

Master Programme in Clinical Pharmacy – self-evaluation 2017

Introduction

Since 2006, the Department of Pharmaceutical Biosciences at Uppsala University has run a Master's degree programme in clinical pharmacy, the first and only programme of its kind in Sweden. Clinical pharmacy is expanding in Sweden and being able to provide the relevant education is an essential part of the development and establishment of the profession. Our intention is that this Master's programme should provide future clinical pharmacists with the knowledge and skills required to contribute to the daily work of promoting a rational and appropriate use of medicines at the individual patient level, as well as preparing them for the task of further developing the profession.

In Sweden today, clinical pharmacists work in secondary care settings with medication management issues, medication reconciliation and drug reviews for individual patients. In primary care settings, pharmacists mainly work with in-depth drug reviews focusing on the elderly population. There are also growing numbers of specialised clinical pharmacists, e.g. within pediatrics and psychiatry.

The programme consists of a total of 60 credits (one year full-time, or two years part-time) divided into four courses, given in parallel:

- Evidence-Based Clinical Pharmaceutical Methods, 12 credits
- Applied Pharmacotherapy, Pharmacokinetics and Therapeutics, 15 credits
- Clinical Attachment and Service Development, 18 credits
- Research Project in Clinical Pharmacy, 15 credits

The teaching consists of teacher-led sessions on campus in Uppsala (3x3 weeks), supervised clinical internships (26 days general placement, 10 days specialisation), self-study including assignments, and a 10-week research project (thesis work). The capacity of the programme is currently 20 enrolled students per year (10 full-time and 10 part-time). There is a wish to increase the number of students but currently the number of places and supervisors for the internship is a limiting factor. At present the programme has 19 active students, with internships located all over the country, involving 17 different hospitals.

The programme was originally created based on influences from and collaborations with the University of Strathclyde, Glasgow. In more recent years, influences have also been drawn from the University of California, San Francisco (UCSF). New staff have brought new expertise, which is reflected in the current content and the educational approaches used. Further, the economic situation has changed over the years, affecting the lay-out of the programme.

The Master Programme in Clinical Pharmacy was evaluated in 2012 by the Swedish National Agency for Higher Education. In that evaluation, the fulfilment of programme objectives was assessed mainly on the basis of research project (thesis) reports. The results of that evaluation are used as a starting point for the current evaluation. The current evaluation will follow the structure of the Guidelines for Uppsala University's Model for Educational Evaluations (see appendix G). The evaluation will be performed both by internal assessors from Uppsala University and, in a benchmarking process, by external assessors from the University of Strathclyde. The internal assessors will give extra attention to examinations and examination criteria, since they are only available in Swedish.

This self-evaluation will serve as an introduction to the programme and the different aspects that are to be assessed (11 aspects, outlined in appendix G). The information provided here will be complemented by interviews with students and teachers, and other documents as needed.

1. Achievement of objectives set out in the Higher Education Act and Higher Education Ordinance and programme-specific objectives

The Master Programme in Clinical Pharmacy has a clear intention to actively work on linking programme objectives to course objectives and examinations. The achievement of objectives is ensured using objective-based criteria for examination. Over the years, an ongoing improvement process has pursued a clear aim to make sure that all goals are examined and that all exams have criteria based on the course objectives.

Linking programme objectives to exams and mandatory sessions

Appendix A consists of a matrix illustrating how the objectives of the Master Programme in Clinical Pharmacy correspond to the general qualification (GQ) objectives of the Higher Education Act and Higher Education Ordinance and how the programme objectives correspond to course objectives and examinations. Corresponding course-specific objectives serve as examples of how the programme objectives are covered in specific courses. The last column describes how these course objectives are examined. Most of the examinations have criteria to ensure that the goals are met (see sub-section 4 below).

The latest evaluation of the programme in 2012 centred on the achievement of objectives. In this process, the Master Programme in Clinical Pharmacy received the grade “high quality” for general qualification objectives 1–4. Since the evaluation in 2012 was based solely on the written thesis and not on any other exams, we suggest that this assessment is still valid and that the grade would be strengthened further by including more courses and exams. Therefore, general qualification objectives 1-4 are only summarised in appendix A. For general qualification objectives 5–9, brief additional reflections follow below.

GQ objective 5: corresponds to “demonstrate the ability in speech and writing to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences”

Several written exams, listed in the matrix, ensure that students are able to express themselves clearly and to discuss different options and justify their decisions. Terms such as compare, discuss, motivate, argue are used in the criteria for these written exams. There are also oral exams where this ability is examined. In the oral presentation of the specialisation, the criteria ensure that the presentation includes comparisons between treatment options and discussion of the risks and benefits of different treatments. Course objectives and criteria also include a component to ensure sufficient language skills. The oral presentation of the thesis work is followed by a public discussion and examination of results, giving a good opportunity to assess the ability to deal with critical review and answer questions in direct dialogue. Further, the oral exam on clinical communication (OSCE) includes reasons and arguments from the student in direct dialogue with the pretended physician. The audiences are mainly colleagues within the medical field, such as fellow pharmacists, researchers and physicians, but also decision-makers, for example in the case of the service development assignment. There is also communication training for interactions with patients, something that is also included in the local programme-specific objective “demonstrate the ability to efficiently communicate with patients and colleagues in a healthcare team”.

Our assessment is that we achieve and examine this objective well for professional target groups and for patients. The focus in communication with patients is less concerned with arguments and has more of an information-seeking and informative approach, and can perhaps best be described by the local programme-specific objective concerning communication. The programme does not include communication with the general public as an audience (for example public health campaigns).

