

REVIEW AND REVISION OF LABORATORY CURRICULA

Best practices document and facilitators'
guidance



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Abbreviations

CanMEDS	The Royal College of Physicians and Surgeons of Canada
HRH	Human resources for health
MoH	Ministry of Health
NGO	Non-governmental organization
NLCG	National laboratory curriculum group
NLWG	National laboratory working group

Scope of the document

This document provides guidance for the activities needed to review and revise laboratory curricula at the national level.

Section 1 provides governments, participants and facilitators with an overview of the activities needed to review and revise laboratory curricula into ones that are nationally owned and widely supported.

Section 2 provides information on the main actors, their roles and responsibilities.

Section 3 provides a practical guide for facilitators to conduct workshops in which health laboratory curricula are reviewed. The facilitators' guidance includes detailed, step-by-step agendas, complete with descriptions of the activities, exercises, presentations and example outcomes that can be used for workshop facilitation.

Associated with this guidance are annexes and materials including sample agendas, template slideshow presentations, and exercises. These materials can be requested from eulab@who.int.

Section 1: Background and approach

Background

Reliable and timely laboratory investigation results are fundamental elements in decision-making in almost all aspects of health services and so directly affect the health and well-being of individuals and communities. Reliable and timely laboratory services are also crucial to a nation's health security and economy and its ability to meet obligations under the International Health Regulations (2005). Approximately 60–70% of medical decisions are based on laboratory results (Kessel, 2014¹). The 2014–2016 outbreak of Ebola virus disease in West Africa has highlighted not only the crucial role of a strong health system in responding to public health emergencies, but also the immense cost of ignoring this need (Oleribe et al, 2015²). Effective high-quality and, if feasible, accredited laboratories and response networks are part of a strong health system (Pereyaslov et al, 2014³). A crucial component of laboratory services is competent staff. Laboratory services are labour intensive, yet human resources are lacking worldwide and often difficult to manage, and contribute to a significant part of a laboratory's budget. Disease-specific development programmes can provide training for existing laboratory staff; however, the basic national curricula often remain unchanged. To improve efficiency and effectiveness it is therefore important to review the basic curricula of different levels of laboratory workers and identify where those curricula can be strengthened and brought up to date with current technology and best practice.

Approach to the review of curricula for laboratory services

A curriculum is described as a written description of an educational programme, or more broadly the learning experiences of the students in an educational process towards the achievement of certain goals. It usually contains the learning goals, a sequence of courses and all materials required, such as syllabi, methods of assessment and quality assurance (UNESCO 2014⁴).

A curriculum review often ensues following questions from concerned stakeholders, such as employers or Ministries, or from staff from universities or schools themselves, on whether the curriculum is still up-to-date, or when questions are asked regarding the knowledge or competencies of new graduates. New developments in the field may stimulate curriculum revision, such as new knowledge, equipment, procedures or international developments which may not have been yet incorporated in the curriculum. There may also be questions regarding the educational approaches and new technologies might be available.

¹ Neglected Diseases, Delinquent Diagnostics; Kessel et al; Science Translational Medicine; 5 Mar 2014: Vol. 6, Issue 226, pp. 226ed6; DOI: 10.1126/scitranslmed.3008194

² Ebola, viewed through a lens of African epidemiology; J. Epidemiol. Community Health January 1, 2016 70:6-8

³ Laboratory capability and surveillance testing for Middle East respiratory syndrome coronavirus infection in the WHO European Region, June 2013; Pereyaslov D et al; Euro Surveill. 2014;19(40):pii=20923. <https://doi.org/10.2807/1560-7917.ES2014.19.40.20923>

⁴ What Makes a Quality Curriculum?; Current and Critical Issues in Curriculum and Learning; March, 2016, No.2IBE/2016/WP/CD/02IBE; Philip Stabback; <https://unesdoc.unesco.org/ark:/48223/pf0000243975>

When embedded in larger, established institutions, curriculum review is usually done every five years, as knowledge of certain disciplines and required competencies change, along with the institutions and the environment in which the training takes place. Often curricula are updated every year by faculty, but these might be small changes, often resulting in patchwork improvements that ultimately are no longer aligned with the overall curriculum. Curriculum review might also be initiated by new or changed requirements of accrediting bodies, which accredit educational institutions, or those bodies which accredit professionals. Currently a competency-based approach to curricula is most widely used (Frenk et al, 2010⁵).

Process

The process of curriculum review entails the following steps (UNESCO 2014⁶, Tuning 2005⁷):

1. Needs assessment involving all the different stakeholders.
2. Revision and/or development of competencies, including validation with stakeholders.
3. Breakdown of competencies into sub-competencies.
4. Review of the existing curriculum to determine which competencies are covered, and what needs to be revised/adapted/developed to ensure that human resources for laboratory health services are able to acquire the required competencies.
5. Revision or development of education vision, including educational environment.
6. Development or adjustment of components, topics, courses or modules to suit the competencies, including learning objectives, teaching and learning methods, teaching and learning materials and assessment methods.
7. Development of teachers.
8. Quality assurance, including monitoring and evaluation of implementation.

Depending on what has been done already, the different components can be tackled. For example, if the competencies for a specific graduate area, such as a Bachelor or Master degree, have already been defined, the curriculum revision can be initiated at the stage of the translation of the competencies into sub-competencies and learning objectives etc. However, if the competencies have not yet been defined or have not been validated by the different stakeholders, this needs to happen first before the curriculum revision process can continue. Please see [Annex 1](#) for an example of an outline of a curriculum.

