CSA JPI HDHL 2.0

Evaluation of Joint Funding Actions

Manuel KH: Knowledge Hub on Malnutrition in the Elderly

Content

1 Introduction and aims 3
2 Approach for the evaluation of the JFA 3
2.1 Methods 4
2.2 Indicators 4
2.3 Project Monitoring 4
3 JPI HDHL Joint Funding Action: Knowledge Hub on Malnutrition in the Elderly (MaNuEL KH) 5
3.1 Aim of the call 5
3.2 Peer-review Procedure and Results 6
3.3 Evaluation Results 7
3.3.1 General Indicators 7
3.3.2 Conclusions 18
3.4 Annexes 19
3.4.1 Annex 1: List of MaNuEL KH partners 19
3.4.2 Annex 2: Members of the MaNuEL Stakeholder Advisory Board 19
3.4.3 Annex 3: Used data sources 19
3.4.4 Annex 4: Overview on general indicators 19

1 Introduction and aims

Monitoring and evaluating of JPI HDHL activities is highly important to measure the success, concrete outcomes and impact of the JPI HDHL and to allow for continuous improvement and development of this initiative. Therefore, these activities are an integral part of the work plan of the current Coordination and Support Action (JPI HDHL CSA 2.0).

The evaluation activities continuously performed by JPI HDHL include:

- Monitoring and evaluation of the processes and general performance of JPI HDHL → Report on the third and fourth Process evaluation of JPI HDHL (CSA Deliverable D6.1, D6.4)
- Evaluation of the funding activities of JPI HDHL → Report on the evaluation of JPI HDHL funding activities (CSA Deliverable D6.2, the present report)
- Monitoring and evaluation the activities of JPI HDHL not related to funding → Report on the evaluation on the progress of the alignment activities (CSA Deliverable D6.3)
- Overall evaluation of the impact of JPI HDHL → Report on the evaluation of the impact of JPI HDHL (CSA Deliverable D6.5)

These tailored activities focus on different aspects of JPI HDHL presented in the consecutive published Implementation Plans (IP) and will result in publically available reports like this one.

The main aim of this report is to evaluate the monitoring data of the funded research in JPI HDHL in relation to the respective aim of the call and the IP and to analyse the output, outcomes and impact of JPI HDHL funding activities (both on call and project level). The results of the evaluations will allow the fine-tuning, refining and planning of new activities for the following IP to reach the expectations of all stakeholders and fulfill the JPI HDHL objectives. The evaluation will also assist in raising awareness for the activities performed under the umbrella of JPI HDHL and provides the basis for the communication and dissemination of JPI achievements.

2 Approach for the evaluation of the JFA

The evaluation is based on comparison of the objectives of the IPs and the outputs/outcomes of the different funding activities of the JPI HDHL. In addition, the Scientific Advisory Board (SAB) and Stakeholder Advisory Board (SHAB) of the JPI HDHL have been involved in the evaluation process. The evaluation of the Joint Funding Actions builds on the related work packages in the ERA-Net ERA-HDHL, in particular WP 7, dealing with monitoring and communication of the additional transnational JFAs and their results.

The present report includes evaluations of all JFAs implemented by the JPI HDHL in 2015 and earlier:

- Determinants of Diet and Physical Activity Knowledge Hub (DEDIPAC KH, 2013)
- European Nutritional Phenotype Assessment and Data Sharing Initiative (ENPADASI, 2014)
- Biomarkers for Nutrition and Health (BioNH, 2014)
- Food Processing for Health (FP4H, 2014)
- Malnutrition in the Elderly (MaNuEl, 2015)
- Intestinal Microbiomics (IM, 2015)
- Nutrition and Cognitive Function (NutriCog, 2015)

2.1 Methods

For this report a 'Framework for the evaluation of JPI HDHL joint funding activities' (see Annex) has been developed by the task leader and agreed with the other involved CSA partners.

In a first step, relevant indicators have been collected and defined (see chapter **2.2 Indicators** for details). Based on these indicators the required data from the funded projects have been collected systematically in form of project reports and oral presentations at the project symposia (see chapter **2.3 Monitoring** for details). If necessary, further questions were addressed to the coordinators of the research consortia. In parallel, other necessary data and information (call documents, call statistics, etc.) have been collected from the respective Call Secretariats. In addition, the success and impact of funded projects has been assessed by experts (previous or former SAB and SHAB members) based on final project reports and symposia. For the experts' assessment a specific short evaluation questionnaire, based on the elaborated indicators, has been developed. This template asked the respective expert for a short written assessment of the funded projects based on 3-4 leading questions after the attendance of the final symposium and/or reading of the final report.

The actual evaluation has then been performed by the task leader by analysing the different data available following the evaluation framework and afterwards agreed with the other involved CSA partners.

2.2 Indicators

The indicators used in this evaluation report have been developed in a designated task force by several CSA partners in a separate task (Subtask 6.1.1 Definition of performance indicators) within the CSA JPI HDHL 2.0. Two different types of indicators on have been defined, general and specific indicators, comprising outcome, output and impact level:

(1) General indicators for all JFAs

To enable the comparison between joint funding actions (at least with JFAs using the same funding instrument) a set of general indicators for all JPI HDHL JFAs has been developed. These general indicators can be grouped into six overarching categories comprising several more specific indicators: Alignment of national funding, Involvement of national scientific communities, Collaboration, Capacity Building, Data and Knowledge Sharing, and Impact.

(2) Specific indicators for each respective JFA

Since the aims and objectives differ greatly between the various JFAs, the definition of specific indicators was necessary to evaluate the success of a JFA in itself and not only in comparison to other JFAs. To evaluate the success of each JFA separately, specific indicators following from the corresponding Strategic Research Agenda and IP as well as the call text as of each JFA have been developed.

2.3 Project Monitoring

The comprehensive monitoring of the output and outcomes of the running and finished funded projects builds the basis for the performed evaluations. The systematic and structured collection of data from all funded projects has mainly been organized within a designated work package of the ERA-Net ERA-HDHL (WP7). The monitoring activities within ERA-HDHL comprised the monitoring of

the progress and the results of the research projects of the non cofunded JFAs implemented as part of ERA-HDHL, as well as the previous calls implemented through the IP 2014-2015.

Data from all funded projects have been collected in accordance to the indicators defined in WP6 of the CSA JPI HDHL 2.0. This comprises data both on call and project level:

(1) Call level:

For each Joint Funding Action, the funding organisation responsible for the Joint Call Secretariat (JCS) of a JFA was in charge of the statistical analysis of the call results based on the elaborated indicators (see 2.2). In particular the geographic distribution of the scientists applying to the call, the discipline and the type of organisation, the amount of funding requested per partner/consortium and the transnational cooperation has been analysed.

(2) Project level:

The follow-up of funded projects was taken care of by the respective JCS. For each funded project, annual scientific progress reports and one final report have been collected.[1] Project coordinators were asked to submit the respective scientific reports for the joint project, on behalf of the whole consortium to the respective JCS based on a pre-defined template including the specific indicators (see 2.2). Since 2019, these reports are collected using an online submission tool.