GQ objective 6: corresponds to “demonstrate the skills required for participation in research and development work in the field of clinical pharmacy and consultative work with pharmaceutical care in a healthcare team”

The first part of this objective regarding research and development is examined by the thesis in the form of a written project report and the service development assignment. The skills needed for participation in research are defined in course objectives and examined in the written project report. The examination criteria include an assessment from the supervisor focusing on the process and on the independence of the student during the process. The second part of the objective, concerning consultative pharmaceutical care, is examined in various ways. There is a mandatory clinical attachment period during which the student practises clinical pharmacy in a hospital setting. Various tools are used to ensure the quality of the clinical rotation. One is a checklist of different tasks that should be performed, to ensure that the student gets a minimum level of training in the required fields. Further, an assessment tool is used by the student and the supervisor both at the halfway point and at the end of the clinical attachment period. This facilitates the progression of skills during the internship so that all objectives can be reached. At the end of the attachment, the supervisor makes an assessment recommendation estimating the skills level of the student. In cases where the supervisor signals that skills are below the required level, special exams can be arranged by the examiners at the university. The objective structured clinical examination (OSCE) is the final examination of skills in consultative work.

Our assessment is that we achieve this objective well for research skills and as well as possible for consultative work. It is always a challenge to examine skills that are practised outside the University and the reach of examiners. Clinical observation by the examiner in a real hospital setting would be a way to examine this, but is not feasible with current resources. In order not to put the supervisor in a dual role as an examiner as well, we use OSCE as a final way to measure skills in consultative work.

GQ objective 7: corresponds to “demonstrate the ability to make assessments in the field of clinical pharmacy informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work”

The relevant disciplinary and social aspects of the field of clinical pharmacy include laws and regulations that govern the work of pharmacists and other healthcare personnel. The students are already certified pharmacists and already know the regulations concerning prescribing and dispensing practice. In this programme we focus on healthcare-related laws and regulations in a mandatory lecture, including discussion of the responsibility of the pharmacist, both legally and under the principles of pharmaceutical care. Further, the students participate in a mandatory lecture on ethical principles in healthcare. This is later followed up by a student-driven seminar based on their own ethical dilemmas from clinical practice. In this seminar, they have to use ethical principles to discuss the dilemma. The ethical aspects of research and development are examined in the project report, which requires ethical reflection. This is also discussed for each student during the mandatory sessions on project plan development.

Our assessment is that we achieve this objective from the angle of both clinical practice and research and development. Over the course of time, ethical aspects have been strengthened and highlighted in the programme. As a result of this overview, the student-driven seminar on ethical dilemmas will be strengthened further by the addition of a short written assignment in preparation for the oral presentation, so as to ensure individual performance.

GQ objective 8: corresponds to “demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used”

Insight into the possibilities and limitations of research is examined in the programme, especially by the discussion in the project report. The limitations of research also become obvious in the clinical setting. Studies of a certain population, which provide the evidence base, may not be applicable to your individual patient. Individualisation of therapy is at the core of clinical pharmacy. This is examined in patient reviews, written exams and pharmacokinetic assignments. The role of research in society is covered and discussed at mandatory sessions on laws, regulations, responsibility and ethics. All healthcare personnel are required by law to work in accordance with evidence or proven experience. This is also a clear individual responsibility for the healthcare professional.

Our assessment is that the possibilities and limitations of research are well covered in the programme and examined at individual level. The second part of this objective is examined by mandatory lectures and group discussions, including a case discussion on individual responsibility as a clinical pharmacist and students own ethical dilemmas. Further, a general appreciation of responsibility and professionalism is mainstreamed throughout the programme.

GQ objective 9: corresponds to “demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning”

This objective was evaluated in 2012 by the Swedish National Agency for Higher Education and received the grade “insufficient quality” as it was not reflected in the evaluated project reports. The project reports are written in an article format and scientific articles generally do not include aspects such as the author’s personal need for knowledge. However, other parts of the programme do cover this objective. Reflective practice is taught and used in the programme. Mandatory written reflections from clinical practice and after the half-time evaluation with the clinical supervisor are used to ensure coverage of the objective regarding personal needs for further knowledge. Further, the project report contains a discussion of the need for further research in the field.

Our assessment is that the use of reflection and reflective practice is one of the best ways to capture this kind of ability and that we use reflection well to achieve the objective. Each student produces written reflections. These are then presented and discussed in the group in a mandatory session. Reflective practice is a useful tool for future ongoing learning as a professional.

Additional objectives: “demonstrate the ability to efficiently communicate with patients and colleagues in a healthcare team” and “demonstrate the ability to an empathic, professional and scientific approach”

As this is a healthcare-related programme, these two objectives have been added to emphasise the importance of communication and an empathic and professional approach in a healthcare setting. Communication is examined in an oral examination, OSCE, which includes communication with both a pretend patient and a pretend physician. The exam also covers the aspects of showing empathy and professionalism. The mandatory clinical attachment also provides an important basis for evaluating these abilities and the supervisor makes an assessment recommendation based on the student’s interaction with patients and healthcare staff. Further, the written reflections also capture professionalism. The scientific approach is examined in the project report.

Our assessment is that we achieve the communication objective and can examine this in a structured and objective way through OSCE. The aspects of empathy and professionalism are difficult to examine

and all healthcare education programmes struggle with this. Our way of trying to capture these abilities is described above, but there is room for improvement. This is an area where we would appreciate discussions and exchange of experience with other healthcare-related programmes.

Student and alumni opinions and goal achievement

As part of this programme evaluation, an alumni survey was conducted that included students enrolled between the years 2010 and 2015. The results are summarised in appendix B. One question asked the alumni to rate the opportunity the programme gave to develop certain types of knowledge and skills related to the objectives of the Higher Education Act and Higher Education Ordinance. More details can be found in the appendix, but the results show that all skills except one receive an average score of 4 or more, on a scale from 1 (to a very low degree) to 5 (to a very high degree). One skill scored 3.7, namely “Explain subject-specific questions to persons without specialist knowledge”. This might be related to the fact that the programme does not include communication with the general public, as mentioned above. Overall, the survey shows that alumni think that the programme provides the skills required in the objectives, which supports our own assessment.

An analysis of student retention and throughput for the time period 2010–2015 (see appendix C) shows no indication that the throughput has increased or decreased during this period. In total, it ranges between 76% and 80% for the four individual courses included in the programme. Overall, the lowest pass rate is observed for the project course, which reflects the fact that some students have dropped out of the programme before starting this course, rather than being a sign that the course is particularly difficult to pass. The alumni survey supports this, since as many as 73% of the respondents got a job before completing their studies.

