufficiently detailed to articulate and delineate the competencies of the pharmacist.
2. The competency framework must allow sufficient scope for pharmacy schools in the Netherlands to emphasise different aspects in terms of teaching methods and graduate profile on completion.
3. The competency framework must be sufficiently future-proof to serve its purpose for at least ten years.
4. The learning outcomes for the Bachelor of Pharmacy degree program described in the competency framework must be aligned with Master of Pharmacy degree program. In other words, they must facilitate academic preparation for the pharmacy profession.
5. The CanMEDS model[3] was chosen as a template for the formulation of pharmacist competencies.

The competency framework must also meet the following conditions:
a. It must situate pharmacy education in an international context, ensuring that pharmacy education in the Netherlands is equivalent to pharmacy education in other countries.
b. It must ensure that pharmacy degree programs are aligned with domains of the profession in which activities are performed by licensed pharmacists, as defined in legal frameworks such as the Dutch Individual Healthcare Professions Act (Wet BIG).

c. It must ensure that pharmacy degree programs are aligned with hospital and community pharmacy specialisation pathways.[4]

d. It must facilitate collaboration between pharmacy and medical education in order to improve interprofessional collaboration in practice.

The parties involved appointed a project group to develop the competency framework.

1.3 Project group and consultation

Within the project group a core team was assembled and assigned the task of preparing the report, conferring with external parties, organising project group meetings and processing feedback from the project group. The project group as a whole is responsible for the final report. When selecting the members of the project group, care was taken to ensure a spread across different disciplines. However, the members of the project group were appointed in a personal capacity and were not bound by any instructions. The names of the members of the project group are listed in Appendix 3.

To gain the widest possible support, an open consultation was held and parties were actively approached and invited to respond. The project group received comments on the 2016 Pharmacist Competency Framework and the Domain-specific frame of reference for Pharmacy in the Netherlands from seventeen respondents (the names of the respondents are listed in Appendix 4). These comments were discussed by the core team and, where relevant, incorporated in the definitive version with the approval of the steering committee.

2. The background to the 2016 Pharmacist Competency Framework

The competency framework is structured as follows:
− General introduction and explanation of choices (Chapters 1 and 2)
− Areas of responsibility and areas of knowledge of the pharmacist (Chapter 3)
− Stages and levels of pharmacy education (Chapter 4)
− Competency profile for newly qualified pharmacists based on the areas of responsibility and knowledge (Chapter 5)
− The competencies of the pharmacist (Chapter 6)
− The learning outcomes of the Bachelor of Pharmacy degree program (Chapter 7)

The project group chose to use the competency framework developed for medical education in the Netherlands (Raamplan Artsopleiding 2009) as a model for the 2016 Pharmacist Competency Framework, because the former framework provides a systematic and comprehensive description of basic medical education and also because there are strong similarities between medical and pharmacy education. The similarities include the stages and levels of the respective degree programs and the desirability of formulating learning outcomes for academically qualified health professionals as a set of competencies. The main differences in the structure of the competency framework developed for medical education in the Netherlands and the 2016 Pharmacist Competency Framework are listed and explained in Appendix 5 of the Dutch version of this document.

Pharmacy education is governed by Dutch and European legislative frameworks. To be able to use the title of 'Pharmacist' in the Netherlands, the practitioner must be listed in the BIG-register. The 2016 Pharmacist Competency Framework takes the legal frameworks into account. The Domain-specific frame of reference for Pharmacy in the Netherlands provides a more detailed description of the relevant legal frameworks.[5]

The Domain-specific frame of reference for Pharmacy in the Netherlands describes the current status of pharmacy in the Netherlands. In recent decades the role of pharmacists working in primary or secondary care has changed as a result of developments in pharmacy in the Netherlands. These changes in the role of the pharmacist will be augmented by future developments in the knowledge domain of pharmacy.[6] The 2016 Pharmacist Competency Framework defines in more detail the pharmacist's areas of responsibility outlined in the Domain-specific frame of reference for Pharmacy in the Netherlands[7] It also summarises the relevant areas of knowledge within each of these areas of responsibility (Chapter 3).

The 2006 Pharmacist Competency Framework defined the learning outcomes of

pharmacy education in the Netherlands as concise lists of competencies, knowledge, skills and attitudes required for each core role. There was a need for pharmacist competencies to be defined in more detail. The CanMEDS model developed by the Royal College of Physicians and Surgeons of Canada was chosen as a template for this more detailed description.[8] The model was originally developed for specialist medical education programs, but was found to be suitable for the community pharmacy specialisation pathway in the Netherlands. It is also suitable for pharmacy education in the Netherlands because, like the competency framework developed for medical education in the Netherlands, it categorises the competencies of the pharmacist in a range of professional situations.

The competency framework developed for the community pharmacy specialisation pathway defines the core role of the community pharmacist as 'Pharmaceutical Expert'. Newly registered pharmacists are not yet capable of providing pharmaceutical services without supervision, partly because they do not possess full professional competence on completion of pharmacy education. The hospital and community pharmacy specialisation pathways are designed to enable continuing professional development. The main purpose of these specialisation pathways is to facilitate the development of pharmaceutical expertise and the ability to apply the corresponding knowledge, skills and attitudes while working under pressure in a range of professional situations. Hence, in the competency framework for pharmacy education, the core role is not that of 'Pharmaceutical Expert', since this would imply possession of full professional competence. In line with the terms used in medical education, the core competence is defined as 'Pharmaceutical Expertise'.

The competency profile for newly qualified pharmacists described in Chapter 5 is based on a combination of the seven physician roles identified in the CanMEDS model and the pharmacist's areas of responsibility summarised in Chapter 3. The competencies and sub-competencies that form this profile are described in more detail in Chapter 6. In the Netherlands pharmacy education consists of a bachelor degree and a master degree. The bachelor degree is a separate program. Most students who complete a Bachelor of Pharmacy degree go on to complete a Master of Pharmacy degree. In this sense, the Bachelor of Pharmacy degree program serves as a preparatory course for the Master of Pharmacy degree program. The individual bachelor degree programs offer considerable choice. To ensure ideal preparation for the Master of Pharmacy degree program, the project group decided to also formulate learning outcomes for the Bachelor of Pharmacy degree program. However, since bachelor degree students

do not deal with professional situations and cannot be said to possess (foundation-level) professional competence, the learning outcomes of the Bachelor of Pharmacy degree program are defined in terms of knowledge, skills and professional behaviour. The Dublin Descriptors were used as a general guideline (Chapter 7).

Formulating learning outcomes as a set of competencies has consequences for pharmacy schools in the Netherlands. Their primary purpose is to educate pharmacists who meet the learning outcomes specified in this Competency Framework and can therefore be considered foundation-level pharmacy professionals. It is neither possible, nor necessary for pharmacists to achieve the same level of attainment in all learning outcomes. For example, the level of pharmaceutical expertise accomplished on completion of pharmacy education must exceed the expertise required to recognise unprofessional pharmacy practice and build effective working relationships. A higher level of proficiency in these latter competencies will (or can) be attained in the post-academic period of the pharmacy education continuum. Hence this Competency Framework defines learning outcomes at different levels. These levels and the pharmacy education continuum are summarised in Chapter 4.

3. The areas of responsibility and areas of knowledge of the pharmacist

The pharmaceutical profession has always been a wide-ranging profession. Developments in pharmacy in recent decades and changes in legislation have made patient care more central to the practice of pharmacy. As the profession continues to expand, pharmacists are required to have greater knowledge of medicine and pharmacotherapy.[9] Professional practice involves several areas of responsibility.

This chapter describes the areas of responsibility involved in traditional and more recent pharmacy practice, which includes the pharmacist's role as a health professional as defined in the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)). To become a competent pharmacist requires the development of professional competence in these areas of responsibility. Definition of the areas of responsibility provides pharmacy schools with more specific guidance on how to adequately tailor the content of their pharmacy curriculum and adds context to the competency profile for newly qualified pharmacists described in Chapter 5. The knowledge components listed for each area of responsibility are regarded as essential in order to be able to develop the competencies required to practice as a pharmacist.

1. The area of responsibility of Product Care

The area of responsibility of Product Care includes all activities involved in ensuring the responsible dispensing of medicines to patients in pharmaceutical dosage forms that result in rational, appropriate, effective and safe pharmacotherapy.

Medicines used in clinical practice are usually registered commercial preparations, the efficacy and safety of which have been demonstrated by clinical trials as far as possible. In addition to this, the composition and packaging of commercial preparations guarantee a certain shelf-life. Essential features of these products are important factors in providing the patient with appropriate advice on correct use. These include the intended route of administration (such as rectal or respiratory, for example) and the prescribed method of storage. Other important factors are the consequences of deviation from the intended use, including:

a. Consequences associated with the changing of a preparation, such as crushing of tablets, dilution of drinks and injection fluids, and addition of substances to injection preparations.

b. Consequences associated with different use of a preparation, such as oral intake of a preparation intended for rectal or parenteral administration.

c. Consequences associated with deviation from the prescribed storage conditions, such as storage above or below the recommended storage temperature.

Assessment of the extent to which the efficacy and safety of the medication used is assured on the basis of biopharmaceutical, pharmacokinetic and pharmacodynamic considerations is one of the primary tasks in this area of responsibility. Another fundamental task is determining the extent to which bioequivalence of a formulation is necessary to ensure therapeutic equivalence.

A significant part of Product Care is concerned with non-registered preparations manufactured on a small and large scale that are compounded for an individual patient or prepared for administration to a patient. This area of responsibility also includes the ability to design and produce pharmaceutical dosage forms, the quality, efficacy and safety of which are assured, and compiling product information for the patient. Production of a pharmaceutical dosage form needs to be preceded by an assessment of the pharmacotherapeutic ratio. The ability to design a medicine requires an understanding of the physicochemical properties of a pharmacon, the design of a pharmaceutical dosage form (pharmaceutical technology), and the route of administration in relation to the pharmaceutical rationale and biopharmaceutical, pharmacokinetic and pharmacodynamic properties of a pharmacon (biopharmacy).

