HBM4EU
science and policy
for a healthy future

2018 Programme of training activities, materials and capacity building mechanisms

Deliverable Report D 2.4

WP 2 - Knowledge Hub

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1 Authors and Acknowledgements

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2 Development of the training programme

2.1 Background

Training is vital to every participant to the HBM4EU programme as it provides structure to the existing knowledge base and evolution of the state-of-knowledge on developments in different WPs. Training is also much about bringing this knowledge into practice and involving expertise of experienced persons in the programme.

The challenge will be to provide an open platform and a free flow of information in a tailored training setting. For this the core group developed some principles that were used throughout the development phase:

▸ Open access – the training programme and the training materials to be publicly available. This means that we are aiming to only invite instructors who are willing to provide all their materials open access.
▸ Inclusiveness – the training programme to be available to all participants within HBM4EU and if the courses are not full, availability for participation of parties from outside HBM4EU.
▸ Active and dedicated participation – the participants will be expected to be active in the sense that they will bring in their own experience and plans for studies, as well as training materials for themselves. The participants will also be expected to support their own travel and accommodation expenses.
▸ Effective implementation – the training format should be tailored to the needs of the participants and be efficient in implementation of the training activities with regard to the involvement of instructors.

2.2 Approach

The approach that was used during the development stage consisted of four steps: collection of information, analysis, dissemination and development.

2.2.1 Information collection

Information was gathered from the HBM4EU participating institutes in all of the participating countries. This was done by sending a request to the National Hub Coordinators (NHCs) to provide us with person names and e-mail addresses of persons from target group of (potential) course participants and the target group of (potential) instructors. For both target groups online questionnaires were developed that were structured to allow matching of the 'needed' items with 'provided' items. For the questionnaire we have introduced the abbreviations QNEEDS to provide information on the needs and QKES to provide information on knowledge, expertise and skills. The questionnaires contained a section on the general background of the respondent and more specific items on the needs or available KES. In QNEEDS some extra questions addressed the preferred training format, time planning, training location and travel. In QKES some questions were included regarding open access to training materials, availability of institutional lab facilities for training, etc. Before sending out the online questionnaires, the contents and format were discussed and tested online (core group telecon meeting of April 27th 2017). Persons in the target groups received an invitation to complete the questionnaires online in May 2017. We sent out personal reminders during the summer and closed the questionnaire on 01-08-2017. The final call resulted in a response rate of 61 % for QNEEDS and 71 % for QKES (note that the percentages are slightly skewed because some answered the questionnaire on behalf of their colleagues).

2.2.2 Analysis

An overview was prepared on the number of questionnaires sent out to each country and on the response from each country. These data were also aggregated on HBM4EU level. The results from the questionnaires were presented in tabular and graphical overviews.

2.2.3 Dissemination

Based on the available questionnaire data a presentation was prepared for the HBM4EU consortium meeting on September 7th 2017 in Berlin. All feed-back received during and after this meeting was discussed with the core group during a teleconference on October 17th, 2017.

2.2.4 Development

With the presented information the task leader developed a proposal for a generic template for a basic training and a concept for one-day trainings of advanced topics. During a core group teleconference session (October 17th, 2017) this plan was taken to the stage that the 2018 training programme could be developed for online publication. In addition, a procedure for application and registration was developed by the task leader and discussed with the core group. The result of this discussion is ready for online implementation.

2.3 Needs and Available Knowledge, Expertise and Skills

2.3.1 Needs

Below Tables 2.3.1-2.3.5 show an overview of the most important results from the QNEEDS questionnaire. The questionnaire was completed by respondents from all countries currently participating in HBM4EU. Most of the respondents have 0-5 years of experience with HBM (63.3 %) and a majority of the respondents is interested in basic training (71.4 %). The interest in advanced training topics is also considerable (32.4 % for non-specific generic topics and 45.2 % for specific topics). Regarding the training format no distinct preference was identified for the number of meetings. Trainings of 1-3 days are preferred and most of the respondents would like to participate in about 2 training activities within one year. As preparation for the course self-study with online materials or with a webinar had the preference. Regarding planning of the training, a clear preference for the months February to May and September to November was observed. There was no preference for the location of the training, although most respondents indicated to prefer less than 4 hours travel time.