Human resources for health (HRH) laboratory services can be distinguished at different levels, for example:

- laboratory assistants, often educated at a medical college;
- laboratory doctors, educated at a medical university; and

⁵ Health professionals for a new century: transforming education to strengthen health systems in an interdependent world; Julio Frenk et al; The Lancet Commissions; November 29, 2010; DOI:10.1016/S0140-6736(10)61854-5. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(10\)61854-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)61854-5/fulltext)

⁶ What Makes a Quality Curriculum?; Current and Critical Issues in Curriculum and Learning; March, 2016, No.2IBE/2016/WP/CD/02IBE; Philip Stabback; <https://unesdoc.unesco.org/ark:/48223/pf0000243975>

⁷ The Tuning Project for Medicine - <http://tuningacademy.org/medine-medicine/?lang=en>

- laboratory managers, often a laboratory doctor who has additional experience/education in management.

In different countries the situation may vary and specializations can be applied.

The curricula are reviewed over a period of 3–4 months through a facilitated, country-tailored, step-by-step approach under the umbrella of the national laboratory working group (NLWG) or similar national body. The methodology can be based on examples from other countries (see Development of National Laboratory Policies: best practices document and facilitators' guidance⁸) and involves a number of stakeholders in the process of collection and evaluation of the documents and material gathered, during focused workshops.

The members of the NLWG, or the members of the national laboratory curriculum group (NLWG), if that is distinct from the NLWG, are trained in the analysis of the evidence and in the development of competencies during the curriculum review workshops. After the workshops, the curricula should be revised, adapted and/or changed based on the results of the curriculum review.

Steps in the approach

Phase 1: Preparatory activities

If an NLWG is already functional in the country, the NLWG establishes a NLWG of about 15–20 persons. These people can be partly overlapping with the members of the NLWG.

The NLWG ensures that a survey is carried out amongst the different stakeholders, using the survey questionnaires as provided by WHO (materials available on request to eulab@who.int). The results together with documents relevant to the curriculum review process are made available to the full NLWG and facilitators before the first workshop. Relevant documents include the national laboratory policy, descriptions of the different curricula, and any documents on educational reforms and national quality assurance of higher education.

Phase 2: Review of curricula

In phase 2, the results of the survey are validated in a series of two workshops and competencies for the different target group are developed. Critical factors for curriculum development are identified. Gaps in curricula as well as topics for improvement are identified and possible learning methods and assessment methods; quality assurance is also discussed. In the second workshop, detailed sub-competencies are developed, including learning objectives and the choice of learning and assessment methods, and several learning and assessment methods are discussed, role-played and practiced. A curriculum outline is presented and gaps are identified. A plan for curriculum revision is made.

Phase 3, the actual revision of curricula, and phase 4, the actual implementation of the curricula, are outside the remit of this guidance.

⁸ Development of National Laboratory Policies: best practices document and facilitators' guidance, WHO, December 2016. http://www.euro.who.int/_data/assets/pdf_file/0003/333471/Development-NLP.pdf

Methods/ methodology

During the workshops the facilitators use a variety of participatory and interactive methods including individual reflections, group work and plenary discussions. Slideshow presentations can be used; these are short and mainly serve as background for the exercises and activities.

The facilitators should have a solid background in curriculum review and revision, as well as in laboratory work and laboratory quality management, and broad international experience in laboratory system assessment and strengthening, see [Actors involved and their roles and responsibilities](#).

This facilitators' guidance for the curriculum review process is based on the two-workshop approach described [Phase 2: Review of curricula](#).

Section 2: Actors involved and their roles and responsibilities

The main in-country parties.

The Government

The training, recruitment, remuneration and retention of human resources for laboratory services vary by country. The training, licensing and employment of human resources for laboratory services may fall fully under the Ministry of Health. Alternatively, the basic, pre-service training of human resources for laboratory services can fall under the Ministry of Education, and the employment and in-service training, as well as continuous training, may fall under the Ministry of Health.

Other Ministries may play a more or less indirect role in human resources for laboratory services. For example, the Ministry of Finance can be responsible for the budget necessary to train the human resources for laboratory services. The involvement of ministries other than health may vary per country.

National laboratory curriculum group

A national laboratory curriculum group should be established for the curriculum review. The group is composed of all important stakeholders in the national health laboratory services and may include representatives from:

- The Ministry of Health and other relevant ministries, for example Agriculture, Food, Environment, Finance, or Labour.
- The Ministry of Education.
- Representatives from the quality assurance body of higher education, if it exists.
- Managers from national (and regional) public laboratories or laboratory networks. There should be a broad representation of the various types of laboratories in the country, such as clinical and public health at different levels.
- Managers from private health laboratories.
- Universities and other training institutes providing pre-service or in-service laboratory training.
- Laboratory accreditation, certification or licensing bodies.
- Quality assessment programs.
- National health insurance.
- Representatives from research groups.
- Practitioners and clinical heads of hospitals as the main customers of clinical laboratory services.
- World Health Organization.
- Important donors and non-governmental organizations (NGOs) involved in laboratory services.

For further details regarding the national laboratory working group see: Development of National Laboratory Policies: best practices document and facilitators’ guidance⁹.