A secondary task related to Product Care is monitoring and evaluating design, compounding and production processes in order to be able to guarantee the quality of the end product. Products are only released on the basis of adequate assessment of preparation and analysis results and other product specifications.

The shift from low-molecular-weight to high-molecular-weight (protein-based) medicines and the development of more advanced medicines and pharmaceutical technologies, such as gene therapy, somatic cell therapy, nanomedicine and tissue-engineered products, have significantly expanded the area of responsibility of Product Care.

Lastly, the area of responsibility of Product Care includes ensuring that medicines are stored and distributed under the right conditions. This applies to both commercial products and pharmacy compounded preparations. In addition to the correct handling of active pharmaceutical ingredients, knowledge of the correct storage and use of medical devices also forms part of Product Care.

The areas of knowledge involved in Product Care
- Distribution of medicines
- Physical, chemical and biological properties of medicines, pharmaceutical auxiliary substances and packaging materials
- Compounding of medicines in their pharmaceutical form
- Microbiological properties of pharmaceutical products
- Pharmaceutical dosage forms and their general and specific characteristics
- Pharmaceutical availability and release processes of pharmaceutical dosage forms
- Physicochemical interactions between medicines and other products that need to be administered simultaneously
- Absorption, distribution, breakdown and elimination of medicines
- The relationship between pharmacokinetics and pharmacodynamics (pk/pd)
- Requirements that apply to ingredients, pharmaceutical dosage forms and packaging materials
- Methods used to analyse and characterise active pharmaceutical ingredients, medicines, pharmaceutical auxiliary substances and packaging materials and determine the shelf-life of medicines
- Medical devices to the extent that these are relevant to professional pharmacy practice
- Use, handling and storage
- Compiling of product information for the patient.

2. The area of responsibility of Patient Care

The objective of Patient Care, which, in pharmacy, is also referred to as pharmaceutical patient care, is to optimise pharmacotherapy outcomes for individual patients in terms of reduced mortality or morbidity and better quality of life.

In delivering Patient Care the pharmacist's primary task is to take the initiative in providing pharmacotherapy and assume responsibility for pharmacotherapy outcomes, medication monitoring and patient counselling and guidance. Important secondary tasks include proactively guiding the choice of medicines at an individual level, monitoring individual pharmacotherapy over time and coaching the patient. A medication review involves all three of these secondary tasks.[10]

The ability to proactively guide the choice of medicines requires a wide range of knowledge at the margins of medicine, pharmacy and psychology: firstly, knowledge of health conditions and pathophysiology, the actions and effects of medicines in

the body (pharmacokinetics), the interaction between a medicine and the (target) biological system (pharmacodynamics), current treatment guidelines and their background, and knowledge and understanding of new scientific developments; secondly, knowledge and understanding of health behaviour, and understanding of concerns, expectations and beliefs that influence behaviour in terms of medicine use; and thirdly, knowledge and understanding of ways of influencing patient behaviour. To optimise pharmacotherapy, this knowledge needs to be combined with information about clinical parameters and genetics, and information obtained from questionnaires or interviews.

The pharmacist adds value to pharmacotherapy by making informed choices based on an understanding of the interaction between a medicine and the biological system, taking patient preferences into account. This aspect of the pharmacist's role becomes more prominent when pharmacotherapy according to treatment guidelines is not (or no longer) possible. Basing pharmacotherapy choices on factors such as those mentioned above is moving in the direction of precision medicine, as described in the Domain-specific frame of reference for Pharmacy in the Netherlands.

Monitoring and assessing patient medication involves identifying, interpreting and taking appropriate action to resolve pharmacotherapy-related problems. These problems may be reported by the patient, discerned during consultation with the patient, informal carer or other health professionals, or identified on the basis of information in the Pharmacy Information System through methods such as automated medication monitoring or an analysis of medication history or status. Medication monitoring includes identifying medicine interactions, contraindications, unintended double medication, over- and under-use, compliance-related problems, intolerance, over- and under-dosage, ensuring medication safety at an individual level, therapeutic drug monitoring (TDM), toxicology and prospective risk analyses.

In addition to performing the Patient Care tasks described above, the pharmacist also plays an important role in promoting patient self-care. The provision of appropriate advice on self-care can help mitigate symptoms experienced by the patient thereby avoiding the need for referral to a general practitioner. In this respect the pharmacist plays a 'gatekeeper' role in primary care. The appropriate dispensing of pharmacist-only over-the counter medicines[11] also falls within this area of responsibility.

Coaching patients through their individual pharmacotherapy means informing them verbally, providing written information and offering practical solutions in order to optimise pharmacotherapy outcomes. In a broader sense, patient coaching also includes

advising, counselling and thinking things through with patients, identifying possible obstacles and assisting with choices. When determining information needs and talking through the feasibility of pharmacotherapy choices, such as pharmaceutical dosage forms and dosage schedules, the patient's concerns, expectations and beliefs need to be taken into account. Answering questions regarding self-care, providing counselling when dispensing medication for the first and second time, discussing specific experiences and/or problems and regular medication reviews are important moments of contact with the patient and/or their informal carer, during which the content and form of the communication need to be tailored to (the level of understanding of) the patient and/or their informal carer.

Patient-centred activities pertaining to pharmacotherapy are documented and, where necessary, adequately coordinated with other health professionals.

Assuring medication safety for individual patients by addressing actions that can be taken to minimise pharmacotherapy-related problems, which include both side effects of medicines and medication errors, also fall within the area of responsibility of Patient Care.

The areas of knowledge involved in Patient Care
– Complex human molecular biology in relation to the structure-function relationships of medicines
– The action of medicines in the body, partly in relation to pharmaceutical dosage forms (biopharmacy and pharmacokinetics)
– Important medicine target sites and the main desirable and undesirable effects at the site of action (pharmacodynamics)
– Specific pharmacokinetic and pharmacodynamic factors in particular patient groups, such as children and the elderly
– The pathophysiology of common health conditions as it affects and pertains to the musculoskeletal system, endocrinology, the cardiovascular system, the skin, infections, respiratory physiology, the gastrointestinal tract, neurology, oncology and psychiatry
– Medical terminology
– Clinical presentation and course of health conditions
– Methods used to determine health gains and improvement
– Treatment guidelines, their background and rationale
– Self-care guidelines, their background and rationale

- Pharmacist-only medicine dispensing guidelines, their background and rationale
- The effects, side effects and particulars of medicines, such as dosage, interactions and contraindications, and their background
- Types of factors to be considered in medication monitoring, such as interactions, contraindications, double medication, over- and under-use, over- and under-dosage, intolerance, etc.
- The background to clinical decision-making rules and their use in promoting medication safety
- Interactions between medicines, nutrients and nutritional supplements
- Relevant clinical-chemical parameters and biomarkers
- Therapeutic drug monitoring (TDM)
- Pharmacogenetics
- Medicinal toxicology
- Disease-related factors that contribute to non-optimal medicine use
- Factors that influence health behaviour, such as patient concerns, expectations and beliefs, level of education and cultural background
- Medical devices required to ensure correct use of medicines.

3. The area of responsibility of Medication Policy

Medication Policy guides efforts to improve pharmacotherapy at population level, which is achieved by promoting the efficacy, safety, appropriateness and cost-effectiveness of pharmacotherapy. Secondary tasks within the area of responsibility of Medication Policy include developing, or contributing to the development of, guidelines and care protocols based on pharmaceutical expertise, evaluating existing guidelines and care protocols and issuing specific advice on the improvement of pharmacotherapy-related aspects, advising on pharmacotherapy at population level, in formulary committees for example, and evaluating pharmacotherapy policy and related agreements and adjusting policy if necessary. Development and evaluation of and advice on treatment guidelines and care protocols are based on scientific reasoning in the primary literature (evidence-based medicine) as far as possible. Medication Policy is part of healthcare policy in general and, as such, is reflected in national and international policy areas such as public health and pharmaceutical policy.

Medication Policy can be implemented in extramural, intramural and transmural contexts at a local, regional, national and international level. A relevant local form of Medication Policy is the pharmacotherapy consultation with local prescribers. This area

of responsibility also requires participation in relevant committees and acceptance of responsibility for protocols and the range of medicines available from a pharmacy. Within the area of responsibility of Medication Policy, pharmacists contribute to the delivery pharmacotherapy services across the care continuum, which also involves addressing broader problems such as medication transfer and promotion of compliance. Agreements regarding pharmacotherapy at population level are made in consultation with other health professionals. Evaluation of and feedback on agreements with peers is assisted by prescribing data.

The areas of knowledge involved in Medication Policy
- The structure, delivery and funding of healthcare services in general and pharmaceutical care services in particular
- Relevant legislation and regulations
- The pharmacist's role in the provision of healthcare services
- Medicines research (methodology), clinical pharmacology, (pharmaco) epidemiology and pharmacoeconomics, pharmacy practice research
- Guidelines, their background and pathology and properties of medicines that are relevant to compliance with guidelines.[12]

4. The area of responsibility of Quality Assurance

Quality Assurance and quality policy are essential in all areas of the pharmacy profession, which include not only community and hospital pharmacy, but also pharmaceutical roles in industry, government and scientific research. Relevant secondary tasks involved in Quality Assurance include implementation of quality policy, management, planning, organisation and evaluation.

Medication safety and the organisational measures required to ensure medication safety are key priorities in this area of responsibility. Pharmacists play an important role in reducing risks. Pharmacotherapy-related problems, side effects and medication errors are addressed as part of Patient Care (see The area of responsibility of Patient Care). Formulation of appropriate quality policy that ensures medication safety requires knowledge of potential risks inherent in processes that range from mass production to individual distribution and from prescription of medicines to administration of medicines.

Activities that support the development and implementation of quality policy include establishing the principles of the quality policy adopted by an organisation, assuming

responsibility for setting up, implementing and maintaining the quality system, adequately addressing shortcomings in quality and adequate handling of complaints. Delivery of quality policy involves determining the objectives and priorities within a pharmaceutical organisation, (establishing clear agreements regarding) delegation of secondary tasks, and efficient allocation of time and resources to achieve set objectives.