Reflections and lessons for the future

Overall, we feel that our current method of linking programme objectives to course objectives and examinations gives us good control over the programme contents and achievement of objectives. In the early years of the Master’s programme’s history, it was very examination-heavy. This was possible because the programme had greater economic resources and fewer students. As the number of students has increased and resources have decreased, continuous adaptation to a sustainable level of teaching and examination has been a necessity for the survival of the programme. For example, oral exams in pharmacotherapy have been replaced with discussion seminars since the objectives were also examined in a written exam. Another example is that the number of patient cases used as examination has been reduced from three to one. Two of the patient cases are now for learning purposes and progression. Even though exams have been removed, in our opinion the fulfilment of objectives has not been compromised. Instead, a degree of over-examination has been reduced. In support of this opinion, we can see that the throughput has remained constant over the past 5 years at least. However, we find room for improvement. This current overview of objectives has highlighted some remaining areas for discussion on over-examination and this is an important task for the coming period of continued development and optimisation of the programme.

2. Link to research – science and proven experience as a basis for content and form of teaching

The link to research is integrated throughout the programme. The clinical methods taught are based on research and proven experience and the therapeutic contents are based on evidence-based medicine, including both reviews of current evidence and original articles. The teaching related to pharmacokinetics is directly linked to teachers involved in the programme who conduct their own active research (for a summary of competence and capacity, see appendix D), with EN as the key teacher with own research. Further, other researchers active in different areas of clinical pharmacy are invited as guest lecturers. At the annual project presentations, the aim is to also invite an active

clinical researcher to present their work. When possible, researchers who are former students of the programme are invited to provide extra inspiration and serve as research role models. The research field of clinical pharmacy is evolving in Sweden and the aim is to give a good reflection of ongoing research. The teachers in the programme know the national research community in clinical pharmacy and stay continuously updated on current research.

Students are encouraged to use the library resources at the University and are trained and assessed in information seeking. The reading list is flexible for the evolving field of EBM and treatment recommendations and includes, for example, “current evidence reviews and recommendations” to ensure that the latest research results are used. The requirement for literature and articles is specified for certain assignments to ensure that each student finds and reads relevant in-depth research literature and original articles.

The students have ample opportunity to develop their scientific approach during the programme. The course Evidence-Based Clinical Pharmaceutical Methods lays the foundation for this. During this course they learn about different methods used in scientific work, analyses of different study types and the scientific basis for clinical methods that are later used and examined during the course Clinical Attachment and Service Development. The course Applied Pharmacotherapy, Pharmacokinetics and Therapeutics is largely based on current research at the department on pharmacokinetics and individualisation. Further, the therapeutics section is based on current evidence and emphasis is put on explanatory statements and resulting treatment suggestions. The students learn about a scientific approach during these courses and finally get to practise it themselves in the final course, Research Project in Clinical Pharmacy, so that progression within the programme is ensured in this respect.

During the clinical placement and project work, some students obtain an insight into current research as their supervisors work with research and development. This is, however, something that differs between hospitals over the country. Supervisors attend project plan discussions in Uppsala and after the session in 2017, their reflection was that projects from academic hospitals or hospitals with a tradition of conducting research were generally more advanced and research-oriented. Since students actively take part in each other's project planning, all students benefit from the research experience that some hospitals possess. Further, the teacher provides individual feedback on each project idea and subsequent project plan to ensure that the project plan is of sufficient scientific quality.

The alumni survey shows that former students think they were given good opportunity to critically appraise information, read and understand scientific texts and apply scientific methods. This can be interpreted as evidence of a good link to research in the programme. A student survey exploring current students' opinions was conducted in connection with the evaluation of the programme (see extract of results in appendix E, Swedish only). This survey shows that 92% of the respondents think the programme has given them a high or very high degree of insight into the research field of clinical pharmacy. The survey also shows similar results to the alumni survey regarding the opportunity to develop research skills such as critically appraise information, read and understand scientific texts and apply scientific methods.

Reflections and lessons for the future

One of the main strengths of this programme is that the teachers know the clinical pharmacy community in Sweden well. As a result, the content of the programme regarding current research is up to date and good examples can be selected to illustrate the clinical research reality. One challenge is finding good quality student projects and supervisors that can guide the students in the research process. Most supervisors are not researchers and many declare a lack of research competence; one example that is often raised by supervisors themselves is competence in statistical methods. This is a

reflection of the realities of clinical pharmacy today, where the work environment in many places is not research-oriented. One of the added benefits of our Master's programme, besides training future clinical pharmacists, is to encourage and inspire our supervisors, and ultimately clinical workplaces, to get more involved in research and development.

3. Student-centred learning

Tools for lifelong learning

One important focus of the Master Programme in Clinical Pharmacy is to produce independent future pharmacists who are able to find ways to keep developing after their studies and who are able to see their own need for future development. In order to achieve this, we use teaching tools that can later also be used in a work environment.

We use peer learning and feedback as an educational approach. This is considered to be a good way to develop the ability for lifelong learning¹. Peer learning is used in a formal or structured way through specific assignments, such as peer review of a patient case and peer feedback on project ideas and project plans. Students are also encouraged to meet during clinical rotations and provide feedback on patient interviews, for example. This is, however, down to students' own initiatives and not a requirement. Programme evaluations over the years show that the students that also use student-driven peer learning find it very useful. A key prerequisite for success is, however, that the matching of peer students is successful. We also teach supervisors this method and encourage them to use peer feedback in their workplaces.

Reflection and reflective practice as an educational approach has been studied in pharmacy students in Uppsala² and can be used to bring tacit knowledge to the surface and function as a theoretical model for practitioners' workplace learning. In this programme we use reflection as a way for students to critically assess their own behaviour in different work-related situations and draw lessons from this. We train supervisors in reflective practice as well and one of their main tasks is to encourage and facilitate reflection throughout the clinical placement. The students keep a reflective diary and hand in a written example that is later shared and discussed with the whole group. They also reflect on their own development and future learning needs in a half-time assessment with their supervisor during the clinical placement period.