Table 2.3.1: Origin of the respondents

Country of origin	Number (%), total n=210
Austria	7 (3.3)
Belgium	10 (4.8)
Croatia	7 (3.3)
Cyprus	2 (1.0)
Czech	16 (7.6)
Denmark	6 (2.9)
Finland	7 (3.3)
France	11 (5.2)
Germany	9 (4.3)
Greece	5 (2.4)
Iceland	6 (2.9)

Country of origin	Number (%), total n=210
Ireland	7 (3.3)
Israel	7 (3.3)
Italy	8 (3.8)
Latvia	8 (3.8)
Lithuania	8 (3.8)
Netherlands	9 (4.3)
Norway	9 (4.3)
Poland	4 (1.9)
Portugal	11 (5.2)
Slovakia	5 (2.4)
Slovenia	9 (4.3)
Spain	21 (10.0)
Sweden	4 (1.9)
Switzerland	9 (4.3)
United Kingdom	5 (2.4)

Table 2.3.2: Level of experience of the respondents, estimated in years

	Number (%)
0-5 years	133 (63.3)
6-10 years	37 (17.6)
> 10 years	39 (18.6)

Table 2.3.3: Description of general training needs

	Number (%)
Non-specific / Basic	71 (33.8)
Non-specific / Advanced	68 (32.4)
Specific / Basic	53 (25.2)
Specific / Advanced	95 (45.2)

Table 2.3.4: Interested expressed in a general basic training

	Number (%)
Yes	150 (71.4)
No	55 (26.2)

Table 2.3.5: Interested expressed in training per topic, as well as an indication for basic or advanced

Subject	Basic n (%)	Advanced n (%)	Basic & Advanced n (%)
Ethics issues: informed consent procedure	43 (20.5)	26 (12.4)	33 (15.7)
Communication and information related to recruitment phase	37 (17.6)	20 (9.5)	38 (18.1)
Communication and information related to reporting of study outcome	35 (16.7)	29 (13.8)	56 (26.7)
Development and design of population-based HBM-surveys	51 (24.3)	28 (13.3)	57 (27.1)
Study protocol development and quality assurance	43 (20.5)	27 (12.9)	56 (26.7)
Data collection and management including privacy protection	47 (22.4)	25 (11.9)	45 (21.4)
Sample collection, shipment and short-term storage	37 (17.6)	25 (11.9)	42 (20.0)
Long-term storage and biobanking	38 (18.1)	28 (13.3)	41 (19.5)
Sample pre-treatment	23 (11.0)	32 (15.2)	41 (19.5)
Method development and validation and quality assurance issues	32 (15.2)	40 (19.0)	48 (22.9)
Laboratory analysis	40 (19.0)	25 (11.9)	51 (24.3)
Interpretation of biomarker data (health effects)	33 (15.7)	40 (19.0)	68 (32.4)
Questionnaire related to sample annotation of contextual information	37 (17.6)	19 (9.0)	37 (17.6)
Data acquisition and cleaning	36 (17.1)	18 (8.6)	37 (17.6)
PBPK-modeling	49 (23.3)	7 (3.3)	37 (17.6)
Statistical analysis	33 (15.7)	36 (17.1)	63 (30.0)
Other	4 (1.9)	2 (1.0)	3 (1.4)

2.3.2 Knowledge, expertise and skills (KES)

In Tables 2.3.6-2.3.10 the results from the QKES questionnaire are presented. The topics 'long-term storage and biobanking (9.2 %) and PBPK-modelling (4.9 %) were relatively under represented among the expertise that could be provided by the group of respondents. About half of the respondents have facilities available at their institute that would be suitable for hands-on training. These facilities varied widely from laboratories to computer rooms, for various group sizes. Almost all agreed to travel to the training course venue, and most of the respondents would prefer up to 3 days per training activity with 2 training activities per year. The availability of the respondents was the highest in the months February to May and October and November. The preference for the training days was Monday to Friday.

