Chapter 8:

General discussion
This thesis’ focus is on improving the intake process of patients with ear and hearing problems, by developing and implementing an intake tool based on the Brief Core Set for Hearing Loss (CSHL) in clinical oto-audiology practice. We refer to this tool as the **ICF-based e-intake tool**. This chapter provides a general discussion of the results of the individual chapters. First, the main findings are presented. Second, considerations on the different aspects experienced in the presented studies are discussed. Third, the international perspective on the use of the CSHL and the implementation of other Core Sets is addressed. Finally, implications for clinical practice and recommendations for further research are provided.

**MAIN FINDINGS**

In what way each study contributed to the development and implementation of the ICF-based e-intake tool, is graphically represented in Figure 1 and described in the following paragraphs.

In the studies described in **Chapters 2 and 3**, the content of the Comprehensive and Brief CSHL were compared with the content of the intake documentation of patients enrolling for ear and hearing care. These studies were performed at Ear Nose Throat (ENT) departments and in audiology clinics in the Netherlands and the United States of America (USA). In both studies, a high percentage of overlap was found when all intake documentation was taken together. This large overlap supports the content validity of the CSHL. On an individual patient level, however, the degree of overlap found between the patient’s record and the CSHL varied greatly. Variability was also found within disciplines (otology and audiology), between settings (secondary and tertiary), and between countries. Furthermore, the results highlighted an overall lower representation of the CSHL-Activities and Participation and Environmental Factors components in the intake documentation as compared to Body Functions and Structures components. This suggests that the current otology and audiology practice still is predominated by the biomedical perspective towards hearing impairment and ear disorders. The identification of extra categories in the intake documentation that are not included in the CSHL, suggests that these may need to be expanded in the context of the oto-audiology intake procedure. This is a valid option, as the CSHL are intended to serve as the minimum dataset that needs to be reported. It may be expanded for any purpose stated\(^1\). Overall, the findings indicate that otology and audiology intake currently lack consistent, and standardized documentation of relevant categories that - following the ICF CSHL - would need to be addressed in a patient’s intake procedure and subsequent treatment plan. To follow the advice of the ICF, it was therefore concluded that current standard procedures need to be adapted (including the adoption of the extra categories identified) so that the biopsychosocial perspective on the patient’s functioning would be incorporated.
In the study described in Chapter 4, the rehabilitation needs of visually impaired young patients of Dutch Multidisciplinary Low Vision Rehabilitation Centres were linked to the ICF categories. The results illustrated the benefits of using a structured ICF intake method over non- or semi-structured intake methods without an underlying conceptual model. Use of the ICF-based structured method resulted in more frequent and better representation of relevant domains in the rehabilitation needs that were documented. The results - obtained in a clinical discipline other than otology or audiology - support the relevance and implementation of a structured and ICF-based intake tool in clinical practice in general.

In Chapter 5, it was described how the ICF Brief CSHL categories were operationalized into a Patient Reported Outcome Measure (PROM). The results of the pilot study that was part of this developmental process, showed sufficient content validity of the intake tool in a Dutch clinical oto-audiology care setting. In addition, the integration of the intake tool into an electronic system (KLIK) was described. It is recommended that the intake tool should be further optimized, e.g., by defining meaningful cut-off scores to enhance the ease of reviewing and interpreting patient’s scores on the intake tool.

In Chapters 6 and 7, the implementation of the intake tool was described. Chapter 6 focused on the barriers to and enablers of the implementation from the perspectives of patients and hearing health professionals (HHPs: ENT surgeons and audiologists). Results showed that HHPs’ knowledge, skills, and motivation regarding the relevance and the clinical usefulness of the intake tool would need to be enhanced to allow successful uptake in clinical practice. For patients, the provision of clear and specific information on the purpose of the intake tool would be needed to enhance their motivation for filling out the intake tool. Opportunities relating to the (digital) administration and the design of the tool provided additional targets for successful implementation. Chapter 7 focused on the development of an intervention for the implementation of the intake tool. Intervention content was based on the barriers and enablers identified in Chapter 6, and on the available evidence on interventions from other implementation studies. For HHPs, provision of educational/training materials and workshops delivered by opinion leaders, and feedback on HHP’s performance during implementation, were recommended. For patients, an information letter to clarify the intake tool’s goals and relevance, and to address concerns regarding the intake tool’s impact on the relationship with the HHP, was recommended. In addition, it was recommended that the intake tool should be further developed such that it would fit HHPs’ and patients’ preferences when applied in the clinic (also including the definition of cut-off scores, referral- and treatment decision trees). The first steps towards the implementation of the intake tool have been taken, and now need to be further worked out into an integrated implementation plan.
*Field-test study*
Currently a field-test study is being carried out, in which the intake tool is provided in a large sample of patients. The aim of the field-test study is to obtain sufficient data so that the choice for the cut-off scores of the individual items (or domains) can be supported by the distributions of the answers. Another aim is to further optimize (the content of) the intake tool.
FIGURE 1. Graphical representation of the studies for the ICF-based e-intake tool
CONSIDERATIONS

In the next paragraphs it is discussed that the different aspects experienced in the presented studies have given rise to some considerations. These are identified and discussed below.