Suggested roles and responsibilities

The Government

If the pre-service training and deployment of human resources for laboratory services all fall under the Ministry of Health (MoH), the MoH can serve as the government’s coordinating body for the curriculum review process. If the pre-service training of human resources for laboratory services falls under the Ministry of Education, both Ministries should discuss who should take the lead (preferably the Ministry of Health as the primary employer); however, with the Ministry of Education having strong input.

The MoH monitors the progress of the curriculum review and revision, and is responsible for discussing the draft revised curricula with all government bodies and for formalizing the curricula in a way appropriate to the country.

The Ministry of Education should ensure alignment of the curriculum review and revision with existing and upcoming national policy. If a quality assurance body of higher education exists, this body should also ensure alignment of the review and revision with the (expected) quality criteria.

National laboratory curriculum group

If a national laboratory policy is being developed, the NLWG can oversee the review and revision of the human resources for laboratory services’ curricula. It is, however, preferable to establish a separate NLCG. If there is no NLWG, a NLCG needs to be established.

The NLCG terms of references for curriculum review and revision are:

- The NLCG provides advice and expertise to the government on the training of human resources for health laboratory services when requested.
- The NLCG takes the lead and drafts a report on the review of the curricula of Human Resources for Health (HRH) for health laboratory services.
- The NLCG seeks advice from, and tries to reach consensus with, the stakeholders of HRH for health laboratory services before submitting the draft report on the curriculum review to the government.
- The NLCG ensures that the curriculum revision process starts for each of the curricula and monitors its progress.
- The NLCG actively explains and advocates for the importance of quality and quantity of HRH for health laboratory services.

The members of the NLCG appoint a Chairperson and Executive Secretary from within the group. These may be the same chair and secretary of the group for the policy process.

⁹ Development of National Laboratory Policies: best practices document and facilitators’ guidance, WHO, December 2016. http://www.euro.who.int/__data/assets/pdf_file/0003/333471/Development-NLP.pdf

WHO

Upon request, the WHO Regional and/or Country Office can facilitate the process of review and revision of curricula for HRH of health laboratory services. Depending on the resources and expertise available to WHO, this can be in the form of advice, identification of (inter)national experts, participation in the NLCG and/or organization and facilitation of the curriculum review and revision process.

Facilitators

For each workshop it is important to have two facilitators and one rapporteur. The team of facilitators should be the same for both workshops.

The facilitators should have a solid background in curriculum review and revision as well as laboratory work and laboratory quality management, and broad international experience in laboratory system assessment and strengthening. They should preferably come from another country to provide an independent and fresh view on national issues. They introduce the various elements and methodology of the curriculum review and revision process to the participants, monitor the process, ask critical questions and place the national experiences and input from the NLCG in a broader perspective to ensure that the review and revision of the curricula is based on current international best practice. With very experienced facilitators it is possible for the second facilitator to double as rapporteur.

Section 3: Facilitators' guide curriculum review

In this section the curriculum review process is explained step-by-step.

Practical organization of the workshops

Each workshop requires 2 facilitators, 1 rapporteur and 15–20 participants for optimal results. Interpreters may be required; these should have a working knowledge of laboratory and curriculum terminology. As the methodology is highly interactive with most of the work being done in small groups and relatively few and short presentations, it is more practical to have consecutive rather than simultaneous translation.

Sample agendas for the two workshops are provided in [Annexes 2 and 3](#). The exact length of the individual workshops will depend on the length of the discussions required, the information that the participants have available, and the need for translation of discussions for the facilitators.

The workshops should be organized in a large, quiet room suitable for group discussions as well as plenary work. The room should preferably not be attached to the working place of one or more of the NLCG members to prevent distraction.

A computer, beamer/projector and flip-charts with marker pens in four colours are required, as are small items such as stationery, pens, A4 paper, sticky tape and medium and large-sized Post-it notes in various colours.

The report of the workshop should give extensive summaries of all exercises and should be made available for the workshop participants within two weeks of the workshop, in order not to lose momentum and to inform the activities in between workshops.

Phase 1: Preparatory phase before workshop 1

At the start of the curriculum review and revision process, the NLCG discusses the terms of reference for the review and checks whether any other members need to be added – for example, a representative from the Ministry of Education (see [Suggested roles and responsibilities](#)).

Before the start of the workshop, basic information to inform the participants should be collected. This includes:

- A list of the different type of HRH for laboratory needs to be drawn up, including the institutions where they are trained. As outlined above most commonly these human resources are: laboratory assistants, often educated at medical colleges; laboratory doctors, educated at medical universities; laboratory managers, often a laboratory doctor who has additional experience/ education in management. However, depending on the country's situation there may be more.
- The survey activities with different types of stakeholders for the curriculum review (see [Annex 4](#)) need to be carried out and data analyzed. Based on the data, a draft report should be prepared and made available to all NLCG members and the facilitators before the start of the workshop.

- The data should also be compiled in slideshow slides before the first workshop. Data derived from the “laboratory educational system” and “curriculum analysis” sheets (see [Annex 4](#)), should be entered under the different headings: training capacity, lab system absorption capacity, training curriculum, training facilities, students, teachers, examinations, comments from end-users. See *PPT1 WHO Day1Outcomeoftraininganalysis.pptx*.
- Before the start of the workshop, the NLCG should ask someone to give a 10 minute overview of the educational system for laboratory workers: technicians, laboratory doctors, laboratory specialists, both pre-service and postgraduate.