Table 2.3.6: Origin of the respondents

Country of origin	Number (%), total n=184
Austria	11 (6.0)
Belgium	8 (4.3)
Croatia	3 (1.6)
Cyprus	5 (2.7)
Czech	14 (7.6)
Denmark	6 (3.3)
Finland	7 (3.8)
France	9 (4.9)
Germany	7 (3.8)
Greece	6 (3.3)
Iceland	6 (3.3)
Ireland	2 (1.1)
Israel	0
Italy	9 (4.9)
Latvia	6 (3.3)
Lithuania	3 (1.6)
Netherlands	8 (4.3)
Norway	10 (5.4)
Poland	2 (1.1)
Portugal	12 (6.5)
Slovakia	8 (4.3)
Slovenia	9 (4.9)
Spain	19 (10.3)
Sweden	5 (2.7)
Switzerland	7 (3.8)
United Kingdom	2 (1.1)

Table 2.3.7: Level of experience of the respondents, in years.

	Number (%)
0-5 years	12 (6.5)
6-10 years	39 (21.2)
11-20 years	70 (38.0)
21-30 years	46 (25.0)
> 30 years	15 (8.2)

Table 2.3.8: What is your contribution to human biomonitoring?

	Number (%)
K – theoretical knowledge	134 (72.8)
E – practical expertise	119 (64.7)
S – you have skills (to demonstrate and support hands-on training)	59 (32.1)

Table 2.3.9: Are you willing to contribute as an instructor in your specific area of expertise?

	Number (%)
Yes	132 (71.7)
No	44 (23.9)

Table 2.3.10: Prior experience in providing training/instruction in the following subjects in English

Topic	Number (%)
Ethics issues: informed consent	22 (12.0)
Communication and information related to recruitment phase	42 (22.8)
Communication and information related to reporting of study outcome	51 (27.7)
Development and design of population-based HBM survey	48 (26.1)
Study protocol development and quality assurance	60 (32.6)
Data collection and management including privacy protection	45 (24.5)
Sample collection, shipment and short storage	48 (26.1)
Long-term storage and biobanking	17 (9.2)
Sample pre-treatment	40 (21.7)
Method development and validation and quality assurance issues	60 (32.6)
Laboratory analysis	65 (35.3)
Questionnaire related to sample annotation of contextual information	37 (20.1)
Data acquisition and cleaning	26 (14.1)
PBPK-modelling	9 (4.9)
Statistical analysis	41 (22.3)

2.3.3 Analysis of results from QNEEDS and QKES

Both QNEEDS and QKES covered almost all participating countries in the HBM4EU countries, with high response rates. The potential training participants showed the biggest interest in the topics of protocol development, laboratory analysis, interpretation of biomarker data and statistical analysis. The available experts stated that they have experience in providing training in all of these topics. Also, a general basic course would be of interest for more than 70 % of the respondents. More than 80 % of the experts stated that they have experience in providing training/instruction, which would match the training needs.

The months of availability and the preference for the number of training activities per year were equal for both training participants and the experts. A wide variety of locations is suitable for the training program at different locations in Europe.

2.4 Outline of a training programme

2.4.1 Training methods

The information obtained from QNEEDS clearly indicates that most respondents would like to have some kind of generic training on a broad range of basic topics. Therefore, the core group proposes to organise a basic training format that would be provided over several years. The content would evolve over the years to include more and more of the results harvested from the on-going HBM4EU consortium. The basic training would rely on frontal teaching methods supplemented with interactive training in break-out groups with cases that can be proposed from both instructors and participants. The more limited interest in specific topics could be satisfied by providing additional advanced training. In these training activities it would be possible to involve the whole range of educational approaches from round-table discussions, hands-on computer-based instructions and hands-on lab-based training, and other methods as long as they serve the content and group size.

Before the start of each training online, self study materials or a webinar are made available, for the most optimal preparation. After each training, an online exam for self-assessment will be made available on the website, knowledge and skills can be included in this exam (including solutions of the instructor).

2.4.2 Format

A general training format was developed consisting of a one-week course that would be provided two times per year, one week in spring and a second week in autumn. Within one year the venues would be in different parts of Europe, to provide accessibility for all countries. Each week would consist of a two-day basic training and two or three one-day sessions to address topics for advanced training. This allows participants to combine the basic with advanced training in the same week at the same location. It also opens up the possibility to attend advanced training on one or two consecutive days.