For the calls launched 2015 and later, the progress of ongoing JFAs has also been monitored by two status symposia organized by JPI HDHL. One status symposium has been held during the runtime of the projects (midterm symposium) and one just before the project is about to finish (final symposium). The main purpose of these symposia is to provide the JCS, the Call Steering Committee and members of the former Scientific Evaluation Committee (SEC) as well as representatives from SAB and SHAB with an update on the progress of the research projects. The presentations by the project coordinators and partners PIs are followed by a plenary discussion with questions from the audience.

For most of the earlier calls (DEDIPAC, ENPADASI, FoodBall/BioNH, MaNuEl) a final conference has been organized by the consortia itself without participation of SAB, SHAB or former reviewers.

3 JPI HDHL Joint Funding Action: Knowledge Hub on Malnutrition in the Elderly (MaNuEL KH)

3.1 Aim of the call

The Joint Action "Malnutrition in the Elderly Knowledge Hub" (MaNuEL KH) is part of the Implementation Plan 2014-2015 reflecting the Strategic Research Agenda of the Joint Programming Initiative "A Healthy Diet for a Healthy Life". In the Implementation Plan of the JPI HDHL it was laid down that "*Research is needed to* ***discover the factors that lead to a poor detection*** *of individuals at risk of malnutrition,* ***to test harmonized European standards, development and validation of screening instruments for quick and easy screening of malnutrition****, plans to improve the medical nutrition therapy of patients of chronic diseases that do not compromise their nutritional status.* ***Pilot***

[1] The data collection for the specific indicators as part of the final report was not possible for the first three JFAs (DEDIPAC, ENPADASI & MaNuEl) since the specific indicators have only be defined after the projects where finished. The project coordinators have been contacted retrospectively to answer those indicators.

***projects of continuous data collection and feedback in different settings**, from the community to the tertiary hospital, have started as local initiatives that **need to be extended across Europe**."*

The main objective of the Joint Action "Malnutrition in the Elderly Knowledge Hub" was to support transnational networking activities on:

1. The definition of malnutrition in the elderly.
2. Integration and harmonisation of currently available valid and reliable screening instruments to enable identification of groups of elderly people that will benefit from nutrition interventions in different settings (e.g., home care, nursing homes, hospitals) and countries.

The purpose of the funding instrument 'Knowledge Hub (KH)' was the increase and facilitation of transnational communication, cooperation and coordination between individual researchers, research groups and research organisations in order to build a productive and sustainable competence network in the field of malnutrition.

The KH should also be instrumental for researchers participating in H2020 calls, in particular the call on "Tackling malnutrition in the elderly". One of the first activities of the KH was to organise a joint workshop in early 2016 with researchers involved in both initiatives to exchange information and knowledge of ongoing or planned activities.

3.2 Peer-review Procedure and Results

The call for the MaNuEL KH was launched on the 15th of April, 2015. The Joint Call Secretariat was located at ZonMW, the Netherlands. The implementation process was organized as a three-step procedure (see fig. 1).

In the 1st step researchers in all participating countries were asked to submit an **Expression of Interest letter** (EoI), stating their expertise and scientific excellence in the relevant field, personal and institutional capacities and infrastructures and the potential contribution to the activities of the KH. In the following **national evaluation processes**, each participating funding organization selected their MaNuEL KH members according to national eligibility criteria as well as agreed criteria as stated in the call document (scientific quality of the intended contribution of the research group/ organization and how it matches the objectives of the MaNuEL KH, quality of the planned activities in the MaNuEL KH, good balance among different expertise's). After finishing the national evaluation, the funders represented in the MaNuEL Call Steering Committee (CSC) discussed and adapted the overall selection of candidates to ensure sufficient scientific and geographical balance of the network partners. Subsequently, the applicants were informed on the outcome of the process.

In the 2nd step, the selected partners of the MaNuEL KH met for the first time at the **networking meeting on** 2nd and 3rd of July 2015 in Brussels**,** to facilitate the concept development and drafting of one **transnational network proposal**. During the course of this networking meeting, the selected hub members identified six work packages of their future work program and elected the Hub coordinators. A first draft framework for the proposal was also outlined at the meeting and over the course of the next three months a full joint proposal was developed describing the work program of the knowledge hub. The network proposal was submitted by the coordinator on 1st of October, 2015.

In the 3rd step, the MaNuEL KH proposal was evaluated in a **peer-reviewed process** by 4 internationally renowned experts in the field, according to the criteria that were described in the call text. The Scientific Evaluation Committee (SEC) discussed the network proposal in a **telephone conference** on the 5th of November 2015, including a hearing of the knowledge hub coordinating team. 3 of the 4 reviewer attended to the conference from which was one the chair. The funders

were invited to observe the discussion by phone. As a result of that meeting, the hub coordinator was invited to revise and re-submit the network proposal according to recommendations from the SEC. The revised proposal was again evaluated by the SEC and based on the positive result, the CSC decided to fund the knowledge hub (December 2015).

Application, selection and nomination of MaNuEL Knowledge Hub members

MaNuEL networking meeting; preparation and submission of the network proposal

Peer-reviewing/evaluation process; decision on funding for MaNuEL KH

Start of National Funding

Figure 1: Implementation of the MaNuEL Knowledge Hub

In March 2016 the MaNuEL KH officially started its work. Dorothee Volkert (Germany) and Marjolein Visser (the Netherlands) were elected as Hub coordinators and 10 co-leaders of the 6 work packages of MaNuEL formed the Coordination Support Team. A stakeholder advisory board was established which included 6 malnutrition experts and representatives of relevant European Societies.

In total, 22 research groups from institutions from Austria, France, Germany, Ireland, the Netherlands and Spain as well as New Zealand were involved in the MaNuEL KH. A list of MaNuEL KH partners can be found in Annex 1. There were some changes in the composition of the network during the course of the three years funding period. Two collaborators (RAD and TTZ) had to step out of the project due to changes in the management in their organisations and termination of employment. Instead, Prof. Mary Hickson from the Plymouth University (UK) was added as a new collaborator to MaNuEL.

The MaNuEL KH officially ended in June 2018 after a final consortium meeting in Amsterdam.