Further documents to be collected before the workshop:

- National laboratory policy.
- Documents describing the overall learning objectives of the training courses (technician, laboratory doctor, manager/postgraduate).
- Any other documents pertaining to the pre-service curricula of the different target groups such as:
 - If available: list of modules taught for technicians and at the MSc phase for laboratory doctors.
 - For medical doctors, how much exposure they get to laboratory work in their training.
 - Modules/courses for laboratory managers.
 - List of laboratory specific postgraduate modules available at postgraduate education institute(s).
 - Example job descriptions for technicians (junior, senior), laboratory doctors (general, specialists), laboratory managers.
 - Policy on curricula and curriculum reform from the Ministry of Education.
 - Policy on quality assurance for higher education from the Ministry of Education.

The organizers of the meetings should arrange all meetings taking into account the points mentioned under [Practical organization of the workshops](#).

Facilitators customize the pre-prepared series of overhead presentations¹⁰ (available on request to eulab@who.int) in advance to reflect the specific situation.

¹⁰ <https://workspace.who.int/sites/EURO-IRP/PAT%20SharePoint/BLBH/Laboratory%20curriculum%20review%20PPTs%20en.zip>

Phase 2: Curriculum review process

Curriculum review workshop 1

This workshop can in principle be carried out in 4 days. An example agenda is given in [Annex 2](#).

Terms of reference:

By the end of the workshop the participants will have:

- Reviewed and further improved the training curriculum review analysis.
- Defined competencies required for laboratory technicians, laboratory doctors and laboratory managers based on the CanMEDS Framework¹¹.
- Reviewed learning outcomes as the training's "end-product".
- Identified topics/methods for further improvement of the training curriculum.
- An agreed way forward and agreed activities to be undertaken.

Description of activities:

Note that during the workshop comments or remarks may be made on what is lacking and what should be improved. Following the first remark on such an improvement, a flip-chart sheet should be taped to a wall with a heading "action points". At any point in time when remarks are made for improvement, ask the participant to write that action point on the flip-chart sheet. During the last day of the workshop, this sheet is then the basis for planning.

Day 1

Activity 1.1 – Workshop opening

The workshop starts with short opening speeches by representatives of the government, WHO and the organizer of the meeting (if other than MoH or WHO), describing the role of the NLCG, the importance of the curriculum review and curriculum revision and the support the NLCG can expect.

A round of introductions of all participants and facilitators then takes place. Often not all participants know each other as they are from different sectors of the laboratory system. When participants introduce themselves they could add what music or flower they like, or other topics of choice. In that way, introduced by the facilitator, communalities between participants can be found.

Activity 1.2 – Introduction: discussion of workshop objectives

During this activity one of the facilitators presents the purpose of the meeting, describes the curriculum review process, the activities undertaken before the workshop and gives an overview of the program of the workshop. An example of such a presentation is given in the series of overhead presentations (*PPT 2 WHO Day1 Introduction.pptx*).

Exercise 1 and 2

Participants are asked about their expectations and the ground rules of the workshop, see *PPT 2 WHO Day1 Introduction.pptx*.

¹¹ The Royal College of Physicians and Surgeons of Canada – <http://www.royalcollege.ca/rcsite/canmeds/about-canmeds-e>

Activity 1.3 – Presentation of the educational system for laboratory workers

Present the educational system for human resources for health for laboratories of the country, in order to create a common understanding of the situation.

Activity 1.4 – Presentation of curriculum review analysis

Using the completed slideshow slides (*PPT1WHODay1Outcomeoftraininganalysis.pptx*), the facilitator presents the summary analysis of the curriculum review. Participants are asked to comment and reflect on this summary analysis, and to provide comments on the draft report of curriculum review (validation). Any comments are noted down and added to the report.

Activity 1.5 – Curriculum development

The facilitator presents the slideshow on curriculum development (*PPT3WHO Curric devt.pptx*) and asks whether participants recognize the steps, and discusses any context-specific additions/alterations to these steps.

Activity 1.6 – Identification of critical success factors of curriculum development

Exercise 3

Participants are asked to write down for themselves the characteristics of a good curriculum on individual post-its. The facilitator groups the post-its according to their similarities, asks for clarifications and additions, and summarizes.

Exercise 4

In groups, participants share and discuss some success and non-success stories regarding curriculum development as well as influencing factors. These are written on a flip-chart sheet, taped to the wall and summarized by the facilitator (see *PPT 4 WHO Identification of critical factors for curricular revision.pptx*).

Activity 1.7- Definition of competencies

The facilitator explains the definition of a competency and the CanMEDS Framework.

Exercise 5

Based on the CanMEDS Framework as well as the results of the curriculum review, participants are asked to develop in groups the competencies for the different target groups.

The groups in which the participants are divided should be multi-sectoral, i.e. ministry level, manager and educational institutions should be included in one group, for maximum diversity and background information on the real situation. The facilitators closely facilitate this process, clarify and encourage dialogue.

It may be best to start with the laboratory technicians and the laboratory doctor and divide the tasks amongst the groups, not by target group, but by competency group, as this will help to make the distinction between the different target groups. One group may discuss different competencies. Each competency consists of 3–5 lines; for criteria see *PPT 5 WHO Development of competencies.pptx*. After these competencies are developed, the draft competencies are presented

to the group for improvement. The competencies of the laboratory manager are then developed in the next group work session.

Day 2

Activity 2.1 – Recap

The second day starts with a short recapitulation and overview of the outcomes of the first day.

Activity 2.2 – Discussion of draft competencies

The groups present the draft competencies that they have defined and any changes or additions are discussed. Depending on how much was done, i.e. whether the groups were able to finish the drafts on the day before, this may take the whole morning.