MON ADVANCED TOPIC-1	TUE BASIC	WED BASIC	THU ADVANCED TOPIC-2	FRI ADVANCED TOPIC-3

Figure 2.4.1: Schematic representation of arranged training activities for a one-week training

For the basic training the following learning objectives were formulated:

1. The participant is familiar with applications of HBM and is aware of the societal context.
2. The participant is aware of the ethics implications and the required approval of study protocols.
3. The participant can prepare a basic study design for a HBM study and can assess the quality of such designs.

Before start of the training activity, the participants receive documentation for preparation. They receive a short questionnaire to try and find out about their interests and expectations (to be compared to a similar set of questions asked after completion of the course). Participants are encouraged to take their own projects ideas to the course. For some participants, it may be possible to apply some of the acquired knowledge and skills immediately to their own substances or protocols that they are working on. Some brief presentations/instructions/demonstrations will be recorded on video. For the basic training a tentative programme was developed:

Table 2.4.1: Outline of the programme for the two-day basic training.

Day-1

Session 1: introduction of the course and the topic (1.5 h)

> Introduction to the course
>
> Concepts and principles of HBM
>
> Overview of HBM initiatives around the globe and brief history of HBM4EU
>
> HBM in a societal context and policy interactions

Break

Session 2: Orientation on the design of HBM studies (1.5 h)

> Objectives and research questions: science and society
>
> What is needed for the protocol for a population based study: an overview
>
> Ethics and approval of study protocol: what is required and how to arrange it
>
> Case study [to be determined] and discussion in break out groups

Lunch

Session 3: information and recruitment of participants (1.5 h)

> Selection of participants (inclusion/exclusion)
>
> Information, invitation and informed consent
>
> Data management and save-guarding privacy
>
> Collection of person and contextual information by questionnaire

Break

Session 4: Acquisition of samples (1.5 h)

> Choice of media: advantages and limitations [apply to substances of interest]
>
> Selection of most suitable biomarker(s)
>
> Sample collection techniques and instructions
>
> Sample collection, short- and long-term storage and shipment

Day-2

Session 5: Basic principles of laboratory analysis (1.5 h)

> Sample pretreatment [propose urine and blood]
>
> Method development and validation
>
> Laboratory quality assurance
>
> Laboratory validate an analytical procedure

Break

Session 6: Data analysis and interpretation (1.5 h)

> From raw data to information
>
> Adjustments
>
> Eye balling and descriptive statistics
>
> Basic principles of biokinetics

Lunch

Session 7: Reporting and communication (1 h)

> Communication of group and individual HBM data

> Communication to the public: getting the message across

> Basic introduction to reporting and submission of data to IPChem database

Break

Session 8: Exercise and discussion (2 h)

> Instruction for training on 'Designing your own HBM study'

> Exercise to prepare a study design in break-out groups

> Short presentations by participants and discussion

> Plenary course evaluation

Closure

For the advance one-day training sessions the core group suggests the following topics to be covered in 2018:

- ‣ Protocol development
- ‣ IPCheM data base
- ‣ Ethics
- ‣ Lab skills, exposure biomarkers
- ‣ Lab skills, effect biomarkers

The basic programme and the advanced topic will be announced online in November of 2017. A more detailed programme will be provided to the course participants.

2.4.3 Planning

For 2018 the core group proposes to start with venues that include active participation of core group institutes in providing the venue and also in providing contributions to the advanced part of the course. This will be a good way to find out how the proposed course content and format is received and to build on that experience for the following years. The core group proposes to have the first training course in Ljubljana, Slovenia in week 8 (preferred) or week 9 (reserve). The second training course is proposed to be scheduled in autumn 2018 in Nijmegen, the Netherlands.