3.3 Evaluation Results

3.3.1 General Indicators

3.3.1.1 Alignment of national funding

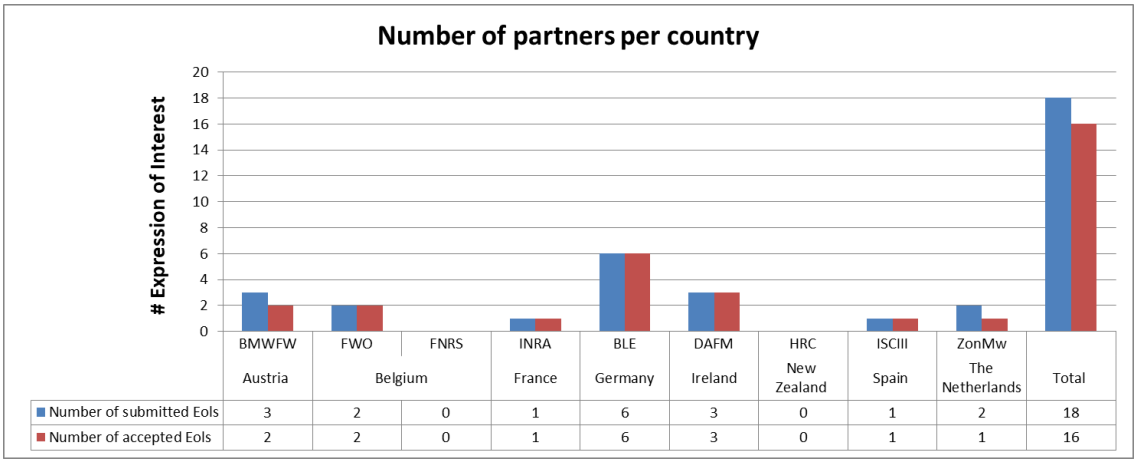
Initially, 7 JPI HDHL member countries and 8 funding organisations participated in the call (see. Fig. 32). The total *in cash* budget committed by the participating funding organisations of MaNuEL was 1.18 Mio. €. New Zealand, France and Spain participated with *in kind* budgets.

3.3.1.2 Involvement of national scientific communities

3.3.1.2.1 Participation of national scientific communities

In response to the call 18 EoI letters had been submitted, of which 16 were selected as Hub members in the national selection processes (step 1) and invited to attend the networking meeting (step 2). Some EoI letters included several research groups from the same country thus in the submitted network proposal 22 research groups (incl. two organisations from New Zealand and UK) were part of the network as partner or collaborator (step 3).

The distribution of the submitted EoI letters and selected hub members over the participating countries is depicted in Fig. 2. In almost all participating funding organisations despite of FNRS (Belgium) and HRC (New Zealand) at least one EoI letter was submitted in response to the call and research groups and/or scientists were selected to join the knowledge hub (Fig. 32).



	BMWFW Austria	FWO Belgium	FNRS Belgium	INRA France	BLE Germany	DAFM Ireland	HRC New Zealand	ISCIII Spain	ZonMw The Netherlands	Total
Number of submitted EoIs	3	2	0	1	6	3	0	1	2	18
Number of accepted EoIs	2	2	0	1	6	3	0	1	1	16

Figure 2: Numbers of EoIs per country in the implementation of MaNuEL KH

From the 16 research groups/scientists that were selected in the national processes and attended the networking meeting, 14 (87,5%) were finally involved as partners in the joint network proposal, showing that despite the top-down selection processes on national levels the network succeeded to integrate most of the selected partners in a joint network programme. In addition, one research group from New Zealand was integrated in the network at this stage as a collaborator, another one from UK during the course of the project.

All MaNuEL KH partners were scientists and research groups from research institutions, no industry partners or other type of institutions were involved, reflecting the academic nature of this research field.

3.3.1.2.2 Distribution of national funding

Like all subsequent joint funding actions implemented by the JPI HDHL, the funding of the MaNuEL KH was organized as „virtual common pot“, meaning that each country and/or funding organization finances the activities of „their“ national scientists.

The total budget committed by the participating funding organisations for the Knowledge Hub was 1,2 Mio. € *in cash*. In the joint network proposal, the Knowledge Hub requested a total budget of 1,0 Mio. € *in cash* and approximately the same budget was then allocated to the hub members by the different funding organisations over the course of two years. Thus 86.5 % of the *in cash* committed budget were spent by the participating funders. New Zealand, Spain and France (approx. 405.000 €) allocated an *in kind* budget, however data regarding the amount are not available for all funders.

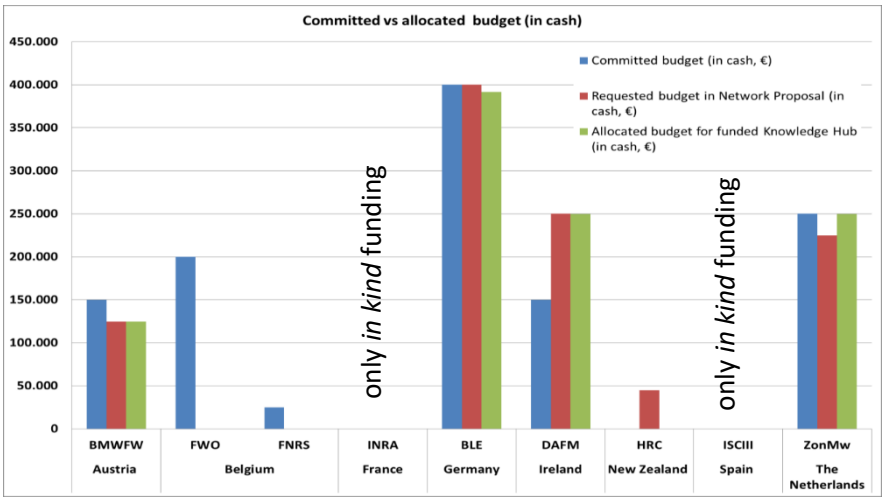


Figure 3: Committed, requested and allocated funding budget of MaNuEL KH, distributed by countries.

3.3.1.3 Success of implementing collaboration

The general objectives of MaNuEL KH were the extension of scientific knowledge and the strengthening of evidence-based best practice in the field of malnutrition in older persons, building a sustainable, transnational competence network of malnutrition experts, and standardization harmonisation of research and clinical practice across Europe.

MaNuEL consists of six work packages that focused on: 1) defining treatable malnutrition in older persons, 2) malnutrition screening in older persons, 3) determinants of malnutrition in older persons, 4) prevention and treatment of malnutrition in older persons, 5) policies and education regarding malnutrition screening and treatment in older persons across Europe, and 6) management of MaNuEL.

The funding action was conducted as a joint Knowledge Hub with its members addressing one research challenge together, rather than as in classical competitive call, resulting in several smaller research consortia addressing several single research questions in parallel. The success of the established collaboration on transnational and scientific level is being assessed in the following subchapters.

After the start of MaNuEL KH it turned out that it was not possible to establish a definition for “treatable malnutrition” due to a lack of baseline data on appetite and body composition from previously conducted nutritional intervention studies that were pooled. Therefore, the first aim was changed focusing on the investigation of the effectiveness of nutritional intervention on clinically important outcome measures and whether the effectiveness is influenced by patient characteristics and/or intervention characteristics. Furthermore, MaNuEL KH planned to develop a minimum dataset for nutritional intervention studies including specific variables to measure baseline and the follow-up effects of the intervention to increase the comparability of measures in these studies.

Because of a lack of information in the internet about educational curricula regarding malnutrition, the MaNuEL KH implemented an alternative way to collect information about the curricula by adding a request in the survey. Additionally, an intensive internet search and evaluation of online modules was performed regarding malnutrition of older persons.

3.3.1.3.1 Interdisciplinary collaboration

In the MaNuEL KH different relevant disciplines were available including epidemiologists, nutritionists, geriatricians, dieticians, and nursing specialists. The different disciplines were very

relevant for MaNuEL's objectives regarding clinical practice, policy and education of health professionals.

3.3.1.3.2 Transnational collaboration

The transnational composition of the Knowledge Hub is depicted in Fig. 34.