The students need to take personal responsibility for planning their studies. The lay-out of the programme is flexible as long as pre-set deadlines are met and the student participates in scheduled teaching sessions in Uppsala. This means that the student has the responsibility to make a detailed plan for the internship together with the clinical supervisor, set their own deadlines for assignments and plan ahead for upcoming exams.

During the first week of the programme, the students have a teaching session on the educational tools peer learning, reflection and constructive feedback. They are also informed at an early stage, already at admission interviews, that planning and time management is essentially their own responsibility. Some students find this a challenge, but the alumni survey shows that the alumni think the programme gave them a good opportunity to independently solve problems. The free text answers on the strengths of the programme show that some highlight the increased ability to work independently after the programme.

¹ Martin C (2010). Peer learning – att lära i samspel med jämbördiga. I *Att undervisa med vetenskaplig förankring – i praktiken*. Rapport nr 8. Red Johansson BI. Uppsala: Universitetsstryckeriet, Ekonomikum.

² Wallman A (2010). *Pharmacy internship. Students' learning in a professional practice setting*. Diss Uppsala universitet. Uppsala: Acta Universitatis Upsaliensis. Available from: <http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-112771> [2017-06-16]

Variation in modes of teaching and examination

The student group in the programme is generally highly motivated and heterogeneous when it comes to previous work experience. Some have just finished their Master of Pharmacy degree, others have worked for many years in various pharmacy-related sectors. The range of experiences, both at the beginning of the programme and gained at different hospitals during the programme, is a valuable resource that we use actively in different course components. Examples range from sessions on current clinical practice throughout the country and internationally to differences between hospitals in the use of TDM and estimation of renal function. Students are used actively in teaching, as they, for example, present and discuss EBM cases with each other and create student-driven lectures. Good examples of patient cases and interactions etc. are used to shape future sessions and assignments, and provide inspiration for exam questions.

The programme also tries to meet different learning styles through the use of different teaching modes (such as workshops with group preparation, seminars with individual preparation, lectures, student-driven lectures, student feedback, teacher feedback and role play) and examination forms (see overview under section 4 below). The teaching session introducing educational tools mentioned above also includes a discussion of learning styles and all students do a PILS learning test to visualise each individual's learning preferences. The supervisors do the same test during their training and they are encouraged to discuss this during their first meeting to see if it might affect their interaction.

Quantity of teacher-led sessions

Although the modes of teaching during the sessions in Uppsala vary (as seen above), much of the learning is done through self-study so all students in the programme must be able to plan their studies individually. Some students express a wish for more teacher-driven sessions in the annual programme evaluations, especially in the course Applied Pharmacotherapy, Pharmacokinetics and Therapeutics. The student survey based on current students' opinions is not as clear: about half of the respondents want more lectures and half are satisfied or want fewer. A majority of 69% think that the amount of teacher-led seminars/discussions is at a satisfying level. Since this is an issue that has been discussed over the years, a comparison of the number of teaching hours for the different courses was made (see appendix F). In this analysis we see that the number of teaching hours has remained fairly constant for three of the courses, but teacher-led sessions in pharmacotherapy have decreased, from 64 hours in 2012 to 43 hours in 2016. The change is due to multiple factors. One factor has been a strong need to revise and streamline the programme for economic reasons. Further, when evaluating the programme in 2012 and before, students stated that some lectures were the same or similar to those given in specific courses needed for admission to the programme.

Feedback on performance

Individual feedback is one of the central components of the Master's programme. It includes teacher feedback, for example on OSCE performance, the first written patient case, and project ideas and plans. During the clinical placement one key task for the supervisor is to give individual feedback on performance. This is formalised on two occasions, the half-time assessment and the final assessment. In between these, the supervisors give feedback in daily clinical practice. Further, the students themselves give each other feedback in the peer learning process discussed above. Both supervisors and students are given training in giving and receiving constructive feedback. In the student survey, 92% of the respondents say that they have received a high or very high degree of feedback on their performance.

Reflections and lessons for the future

This programme demands a lot from the students when it comes to independent work and planning the study period. This is perceived as a challenge by some, but we as teachers see how individual students progress over the year as they grow and become more secure and independent. In the student survey, 77% say that the level of own responsibility is satisfactory, while 23% say it is somewhat too high. We believe that this is an important part of the learning process and want to keep this aspect of the programme. The intention to use teaching methods that activate students is

recognised by the students, as shown by the student survey in which 92% of students say they are given tasks that contribute to each other's learning to a very high degree. We believe this to be a key component for lifelong learning and learning at the future workplace.

Overall, we think that we have a well-thought-through approach to varying teaching and examination modes to meet the different learning styles of our students. However, we acknowledge the students' opinion that more teacher-led sessions in pharmacotherapy would be desirable. To help the students, the lectures are now provided as recorded material and this is something we will emphasise more in the future. The students also express the added benefit of meeting a lecturer and expert within a field to be able to interact and discuss. We therefore plan to re-introduce some lectures in pharmacotherapy in specific topics that are not covered in previous courses, e.g. related to psychiatry and neurology.

4. Methods for testing achievement of objectives – appropriateness, legal certainty and progression

The use of objective-based criteria in examinations

As explained in section 1, objective-based criteria for examination is the method used to ensure achievement of objectives. Appendix A includes an overview of exams and the respective criteria can be found in the student handbook "Programbeskrivning" (provided only in Swedish). All major written assignments and oral exams are examined using criteria, the latest addition being the criteria-based written exam that was used in March 2017 after a testing and improvement period of more than one year. All criteria are handed out to the students at the beginning of the academic year and explained and exemplified throughout the programme.