The areas of knowledge involved in Quality Assurance
− Principles of quality assurance (monitoring, quality enhancement and assurance) and the PDCA (plan-do-check-act) cycle
− Standards, guidelines and important developments in quality assurance
− Quality assurance models
− Current quality indicators in pharmacy
− Organisational measures required to ensure medication safety, in distribution of medicines and medication transfer in particular.

5. The area of responsibility of research, Education and Innovation

All academic education is based on knowledge generated by research and science. Pharmacy education is no exception. Practice of the profession is guided by science in all professional settings. After completing a Master of Pharmacy degree, some newly qualified pharmacists will choose to pursue a career in science, possibly by embarking on a PhD, which may or may not be combined with a pharmacy specialisation pathway. Academic training and skills, scientific knowledge and a scientific attitude lay the basis for a scientific approach to professional practice in the areas of responsibility of Product Care, Patient Care and Medication Policy. Pharmacists working in primary and secondary care, industry and government are frequently confronted with complex issues, often in the form of complex cases. Complex issues and cases need to be approached and analysed with an academic mindset in order to be able to arrive at appropriate, evidence-based solutions and advice. Pharmacists must also be able to formulate research proposals in the area of pharmacy practice research for example.

The sharing of knowledge with staff, peers, other care workers and students makes education an important task in almost all areas of the profession. Sharing knowledge of medicines and educating others on medicines is often an important part of regular pharmacotherapy consultations with physicians. In addition to this, educating both groups of patients and individual patients is an educational task that goes beyond the transfer of information.

(Medical) pharmaceutical science is constantly evolving. Completing a Master of Pharmacy degree is really just the start. Thereafter it is essential for pharmacists to continue to study developments that affect the practice of the profession, by keeping up with the literature, either through continuing professional development or in other ways. As lifelong learners pharmacists determine their own educational needs. New evidence-based understanding has to be translated into daily practice. As part of this process, it is important to ensure that new developments can be shared with and transferred to others. The pharmacist's task as an educator and a positive learning environment are both relevant in this respect.

The areas of knowledge involved in Research, Education and Innovation
- It goes without saying that any form of research, study of research, provision and pursuit of education and assessment of innovation must be underpinned by the comprehensive knowledge required for the areas of professional responsibility listed above.
- Research methodology
- Knowledge and understanding of (bio)statistical methods.

# 4.	Stages and levels of pharmacy education

Pharmacy education is the start of a lifelong learning continuum which, broadly speaking, consists of three stages: 1) pharmacy education; 2) specialisation; 3) professional practice as a pharmacy specialist committed to lifelong learning as part of maintaining professional registration.

In the Netherlands pharmacy education consists of a three-year Bachelor of Pharmacy degree and a three-year Master of Pharmacy degree. On completion of the Bachelor of Pharmacy degree program, students can then embark on actual professional training that leads to the Master of Pharmacy degree. In other words, students who have been awarded a Bachelor of Pharmacy degree are just at the start of their career. On completion of this first part of their education they possess knowledge, skills and attitudes that can be applied in simulated practice situations. During the Master of Pharmacy degree program, students train as pharmacists, developing their knowledge, skills and professional standards and the ability to apply what they have learnt in an integrated way in increasingly complex simulated and real situations.

Newly qualified pharmacists who train in the Netherlands possess foundation-level competence in pharmaceutical practice. They[13] are capable of independently carrying out pharmaceutical activities, but, during a specialisation pathway, they are required to carry out these activities under the supervision of an experienced pharmacy professional who is recognised as an educator.

Those who hold a Master of Pharmacy degree (= Master of Science, MSc) are entitled to apply for inclusion in the BIG-register as a pharmacist. In the Netherlands, only qualified individuals listed in the BIG-register are permitted to use the protected title of 'Pharmacist'.

This Competency Framework describes five levels of competence in pharmacy education.

Levels of competence in pharmacy education (applicable to the Bachelor and Master of Pharmacy degree programs in the Netherlands)

Level	Description
I	a. The student has knowledge and understanding of scientific disciplines relevant to pharmacy. b. The student demonstrates relevant pharmaceutical skills in standardised situations. c. The student demonstrates basic professional behaviour skills.
II	The student is able to integrate and apply knowledge, skills and professional behaviour when dealing with pharmaceutical matters in context-rich assessment situations.
III	The student performs the professional activities described in the competence section of the framework[14] adequately[15] in training situations created for this purpose and/or in simulated professional situations.
IV	The student performs the professional activities described in the competence section of the framework adequately in real situations with prior instruction and intensive supervision by an experienced pharmacy professional.
V	Where possible, the student independently performs the professional activities described in the competence section of the framework adequately in real or simulated situations.[16] The student is supervised by an experienced pharmacy professional who is immediately available should the student wish to seek advice.

The five levels of competence described above apply primarily to professional situations in which the student is required to demonstrate knowledge, skills and professional behaviour. The levels of competence differ in terms of the degree of independence exercised by the student, the speed at which the student is able to perform activities with the requisite care, the complexity of the activities and the degree of integration of the knowledge, skills and attitudes required to perform the activities. At Level I, the student possesses distinct knowledge and skills, but is not yet required to apply them in an integrated way in complex situations. At Level II, the student is required to apply knowledge, skills and professional behaviour in an integrated way in context-rich situations. This might involve written case studies or an assignment pertaining to professional practice that requires basic integration of knowledge, skills

and professional behaviour. At Levels III, IV and V the student exercises increasing independence, either in contrived training situations and/or simulated situations (Level III), or in real situations with decreasing supervision (Levels IV and V). Levels IV and V differ solely in terms of the amount of supervision. Since the student pharmacist is not a qualified pharmacy professional, supervision is needed at all levels, even at the most advanced level of the master degree program. The required level of competence in the learning outcomes specified for the Master of Pharmacy degree program in Chapter 6 of this Competency Framework is defined as Level III, IV or V in each case.

After completing pharmacy education, further specialisation and experience gained through practice are needed to become an experienced pharmacy professional. Continuing professional development is essential to maintain the experience and competence required to practice as a Pharmaceutical Expert. This is also specified as a requirement in the Dutch Individual Healthcare Professions Act (Wet BIG).

Assessment

The categorisation of levels of competence in pharmacy education has a bearing on the process of assessment. At Level I, knowledge, understanding, skills and professional behaviour are assessed separately. At Level II, assessment is based on the student's ability to integrate knowledge, skills and professional behaviour in context-rich situations.

At Levels III, IV and V assessment is based on the demonstration of competencies.

At Level III competencies can be assessed in simulated situations.

At Levels IV and V competencies must be assessed in real situations. If this is not possible, as a last resort, a carefully simulated professional setting with realistic time constraints is an acceptable alternative. The required level of competence (Level III, IV or V) is specified for each (sub-) competency in Chapter 6 of this Competency Framework.

Pharmaceutical cases

Students will be presented with a range of pharmaceutical cases during the course of their training. This Competency Framework does not address possible pharmaceutical subject matter. It is the responsibility of the individual degree programs to ensure a representative choice of subjects within the pharmacist's areas of responsibility described in Chapter 3. The level of competence is ultimately determined by the complexity of the pharmaceutical cases presented to the student. The degree of complexity is primarily determined by the following factors:

1. Is there a standard solution, in the form of a guideline or a protocol for example, or must the student do further (literature) research in order to develop an 'own' solution?
2. To what extent do the different areas of competence based on the CanMEDS model need to be integrated to ensure a professional approach?

When assessment is based on demonstration of competencies, student pharmacists need to be presented with progressively complex cases. During the bachelor degree program, for the most part, knowledge and skills are assessed separately. During the master degree program, this is far less the case. It is important to ensure that student pharmacists presented with increasingly complex cases in real situations are able to rely on supervision and adequate assessment by an experienced pharmacy professional. To enable the acquisition and assessment of competencies, during their training, student pharmacists need to be progressively exposed to real situations and learn to operate with an increasing degree of independence. The professional internships towards the end of the master degree program play an essential role in this process. It goes without saying that supervision and assessment by experienced pharmacy professionals must result in reliable assessment of the student pharmacist's competencies.
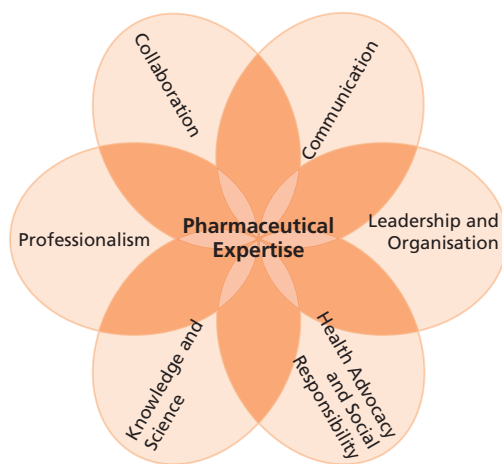
5. A competency profile for newly qualified pharmacists

5.1 Introduction

Pharmacy education at university is the first stage of the pharmacy education continuum. Students who complete the Bachelor and Master of Pharmacy degree programs may choose to specialise as a community or hospital pharmacist. Other routes of specialisation include in-company training to become a 'qualified person' within a pharmaceutical company. Some newly qualified pharmacists may choose to embark on a PhD, which may or may not be combined with a pharmacy specialisation pathway. And lastly, pharmacists can use their knowledge of pharmaceutical science and practice in combination with professional and academic skills in other institutions in the public or education sector for example. Yet, no matter which career path they choose, all pharmacists must embrace lifelong learning and undertake continuing professional development to maintain their competence and, where appropriate, their registration as a specialist.

This Competency Framework is primarily intended for pharmacists working in primary or secondary care in accordance with the legal frameworks set out in the Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker), the Dutch Individual Healthcare Professions Act (Wet BIG)and the EU directive on pharmacy education.[17, 18]

The competency profile for newly qualified pharmacists articulated in this Competency Framework includes seven overlapping areas of competence based on the Roles outlined in the CanMEDS model frequently used for specialist medical and pharmaceutical education programs.[19, 20] In the CanMEDS model the core competence is the

Medical Expert Role. The other areas of competence are Communication, Collaboration, Leadership and Organisation, Health Advocacy and Social Responsibility, Knowledge and Science, and Professionalism. These last six areas of competence are needed by all health professionals, including pharmacists. The core competence of the newly qualified pharmacist is defined as 'Pharmaceutical Expertise'. A qualified pharmacist who specialises as a community or hospital pharmacist can be defined as a 'Pharma-

ceutical Expert', since this term accurately describes professional competence in pharmaceutical science and practice, characterised by the performance of pharmaceutical duties with the expertise gained from university education.