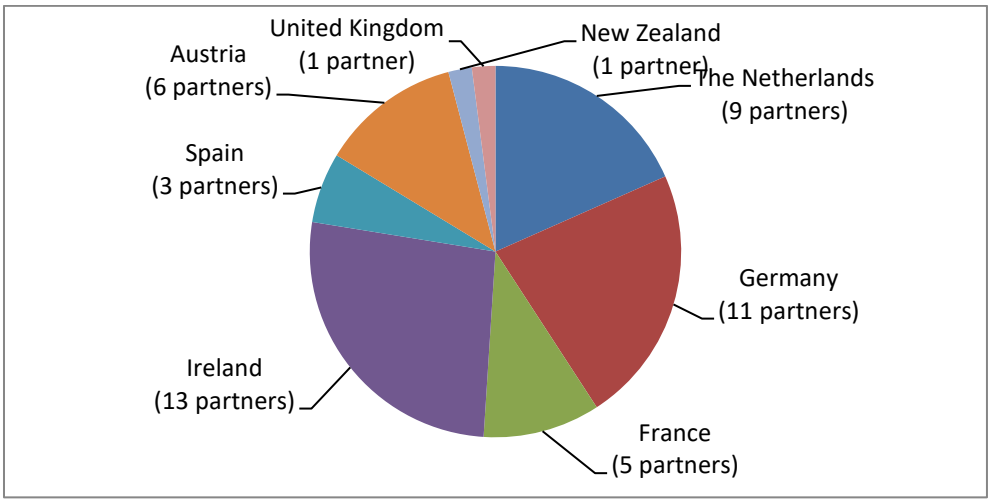


Figure 4: Transnational composition of MaNuEL KH

Members of the MaNuEL KH were originated primarily in Middle or Western Europe. Eastern Europe was not represented since no funding organizations participated in the call. The distribution of the leading roles within the single tasks was mainly covered by Germany and The Netherlands, reflecting the highest budget of these KH members. But also the other KH members took over the responsibility of at least one task of a work package (Fig. 35). Only New Zealand and United Kingdom, which were integrated collaborators without own funding, had no leading role in the tasks.

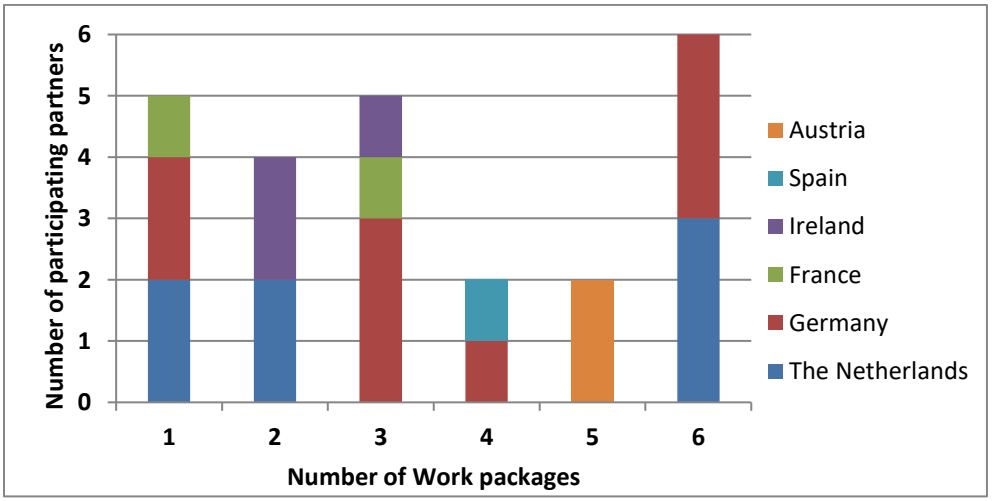


Figure 5: Distribution of Tasks / Leading Roles within the network over the countries.

The MaNuEL KH had established a large number of collaborations with other networks.

- Collaboration with the ONCA (Optimal Nutritional Care for All) network through a representative in MaNuEl's Stakeholder Advisory Board (see Annex 2): 14 countries were involved including Belgium, Czech Republic, Croatia, Denmark, France, Germany, Ireland, Israel, the Netherlands, Poland, Slovenia, Spain, Turkey and the UK. The web survey of work package 5 was conducted with support of ONCA and publication of MaNuEL results as well as the download of MaNuEL Toolbox was published on the ONCA website for maximal dissemination of the results.

- EU funded research project SENATOR (Software Engine for the Assessment & optimization of drug and non-drug Therapy in Older persons): The ONTOP (Optimal Evidence-Based Non-drug Therapies in Older People) group, as part of the SENATOR trial, used a newly developed systematic review protocol and was used to perform a systematic review of non-pharmacological interventions for malnutrition in WP4. In addition, a Delphi study among members of both the SENATOR and MaNuEL projects was set up to define relevant clinical outcomes for non-pharmacological interventions for malnutrition in older persons.
- EU funded Research and Innovation Action PROMISS (Prevention Of Malnutrition in Senior Subjects in the EU): The hub coordinator (Marjolein Visser) was coordinator of PROMISS and supported thereby the active and continuous dissemination between the two projects. Two symposia at the European Society for Clinical Nutrition and Metabolism (ESPEN) 2017 and 2018 linked the results of PROMISS and MaNuEL. The results of work package 4 in collaboration with the SENATOR project were used to help defining the primary and secondary outcomes of the long-term intervention trial to be conducted in PROMISS.
- Collaboration with worldwide nutritionDay initiative **to fight malnutrition in health care institutions**
- Meeting "Determinants of Malnutrition in Older Persons" at FAU University organized by the BANSS foundation: The basis for aetiological model of malnutrition was developed and a Delphi Study was conducted to finalize the model with the help of individual BANSS meeting participants. The results were presented at ESPEN 2018 and are included in MaNuEL Toolbox.
- Collaboration with Special Interest Group (SIG) Geriatrics and SIG Nutrition: The members were provided with a short lecture on the Minimum Data Set for nutritional intervention studies and were actively invited to participate in a Delphi round. Email addresses were collected to ensure dissemination of MaNuEL result in ESPEN and European Union Geriatric Medicine Society (EuGMS) community.

3.3.1.3.3 Intensity of Collaboration

Transnational communication, collaboration and coordination between individual researchers and research groups started with the kick off meeting on the 4th and 5th of April 2016 in Nuremberg, Germany. In the following, communication structures were installed, including regular calls and e-mails between the hub coordinator and individual work package leaders. Between 2016 and 2018, six web conference calls with all work package leaders and the hub coordinator were organized. Capacity building and willingness to cooperate was also reflected in the development of a comprehensive consortium agreement, which was approved and has been signed by all partners. Further communication was achieved through three MaNuEL activities organized at international congresses (two times at ESPEN congress 2017 and 2018, and one time at EuGMS congress 2017). During the two ESPEN congresses a 90 min co-symposium was organized involving three MaNuEL presentations and two presentations from the MaNuEL partner PROMISS. All partners of the knowledge hub participated at the final meeting on the 10th and 11th of June 2018 in Amsterdam sharing and discussing the results of the MaNuEL consortium. Apart from 26 MaNuEL partners, the session was attended by 41 invited guests from 5 different EU countries including representatives of higher education institutes and funding agencies. All partners unanimously expressed their interest in a continuation of the group by means of future collaboration and by exploring a future extension of the Knowledge Hub. Additionally, at the 11th of June 2018 a public session for invited stakeholders was organized presenting all results of the MaNuEL partners.