Students' opinions about the criteria and the ways in which they use them have been evaluated each year since 2010. Over the years, these evaluations have shown that the students consider the criteria valuable and that they use them, to varying extents, in their learning. The student survey shows that among the current students, 84% of the respondents consider that they have a high or very high degree of understanding of what is expected of them. The survey also shows that the students think the examinations require deeper understanding and analysis, with 91% of the respondents finding this to a high or very high degree. As more and more undergraduate courses also use criteria, the students have become more used to them. The strength of using criteria is that it is easier for the student to know beforehand what is required. Also, the assessment and grading of an exam becomes more transparent. However, one aspect that is perceived as a weakness by students is that they feel that criteria take away the freedom to individually interpret and shape an assignment, for example. Some regard the criteria as too detailed. The alumni survey captured some of this in the free text answers as well (see appendix B). To some extent, criteria need to be detailed in their requirements since they are meant to ensure that certain objectives are fulfilled. One example might be that a comparison between different options is required instead of just a compilation of options. The challenge is to make sure that the right details are included when constructing criteria, allowing for individual expression and interpretation as well.

Modes of examination and progression

To ensure that we examine different skills in appropriate ways, we use a variety of examination modes. The majority of examinations are in a written format, such as written assignments (of varying lengths and format), a written exam and a written take-home exam. To capture oral presentation and communication skills, we have three different types of oral exams: oral presentation (one in Swedish, one in English), oral opposition, and Objective Structured Clinical Examination (OSCE).

This one-year programme is at advanced, second-cycle level so there is no progression between levels, but there is progression between learning assignments and examinations as well as between

different examinations. One example is communication and methods for clinical practice. The students first receive methodological training during seminars and workshops. They then do a training OSCE where they get individual feedback on their strengths and weaknesses in communication and methods. This “starting point” is then used as a basis for planning supervision during the clinical internship. After the internship (with constructive feedback from the supervisor), communication skills and methods are examined in a second OSCE.

Another example is that of oral presentation and constructive feedback. First, the students learn about giving and receiving feedback during a seminar. Then they are paired off into peer groups with the task of providing constructive feedback on each other’s patient reviews. The first presentation they have is for training purposes and one student peer provides feedback based on the criteria for oral presentation. The second presentation is an examination and is held in Swedish. The third presentation is for the project work and is held in English. One student peer opposes and the two discuss the results in front of an audience. Both the presentation and opposition are assessed and examined using criteria. This is a very clear example of how assignments and exams are used to achieve progression of skills.

Legal certainty

Two examiners are assigned for each course (one main examiner and one back-up) and for legal certainty, the main examiner discusses borderline cases with the back-up examiner when necessary. The examiners discuss the criteria, which are adjusted on a yearly basis where a need for clarification is identified. The written take-home exam in pharmacokinetics is marked by two teachers and this was also true of the written exam in pharmacotherapy until recently, since when only one teacher has marked the exam.

The written assignments are run through URKUND Plagiarism Detector. The written exam is coded and the examiner does not know the identity of the student. This procedure is appreciated by the examiners and increases legal certainty for the students. The other exams are not anonymous. All students have the right to apply for a reassessment of examination results and also to demand another examiner, in accordance with existing guidelines within the Faculty of Pharmacy.

Reflections and lessons for the future

We believe that we have a well-thought-through strategy for progression within the programme and that our mix of examination methods is relevant for the knowledge and skills we assess. We also think that the use of criteria in assessment helps teachers and students by making examinations transparent and evolving. The fact that only one examiner is responsible for individual exams is an aspect that we have identified that needs more attention. Few teachers are involved as examiners and resources do not allow the involvement of more teachers. However, the existing teachers could work more on calibration of requirement levels, for example by assessing samples of written assignments and exam questions and comparing the results between teachers. Another area for improvement, which is already planned, is to create and use criteria in the take-home exam in pharmacokinetics as well.

5. Staff subject expertise, teaching skills and capacity

Teacher capacity and expertise

A summary of the competencies of the teachers in the programme is provided in appendix D. The two main responsible teachers have different competency profiles and complement each other. EN has a strong scientific and research base with active ongoing research relevant to the field of clinical pharmacy. MS has worked as a practising clinical pharmacist for a number of years and knows the clinical setting well. These competency profiles, together with their combined links within the national field of clinical pharmacy, form the essential basis of the teacher capacity in the programme.

In addition to the teachers responsible for the programme, other teachers (researchers, clinicians, PhD students and others) are used as experts in different parts of the programme. These are brought into the teaching sessions by individual consultation.

There is a profound interest in educational theory in the department, particularly in the teacher group working with pharmacotherapy and pharmacokinetics. Three of the teachers in that group have been appointed excellent teachers, MS being one of them. As a group and individually, they frequently present educational ideas and experiences at education conferences. The Master Programme in Clinical Pharmacy exists in a creative educational environment, which indicates continued development and focus on quality even if the current teachers should be replaced.

Administration support

The programme has administrative support at department level. This differs organisationally from other Master's programmes at the faculty, which more generally have administrative support at faculty level. The advantage of keeping administration at department level is that it is closer to the actual teaching and course administration. The disadvantage is that the administrator does not have formal authorisation to perform all tasks at programme level, which creates unnecessary duplication of administration and slower processes. Another strategic disadvantage is that the programme is not as visible at faculty level as it could have been.

Reflections and lessons for the future

The Master Programme in Clinical Pharmacy exists in a teaching environment that is creative and educationally competent. Looking specifically at capacity within the programme, the current competence of the teachers is well matched and fit for the purpose. However, one of the weaknesses of the programme is that only two teachers are involved to any great extent. This makes the programme vulnerable. The current staffing with a total of 100% placement for the two main teachers combined also limits the capacity regarding the number of students in the programme. To ensure continued capacity for the future, it would be desirable to raise the research competence level within the group and also to link currently active clinical pharmacists to the programme as teachers. Looking at the programme administration, it might be beneficial and strategic for the programme to be more linked to the central administration, thereby becoming more visible in the faculty.