It is best to show the competencies of the different groups in columns next to each other, so the correlation between the three different groups can be discussed and contrasted, and changes made.

Activity 2.3 – Comparison of learning outcomes and competencies

Exercise 6

After the competencies have been drafted, the different groups are asked to compare these competencies with the learning objectives/learning outcomes and the current curriculum for the different target groups.

- It is best to divide the group into three: one which discusses the curriculum for the laboratory assistants, one for the laboratory doctors, and one for the laboratory managers.
- Participants are asked to identify any gaps in terms of competencies that are not taught in the current curriculum, and to come up with action points for these.
- The comparison for the different curricula are written on flip-chart sheets and presented and discussed in plenary.

Activity 2.4 – Preconditions for improvement of the training curriculum

Exercise 7

Based on the analysis of the curriculum review, participants are asked to identify preconditions for improvement, such as materials, facilities and teachers.

- Examples of materials may be consumables or equipment.
- Facilities may be educational sites that allow for group work, access to a library, internet etc.
- Teachers may relate to numbers or quality, both in terms of knowledge of the content as well as teaching competency.
- The three groups are the same groups as before, for consistency. It may be required here to do, for example, the exercise of the 9 dots – to help participants think about out-of-the-box solutions, such as looking for available equipment elsewhere, appropriate scheduling of student practicals, i.e. out-of-office hours.
- The findings are presented in plenary and discussed.

Day 3

Activity 3.1 – Recap

The third day starts with a short recapitulation and overview of the outcomes of the second day.

Activity 3.2 – Quality assurance of curricula

The facilitator presents the case study (*PPT 6 WHO Quality assurance.pptx*, slide 1).

Exercise 8

Participants are asked to discuss what is quality, who is involved in deciding on quality and who is involved in assuring quality in the case study. The answers are discussed in plenary. The facilitator presents the quality assurance slide (*PPT 6 WHO Quality assurance.pptx*).

Exercise 9

In the same groups, participants are asked who is involved in deciding on and assuring the quality of the curriculum, and in what way. They are then asked to identify action points for improvement that are then discussed in plenary.

Note: In case the level of the group is high, participants can be asked to develop indicators for the different components of a curriculum in different groups.

Activity 3.3 – Review of assessment

Exercise

Start the session by asking the participants to discuss in groups what is easy and what is difficult regarding examinations. Ask them to write on the flip-chart sheet and summarize the presentations.

After that ask them to write down on cards the different types of assessment used. Show the slide on different methods (*PPPT 7 WHO Assessment.pptx*).

Exercise

Ask the participants to discuss in groups who are currently involved in exams, who should be involved, how they are involved, whether this is all written in a policy and adhered to and whether there are any issues for improvement.

Present the rest of the slide on assessments (*PPPT 7 WHO Assessment.pptx*).

Activity 3.4 – Debate

Participants are asked to form two groups. The groups are divided into “in favour” and “against”. Participants are asked to discuss arguments in favour or against the following debate statement: “It is necessary to learn attitude”. Participants are then asked to form two lines (one in favour and one against). They are then asked to start arguing, but they are required to listen to each other and allow the other person to speak, and not interrupt. They are also allowed to use only one argument each time that they speak. The facilitator facilitates the debate. At the end the facilitator summarizes the arguments. The facilitator then asks the participants to reflect on the use of this learning method.

Activity 3.5 – Learning objectives

Explain the definition, elements and criteria for a learning objective. Show an example (see *PPT 8 WHO Learning objective.pptx*).

Exercise

Ask participants to individually develop 3–4 learning objectives for a session they would like to teach.

Ask participants to share with their neighbour and to ask for feedback.

Day 4

Activity 4.1 – Recap

The fourth day starts with a short recapitulation and overview of the outcomes of the third day.

Activity 4.2 – Choice of learning methods

Show the slide on learning methods (*PPT 8 WHO Learning objective.pptx*, last slide).

Exercise

Ask participants to work in groups to match the three different types of learning objectives with the different learning methods shown. Ask them to justify their choice. Note: this could also be done as a game: ask participants to sit in groups. Ask them to name as quickly as they can three methods for each learning objective. They have to decide as a group, the facilitator can choose anyone of the group to make sure that the whole group has discussed and agreed. After the game is over, ask them what they learned from the game as an exercise.

Activity 4.3 – Lesson plan

Exercise

Ask participants to name the elements of a lesson plan. Note these down on a flip-chart sheet. Ask them whether they use these when they prepare a lesson.

Present an example of a lesson plan, see [Annex 5](#). Explain the usefulness of a lesson plan.

Activity 4.4 – Discuss one learning method

(Choose which one is more relevant/not yet known.)

Activity 4.5 – Planning next steps

Take the flip-chart sheet with action points. Ask the group to plan: activity, responsible person – who, by when, resources needed. Facilitate the group in the planning, try to help them to make the action points clear, and develop a realistic action plan. Include advocacy for curriculum revision as part of the plan.

Activity 4.6 – Evaluation and closure of workshop

The evaluation can be done formally and informally. Formally by asking participants to fill in a written evaluation form, and informally by drawing a puppet on paper. Ask participants to write on sticky notes one point each that they liked and one point each which can be improved for the brain

(knowledge), for the heart (attitude) and for the hands (skills). The facilitator reads the sticky notes and summarizes, asks for clarifications and additions.