3.3.1.4 Success of scientific collaboration

3.3.1.4.1 Scientific Output

At the publication date of the final report (September 2018), MaNuEL KH had 8 scientific publications published or in press, 4 papers submitted or in revision and 10 further manuscripts in preparation. At the time of drafting this report (October 2019) a total of 16 papers were published including one additional publication found during online search for MaNuEL publications. Furthermore, 7 manuscripts were still in preparation. The publications included systemic reviews, results of clinical trials and MaNuEL studies and multi-cohort meta-analysis. Furthermore, a flyer "MaNuEL project 2016-2018" was distributed during the ESPEN 2018 and The European Federation of the Associations of Dietitians (EFAD) 2018 congress as well as during the Nursing Home Research 2018 congress highlighting the scientific output of the project. The Toolbox booklet "JPI Knowledge Hub Malnutrition in the Elderly, TOOLBOX, clinical practice and policy recommendations from the MaNuEL Knowledge Hub" was developed and can be downloaded as PDF-version[2].

At international conferences 22 oral and 17 posters presentations were held in addition to 5 oral and 17 poster presentations at national conferences resulting in a total of 56 presentations.

In addition, several public relations activities were organized to disseminate the results of MaNuEl including project overviews on websites or public platforms like facebook and oral presentations open for public audience.

3.3.1.4.2 New funding obtained

One of the consortium partners (Dr. Eva Kiesswetter, FAU) successfully applied for a research grant at the German Research Foundation (DFG) for a 6-month research exchange at the group of Prof. Marjolein Visser (VU) to perform secondary data analyses using data from the Longitudinal Aging Study Amsterdam. This work was related to work package 3 and she stayed in Amsterdam from November 2017 to June 2018. The title of the grant proposal was: The relationship between oral health and malnutrition in older adults – a secondary data analysis of the Longitudinal Aging Study Amsterdam. Two manuscripts were prepared during this time.

3.3.1.5 Involvement in other JPI HDHL activities

The MaNuEL KH presented the project and its first results on two events organized by the JPI HDHL. In September 2017, the results were shown by a live video presentation on the JPI HDHL mid-term symposium in Brussels and in December at the 4th JPI HDHL conference in a designated workshop in Brussels by an oral presentation.

Furthermore, MaNuEL KH closely collaborated with JPI HDHL Knowledge Hub DEDIPAC (Determinants of diet and physical activity). An internal report and a framework for determinants developed by DEDIPAC were used by MaNuEL KH resulting in knowledge exchange and harmonization of methods between the KHs.

3.3.1.6 Capacity Building

No PhD student positions were financed via the MaNuEL KH, but 4 PhD students worked within MaNuEL as part of their PhD thesis. 5 Post-docs, 1 Master student and 2 research assistants were involved and in addition, several students performed internships within the MaNuEL project.

[2] MaNuEL Toolbox: https://www.healthydietforhealthylife.eu/index.php/news-archive/476-practical-tools-to-prevent-malnutrition-in-the-elderly-by-the-manuel-knowledge-hub

Since no extra budget was available for training activities, no specific training was offered for the scientists. However, young scientists were stimulated to participate in the conference calls, to present their data during scientific congresses and to attend to the final project meeting of the KH presenting the data orally or on posters and joining the discussion.

The following new tools and resources have been developed during the MaNuEL KH:

- The MaNuEL Toolbox[3] was developed containing the main findings and recommendations for clinical practice and policy.
- The DoMAP (Determinants of Malnutrition in Aged Persons) model was developed to highlight underlying factors contributing to the development of malnutrition.
- A Massive Open Online Course[4] (MOOC) was developed consisting of 5 modules to strengthen the evidence-based knowledge on malnutrition of health professionals.

3.3.1.7 Data and Knowledge Sharing

For answering the specific questions of the single work packages, 9 nutritional intervention studies with a total of 990 participants, 37 dataset from 5 longitudinal or cross-sectional studies, 20 non-pharmacological intervention studies as well as 48 tools for malnutrition and 235 cohorts (from 215 manuscripts) were analysed. The data were further processed for standardization and secondary analysis/meta-analysis.

According to FAIR data management differences were made between newly collected data sets in the MaNuEL project and previously obtained data. In case of newly obtained data, results of the surveys were stored at the departments of the executing research group and other MaNuEL partners were informed about the future use and accessibility through a personal network. The results of the Delphi studies were archived by the specific task leaders but the data are not suitable for reuse, because they were collected to specifically develop one product/outcome. The other newly obtained data were communicated by publications and presentations and archived by the specific task leaders. Secondary datasets of 9 nutritional interventions studies would allow further testing of other hypothesis however they have to meet the requirements of the data contract between the hub coordinator and the principle investigators of the studies. In case of the 37 datasets from 5 different studies, MaNuEL partners are informed about the possibility of future secondary analysis and the community was informed in conference presentations about the accessibility via the principle investigators. Since further use should follow cohort-specific guidelines no specific data use arrangements were made.

3.3.1.8 Impact

3.3.1.8.1 Contribution of the project to the coordination/harmonization of research activities

By the large number of partners (see 3.3.1.3.2 and 3.3.1.3.3) it was detectable, that MaNuEL KH had a clear focus on dissemination of the project results to other scientists and the society. Hereby, harmonization of their research was supported by discussion and cooperation using, for example, joint secondary data analysis from harmonized variable and fixed analysis protocols. Further dissemination was achieved by project presentations as partner institution websites, at several scientific events (see 3.3.1.3.3 and 3.3.1.4.1) and sharing data with scientific or non-scientific stakeholders. The “MaNueL TOOLBOX” was developed for maximal dissemination and harmonization

[3] MaNuEL Toolbox: https://www.healthydietforhealthylife.eu/index.php/news-archive/476-practical-tools-to-prevent-malnutrition-in-the-elderly-by-the-manuel-knowledge-hub

[4] Website of MOOC: https://imoox.at/mooc/local/courseintro/views/startpage.php?id=31

of methods and protocols. For example, with the DoMAP model and the proposal of a Minimum Data Set, MaNuEL KH can contribute to future research harmonization. Amongst others, a rating system for malnutrition screening tools and the identification of the best scoring screening tools as well as a web-based survey to identify gaps in practice and education contributed to the harmonization of clinical practice.

3.3.1.8.2 Contribution to Public Health

Health professionals like dieticians, general practitioners and geriatricians, political bodies and decision makers regarding clinical practice and education of health professionals belonged to the target groups for MaNuEL results. The obtained information will improve the overall conditions regarding screening, prevention and treatment of malnutrition. As one consequence of these results, an audit was organized of all existing Nutrition screening and Nutrition Support policies, procedures, protocols and guidelines used in all community health organisations across the Republic of Ireland. This is a first step in the development of a National Community Nutrition Support Service Improvement Programme. Furthermore, the identification of gaps in medical and nursing education curricula and the development of MOOC course will lead to health professionals with greater evidence-based knowledge on malnutrition in older persons and subsequently benefit effective screening and treatment. In Austria the MOOC became already an official part of the nursing curricula.