6. Internationalisation, international perspectives and sustainability perspective

International perspective

The international perspective is captured through an introductory overview of clinical pharmacy nationally and internationally. Since this is a discipline that is fairly new in Sweden, nearly all national clinical activity derives from international models. During the programme, international examples of clinical practice are used, for example as illustrations and points of comparison in the service development assignment. Some of our students have experience from international clinical settings, mainly through previous studies and project work. Their perspectives provide useful input in discussions about clinical practice. Some were born in other countries and cultures and provide valuable insights into cultural perspectives on healthcare and how to overcome language barriers. These experiences are lifted in an organised way during a seminar about clinical pharmacy in Sweden and abroad, but they also add to discussions throughout the programme.

The teachers have experience from international settings, either through research or visits to clinical settings. MS spent one year at UCSF on a professional visit, observing clinical practice, observing teaching and working as a research volunteer. This experience is reflected in the teaching of supervisors and students. Further, both teachers are involved in the Nordic network for clinical pharmacy and they attend pharmacy-related meetings such as ESCP, NSPC/NNGCP and FIP at regular

intervals. The experience gained from meetings and contacts is actively used to shape the programme.

The programme had internship placements in Norway for a couple of years. This gave one student each year the opportunity to see a clinical setting abroad and provide insights from this experience to the other students. However, this collaboration has ended and one weakness of the programme from an internationalisation perspective is that the students are not actively encouraged to go abroad for sections of the programme. This is complicated, since the courses are read in parallel, but the specialisation period and project work could in theory be done abroad. As is the case today, it would be up to the student to plan any such arrangements. Another factor is that many of the supervisors want students to stay and do the project work at their setting, as they see the benefit of this.

Looking at the student survey, the respondents' opinions differ on the question of the extent to which the programme has contained international perspectives, with 23% thinking it has done so to a very high degree and 15% thinking it has done so to a very low degree. Even though the majority think the international perspective has been visible to a high or very high degree, not all students have picked this up.

Sustainability perspective

The sustainability aspect of the programme is captured by the programme objective "demonstrate specialised knowledge in [...] individualised and sustainable use of medicines". This is examined by medication reviews and discussions in patient cases where the student is required to justify their medication choices or options based on economic aspects and, where relevant, environmental factors. The students have received training in pharmacoeconomics during their Master of Pharmacy education. The teaching builds on this and now expands to interpretations of local therapy recommendations and the place of economic concerns in relation to proven effects, for example. The environmental impact of medicines during production and through medical waste has also been covered in previous courses. During this programme we focus on the tools that are available to the clinical pharmacist for informed decisions about medication choices based on available environmental and toxicology data collected in a national database. We also focus on the evolving problem of resistance to antibiotics, for example, and how medication use can contribute to this.

The student survey shows that, overall, the students do not perceive the programme to contain much of a sustainability aspect. This is a fair reflection of the reality concerning environmental aspects, but economic aspects and priorities in healthcare are always present in discussions of patient management and clinical reality. It might be that the students mainly perceive sustainability in terms of environmental issues.

Reflections and lessons for the future

The international perspective is essential for clinical pharmacy. We believe that we are well connected internationally and that we try to lift this perspective throughout the programme. However, not all students have seen this and this feedback from the student survey gives us an incentive to make different types of international perspectives more visible to the students.

The programme originated from international experiences and influences from University of Strathclyde and it has always been essential to uphold the international input to the programme in order to stay at the forefront and be relevant at a national level. It is important to keep prioritising international meetings and networking with relevant international partners. This benchmarking and evaluation together with University of Strathclyde is an important part of this strategy.

Even though sustainability aspects are covered in the programme and its objectives, and are examined with the help of criteria in patient reviews, the course objectives do not state clearly that this is a key aspect. The importance of this perspective could be underlined for the students by special

mention in the course objectives. This might also broaden the perspective to include economic and societal as well as environmental aspects.

7. Equality perspective

Equality perspectives in student recruitment

The equality perspective can include both gender equality and other diversity perspectives such as transgender identity, ethnicity, religion, disability, sexual orientation. When looking at the clinical pharmacy practitioners in Sweden today, it is a clear domination of women practitioners. Looking at the recruitment to the master programme in clinical pharmacy, the distribution of women is probably even higher (no data to support this comparison). As an illustration, among the 27 qualified applicants 2017, only one was a man. This is the same trend as we have seen throughout the existence of the programme. The same inequality is seen among the supervisors, only one out of 14 supervisor 2016 was male. An analysis based on other factors besides gender has not been done and requires a better knowledge base regarding the applicants. So far, the programme has not made any specific effort towards increasing diversity among the applicants or supervisors.

Since the programme requires that many of the students spend time away from home, both during sessions in Uppsala and at the clinical placement, some might not even apply for the programme. This is probably true for parents of small children for example. Further, through our pre-qualification assessments of the applicants, we see that many potential students with degrees from other countries have to take some additional courses to be qualified for the programme. This probably deters some applicants from other countries.

Equality perspectives in teaching and examination

As we described earlier, the clinical pharmacy sector in Sweden is dominated by women. The majority of the teachers from the university teaching at the programme are women. It has therefore been a strategy to include more men as invited speakers to compensate for this (see appendix D). We believe that it is important to show a diversity among role models. However, all speakers and lecturers are of Swedish origin and no conscious effort to increase diversity regarding for example ethnic background has been made so far.

Students with disabilities are offered extensive support through a centralised university system, and the support is provided based on individual needs. Apart from this, all students access the language support service “the language workshop” if they want to and have a need for this help as well as support from the student health services. All students are given the same teaching and exams. We do, however try to vary study forms and examination methods to meet different needs, as discussed in section 3 above.

Within individualisation of treatment and interpretation of clinical studies biological aspects like sex, ethnicity, age and comorbidity are always important. In this regard, diversity is well discussed, included and examined in the programme. However, the inclusion of other aspects of diversity relating to health care and clinical practice such as access to care and cultural considerations are not included and examined in a structured way. Today, cultural, language and socio-economic aspects are included in two patient cases discusses at a mandatory inter-professional (IPL) session together with district nurses. During a seminar during which the students’ own examples of ethical dilemmas are discussed, the aspects of cultural and language barriers and potential discrimination within healthcare often surface. The exam questions on the written exam consciously includes patients of different gender, age, ethnicity and sexual orientation. All supervisors that undergo the basic training have a session on diversity to prepare them for the student group. However, the student survey show that the students do not see the equality perspective in the teaching.