Activities in between workshop 1 and 2

In between the two workshops there are three activities that need to be done.

- It is important to validate the developed competencies. The validation means that, though important persons were there during the development of the competencies, it is crucial that the competencies are checked with a wider range of persons in the field. This could be done by asking a number of key persons to react on these competencies, such as heads of educational programs, teachers, managers from rural areas, graduates from the educational programs, possibly representatives from the Ministry of Education/Health and the accreditation body, if they were not present during the first workshop. After the collection of the reaction the NLCG should meet to finalize these competencies.
- Next to that, with the results and action points from the curriculum review, it will be important to advocate for curriculum revision in the respective educational institutions. Often resistance to curriculum revision is found at the side of the educational institutions, as they see their workload increasing, without having a clear view on the underlying reasons for change or without knowing the long-term vision. It is therefore important to hold advocacy meetings, and to provide feedback on the process and results of the curriculum review at the respective educational institutions.
- Those action points from the workshop that can be readily implemented, should be implemented as far as possible. The NLCG should ensure the implementation of these action points.

Curriculum review workshop 2

The second workshop can be carried out in 3–5 days depending on which curricula will be reviewed. An example agenda is given in [Annex 3](#).

Terms of reference

By the end of the workshop the participants will be able to:

- Identify and apply steps for curriculum design and review of the curriculum of e.g. laboratory medical doctors.
- Develop appropriate sub-competencies based on the identified competencies and their level of proficiency.
- Formulate detailed learning objectives for a sub-competency in the appropriate stage of proficiency.
- Identify a variety of methods for teaching and learning for different types of learning objectives.
- Construct formative and summative evaluations, in particular skill-based assessments to measure the knowledge, skills, and judgment required for competency in a specific domain.
- Match competencies required for the target group with current curriculum and identified additional topics to include, or topics to change in the curriculum of the target group.
- Agree on the way forward and the activities to be undertaken.

Preparation

The participants are asked to report using a slideshow template (*PPT 9 WHO Template.pptx*) on the activities that have been implemented in the area of curriculum development and teaching programme.

Participants need to bring the following information at the start of the workshop:

- Validated competencies.
- Documents describing the overall learning objectives of the training courses (technician, laboratory doctor, postgraduate).
- All other documents on the curricula that are available to be reviewed.
- If available: list of modules of the specialization phase for laboratory doctors and technicians.
- List of postgraduate laboratory specific modules possibly available at postgraduate education institute.

If possible, participants are asked to bring examples of good teaching and learning practices, i.e. videos, pictures, manuals, handouts, syllabi, checklists.

Profile of participants

Depending on which curriculum will be discussed (or all), the respective heads of educational programmes should be invited, alongside the NLCCG – especially, for example, the managers of laboratories at different levels (national, provincial, local). Although the process is specific to curriculum review and revision, it is important that these managers discuss this together with the head of the educational programs, for those heads to more deeply understand the realities in the

field and vice versa. The profile of the various participants should therefore include at least one of each of the following:

- In charge of the training of the target group for the curriculum – they can make decisions about curricula adjustments for the specialization component for the target group curriculum i.e. laboratory medical doctors.
- Currently teaches the curriculum of medical doctors.
- Teaches/ supervises skills of laboratory doctor students at the laboratories.
- Is currently in charge of a laboratory at national, provincial or local level.

The participants are asked to use the template slideshow (*PPT 9 WHO Template.pptx*) to report on the activities that have been implemented in their respective institution in the area of curriculum development and teaching programmes.

Day 1

Activity 1.1 – Workshop opening welcome and introductions, objectives of the workshop

The workshop starts with a short opening speech by a representative of the NLCG, the importance of the curriculum review and curriculum revision and the support by the NLCG.

A round of introductions of all participants and facilitators then takes place. Often not all participants know each other as they are from different sectors of the laboratory system. When participants introduce themselves they can add what music or flower they like, or other topics of choice, in order to identify commonalities between participants. The workshop objectives are presented and participants are asked about their expectations and the ground rules of the workshop

Activity 1.2 – Presentation of activities after workshop 1

A representative of the NLCG is asked to present the work plan and the activities after workshop 1 (see template *PPT 9 WHO Template.pptx*) in order to update participants on progress.

Activity 1.3 – Discussion on validated competencies

The draft competencies from the previous workshop have been validated in the field and it is now necessary to discuss this validation at the workshop. The competencies are best presented together next to each other so that participants can see whether the competencies are aligned with each other, and whether there are no gaps or overlaps between the competencies of the different target groups.

Activity 1.4 – From competencies to sub-competencies

If necessary, the facilitator explains the curriculum development cycle using the slideshow *PP 3 WHO Curriculum development.pptx*.

The facilitator explains what competencies and sub-competencies (see *PPT 10 WHO From competency to sub-competency.pptx*). The facilitator chooses beforehand which competency the group needs to make sub-competencies for from those competencies which have been validated.

Exercise

The participants are asked to form a group to develop 5–6 sub-competencies for each competency.

- Groups are given different competencies.
- The results are presented in plenary on flip-chart sheets and comments are solicited.
- After the presentation, the group hands the sub-competency over to another group. This group is asked to determine the level of the sub-competency that the student needs to achieve at the end of the educational program, and then to develop a learning objective for one of the sub-competencies.
- After the exercise the facilitator needs to explain the reason for exchanging the sub-competencies between groups: frequently in curriculum development someone develops the competency and then another person needs to make a sub-competency learning objectives from this.