2.4.4 Registration

The course programme for 2018 will be published on the Training page of the HBM4EU website. There will be two time slots for registration: a first and a second announcement (see Figure 1). The number of participants for the basic training is proposed at 30 (the exact number will depend on the venue). For the one-day training activities maximum participation will depend on the content and type of training (to be determined). During the first time slot interested persons, affiliated with HBM4EU partners, can apply for registration. They will be asked to complete an online form in the closed area of the website. This form covers person name and affiliation and a field were the applicant can motivate participation in 2018. After completing the form the information will be transferred by e-mail to the training coordinator at RUMC. Applicants will be pre-registered based on the date of application. For acceptance, the training coordinator will also take into account the motivation of the applicant for admittance in 2018 based on motivation to e.g. activities planned as part of their role in HBM4EU and contribution to studies already on-going or starting in 2018. After the deadline, the course coordinator will fix the number of participants and will, if there are still spaces available, open the second public announcement on the website for those parties outside of HBM4EU to apply for participation and they will be granted access to the application form. Participants from outside HBM4EU will be asked to pay a registration fee. The income generated

from these registration fees will be spent by the core group within task 2.5, e.g. to support participation from low-income countries (to be decided).
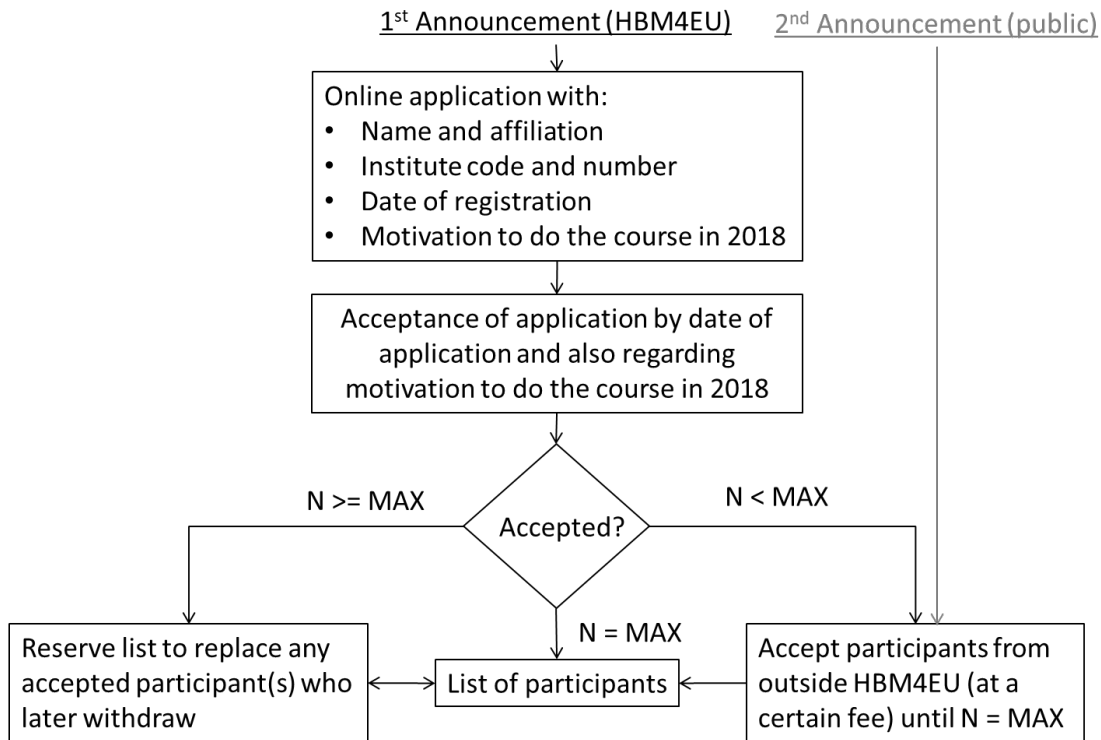

Figure 2.4.1: Flow chart of application and registration.

2.4.5 Evaluation

After each training activity, an evaluation will be sent to the instructors and training participants. One of the sections in the questionnaire will address the degree of satisfaction after following the training (matching with indicator 29 of Deliverable 6.1). This questionnaire will be provided online and sent out directly after each training. The evaluation questionnaire will be prepared in advance and will be as much standardized as possible, for comparability purposes with future training activities over the years.