5.2 The pharmacist competency profile

The pharmacist competency profile is based on the areas of responsibility described in Chapter 3 and the seven areas of competence derived from the CanMEDS framework, which are:

1. Pharmaceutical Expertise (core competence)
2. Communication
3. Collaboration
4. Knowledge and Science
5. Health Advocacy and Social Responsibility
6. Leadership and Organisation
7. Professionalism.

These areas of competence are described below.

Pharmaceutical Expertise. Pharmaceutical Expertise, or professional competence in pharmaceutical science and practice, is the pharmacist's core competence and dovetails with the six other areas of competence. Pharmacists possess a wide range of knowledge and skill in the areas of responsibility involved in the delivery of pharmaceutical services (see Chapter 6), and applies their knowledge and skill in pharmaceutical practice. Given the wide-range of knowledge and responsibility involved in the provision of pharmaceutical services, pharmacists are aware of the limits of their own expertise and competence and take these into account when serving as a professional pharmacist. Pharmacists perform pharmaceutical duties in accordance with accepted professional standards and are guided by scientific evidence and appropriateness where possible. In serving as pharmacy practitioners, pharmacists are guided by the core values of the profession, which are summarised below under the heading of 'Professionalism'. Pharmacists are able to communicate effectively on pharmaceutical matters in Dutch, both verbally and in writing.

Communication. Pharmacists are able to establish and maintain effective relationships with patients and their relatives or carers. Pharmacists possess communication skills

that enable them to gather information and communicate it convincingly in providing quality pharmaceutical care.

Collaboration. Pharmacists are able to collaborate effectively with peers, pharmacy staff, prescribers and other health professionals in order to achieve the shared vision of providing quality care. In contributing to an effective collaborative approach, pharmacists are aware of the ways in which their pharmaceutical expertise can be used to provide optimal patient and product care. Within the scope of their expertise, pharmacists know which tasks can be delegated to a pharmacy team and when it is best to refer to peers or other health professionals.

Knowledge and Science. Pharmacists use academic skills in the practice of their profession. They are able to make a scientific contribution in the pharmaceutical areas of responsibility within which they operate as health professionals. They are able to critically assess pharmaceutical and related medical information and contribute to the development and expansion of the profession. Pharmacists embrace lifelong learning and are able to create a personal learning and development plan. Pharmacists are able to effectively transfer knowledge to patients, staff, peers and other pharmacy practitioners in the context of their professional development and foster the creation of a positive learning environment.

Health Advocacy and Social Responsibility. Pharmacists are aware of the social value of pharmacy services in the context of healthcare, both for the individual patient and for society as a whole. They are able to communicate this value to policy makers and all other persons and agencies involved in the delivery and promotion of healthcare. They are aware of the legislation and regulations that pertain to pharmaceutical services and act accordingly. They help control healthcare costs by considering the cost-effectiveness of pharmacotherapies in their analysis and recommendations. Where possible, they prevent problems through appropriate intervention in incidents involving medicines and actively contribute to the delivery of quality healthcare in a broad sense.

Leadership and Organisation. Pharmacists are guided by a personal vision, constantly seek to improve their knowledge and refine their behaviour, lead by example, provide coaching and direction, and assume responsibility. Pharmacists are conscious of the importance of organisational and financial policy within an organisation and aware

of the structure, delivery and funding of healthcare services. Pharmacists are also conscious of the role pharmacists play in delivering healthcare and conversant with developments in the domain in which they operate. They are also aware of the principles of quality assurance and apply these principles appropriately in practice. They are efficient in coordinating their work with staff, peers and other health professionals and keep adequate records of agreements, services and assigned tasks.

Professionalism. Pharmacists practice their profession in accordance with the highest pharmaceutical, scientific and ethical standards prescribed in the Charter Professionalism of the Pharmacist.[21] Their practice of the profession is guided by the core values described in the Charter, which are: 1) Commitment to the patient's well-being, 2) Pharmaceutical expertise, 3) Social responsibility, 4) Reliability and care, and 5) Professional autonomy, with patient care being the primary concern. Pharmacists assume responsibility for decisions that may affect the welfare of the patient and are guided by the aforementioned core values in this respect. Pharmacists are aware of the limits of their own competence and the importance of operating within these limits. In prioritising the interests of the individual patient, pharmacists are also constantly aware of the general interest served by effective, safe and appropriate healthcare.

To summarise: the profile for newly qualified pharmacists is based on the seven areas of competence identified in the CanMEDS framework and the areas of responsibility described in Chapter 3 of this Competency Framework. These are listed below.

Areas of responsibility	Areas of competence
– Product Care	– Pharmaceutical Expertise
– Patient Care	– Communication
– Medication Policy	– Collaboration
– Quality Assurance	– Knowledge and Science
– Research, Education and Innovation	– Health Advocacy and Social Responsibility
	– Leadership and Organisation
	– Professionalism

6. Pharmacist competencies

6.1 Introduction

In this chapter the seven areas of competence described in Chapter 5 are translated into learning outcomes for the pharmacist. These learning outcomes are formulated as specific competencies.

A competency is the ability to integrate and apply knowledge, understanding, skills and attitudes in professional situations. The pharmacist must possess sufficient mastery of the relevant competencies in real situations with limited supervision and/or under controlled conditions.

The areas of competence studied and acquired during pharmacy education are almost identical to the areas of competence developed during the hospital and community pharmacy specialisation pathways.[22] However, the individual competencies described in this Competency Framework are explicitly formulated for *newly qualified* pharmacy professionals, who are referred to in this document as pharmacists. Newly qualified pharmacy professionals possess foundation-level competence. Compared with more advanced pharmacy professionals, they are more limited in their ability to handle complex cases and perform under time constraints. The aspects involved in providing pharmaceutical services in increasingly complex situations with increasing time constraints are the primary focus of the specialisation pathways pharmacists can pursue after obtaining a Master of Pharmacy degree.

The required level of competence to be demonstrated in each competency is specified in each case as Level III, IV or V (see also Chapter 4). The student pharmacist must be able to adequately perform the professional activity:

- in training situations created for this purpose and/or in simulated professional situations (Level III: noted as (III) after the competencies to which this applies).
- in real situations with prior case-specific instruction and intensive supervision by an experienced pharmacy professional (Level IV: noted as (IV) after the competencies to which this applies).
- independently in real or simulated situations with an experienced pharmacy professional being immediately available should the student pharmacist wish to seek advice and who at least provides subsequent supervision (Level V: noted as (V) after the competencies to which this applies).

6.2   Competencies

1. Pharmaceutical Expertise

The competencies listed below carry the implicit assumption that the pharmacist possesses a wide range of knowledge and skills in each of the areas of responsibility inherent in pharmacy practice.[23]

Pharmacists are able to:

1. Apply a wide range of knowledge and skills to pharmaceutical matters across the full spectrum of pharmaceutical practice.
    −   Apply acquired knowledge and skills in natural, pharmaceutical, medical, human and social sciences in pharmaceutical practice. (V)
    −   Apply scientific reasoning in approaching and analysing pharmaceutical matters where possible. In the area of product care this involves the application of basic principles of chemistry, physics and biology. In the area of pharmacotherapy this involves a pharmacological approach. (V)
    −   Approach and analyse pharmaceutical issues from the user's perspective. In the case of product care, this applies primarily to the pharmaceutical dosage form and its application. In the case of patient care, this involves taking into account the patient's personal beliefs regarding health benefits (effects and side effects), medical necessity (safety and efficacy) and use. (V)

2. Apply knowledge and skills appropriately, responsibly and ethically to relevant matters in the areas of responsibility of Product Care, Patient Care and Medication Policy in pharmaceutical practice.
    a. Within the area of responsibility of *Product Care* pharmacists are able to:
        −   Design high quality pharmaceutically rational and active products that are safe.[24] (V)
        −   Assess whether a medicine meets all of the criteria to achieve the desired pharmacotherapeutic effect. (V)
        −   Select the right pharmaceutical dosage form and route of administration to achieve optimal therapeutic effect. (V)
        −   Make valid statements regarding the bioequivalence of different preparations that contain the same active substance, in the same concentration, in the same pharmaceutical dosage form. (V)
        −   Assess the rationale and feasibility of a compounding request. (V)

- Describe a pharmaceutical product in technical pharmaceutical and biopharmaceutical terms. (V)
- Develop and implement a protocol or procedure for small-batch compounding of pharmaceutical ingredients or preparation of medicines for administration.[25] (V)
- Evaluate and assess the design, composition, production method and packaging of medicines. (V)
- Compile inspection requirements and carry out inspections. (V)
- Interpret the results of product inspections and make statements regarding the deliverability of products based on the interpretation of the results. (V)
- Determine and document optimal conditions for the transport and storage of medicines. (V)

b. Within the area of responsibility of *Patient Care* pharmacists are able to:
- Make a well-informed choice of, and use medical terminology to present an argument for, a particular pharmacotherapy, based on clinical reasoning,[26] especially in situations where treatment according to treatment guidelines is not possible. (V)
- Perform (parts of) a medication review[27] systematically and adequately, taking into account the patient's concerns, expectations and beliefs. (V)
- Design (part of) a pharmacotherapy treatment plan. (V)
- Document agreements regarding patient problems electronically or on hard copy. (V)
- Identify, interpret and resolve patient-specific pharmacotherapy problems to the best of their ability. (V)
- Supervise pharmacotherapy interventions undergone by patients or initiate pharmacotherapy interventions in consultation with other practitioners. (V)
- Determine when bioanalytical measurements are required to determine drug concentration in body fluids, interpret the measurements and translate them into optimal individual pharmacotherapy. (V)
- Identify potential risks of medicine use and factor this in when making choices. (V)
- Analyse a request for care made by a patient or health professional, verbally and in writing, and respond appropriately. (V)