Day 2

Activity 2.1 – Recap

The second day starts with a short recapitulation and overview of the outcomes of the first day.

Activity 2.2 – Development of sub-competencies

Experience has taught that it is important to organize another 1–2 rounds of developing sub-competencies. These sub-competencies will be the basis for the rest of the curriculum review and therefore the more sub-competencies and more specific these are, the more in-depth the review of the curriculum will be.

Activity 2.3 – Development of learning objectives

The facilitator explains how to develop a learning objective – see *PPT11 WHO From subcompetency to learning obj.pptx*.

Exercise

The participants are asked to discuss with their neighbour the difference between teaching objectives and learning objectives, and how this affects curriculum development.

The facilitator asks participants to explain their discussion and then summarizes, after which slides 5–18 from *PPT11 WHO From sub-competency to learning obj.pptx* are presented.

The facilitator explains the three domains of learning, the cognitive domain and Bloom's taxonomy.

Exercise

Participants are asked in groups to match Bloom's level of cognitive activity with action verbs and to match the learning outcome with the level of cognitive activity (see handout [Annex 6](#)). After that they should construct a learning objective for the cognitive domain.

The facilitator briefly explains the psychomotor domain.

Exercise

Participants are asked in groups to match levels of psychomotor activity with action verbs and to match the learning outcome with the level of psychomotor activity (see handout [Annex 6](#)). After that they should construct a learning objective for the psychomotor domain.

The participants do the same for the affective domain.

After the groups have finished this exercise, they are asked to give their prepared learning objectives for the three domains to another group for constructive feedback. The group that provides feedback reads and provides suggestions and comments for improvement based on the standards for learning objectives, as explained previously.

Day 3

Activity 3.1 – Recap

The third day starts with a short recapitulation and overview of the outcomes of the second day.

Activity 3.1 Updating the curriculum to assure competence for other competencies of CanMEDS Framework

Exercise

The facilitator asks participants, in light of the developed competencies and sub-competencies, to look at the curriculum and discuss whether the sub-competencies are included, whether the learning objectives fulfil the criteria, and what needs to be changed or improved.

Depending on the number of days of the workshop (if five days): other competencies can be elaborated into sub-competencies and learning objectives, in order to ensure that participants have the skills to develop these and that they can use these products for the further revision of the curriculum.

Depending on the type of target group, sub-competencies may need to be further divided.

- For laboratory assistants who have been trained over several years; the competencies will need to be divided according to level per year.
- For laboratory doctors and medical doctors, it should be verified whether certain more generic competencies, such as ethics, are included in the general curriculum.
- For laboratory managers, it depends whether a specific curriculum is available, or whether modules for general managers/public health managers are used. In such case, some separate modules for laboratory managers (e.g. bio-risk management) might need to be developed. Alternatively, assignments may need to be adjusted, i.e. developing a quality assurance plan for the laboratory and not in general.

Activity 3.2 – How we learn

The facilitator explains the way we learn using *PPT 12 WHO How do we learn.pptx*. Included in the presentation are several exercises which the participants can do individually.

The first exercise is to recall what the participant had for breakfast/lunch today, and what they had for breakfast/lunch on exactly the same date one year ago (see slide 4). The next step is to discuss the participant's first childhood memory.

The facilitator continues with the explanation of the story of the chicken in New York and then proceeds with the exercises on slides 10 and 12, explaining that learning has to be structured.

Slide 14 asks participants to remember a good teacher and write down why they thought the teacher was good. The facilitator continues with explaining the different roles of a teacher.

After that the facilitator asks participants to give themselves “stars” (1–4, 4 being the highest) for the different aspects – if participants want they can discuss what they would still like to learn or improve.

As a conclusion the facilitator explains the usefulness of a lesson plan.

Activity 3.3 – Learning of skills

Roleplay: the facilitator asks the participants to watch carefully. Together with another facilitator or with a participant, the facilitator undertakes a role play: to learn how to bring coffee to the boss. One of the facilitators playing the boss shouts that he wants coffee. The facilitator playing the subordinate brings a cup of coffee, trembling. The boss shouts that the subordinate always does it wrong, and tells him that he needs to bring milk and coffee, that he needs a spoon, and the subordinate needs to put it in the right hand corner of the table, with the milk and sugar exactly next right to the coffee cup, and that the spoon needs to be at the right hand side of the coffee cup. The subordinate comes in, but makes some mistakes, i.e. forgetting the spoon, putting the milk to the left of the coffee cup and not to the right, and the boss shouts again.

The role play stops, and the facilitators ask the participant what they observed. The idea is that participants realize that you cannot expect someone to learn a skill without a step-by-step explanation, etc.

Activity 3.4 – Exchange of good teaching practices and learning

If enough teachers/persons from teaching institutions are participating, a “market” can be put up in which they can display the different materials and teaching methods they use. This can be facilitated using *PPT 13 WHO Good teaching practices.pptx*, slide 1-5. After that, or if no materials are brought, the next step is to discuss the choice of teaching and learning methods.

Activity 3.5 – Choice of teaching and learning methods

The facilitator asks the participants to choose as many teaching methods as they can for each of the three domains. The one who has the most methods then explains the teaching methods and justifies them to the others. The facilitator can at the end show the slide with the different methods and explain those teaching and learning methods that have not yet been mentioned. The facilitator can also ask what the criteria are for choosing a certain method. As a reflection, the facilitators can ask the participants to write down for themselves what the predominant teaching methods are in their country, to write down at least two methods that they want to use more and what is needed to facilitate this; see *PPT 13 WHO Good teaching practices.pptx*, slides 6–9.