3.3.1.8.3 Activities towards innovation

MaNuEL partners presented the results during lectures as well as the final results during a public session to 41 invited guests from 5 different EU countries (including representatives of higher education institutes, industry, research funding agencies, and health education agencies).

MaNuEL KH contributed to a strengthening of evidence-based practice by identification of optimal malnutrition screening tools for older person and raised awareness of the importance of setting with regard to screening, treatment and determinants of malnutrition. In this context, the DoMAP model and a MOOC were developed.

3.3.1.8.4 New strategies/applications to reduce incidence of diet related chronic diseases

Recommendations regarding preferred screening tools for malnutrition in older persons were developed, and will stimulate effective and harmonized screening of malnutrition throughout Europe. Results regarding effective nutritional intervention strategies will improve clinical practice and non-pharmacological medical prescriptions to prevent and treat malnutrition. The combination of effective screening with effective intervention will ultimately lead to lower prevalence rates of malnutrition in older Europeans and to a reduction of its negative consequences. The DoMAP model developed in MaNuEL highlights the importance of factors underlying the development of malnutrition. It will support the identification and treatment of these factors in order to complement current nutritional interventions for the prevention and treatment of malnutrition. Potential improvements may be to add dietary counselling to any prescriptions of medical nutrition and reference to combined and individualized interventions, which address functional and other patient-relevant outcomes.

3.3.1.9 Experts' assessment on general aspects and the specific aims of the MaNuEL KH

Two members of the SHAB and one of the SAB evaluated the MaNuEL KH based on its final report and the elaborated toolbox. Questions regarding general aspects and specific aims were answered in

written form in the aftermath of the presentation at the final symposium in Brussels in February 2019 so that the content of the final presentation could also been taken into account.

1) *Did the JFA contribute to fill relevant research gaps in the respective research area?*

Two of three experts highlighted the knowledge gain as strength of the project and appreciated the huge effort to review existing data and knowledge regarding malnutrition in the elderly, to combine these in 22 manuscripts and to properly disseminate them worldwide. The JFA formulated several research questions of major importance and the MaNuEl KH managed to address them to a certain extent based on the already available evidence. One important outcome was the "MaNuEL TOOLBOX" that the consortium generated and made available to the public. By providing such applied science results, the consortium filled -in the opinion of the SAB expert- a relevant research gap in the area "Malnutrition in the Elderly". This research team have carried out and reported some impressive research work in the field of clinical undernutrition in the elderly, including an attempt at some epidemiological work and development and application of screening methods.

One critical point mentioned by the experts was that the MaNuEL KH focused only on clinical aspects of malnutrition in elderly. But within this limited field they have certainly demonstrated increased capacity and new knowledge gain. The MaNuEL KH could have filled a more relevant research gap from a Public Health perspective by using a broader definition of malnutrition in the elderly or by the integration of Public Health expertise in the consortium or the Scientific Advisory Board.

Regarding capacity building, it was positive highlighted by the experts that new capacities were generated within the consortium, e.g. by installing communication structures among the consortium members. It would have been even more positive, if the JFA could have generated new capacities also outside the consortium, e.g. by setting up new facilities or new research actions.

2) *Does this JFA contribute to a better coordination of research activities and collaboration in the respective research field (e.g. development of better standards and harmonized methods, generation of new networks, interdisciplinary collaboration, etc.)?*

All three experts agreed that the MaNuEL KH contributed to a better coordination of research activity collaboration, at least in the research field of clinical nutrition. It was seen as a major advantage of the JFA that it included the cooperation of 20 research groups from 7 countries and interconnection with other relevant initiatives in the field. Another advantage was that the MaNuEL consortium was complemented by an advisory board of 6 renowned experts in the field of geriatric nutrition, four of them representing relevant European organizations.

Harmonization of research across Europe was achieved by fostering discussions and cooperation of partners within MaNuEL, e.g. by joint secondary data analysis using harmonized variables and fixed analysis protocols, but also by external cooperation, e.g. with the JPI HDHL project DEDIPAC, the EU funded research projects SENATOR and PROMISS, and the direct collaboration with Special Interest Groups of European Societies including the ONCA network. These efforts contributed to a better coordination of research activities and collaboration in the field of Malnutrition in the Elderly.

The MaNuEL results regarding the prevalence of malnutrition enhanced awareness for a need of standardized operation procedures on malnutrition in research. The experts see that the development of a model on determinants of malnutrition in aged persons (DoMAP) and the proposal of a Minimum Data Set were two actions that indeed contribute to future research harmonization. Harmonization of clinical practice is supported by e.g. the development of a rating system for malnutrition screening tools for older persons and the identification of the best scoring screening tools, which should be stimulated for use in clinical practice. The web-based surveys conducted

within the consortium contribute to the harmonization of malnutrition-related policies, practice and education throughout Europe.

3) *Are there research results that can or could in the future lead to the development of new and suitable strategies / recommendations / applications/ products to reduce the incidence of diet related chronic diseases and/or induce changes or improvements in the food and drink sector and/or public health?*

The experts not fully agreed about the achievements and the impact of MaNuEL KH results. In the following graphs an overview is given about the experts' opinion about the improvements at the end of the project (Fig. 36) and in the coming years (Fig. 37).

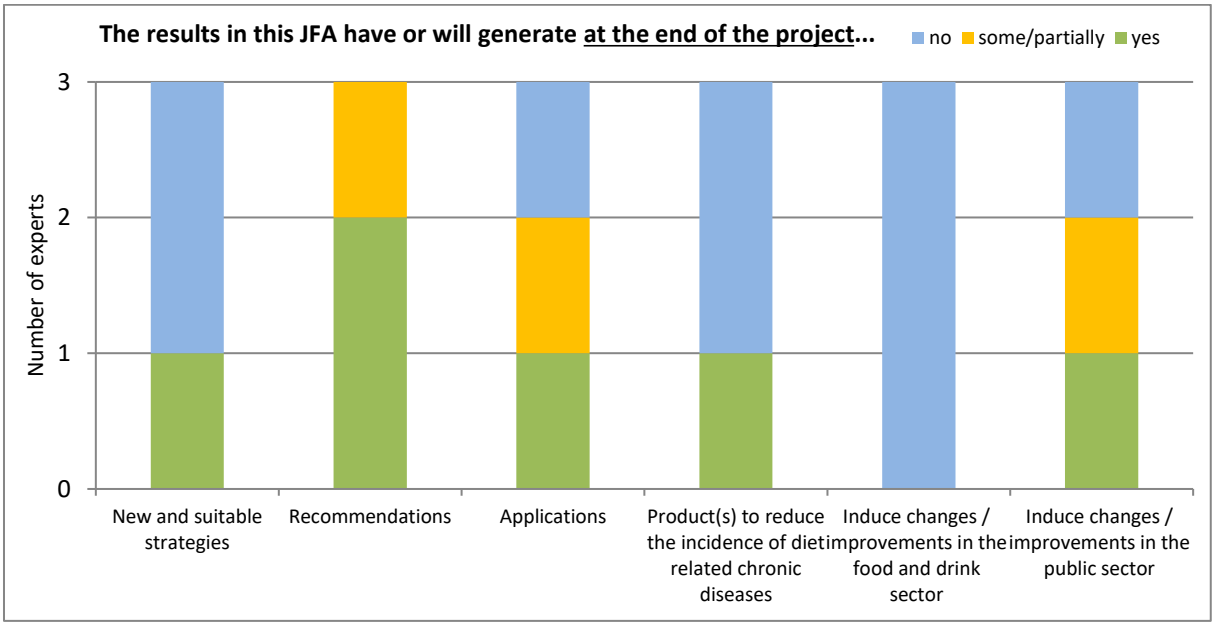


Figure 6: Experts' opinions about the impact of MaNuEL KH results at the end of the project.