- Respond appropriately to patient questions regarding self-care. (V)
- Dispense pharmacist-only over-the counter medicines in accordance with the statutory provisions. (V)
- Discuss the benefits and risks of pharmacotherapies with patients. (V)
- Ascertain a patient's actual medicine use and identify the underlying reasons for deviation from the prescribed use. (V)
- Identify specific experiences and problems and give the patient appropriate advice based on their findings. (V)
- Make agreements with the patient regarding medicine use. (V)

c. Within the area of responsibility of *Medication Policy* pharmacists are able to:
- Contribute pharmaceutical expertise to the development of guidelines and care protocols, taking efficacy, safety, cost-effectiveness and the patient's perspective into account. (IV)
- Interpret clinical medicines research and extrapolate the implications for daily practice, taking patient population and health system differences into account. (V)
- Evaluate the quality of prescribing policy with the aid of prescribing data, discuss the results with prescribers, and make and evaluate agreements with peers. (III)

3. Conduct a systematic search for relevant scientific information pertaining to pharmaceutical issues that affect product care, patient care and medication policy and integrate it in pharmacy practice.[28]
- Consult and correctly interpret electronic and printed sources of information. (V)
- Critically assess the scientific value of information sources. (V)
- Translate scientific knowledge and understanding into optimal product and patient care and practical pharmacotherapy at a population level. (V)
- Make and scientifically justify pharmaceutical and pharmacotherapy choices based on medicines, clinical and pharmacy practice research. (V)
- Consult other experts. (V)

4. Communicate appropriately with other health professionals regarding patient care, verbally, electronically and in writing.[29]
- Express themselves fluently in Dutch, verbally and in writing, in the provision of care. (V)
- Show respect for and respond appropriately to different views and language adopted by health professionals outside the pharmacy industry. (V)

5. Reflect on their actions as pharmacy professionals.[30]
   – Reflect on their strengths and weaknesses in terms of their professional competence as pharmacy practitioners. (V)
   – Reflect on feedback from patients and other health professionals on the pharmaceutical care provided. (V)
   – Clarify and justify moral principles to patients, peers, prescribers and other health professionals. (V)
   – Recognise moral and ethical issues in professional practice and analyse their own views on integrity in pharmacy practice. (V)
   – Express their views on responsibility in specific pharmacy situations, especially situations involving patient care and care policy. (V)

2. Communication

Pharmacists are able to:

1. Establish and maintain a professional (pharmaco)therapeutic relationship with patients based on empathy, mutual understanding and trust.
   – Ensure open and respectful communication, and show empathy and commitment. (V)
   – Employ communication skills appropriately in conversations with patients and their relatives or carers. (V)
   – Employ correct use of Dutch in verbal and written communication. (V)
   – Identify situations in which an interpreter is needed and make the necessary arrangements. (V)
   – Communicate with patients verbally, electronically and in writing, tailoring the content and form of the communication to (the level of) the individual patient and/or group of patients. (V)

2. Gather and integrate information regarding a request for (pharmaceutical) care.
   – Clarify a patient's request for care by listening to the patient, any relatives or carers involved and other health professionals, requesting additional information where necessary, and integrating the information obtained. (V)
   – In enquiring further about a request for care, devote particular attention to specific concerns, expectations and beliefs, the patient's experience of medicines and medicine use, including practical problems with the administration of medicines, efficacy, side effects and compliance. (V)

3. Discuss relevant information with a patient, their relatives or carers and other health professionals as part of ensuring optimal patient care. (This also comes under the area of competence of Collaboration.)
   – Provide the patient with adequate information, including information about the risks associated with use of the therapy, when dispensing medicines and medical devices. (V)[31]
   – Inform the patient, and any informal carers, of the possible outcomes of pharmacotherapy, if necessary in consultation with other health professionals. (V)
   – Check with the patient to ensure that the information provided is clear and understood. (V)
   – Provide prescribers and other health professionals with adequate information about, and advice on, pharmacotherapy for individual patients, the range of pharmacotherapy options for the purposes of medication policy, and patient-centred product care. (V)
4. Provide pharmaceutical supervision for the patient and those involved with the patient.
   – Motivate the patient and provide practical solutions in response to questions regarding, and problems with, the use of medicines or medical devices, such as difficulty with compliance. (V)
   – Allow for the possibility of low health literacy[32] and relevant personal factors (such as housing and living conditions and possible cognitive problems). (V)
   – Explain and offer the patient (and any informal carers) the possibilities of medical devices. (V)
5. Communicate appropriately with different patient groups, such as children, the elderly, men, women, patients with different educational and/or cultural backgrounds, and more vulnerable patients.
   – Show sensitivity in dealing with intercultural situations in care or within the organisation. (V)
   – Take into account possible ethnic and cultural backgrounds and social factors that are relevant to a particular community, which may influence the delivery of care to individuals in that community.[33] (V)
   – Appropriately conduct a (one-to-one) conversation with a patient or their relative or carer. (V)

6. Provide verbal and written information, and report findings, regarding outcomes of (consultation on) product care, patient care, medication policy, quality assurance and their own research. (This also comes under the core competence of 'Pharmaceutical Expertise'.)
   – Systematically record conversations with patients in electronic patient records as part of patient care. (V)
   – Record relevant personal factors that may affect the provision of (certain aspects of) patient care, such as clinical or chemical parameters, reasons for medicine use, low health literacy and/or cognitive problems, in electronic patient records. (V)
   – Keep records of relevant aspects of product care in a product file. (V)
   – Document product care and quality assurance processes in protocols. (V)
   – Produce structured case reports for publication in peer-reviewed scientific journals. (IV)

3. Collaboration

Pharmacists are able to:

1. Engage in effective collaboration with prescribers and other health professionals in order to contribute to optimal patient treatment, and, in doing so, consider and respect the views and interests of others.
   – Develop a pharmacotherapy treatment plan in collaboration with the prescriber and the patient (and possibly the patient's informal carer). (IV)
   – Employ appropriate communication skills in conversations with prescribers and other health professionals.[34] (V)
2. Make an effective contribution to interprofessional[35] teams in the areas of patient care, medication policy, research and education, and, in doing so, consider and respect the views and interests of others.
   – Express their views from a pharmaceutical perspective. (V)
   – Exchange ideas and arrive at a consensus on the (implementation of) medication policy. (IV)
   – Make agreements regarding medication policy. (V)
   – Make agreements regarding medication supervision and patient care to enable efficient documentation and exchange of information that is relevant to care. (V)

- Make agreements regarding the use of eHealth facilities, such as patient portals and telemonitoring. (V)
- Engage in consultation in multidisciplinary teams and develop working relationships within a team. (III)
3. Make an effective contribution to the quality of the organisation in which they work and engage in effective consultation within the organisation, considering and respecting the views and interests of others.
   - Delegate, collaborate and inspire others to commit to continuous improvement of the quality of the organisation. (III)
   - Build effective working relationships based on trust and respect within the organisation. (III)

4. Knowledge and Science

Pharmacists are able to:
1. Set up and conduct scientific research.
   - Identify a problem and develop a research question. (V)
   - Conduct a review of the literature. (V)
   - Apply research methodology and (bio)statistics in one or more areas of medicines or pharmacy practice research. (V)
   - Gather and analyse data in the right way. (V)
   - As far as possible, accurately report and interpret research results in relation to the professional literature. (V)
   - Critically evaluate the quality of their own research. (V)
   - Translate new knowledge and understanding gained from research into new scientific research questions. (V)
2. Help educate patients, students, prescribers and other pharmacy professionals. (IV)
   - Adequately prepare and publish case studies. (IV)
   - Adequately report side effects. (IV)
   - Adequately report incidents associated with medicines and medicine use. (IV)
   - Develop educational activities for individual and groups of patients, students, prescribers and other health professionals. (IV)
3. Critically assess and interpret (sources of) pharmaceutical and related medical information.
   - Form hypotheses based on a study of research sources. (V)

- Adopt a systematic approach to (medical) pharmaceutical problems based on findings in the literature. (V)
- Deal objectively with information provided by stakeholders. (V)
- Develop (or contribute to the development of) protocols for patient care, medication policy, product care and quality assurance. (V)
- Assess the overall quality of guidelines and protocols. (V)

4. Base decisions in pharmaceutical practice on available scientific evidence where possible.
   - Make evidence-based therapeutic decisions where possible. (V)
   - Review the literature on a pharmaceutical problem. (V)
   - Translate scientific knowledge and understanding gained from research into care for the individual patient. (V)
   - Extrapolate scientific knowledge and understanding gained from research to population level. (V)

5. Develop, implement and document a personal learning strategy.
   - Identify personal learning needs and develop a suitable personal study plan. (III)
   - Maintain and advance their professional competence through continual self-initiated study of key scientific developments relevant to professional practice. (III)
   - Implement newly acquired knowledge and skills in professional practice. (III)
   - Assess themselves and others. (III)

6. Reflect on strengths and weaknesses in their performance and direct their learning process accordingly as part of their commitment to lifelong professional development.[36]
   - Analyse areas of knowledge, skills and personal capabilities and identify aspects that require further development. (IV)
   - Take appropriate action to develop competencies to the required level. (IV)
   - Make responsible career choices aligned with their personal capabilities. (IV)

5. Health Advocacy and Social Responsibility
Pharmacists are able to:
1. Practice pharmacy in accordance with the relevant statutory provisions and the principles of professional and ethical conduct set out in the Charter Professionalism of the Pharmacist (*Handvest van de apotheker*). (V)