Reflections and lessons for the future

The most obvious challenge for the programme is the low recruitment of men. So far, we have not specifically targeted male students at the undergraduate programmes. As a result of this assessment process, we have discussed the possible reasons for the lack of men. One reason might be the lack of male clinical pharmacy role models visible for the students. We think about this during the master programme, consciously inviting men as guest lecturers to compensate for the fact that the responsible teachers are women, but this consideration is not made during the undergraduate programmes. This is a reflection that we will bring to relevant people at the faculty. For the master programme, we bring an awareness that we need to include more role models of different ethnic background. We also acknowledge that the teaching of gender equality and diversity perspectives within health care and clinical practice need to be strengthened and visualised for the students. This is something we will bring as a priority as we plan the follow-up of this assessment.

8. Professional relevance – individuals' and society's needs for learning and professional knowledge and career preparation

Career preparation, work-related teaching

Since the Master Programme in Clinical Pharmacy trains future clinical pharmacists, it is of the utmost importance that the education is relevant for a clinical setting. The teaching sessions in Uppsala and the exams are largely based on clinical cases, both from the teachers' own experience and cases produced by current or earlier students. During 2017 we had a first interprofessional learning (IPL) session, together with students training to become specialised district nurses. Learning with other professions is important preparation for future team-based work and could be increased in the programme. At present, it becomes part of the clinical placement at sites that have many students, but is not provided in an organised or mandatory way. It is, however, mandatory to observe and interact with other professions during the clinical placement, though this involves staff, not other students.

Through the clinical placements, which are spread all over the country, the students obtain an overview of the current national clinical pharmacy map and how practices differ between settings. The clinical placement is divided into two parts and gives the student the opportunity to see different types of clinical practice. One of the assignments is to write a proposal for a new clinical service. This proposal should be linked to clinical practice or previous work experience, and some proposals have materialised into real new clinical services. The project work is also directly linked with current clinical work, for example evaluating clinical practice or piloting a new approach. These two assignments are important drivers for development in clinical pharmacy and have direct application to a future workplace.

Generic skills are an important part of the programme, as reflected by the general objectives, and are also important tools used in everyday working life. As mentioned earlier in the self-evaluation, the alumni rated their opportunity to develop generic skills during the programme (see appendix B). Overall, the survey showed that alumni think that the programme provides the required skills. The survey then continued to ask, regarding the same set of skills, "to what degree are you using the following skills and knowledge in your current work". The two answers combined generate a picture of the extent to which the students actually get to use the skills they have acquired. As can be seen in appendix B, the clinical, interprofessional and problem-solving skills are highly used, whereas reading and understanding scientific texts, applying scientific methods, and making oral and written presentations score lower. This probably reflects the fact that most alumni do not work with tasks related to development and research.

Further analysis of the alumni survey shows that the students in the programme are in high demand and 73% get a job even before finishing the programme. This reflects the expansion of clinical pharmacy in Sweden, but also indicates that our students have a reputation of being well trained and

ready to start working independently. The respondents also think that their education level matches their work tasks well, 92% think that the programme has prepared them for clinical working life to a high or very high degree and 92% of the respondents say that they are satisfied or very satisfied with the programme.

Society's needs

Being involved in the national debate about clinical pharmacy and discussions about future services and needs, the teachers have a pretty good overview of skills needs. A panel debate was held at the Swedish Pharmaceutical Society in November 2016 at which future skills needs in hospital and clinical pharmacy settings were discussed. The participants clearly stated that they need more pharmacists who have undergone the Master Programme in Clinical Pharmacy, as the skills acquired are in high demand. They also discussed the need for more ward pharmacists working with medication management and patient safety at that level. This is a need that has grown in recent years in parallel with an increasing shortage of nurses in Swedish healthcare. There are also discussions in the Swedish Pharmaceutical Society about certification processes and paths to advanced practice, in line with similar discussions in international pharmacy organisations. Representatives from relevant courses at the faculty have also participated in a process led by the European Association of Hospital Pharmacists (EAHP) to agree on a common framework for hospital pharmacy training.

Reflections and lessons for the future

Most of the alumni get jobs in their preferred sector and are employed soon after or even before finishing the programme. This shows that the training is relevant and in high demand. We find that the career preparation is good during the programme, but see an opportunity to increase interprofessional learning between student groups, for example during the clinical rotations.

As the tasks of clinical pharmacists are changing, generic and basic clinical skills are an important central part of the programme. Opinions differ, however, as to what the programme should include and no in-depth analysis of the needs has been made. As a way forward, it would be useful to conduct a survey among employers and map future needs. The Master's programme is an important part of developments in clinical pharmacy in Sweden and wants to remain a relevant actor in this process. One way might be to get more involved in practising pharmacists' specialisations or advanced practice, and transfer the teaching of basic skills to the undergraduate pharmacist programme. This is a topic for further discussion in the benchmarking process of this evaluation.

9. Student influence

Student opinions are important in the continuous development of the programme. Course representatives are elected each year and participate in the analysis of the annual programme evaluation, where key strengths and weaknesses are summarised and recommendations for improvements are listed. This is in line with the policy for student involvement at the Faculty of Pharmacy. Since the student group is small and there are only two main teachers, there are continued discussions and evaluations throughout the year. In this sense, interplay and collaboration between students and teachers is easy. During the first week, a team-building activity including students and teachers serves as an icebreaker and a basis for future good interaction. The students appreciate the commitment of the teachers responsible for the programme, as shown over the years in programme evaluations. Further, the student survey shows that 92% of the respondents think the teachers are receptive to students' opinions to a high or very high degree.

The pharmacy student union has never been particularly involved in the work of this programme. The student at the union in charge of administering programme evaluations also does this for this programme, but that is the main extent of the involvement. This is something that could be developed further to strengthen student influence on the programme.