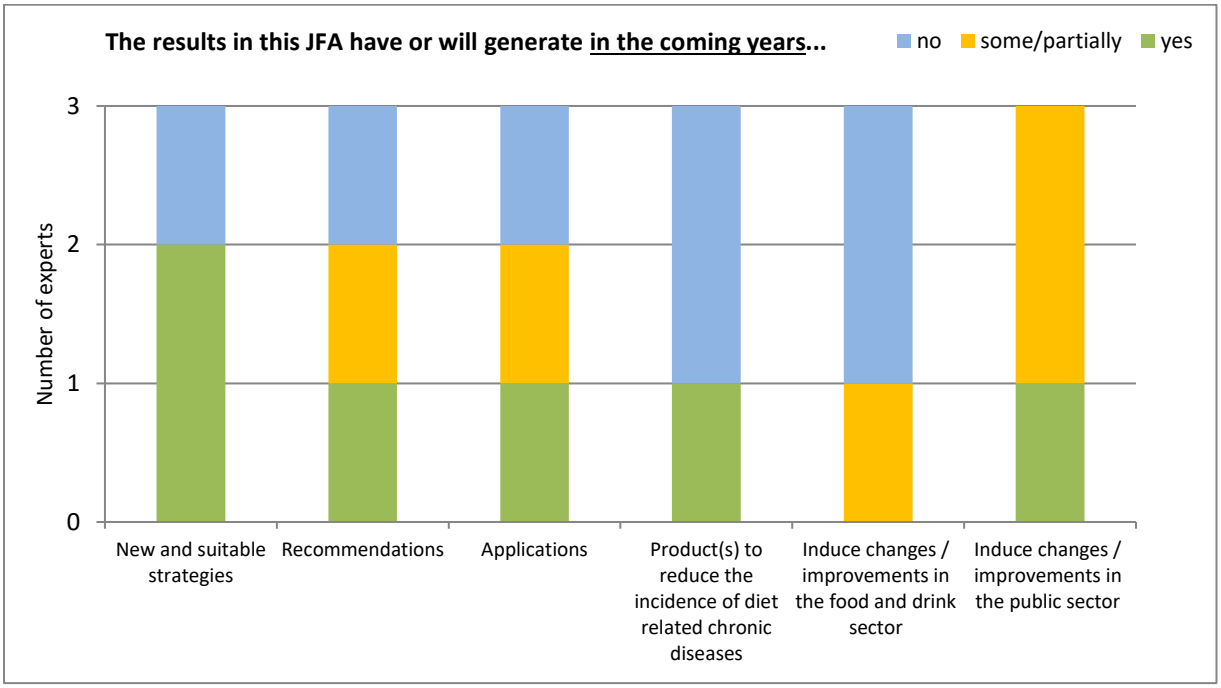


Figure 7: Experts' opinions about the impact of MaNuEL KH results in the coming years.

The experts congratulated to the excellent research but also mentioned the limitation only to clinical aspects[5]. Nevertheless, they agreed that the MaNuEL Toolbox, the Minimum data set for nutritional intervention studies, selection of preferred malnutrition screening tools and the MOOC will strengthen the evidence-based knowledge on malnutrition of future health professionals.

4) *Did the network succeed in integrating and harmonizing available instruments for an easy and effective screening of malnutrition in order to identify groups of elderly people that will benefit from nutrition interventions and to allow for definition of quality indicators of nutrition care?*

In the opinion of the experts the MaNuEL KH successfully integrated and harmonized available instruments. The screening recommendations and the toolbox will promote effective screening of malnutrition and nutrition intervention especially in hospitals and nursing homes but to a lesser content for the community. The experts think that the proposed quality indicators to be assessed in future RCTs at baseline and after an intervention and in several settings were a strength of this project. The experts are not sure about the benefit of certain interventions or individual features of an intervention for malnourished older people. Furthermore, they question if more expertise in these area amongst the research team would have resulted in even better outcomes.

5) *Do the results contribute to identify strategies/processes to prevent and treat malnutrition in different health care settings?*

The experts agree that the results of MaNuEL KH will contribute to improvement in clinical treatment and also to some extent in the community like for free living elder persons. However, they do not see any contribution in regards to prevention and the underlying causes of undernutrition in the elderly was not addressed.[6]

6) *Any other comments:*

It was highlighted by the experts that not only scientific dissemination by papers and oral/poster presentations was performed but also non-scientific dissemination to specific stakeholder groups (ONCA, The European Nutrition for Health Alliance (ENHA), The European Society for Clinical Nutrition and Metabolism (ESPEN) was fostered by public sessions at the final project meeting, flyer distribution on congresses and the development of the MaNuEL TOOLBOX. Furthermore it was seen by the experts that mapping of existing policies and current practice on screening and treatment of malnutrition as well as the content of education of health care professionals can be considered as strengths and will give valuable information for future changes.

One expert stated that MaNuEL KH has performed well and yielded useful tools for clinical practice in the field of malnutrition in the elderly. However, the experts are also quite critical about basic science and clinical studies and the focus on institutional settings. They acknowledge that a knowledge hub is more concentrated on coordination, harmonization and common strategies than on pure science and with this background the consortium has done a very good job that deserve high recognition.

[5] The MaNuEL KH summarized presently available and extend scientific knowledge regarding the definition, prevalence, effective screening and aetiology of malnutrition in older persons and regarding effective interventions to prevent and treat malnutrition in older persons in different health care settings across Europe. With this the aim of the call was full-filled. Further studies are necessary in the future regarding other aspects than clinical ones.

[6] The MaNuEL KH summarized presently available and extend scientific knowledge regarding the definition, prevalence, effective screening and aetiology of malnutrition in older persons and regarding effective interventions to prevent and treat malnutrition in older persons in different health care settings across Europe. With this the aim of the call was full-filled. Further studies are necessary in the future regarding other aspects than clinical ones.

However, experts have detected some weaknesses. On the one hand, the definition of treatable malnutrition as derived by work package 1 was very general and rather simplistic[7]. This has affected the impact of the whole work package significantly. On the other hand, the experts thought that the original call was lacking social science or public health aspects of the aetiology of malnutrition in the elderly. The expert suggested that in the future clinical and public health experts working in the field of nutrition should attend the mutual scientific conferences of the to promote greater understanding of conceptual frameworks.