2. Make an active and critical contribution to the social debate on pharmacy-related issues.
   - Show understanding of the way medicines policy is established and the consequences for patients and groups of patients. (V)
3. Apply knowledge of important disease determinants, and medicine use in particular, to help promote the health of individuals and groups.
   - Show understanding of the way medicines policy is established and the consequences for patients and groups of patients. (V)
   - Identify risk groups among medicine users and help reduce the risk within these groups where possible. (V)
4. Take appropriate action in response to incidents and risks associated with product and patient care at the level of the individual patient and society. (III)
5. Help control pharmacotherapy costs by, among other things, monitoring and minimising spillage, dispensing in appropriate quantities, and promoting responsible recycling of unused medicines.[37] (III)
6. Help protect the environment from medicine waste.
   - Show understanding of the potential environmental impact of medicines. (III)
   - Actively promote safe disposal of unused medicines through designated facilities. (III)
7. Show understanding of their role as pharmacists in primary and secondary care, especially their responsibilities in relation to patients and other health professionals. (III)

6. Leadership and Organisation
Pharmacists are able to:
1. Identify key leadership competencies.
   - Develop their own personal vision of pharmacy. (III)
   - Analyse their personal development as professionals and indicate the importance of personal development. (III)
   - Assume responsibility in professional situations and establish the boundary between personal and shared responsibility in professional situations. (III)
   - Provide coaching and direction in professional situations where this is required. (III)
2. Make effective use of computer systems and information technology.
   - Make appropriate use of computer systems for the purposes of medication supervision. (V)

- – Document interventions, considerations and agreements in electronic patient records. (V)
- – Take appropriate steps to ensure the security and privacy of patient information during data transfer. (V)
- – Offer medical devices that enable communication with patients (and possibly their informal carers) to encourage and facilitate self-management and telemonitoring. (IV)
3. Efficiently organise their own work and work done within the organisation.
   - – Differentiate matters of greater and lesser importance. (V)
   - – Set priorities for their own work. (V)
   - – Set priorities for, allocate, and carry out, the work done within the organisation (as a team), taking into account the context in which the work is done. (IV)
   - – Provide direction and guidance to peers, pharmacy staff and others in the performance of their duties. (IV)
   - – Make clear agreements within the organisation and ensure that agreements are met. (III)
4. Comprehend the structure, delivery and funding of healthcare services and medicine provision in the Netherlands and apply this knowledge effectively within their role and organisation. (IV)
5. Formulate and implement adequate policy on medication safety within their organisation.
   - – Name the key steps in the provision of medicines. (V)
   - – Use a range of prospective and retrospective risk analysis tools. (V)
   - – Use risk analysis as a basis for the development of measures that result in both prospective and retrospective risk reduction. (V)
6. Apply the principles of quality assurance (monitoring, quality enhancement and assurance) in pharmaceutical practice.
   - – Use the PDCA (plan-do-check-act) cycle. (III)
   - – Identify key steps in processes and systems and develop protocols based on these steps. (III)
   - – Systematically define objectives, priorities and actions to achieve specified aims. (III)
   - – Perform a risk analysis to enhance medication safety. (IV)

7. Professionalism

Pharmacists are able to:

1. Show commitment, integrity and sincerity in providing highly specialist pharmaceutical care.
   - Take into account possible ethnic and cultural backgrounds and social factors that are relevant to a particular community, which may influence the delivery of care to individuals in that community.[38] (V)
   - Adopt an open-minded approach to, and deal properly and professionally with, complaints regarding product care, patient care, and the way patients are treated within the organisation. (V)

2. Demonstrate professional conduct when serving as pharmacists and educators and also when carrying out scientific research.
   - Promote the core values of the profession, namely: commitment to the welfare of the patient, pharmaceutical expertise, social responsibility, reliability and meticulousness, and professional autonomy. (III)
   - Clearly act in accordance with the core values of the profession. (III)
   - Deal objectively with information provided by stakeholders. (V)[39]
   - Recognise, and take action to address, unprofessional pharmacy practice. (III)
   - Show understanding of the importance of maintaining relationships based on transparency and integrity with other parties involved in the delivery of healthcare and the pharmaceutical world in general, and the importance of always putting the interests of individual patients and groups of patients first in these relationships. (III)

3. Practice pharmacy in an ethical manner and respect the obligations associated with membership of the profession in terms of professional expertise, legal requirements, professionalism and moral duties.
   - Assume responsibility for their decisions and advice regarding product care, patient care and medication policy, account for their actions, and accept the need for assessment. (V)
   - Identify, and reflect on, ethical and moral dilemmas in light of the core values of the profession. (V)
   - Take into account the dependent position of the patient. (V)
   - Acknowledge, and encourage discussion of, the patient's and/or their own feelings of dissatisfaction with the pharmacist-patient relationship. (V)
   - Apply knowledge of the legal aspects of pharmacy in practice. (V)

- Recognise and acknowledge errors in the areas of product and patient care and report them to the competent authorities. (III)
- Show understanding of, and identify ways of protecting and promoting, the interests of the profession. (III)

4. Reflect on their actions as pharmacy professionals.
   - Show understanding of the element of uncertainty associated with the practice of pharmacy, especially in the area of pharmacotherapy, and act accordingly. (III)
   - Reflect on their actions in difficult situations. (III)
   - Deal appropriately with mistakes made by themselves and others, such as pharmacy staff, admit their mistakes, or mistakes made within the organisation, to patients, prescribers and peers, and draw the appropriate lessons. (III)

7. The Bachelor of Pharmacy degree program in the Netherlands

7.1 Introduction

The introduction of the bachelor-master education system as the model to be applied to all academic degrees in Europe resulted in the development of two separate pharmacy degree programs: the Bachelor of Pharmacy and the Master of Pharmacy. This system offers students the opportunity to make a choice on completion of the bachelor degree program. In this option lies the potential added value of the bachelor-master education system.

Most students who complete a Bachelor of Pharmacy degree choose to complete a Master of Pharmacy degree at the same university. They also have the option of embarking on other master degree programs at the same university as part of their professional advancement.

However, students also have other choices, including transferring to another university to continue their study of pharmacy. The pharmacy school to which they wish to transfer may specify requirements for entry to the master degree program. The learning outcomes described in this chapter must provide adequate assurance that students have acquired sufficient proficiency. Due to differences in the curriculums of the bachelor degree programs at the different universities, the programs are not identical. However, in principle, these differences should level out during the master degree program.

A small percentage of students who complete the Bachelor of Pharmacy degree program decide to enter the labour market, or do a master degree in a subject other than pharmacy. At the moment, most of these students choose to embark on a two-year research-oriented master degree in pharmaceutical science. Conversely, students with a non-pharmaceutical bachelor degree, mostly in biomedical science, can apply for admission to the Master of Pharmacy degree program. Additional entry requirements apply to these bachelor degree graduates to ensure that they are properly prepared to embark on the Master of Pharmacy degree program. Therefore, the bachelor-level learning outcomes described in this chapter must also be regarded as entry requirements for the Master of Pharmacy degree program.

Most students pursue a Bachelor of Pharmacy degree with a view to progressing to a Master of Pharmacy degree. Given that this is the case, the profile and learning outcomes of the Bachelor of Pharmacy degree program should be regarded primarily as a description of the capabilities that must be achieved to ensure that pharmacy students are properly prepared for the Master of Pharmacy degree program. The Bachelor of Pharmacy degree program must have a clear pharmaceutical emphasis.

Only then can students and educators assess whether students are potentially capable of successfully completing the Master of Pharmacy degree program. For this reason, the profile of the Bachelor of Pharmacy degree program includes all of the areas of competence of the pharmacist identified in the competency framework.

Since pharmacy undergraduates are not capable of practicing as (foundation-level) pharmacists, it is not appropriate for the bachelor-level learning outcomes to be described as competencies. Instead, the learning outcomes of the bachelor program are described in terms of knowledge and understanding, skills and professional behaviour. Together these learning outcomes lay the foundation for development of the competencies defined for the Master of Pharmacy degree.

7.2   Profile of the Bachelor of Pharmacy degree program in the Netherlands

Students who successfully complete a Bachelor of Pharmacy degree:

- Have acquired verifiable academic-level knowledge, understanding, skills and professional behaviour in relation to the seven areas of competence defined for newly registered pharmacists in the 2016 Pharmacist Competency Framework (Pharmaceutical Expertise, Communication, Collaboration, Knowledge and Science, Health Advocacy and Social Responsibility, Leadership and Organisation and Professionalism), which also encompasses recent developments in scientific disciplines relevant to pharmacy.
- Are able to apply their knowledge, understanding and skills in a professional manner in training situations relevant to performance in healthcare and pharmaceutical sciences.
- Are able to gather and interpret relevant information in the area of pharmaceutical sciences with a view to forming an opinion that is partly based a consideration of relevant scientific and ethical aspects.
- Are able to convey information, ideas and solutions to an audience of lay people or medical experts.
- Possess the learning skills needed to embark on more advanced studies that presuppose a high level of autonomy.

7.3　Learning outcomes of the Bachelor of Pharmacy degree program in the Netherlands

1. Knowledge and understanding

Students who successfully complete a Bachelor of Pharmacy degree possess knowledge and understanding of:

1. The structural and physiological properties of cells and tissues and the links between the two.
2. The pathophysiological processes that underlie diseases and the relevant basic anatomy and physiology.
3. The binding sites of active pharmaceutical ingredients in the body, down to a molecular level.
4. The processes and factors that a play role in the route of administration and biological action of medicines and the pharmacon released in the body.
5. The chemical and physicochemical properties and analysis of low and high-molecular-weight active pharmaceutical ingredients and auxiliary pharmaceutical substances.
6. The compounding of medicines in appropriate pharmaceutical dosage forms and the associated quality criteria.
7. How the physicochemical properties of chemical compounds affect their potential use as medicine.
8. The (background to the) medicinal treatment of a number of common health conditions.
9. Desirable and undesirable effects of medicines in the biological system.
10. The main patient characteristics and product properties that may influence the effects of medicines and the diagnostic measurement methods used to assess them.
11. The links between genetic information and the associated phenotype and non-genetic factors that affect this phenotype.
12. The processes involved in the development of medicines.
13. The set-up, measurement methods and (statistical) data processing methods used in pharmaceutical research.
14. The pharmacy as an organisation and the pharmacist's role in healthcare.
15. Basic health psychology.