Reflections and lessons for the future

Since this is a small programme with few students and few teachers, communication about the programme is easy. The students also indicate that they are satisfied with how this is arranged and performed by the teachers. However, it might be difficult for an individual to express discontent in an anonymous way. The programme has student representatives who can collect opinions and deliver them to the teacher, but this is rarely done. This lack of anonymity can be perceived as a weakness and could be addressed through increased collaboration with the student union.

10. Study environment

Study environment during clinical placement

This is a programme that is largely based on studies outside Uppsala University, at hospitals all over the country. It is a challenge to make sure the study environment is good for all students. Quality criteria for the clinical placement lay down the basic requirements for the different study venues. The supervisors are all offered a basic course on tutoring methods as well as an understanding of the programme and the educational approaches used. This basic course is important to provide similar conditions for learning at the various venues. The half-time assessment with student reflection functions as a checkpoint where deficiencies in supervision or opportunities at the workplace can be detected. In a few cases, individual venues have received criticism in the evaluations that we have discussed with the supervisors with a view to improving the situation in future years.

Study environment at the University

Student perceptions of the study environment at the University were evaluated in the student survey. The survey reveals a perceived lack of places to physically sit and study. Among the respondents, 31% think there is low or very low access to such places. The responses regarding access to IT resources are scattered and provide no clear indication. The library resources are intensively used, with 77% saying they have found their services useful to a high or very high degree.

For discussion and interaction with the teachers, the student platform “Student Portal” is used. The programme also has a detailed programme description that should answer many questions regarding tasks and exams in the programme. The University has certain centralised resources that students are encouraged to use, such as student healthcare resources, study advisors and a written language support service (the Language Workshop). At programme level, students are encouraged to contact the teachers if they experience any problems in their studies so that an individual plan to manage this can be drawn up.

Psychosocial study environment

This is a programme that requires a lot from the students in terms of individual responsibility, clinical practice experiences in a real life environment, and intellectually challenging tasks and problems. Programme evaluations over the years and the current student survey show that many students find the workload heavy. In more detail, the student survey shows that 38% of the respondents thought the workload satisfactory, 15% somewhat too heavy and 46% far too heavy. An analysis of the free text answers in the alumni survey shows that some state that the workload was too heavy during their studies. The programme evaluations and discussions with students show that the workload varies over the year, with assignment deadlines and exams clustering at certain points of time. While highlighting the workload, the student survey also shows that the students are satisfied with the degree of difficulty during their studies and the programme as a whole.

Since the heavy and uneven workload is a known problem and has been so since the programme started, annual revisions have been made to reduce the workload and even out workload peaks. Some alumni even express a concern that the level of requirements in the programme might be decreasing in the attempt to reduce the workload. It is a challenge to reduce the workload without

lowering the requirement level in terms of exam goals. As mentioned in sub-section 1, an analysis of student retention and throughput for the time period 2010–2015 shows no indication that the throughput has increased or decreased. This can be seen as an indicator that, up to now, the requirement level has remained fairly constant even though the workload has decreased.

Reflections and lessons for the future

The main challenge for this programme is to find a good balance between intellectual challenge, stimulating tasks and workload. The students are happy with the programme, the things they learn and the skills they acquire. However, during their studies many experience the workload to be too heavy, particularly at peak periods. To some extent, this is probably due to the high level of student responsibility for planning study time, though we have no survey or equivalent evidence to support this.

Over the years, the number of mandatory sessions has been reduced and exams have been replaced by seminars. For example, specific pharmacotherapy areas were previously examined during oral exams that many students felt were demanding. Since the teachers felt the format and questions used made the students focus too much on minor details and miss the bigger picture, they were replaced by student-driven seminars instead. These seminars have been much appreciated and the knowledge is still tested in the written exam (double examination was eliminated). Another example is that the scope of therapeutic indications covered in the programme has been reduced in terms of detailed knowledge of diseases and medications.

Based on the student survey and the programme evaluation, we see that there is still a need for continued work on this balance, and this is a priority. To help us in this, we would like to make a detailed analysis of when these periods of time pressure appear and what tasks and programme components are involved. Since we have full-time and part-time students, we suspect that there might be differences for the two groups. Also, there might be differences depending on, say, family situation and other responsibilities outside of studies.

11. Continuous follow-up and improvement

The programme is followed up annually through a programme evaluation and an associated meeting with student representatives. The records from this meeting are distributed to the directors of study at the department, the faculty educational board and the students themselves via the student platform (the Student Portal). The department and faculty review all evaluation records as a quality assurance step and will take action if evaluations are poor or missing from the process.

In addition to this programme evaluation, we also perform smaller evaluations after each session the students have had in Uppsala, after the clinical placement and after the project work. These evaluations capture opinions and concerns throughout the course of the programme and they can also be used formatively, for example when scheduling coming Uppsala sessions. Moreover, they provide detailed feedback on the teaching that the summative programme evaluation does not capture. When changes are made based on student opinions, this is communicated to them at the next Uppsala session.

Based on this information, the programme is followed up each year during a special meeting between the teachers and administrators where plans for improvement are integrated in the planning of the next academic year. A review of student throughput and economic aspects of the programme is also conducted at faculty level each year. In this process, decisions are made about allocation of resources and strategic decisions are taken concerning the future of the programme.

Reflections and lessons for the future

The advantage of being a small programme is that it is relatively easy to try out new ways of teaching, examination and other changes that might be relevant for the programme. However, in this connection, there is also a risk of acting too quickly and readily on student opinions that may not have the support of the student group as a whole. We therefore emphasise the important role of student representatives in balancing and explaining the results of programme evaluations in an attempt to see which opinions are general and which are not. Further, we also want to see the same opinion expressed by different student groups before making major changes to the programme. Overall, we believe that we have a good system for continuous follow-up and improvement. Now, as a result of this evaluation process, we will identify new points for improvement to act on. Repeating the student survey that was done for the first time for this evaluation will give us an important tool to monitor our progress.