3.3.2 Conclusions

Malnutrition is widespread among older persons and represents a serious health problem. However, definitions and research is not standardized and malnutrition screening tools are often not suitable for elderly. For this reason, JPI HDHL initiated the MaNuEl funding activity. The main objective of the MaNuEL KH was to support transnational networking activities on:

- definition of malnutrition in the elderly
- integration and harmonization of currently available valid and reliable screening instruments to enable identification of groups of elderly people that will benefit from nutrition interventions in different settings (e.g., home care, nursing homes, hospitals) and countries
- increase and facilitation transnational communication, cooperation and coordination between individual researchers, research groups and research to build a productive and sustainable competence network in the field of malnutrition.

The MaNuEL KH has intensively worked to reach the aims of the project. The intensive transnational collaboration is not only reflected by the several organized meetings in the MaNuEL KH but also by the large number of partners per work package. The definition of malnutrition as well as results of malnutrition screening tools and recommendations for teaching of nurses and physicians were collected and published in the MaNuEL Toolbox. The development of the MaNuEL Toolbox is an important instrument for dissemination and harmonization of the obtained results. The results were disseminated to the public but also to stakeholders and scientists using different methods (conferences, web pages, posters, newsletter etc.). To improve the results and increase communication, MaNuEL KH established a large number of collaborations with European networks and installed a Stakeholder Advisory Board. The used tools for collecting data, the obtained results and dissemination completely fulfill the aims of the call.

During the funding time no PhD students were appointed to MaNuEL KH since the usual total time for completing a PhD is about 3-4 years. Furthermore, no specific training activities for young scientists were financed during the funding period. For the future it might be a good suggestion to extent the runtime to 3 years and include money for training activities to support young researchers. As mentioned by the external experts, further studies focusing on social science and public health aspects of the aetiology of malnutrition in the elderly are quite important and necessary.

The MaNuEL KH coordinator Marjolein Visser and Dorothee Volkert were invited to the preparatory workshop for the call “Development of targeted nutrition for prevention and treatment of undernutrition in elderly (PREVNUT)”. Here the results were presented and the gaps and needs in this research field were intensively discussed. Based on the input of the experts the PREVNUT call was launched in January 2020.

[7] Due to the lack of baseline data the definition fo treatable malnutrion could not be done. The focus of the aim was changed as mentioned in chapter 4.1.3. The change was approved by the CSC.

3.4 Annexes

3.4.1 Annex 1: List of MaNuEL KH partners

Due to data protection regulations the list of MaNuEL KH partners was removed.

3.4.2 Annex 2: Members of the MaNuEL Stakeholder Advisory Board

Member name	Representing organisation
Elizabeth Archer	The European Federation of the Associations of Dietitians (EFAD)
Dr. Anne Marie Beck	Herlev University Hospital, Gentofte, Denmark
Prof. Alfonso Cruz-Jentoft	European Union Geriatric Medicine Society (EuGMS)
Prof. Marcello Maggio	University of Parma, Italy
Dr. Frank de Man	The European Nutrition for Health Alliance (ENHA) Optimal Nutrition Care for All (ONCA)
Dr. Marian de van der Schueren	The European Society for Clinical Nutrition and Metabolism (ESPEN)

3.4.3 Annex 3: Used data sources

Call Text "The JPI HDHL Knowledge Hub on "Malnutrition in the Elderly Knowledge Hub" (MaNuEL KH)" published via https://www.healthydietforhealthylife.eu/ 2015.

MaNuEL KH final report submitted on 30.09.2018

MaNuEL Toolbox: https://www.healthydietforhealthylife.eu/index.php/news-archive/476-practical-tools-to-prevent-malnutrition-in-the-elderly-by-the-manuel-knowledge-hub

Website of MOOC: https://imoox.at/mooc/local/courseintro/views/startpage.php?id=31

3.4.4 Annex 4: Overview on general indicators

4.1.1 Alignment of national funding	
- Number of countries/partners participating in the call	8 countries and 8 funding organizations
- total committed budget	1.175 Mio €
4.1.2 Involvement of national scientific communities	
- Number of submitted pre/full-proposals per country/funding organisation	19 EoI submitted in total
- Number of accepted proposals per country/funding organization	16 were selected as Hub members, 14 finally involved in as partners
- Committed budget per country	1.175 Mio € in total
- Budget requested /allocated per country	0.999 Mio € in total
- % of the total budget spent	86.5% (1.016 Mio € spent in total)
- Number and type (Research/SME/Large industry) of organisations/teams in the funded consortia	22 research institutes, no industry partner
4.1.3 Success of implementing collaboration	
- Interdisciplinary collaboration	
Number of disciplines per consortium	5
list of disciplines	epidemiologists, nutritionists, geriatricians, dieticians, and nursing specialist
- Success of transnational collaboration	
Number of new collaborations with academia	7
Number of collaboration with other JPI funded projects	1 (DEDIPAC)
- Number of project coordinators/partner per country	See Fig. 5
- Intensity of Collaboration	

Number of Meetings	1 kick off meeting and 1 final symposium, 6 web conferences, 3 MaNuEL activities at international conferences
Number of mobility/lab visits within a consortium	n/a
4.1.4 Success of scientific collaboration	
- Number of new publications related to the project	16 published paper 7 manuscripts in preparation MaNuEL Toolbox
- Number of presentations related to the project	22 oral and 17 poster presentations at international conferences 5 oral and 17 poster presentations at national conferences
- New funding obtained	6 month DFG grant
4.1.5 Involvement in other JPI HDHL activities	DEDIPAC
4.1.6 Capacity Building	
- Training activities	No specific training
- New jobs/positions generated in the project	n/a
- Use of existing tools and/or development of new capacities or resources (e.g. a transnational database, biobanks, animal models, cohorts)	MaNuEL Toolbox DoMAP Model Massive Open Online Course (MOOC)
4.1.7 Data and Knowledge Sharing	
- Use of existing data: Has existing data been used / pooled for the project?	9 nutritional intervention studies, 37 dataset from 5 longitudinal or cross-section studies, 20 non-pharmacological intervention studies, 48 tools for malnutrition, 235 cohorts
- Has the consortium used samples from existing cohorts and / or other epidemiological studies?	no
- To perform the project, have you used samples (omics-based) from bio-bank or/and other disease register sample collections?	n/a
- FAIR-Data principles: Has the data generated in the project made available by following the FAIR principles?	yes
4.1.8 Impact	
- Contribution of the project to the coordination/harmonization of research activities (standardisation of methods and protocols, data harmonisation, data and knowledge sharing)	MaNuEL Toolbox DoMAP Model MOOC
- Activities towards innovation	
New industry collaboration	no
Development of new methods/research tool/products	DoMAP model and MOOC
Patents: number and geographical scope	n/a
- Contribution to public health	
Target groups	dieticians, general practitioners and geriatricians, political bodies and decision makers regarding clinical practice and education of health professionals
Interaction with End-Users (e.g. consumers, patients in intervention studies)	no
- New strategies/applications to reduce incidence of diet related chronic diseases)	no