2. Skills

Students who successfully complete a Bachelor of Pharmacy degree:

1. Are able to apply qualitative, quantitative and statistical techniques in pharmaceutical research.
2. Are able to define a specific pharmaceutical research question, develop hypotheses and articulate explanations.
3. Know how to find relevant pharmaceutical and related medical information and perform qualitative and quantitative analysis.
4. Have demonstrated, in a graduation project, the ability to apply the knowledge, understanding and skills they have acquired to resolve pharmaceutical issues using the empirical cycle.
5. Possess knowledge and understanding of the context of pharmaceutical science, which encompasses philosophical, historical, ethical and/or social perspectives.
6. Are able to read, understand and critically assess pharmaceutical and biomedical professional literature, perform a review of the literature and critically assess relevant publications.
7. Are able to evaluate the quality of pharmaceutical and biomedical information they find.
8. Are aware of the principles of fundamental and applied scientific research.
9. Are able to form an opinion on pharmaceutical issues, based partly on a consideration of relevant societal, clinical, scientific and ethical aspects.
10. Are able to relate pharmaceutical issues to adjacent disciplines (such as medical, social and behavioural sciences, psychology, biology, chemistry and physics).
11. Are able to integrate their knowledge of the different subdomains of pharmacy in dealing with specific pharmaceutical issues.
12. Are able to communicate effectively and efficiently in Dutch and English, both verbally and in writing, tailoring their language to the target group.
13. Are able to adequately report, both verbally and in writing, on scientifically and socially relevant matters that pertain to pharmacy.
14. Are able to make an essential contribution to a scientific discussion.
15. Are able to a form, and defend, well-reasoned opinions.
16. Are able to perform, and work independently on scientifically and socially relevant issues that pertain to pharmacy, as part of a team.
17. Are able to apply basic communication skills when conversing with (actors posing as) patients.

3. Professional behaviour

Students who successfully complete a Bachelor of Pharmacy degree:

1. Are able to independently conduct a targeted search for knowledge to deepen their understanding of pharmaceutical issues that are new to them.
2. Are able to think and act at an academic level, and are willing and able to keep developing their professional expertise. They have developed sufficient academic intellectual and professional proficiency to be able to embark on a master program that follows on from the bachelor program.
3. Know how to keep up with, and apply their knowledge of, developments relevant to the profession.
4. Are able to adopt a multidisciplinary approach and identify connections between different disciplines.
5. Are able to reflect on their own development and academic career and make informed decisions regarding appropriate next steps.
6. Are able to reflect on their actions and give, receive and implement (peer) feedback.
7. Demonstrate professional behaviour in pharmacy practice, when acting as an educator, and when performing research relevant to professional practice.
8. Understand the social significance of pharmacy and the associated responsibilities of pharmaceutical and pharmacy professionals.
9. Are aware of the career opportunities open to pharmaceutical and pharmacy professionals.

Appendix 1. Glossary for the Pharmacist Competency Framework

Term	Definition
Area of competence	A coherent set of competencies and sub-competencies in a particular area, such as Communication or Collaboration.
CanMEDS	The abbreviation for 'Canadian Medical Education Directives for Specialists', developed by the Royal College of Physicians and Surgeons of Canada. Originally intended for specialist medical education programs, now used globally for all kinds of medical and paramedical professions. The CanMEDS competencies are used for the hospital and community pharmacy specialisation pathways in the Netherlands. The CanMEDS model consists of seven overlapping 'Roles' or areas of competence, the central Role being Medical Expert. In the model developed for pharmacy education in the Netherlands, the core competence is Pharmaceutical Expertise. The other six areas of competence are Communication, Collaboration, Knowledge and Science, Health Advocate, Leadership and Organisation, and Professionalism.
Competency	The ability to integrate and apply knowledge, understanding, skills and attitudes in professional situations.
Domain-specific frame of reference for Pharmacy in the Netherlands	The document that describes the current status of pharmacy in the Netherlands, recent and anticipated developments in pharmacy, the knowledge domain of pharmacy, the legal framework of pharmacy education in the Netherlands, and the international context.
Dublin Descriptors	Generic (non-subject-specific) statements of the expected level of achievement of students at European universities (of professional education). These statements, agreed in Dublin in 2004, are designed to ensure the equivalence of higher education qualifications in European countries. The Dublin Descriptors specify separate skill sets for bachelor and master qualifications.

Education continuum	The complete trajectory of education, specialisation and continuing professional development. For pharmacists, this continuum consists of three stages: 1) pharmacy education, 2) specialisation pathway, 3) pharmacy specialist committed to continuing professional development.
Learning outcome	Concise description of the minimum knowledge, skills and attitudes students must have acquired on completion of their studies. In this document: A concise description of the competencies pharmacists must possess on completion of the Master of Pharmacy degree program.
Medication Policy	The area of responsibility that encompasses activities undertaken by pharmacists to improve pharmacotherapy at population level.
Medication review	An evaluation of the effectiveness of pharmacotherapy recommendations for individual patients, performed by the physician, the pharmacist and the patient, based on a regular, systematic and critical evaluation of medical, pharmaceutical and usage information.
Patient Care	A patient-centred approach to the provision of pharmaceutical care, in which pharmacists assume responsibility for 1) the patient's medication-related needs, for which they are accountable once they have made this commitment, and 2) effective and safe medicine use by the patient with the aim of achieving positive outcomes for the patient.
Pharmaceutical care	The care involved throughout the medicine supply process, from design to dispensing.
Pharmaceutical policy	The area of public health policy specifically concerned with the development, provision and use of medicines in healthcare practice.

Pharmacist	A pharmacist awarded the title Master of Science (MSc) or the in Canada and the USA used title Doctor of Pharmacy (PharmD) on successful completion of the three-year Master of Pharmacy degree program.
Charter Professionalism of the Pharmacist (*Handvest van de apotheker*)	A document published by KNMP in 2015, which establishes the basis of professional and ethical practice in pharmacy in the Netherlands, describing the professional context of the pharmacist, the knowledge domain and core values of the pharmacist, and what constitutes professional pharmacy practice.
Pharmacist Competency Framework	A document that describes national learning outcomes of pharmacy education. The 2016 Pharmacist Competency Framework for the Netherlands includes a competency profile for newly qualified pharmacists, learning outcomes formulated as competencies, and specifies the level of competence that needs to be achieved in each case.
Product Care	The area of responsibility that encompasses the core competencies of compounding, storing, preserving and distributing medicines, as defined in the Dutch Individual Healthcare Professions Act (Wet op de Beroepen in de Individuele Gezondheidszorg (Wet BIG)), and also includes evaluating the quality, efficacy and safety of medicines.
Public Health	All organised measures (whether public or private) to prevent disease, promote health, and prolong life among the population as a whole. (WHO definition)
Real situation	A situation in an authentic professional setting. In real situations students act independently as pharmacy professionals, and also operate under the same time constraints.
Simulated professional situation	A typical professional situation recreated for training purposes, with actors posing as patients.

Appendix 2. References

- Blauwdruk master farmacie [Blueprint for the Master of Pharmacy degree program], Universiteit Utrecht, Faculteit Bètawetenschappen, School of Pharmacy, September 2015.
- CanMEDS Physician Competency Framework. Referred to at: http://www.royalcollege.ca/portal/page/portal/rc/canmeds/framework.
- Domain-specific frame of reference for Pharmacy in the Netherlands, adopted in 2015.
- Gier, J.J. de et al. (Ed.). *Farmaceutische patiëntenzorg. Achtergronden en praktijk.* [Patient Care. Background and Practice.] Houten 2013.
- *Handvest van de apotheker* [Charter Professionalism of the Pharmacist], KNMP, 14 May 2013.
- Raamplan Artsopleiding 2009 (The competency framework developed for medical education in the Netherlands.)

Appendix 3. Members of the 2016 Pharmacist Competency Framework Steering Committee and Project Group

The 2016 Pharmacist Competency Framework Steering Committee consisted of the following persons:
- Dr G.M.H. (Ferdi) Engels, Director of Education, Department of Pharmaceutical Science, Utrecht University
- P.H. (Piet Hein) van der Graaf, Professor of Bio-Pharmaceutical Sciences, Leiden University
- H.J. (Henk Jan) Guchelaar, Hospital Pharmacist and Professor of Clinical Pharmacy, Leiden University
- H.J. (Hidde) Haisma, Professor of Pharmaceutical Gene Modulation, University of Groningen
- Dr A.K. (Aukje) Mantel-Teeuwisse, Pharmacist and Director of the Utrecht University School of Pharmacy
- M. (Martina) Schmidt, Professor of Molecular Pharmacology and Director of Pharmacy Education, University of Groningen
- Dr F.J. (Frans) van de Vaart, Pharmacist and Consultant on Pharmaceutical Care Research and Innovation, KNMP
- M.P.D (Marnix) Westein, PharmD, Pharmacist and Policy Officer, KNMP (Secretary of the Steering Committee)
- B. (Bob) Wilffert, Pharmacist and Professor of Pharmacotherapy and Clinical Pharmacy, University of Groningen
- R.J. (Rob) de Wolf, PharmD, Community Pharmacist and board member of KNMP (Chairman of the Steering Committee).