Activity 3.6 – Preparation micro teaching sessions (if there is time)

The facilitator explains the concept of microteaching. After that, the facilitator then divides the group into groups of maximum five participants and asks them to prepare a microteaching session of 10 minutes duration. If there is time, each participant can prepare a microteaching session; however bear in mind that each session takes up 20 minutes (10 minutes practice, 10 minutes feedback),

which allows for a maximum of nine participants in three hours. This is also the maximum number of participants in one (sub-)group, as saturation will be achieved.

Day 4

Activity 4.1 – Recap

The fourth day starts with a short recapitulation and overview of the outcomes of the third day.

Activity 4.2 – Assessment of learning: Different methods of assessment

The facilitators first ask what participants find easy about examinations and what they find difficult. Their answers are collected and put on a flip-chart sheet. These answers are then discussed and, where possible, suggestions for improvement can be made by participants, though not by the facilitator.

Please note: it might be necessary to discuss/repeat the importance in learning as well as a number of other issues regarding assessments, see workshop 1.

Activity 4.3 – Explanation of different steps of exam construction

Ask the group to buzz, write on the white board the different steps they mention, and show the different steps. Discuss the rest of the presentation.

Activity 4.4 – Development of an assessment

This exercise consists of the following steps:

- Ask participants to develop an assessment for a learning objective they developed.
- After they have developed the assessment, ask them to give it to another group for review. All groups should give their product to another group for review. Ask the reviewers to give concrete advice as to how to improve the assessment.
- Ask the reviewers to give their feedback to the group that made the assessment.
- Ask the group to read the review and ask them whether they can use this advice to improve the assessment.
- Ask the participants after this exchange whether they need to review their lesson plan, in terms of content or method, as learning objective, content and method as well as assessment need to be aligned with each other.
- Ask the participants after this exchange what they learned from the exercise in terms of providing feedback.

Activity 4.4 – Use of test specification table

The facilitator explains the use of a test specification table. The facilitator asks whether participants have used them before.

The facilitator then asks the participants to take one sub-competency and to construct a test specification table.

Activity 4.5 – Quality assurance of assessment

The facilitator asks the participants in groups to write down issues regarding quality assurance of assessments in the three different phases: before the assessment, during the assessment, after the assessment.

The facilitator then discusses the points which come out, and derives action points which are written on a separate flip-chart sheet. The facilitator probes whether in the institutions there is an assessment policy and whether this policy is adhered to, whether that is being monitored and how and by whom.

Activity 4.6 – Planning the way forward

Take the flip-chart sheet with action points. Ask the group to plan: activity, activity-responsible person, person who will monitor (e.g. NLCG), by when, resources needed. Facilitate the group in the planning, try to help them to make the action points clear and to develop a realistic action plan. See [phase 3](#) for possible activities. Include continued advocacy for curriculum revision as part of the plan. The facilitator needs to ensure that the timing is clear, concrete and realistic and that enough time is spent on this activity to ensure implementation of curriculum revision.

Activity 4.7 – Evaluation and closure of workshop

The evaluation can be done formally and informally:

- Formally by asking participants to fill in a written evaluation form.
- Informally by drawing a puppet on paper and asking participants to write on sticky notes one point each that they liked and one point each that can be improved for the brain (knowledge), for the heart (attitude) and for the hands (skills). The facilitator reads the sticky notes and summarizes, asks for clarifications and additions.

Phase 3: Revision of curriculum

This phase will depend on the in-country capacity and will need to be adapted for each country.

Possible activities include:

- Workshops for teacher/ trainers /distance guidance on:
 - Review of different modules/components.
 - Review/rewrite learning objectives (knowledge, attitude, skills) of components/modules.
 - Review of content – align with learning objectives.
 - Review and alignment of teaching and learning methods.
 - Review and alignment of assessment methods.
- Ensuring provision of consumables and equipment.
- Reviewing/developing guidances for practice (for each practice period): criteria for practice laboratory, for supervisor.

Phase 4: Implementation and adjustment

After the revision the revised curriculum needs to be implemented, monitored and evaluated, and where necessary adjusted.

References

For further details regarding national laboratory working groups, see Development of National Laboratory Policies: best practices document and facilitators' guidance, WHO, December 2016.
http://www.euro.who.int/_data/assets/pdf_file/0003/333471/Development-NLP.pdf

Annexes (separate document)

Annex 1: Example Outline of a curriculum

Annex 2: Example of program of workshop 1, curriculum review

Annex 3: Sample Program of workshop 2: curriculum review

Annex 4-1: Health laboratory personnel educational system description

Annex 4-2a: Data analysis sheet

Annex 4-2b: Summary laboratory educational system and curriculum review

Annex 4-3a: Health laboratory personnel educational system description (TG/TS)

Annex 4-3b: Health laboratory personnel educational system description (M)

Annex 4-3c: Health laboratory personnel educational system description (E)

Annex 4-3d: Health laboratory personnel educational system description

Annex 5: Example Lesson plan

Annex 6a: Bloom's taxonomy

Annex 6b Exercises: Constructing Good Learning Outcomes

The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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World Health Organization Regional Office for Europe

UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark

Tel: +45 45 33 70 00 Fax: +45 45 33 70 01

Email: eucontact@who.int

Website: www.euro.who.int