The core team of the 2016 Pharmacist Competency Framework Project Group consisted of the following persons:
- M.L. (Marcel) Bouvy, Pharmacist and Professor of Pharmaceutical Care, Utrecht University
- H.W. (Erik) Frijlink, Professor of Pharmaceutical Technology and Biopharmacy, University of Groningen
- P.H. (Piet Hein) van der Graaf, Professor of Bio-Pharmaceutical Sciences, Leiden University
- H.J. (Hidde) Haisma, Professor of Pharmaceutical Gene Modulation, University of Groningen (Secretary and Chairman of the Project Group)
- J.G.W. (Jos) Kosterink, Hospital Pharmacist and Professor of Hospital Pharmacy, University of Groningen

- Dr W.M.C. (Mieke) Mulder, Physician, Clinical Pharmacologist and Director of the Master of Pharmacy Program at the Leiden University Medical Center
- Dr T. (Tom) Schalekamp, Pharmacist and former Director of the Utrecht University School of Pharmacy (Secretary)
- H. (Herman) Vromans, Pharmacist and Professor of Pharmaceutical Technology and Biopharmacy, Utrecht University
- M.P.D (Marnix) Westein, PharmD, Pharmacist and Policy Officer, KNMP, (Project Coordinator)

The following persons served as advisory members of the project group:
- Dr H. (Henk) Buurma, Pharmacist and Director of Community Pharmacy Education, KNMP
- H. (Henk) Spijker, PharmD, Hospital Pharmacist and Clinical Pharmacologist at Maasstad Hospital, and Director of Hospital Pharmacy Education, Dutch Association of Hospital Pharmacists (NVZA)
- A.G. (Arnold) Vulto, Hospital Pharmacist and Professor of Hospital Pharmacy and Practical Therapeutics, Erasmus University Medical Center
- Dr P.M.L.A. (Patricia) van den Bemt, Hospital Pharmacist and Clinical Pharmacologist, Erasmus University Medical Center
- R.F.J.M. (Roland) Laan, Physician, Professor of Rheumatology and Medical Education and Director of Medical Education, Radboud University Nijmegen Medical Centre, appointed by the Dutch Federation of University Medical Centres (NFU)
- M. (Mirena) Nouwen, PharmD, and Dr K.A. (Klaas) Riepma, PharmD, Industrial Pharmacists appointed by the Board of the Association of Dutch Industry Pharmacists (NIA)
- Denise van Vessem, BSc, (Utrecht University), Anne van Schip, BSc, (University of Groningen), Sanne Bakker (Leiden University), pharmacy students appointed by the Board of the Royal Dutch Pharmaceutical Student Association (KNPSV)
- A.D.M. (Annemieke) van der Kaaij, MSc, and M. (Mirna) Hessels, MSc, community pharmacist trainees appointed by the Board of the Young Pharmacists Association (VJA)
- C. (Corine) Bethlehem, MSc, and E. (Edmé) Meuwese, MSc, hospital pharmacist trainees appointed by the Board of the Association of Pharmacists Specialising in Hospital Pharmacy (VAZA)

Appendix 4. List of those who submitted comments during the open consultation period in March and April 2016

- R. (Remco) Boerman, MSc, on behalf of the V&VN Nursing Association
- F.T. (Tamara) de Bruin-Dragt, MSc, on behalf of the Dutch Federation of University Medical Centres (NFU)
- Dr A. (Adrianne) Faber, SIR Institute for Pharmacy Practice and Policy
- Professor J.J. (Han) de Gier on behalf of all tutors of vocational subjects, University of Groningen
- B.H. (Hayo) Graatsma, PharmD, on behalf of the Foundation for Medication Safety (Stichting Medicatieveiligheid)
- B.E.H. (Brigit) Homan, MSc, on behalf of Section BO3/KNMP
- N. (Nicolette) van Horssen, PharmD, on behalf of Pharos/KNMP
- C.J. (Yolande) Jansen on behalf of the Dutch Association of Hospital Pharmacists (NVZA)
- S.G.L. (Stephan) Joosten, PharmD, on behalf of the Young Pharmacists Association (VJA)
- T.C. (Tamara) Köhler, PharmD, Saxion Next
- Y.Y. (Yuen Yee) Li, PharmD, ZO&I/KNMP
- J.J. (Jeltje) Luinenburg, PharmD, and A.C.A.M. (Rian) Lelie, PharmD, GIC/KNMP
- Dr K.A. (Klaas) Riepma on behalf of the Association of Dutch Industry Pharmacists (NIA)
- S.L.N.M. (Sharon) Schouten-Tjin A Tsoi, PharmD, Netherlands Centre for Post Academic Education in Pharmacy (PAO Farmacie)

Notes

1   A three-year bachelor degree program and a three-year master degree program (= pharmacy education).

2   Leiden University was not offering pharmacy education when the pharmacy schools in the Netherlands were reviewed. The degree programs are due to commence in September 2016.

3   The CanMEDS model is described in Chapter 5.

4   The CanMEDS model was chosen partly because it is also used by hospital and community pharmacy specialisation pathways in the Netherlands.

5   See Chapter 8 of the Domain-specific frame of reference for pharmacy in the Netherlands 2016.

6   See the Chapters 4 and 5 of the Domain-specific frame of reference for pharmacy in the Netherlands 2016.

7   See Chapter 3 of the Domain-specific frame of reference for pharmacy in the Netherlands 2016.

8   See http://www.royalcollege.ca/portal/page/portal/rc/canmeds/framework.

9   This is discussed in more detail in the Domain-specific frame of reference for pharmacy in the Netherlands.

10   In this context a medication review is defined as an assessment of pharmacotherapy for individual patients based on a regular systematic and critical evaluation of medical, pharmaceutical and usage information (Source: Handboek farmaceutische patiëntenzorg [Patient Care Manual]).

11   In Dutch these medicines are referred to as UA-geneesmiddelen: UA stands for 'uitsluitend apotheek' (pharmacist-only).

12   Knowledge of pathology and medicines are described in more in detail as areas of knowledge involved in Patient Care.

13   In this Competency Framework the (student) pharmacist is referred to as 'he', though the authors are aware that, nowadays, the majority of pharmacy students are female.

14   Chapter 6 of this Competency Framework.

15   In this context, 'adequately' means in accordance with the relevant guidelines and/or latest evidence-based scientific knowledge. In certain situations the student may demonstrate a competency by adequately performing relevant related activities, including those conducted over an extended period, such as monitoring the results of a pharmaceutical treatment plan.

16   If possible, the ability to independently perform professional activities must be demonstrated in a real situation (ie. in a pharmacy). If this is not possible, a simulated professional setting (with realistic time constraints) is an acceptable alternative.

17   See the Domain-specific frame of reference for pharmacy in the Netherlands for further elaboration.

18   The Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker) dates back to 3 September 1997. Since then, the area of responsibility of Patient Care, in particular, has evolved considerably. Therefore, the learning outcomes formulated for this area of responsibility in this Competency Framework require more than the provision of information and advice mentioned in the Decree on Pharmacist Training Requirements (Besluit opleidingseisen apotheker).

19   Hospital and community pharmacy specialisation pathways in the Netherlands are also based on the CanMEDS model.

20 See http://www.royalcollege.ca/portal/page/portal/rc/canmeds.

21 The Charter Professionalism of the Pharmacist (Handvest van de apotheker, KNMP, May 2013) establishes the basis of professional and ethical practice in pharmacy in the Netherlands.

22 However, in this Competency Framework, the core competence is defined as 'Pharmaceutical Expertise' rather than 'Pharmaceutical Expert'. The reason for this is explained in Chapter 2.

23 The pharmacist's areas of responsibility and the corresponding areas of knowledge are described in detail in Chapter 3 of this Competency Framework.

24 The products being referred to here are pharmaceutical products. The development of active pharmaceutical ingredients does not fall within the pharmacist's area of expertise.

25 In Dutch, the preparation of medicines for administration is referred to by the abbreviation VTGM (Voor Toediening Gereed Maken).

26 'Clinical reasoning' is defined as relating (one's own, other health professionals' and the patient's) observations and interpretations to one's knowledge and understanding of pharmacotherapy.

27 A medication review is an assessment of pharmacotherapy by the physician, the pharmacist and the patient (or their representative) based on a systematic, critical evaluation of medical, pharmaceutical and usage information.

28 Needless to say, this sub-competency also falls within the area of competence of Knowledge and Science. Here it refers specifically to the identification and integration of scientific information that is relevant to the areas of responsibility of Product Care, Patient Care and Medication Policy that fall under the core competence of Pharmaceutical Expertise.

29 This sub-competency applies to communication within the core competence of Pharmaceutical Expertise. The sub-competencies that apply to communication with patients and their relatives or carers are described under the heading of Communication.

30 Reflection on one's actions as a pharmacy professional is also required as a matter of Professionalism. Several of the sub-competencies listed here are elaborated under the heading of Professionalism. The sub-competencies listed in this section are those involved in the self-reflective aspect of Pharmaceutical Expertise.

31 'Adequate information' includes things such as how (often) to administer the medicine, when to start and stop taking the medicine, the most common side effects, the time it takes for the medicine to take effect and the possible need to avoid alcohol consumption.

32 In this context 'health literacy' is defined as the patient's ability to obtain, understand, assess and use healthcare information to make appropriate health-related decisions. (This is the definition used by the National Public Health Compass (Nationaal Kompas Volksgezondheid), which is part of the Dutch National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu)).

33 This sub-competency also comes under the area of competence of Professionalism.

34 This sub-competency also comes under the area of competence of Communication. In that context it applies primarily to communication with patients and informal carers.

35 Interprofessional teams are teams of professionals from different disciplines.

36 Reflection on one's performance as a pharmacy professional is also required as a matter of Professionalism. Rather than being primarily concerned with professional performance, his sub-competency applies specifically to reflection on performance in relation to knowledge and science.

37 Controlling pharmacotherapy costs through assessing and improving efficiency, cost-efficiency in particular, falls under the area of responsibility of Medication Policy.

38 This sub-competency is also listed under the heading of Communication.

39 This sub-competency is also listed under the heading of Knowledge and Science.

rijksuniversiteit
groningen

Universiteit Utrecht

Universiteit
Leiden

KNMP

KNMP MEDICIJN MEDIA

2016

The **Domain-specific Frame of Reference for Pharmacy in the Netherlands** and the **2016 Pharmacist Competency Framework** were developed at the request of the pharmacy schools in the Netherlands, in consultation with the Royal Dutch Pharmacists Association (Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie (KNMP)).

The Domain-specific Frame of Reference for Pharmacy in the Netherlands describes the knowledge domain of pharmacy, and the purpose and legal framework of the Bachelor and Master of Pharmacy degree programs. The 2016 Pharmacist Competency Framework defines the national learning outcomes of university degrees in pharmacy as pharmacist competencies based on the CanMEDS model.

In publishing these documents the pharmacy schools in the Netherlands and KNMP are ensuring that pharmacy qualifications are aligned with pharmacy professions that carry the title of 'Pharmacist', and that pharmacists are suitably prepared to progress to specialisation in hospital or community pharmacy.

rijksuniversiteit groningen

Universiteit Utrecht

Universiteit Leiden

KNMP