Advocating a uniform, standardized approach, and the relationship with patient-centred care

The aim of the work presented in this thesis was to improve the intake process such that it would use the biopsychosocial perspective of the ICF in a standardized way. Ultimately, the aim is to enable more individualized health care provision which is more patient-centred, and eventually improving patient outcomes. As referred to in the Introduction of this thesis, patient-centred care in clinical practice refers to the active involvement of the patient in decision making, planning, and carrying out of the health care. An interesting and fundamental point of consideration here is the apparent disconnection between patient-centred care and standardizing the intake procedure using a structured intake tool. Patient-centred care may be more in line with an open, unstructured approach to the intake to allow for individual differences. Nonetheless, a need for a structured approach to include the patient’s view was recognized. An intake would ideally be open in nature, but to ensure that the patient’s preferences are taken into account, a health care professional would need to be open to any information a patient is willing to share and be ready to create an atmosphere and prompt patients to share information. The variability between patients as well as health care professionals in that respect, can be very high. The patient-record studies (Chapters 2-3) showed that the range of functioning-related CSHL-factors that are assessed during the intake indeed vary greatly within and between disciplines. Moreover, it was found that overall many psychosocial topics were documented to a limited extent only. These findings do not seem to be limited to either the Dutch or USA context, the results were similar. Similarly, an Australian observational study of initial audiology assessment appointments showed that during the diagnostic and management planning phase of appointments, the largest part of audiologist’s talk was focused on the medical condition or hearing aids, not on the patient’s lifestyle or psychosocial topics2,3. A focus on body function and structure alone is not considered patient-centred. There will be large variations in contextual factors (e.g., comorbidity, personality) which in turn, influence how impairments are experienced in daily life (i.e., activity limitations and participation restrictions). In order to stimulate and facilitate a move towards more patient-centred care provision, and supported by our results, implementation of a standard and structured intake tool covering a biopsychosocial perspective on functioning with ear and hearing problems seems an important first step.

As discussed in Chapters 5 and 6, it is important to realize that the ICF-based e-intake tool itself does not automatically assure patient-centred care. Instead, it should be viewed as an instrument that potentially facilitates a step towards such a model of care. The underlying assumption is that measurement of patient reported outcomes, along with adequate provision of the PROM-results and information on follow-up actions, will finally stimulate and incentivise HHPs to provide care that is tailored to the specific needs of their patients4.
Specifically, the patient’s functioning profile generated by the intake tool can be used as a starting point in the intake, to facilitate communication between patients and HHPs, and to foster an equal partnership in determining treatment. Whether the HHPs will actually use the intake tool with their patients in a patient-centred way was beyond the scope of the current thesis and will need to be carried out in future work.

Both HHPs and patients raised the concern that the intake tool could compromise the intake (a ‘normal’ conversation), i.e., that the use of the intake tool might negatively affect or replace the conversation with the HHP (Chapter 6). This underlines the importance of identifying the assumptions, expectations, and perceptions to using (the outcomes of) the intake tool, and of developing a theory of change as part of the implementation intervention development process. Careful consideration of the target behaviour(s) and the implementation context, is necessary to ensure that the provision of the intake tool and its results to patients and HHPs can actually assist with communication, improvements in patient management, and provision of patient-centred care.

**Applicability in audiology clinics and ENT departments**

While hearing impairment is a condition central in both the otology (as part of ENT) and audiology discipline, there are differences in the disciplines’ focus. Audiology is concerned with interdisciplinary diagnosis and rehabilitation of persons with hearing impairment. In contrast, ENT surgeons are trained in the medical and surgical treatment of hearing impairment and disorders of the ear. Given the differences in these approaches, in patient-population, and patient-problems, implementation of the intake tool in the audiology clinical practice may seem more logical at first sight. This point was also raised by the ENT surgeons participating in the implementation study (Chapter 6): they wondered whether the intake tool would be suitable in their practice and in all patients they see.

In Dutch university medical centres, audiology and otology are closely related sections within one overarching department of otolaryngology, head and neck surgery. Moreover, in the Dutch care-system, patients who are referred to clinical care with the same hearing complaints can be either referred to an ENT department or Audiology Clinic (AC). In university medical centres like the Amsterdam UMC, patients can be quickly referred by ENT surgeons to audiologists, or vice versa. In addition, often both disciplines are involved in the trajectory of care of one patient. In our philosophy, this requires an integrated approach that should start on the day the patient is referred to our hospital. This should be independent of the specific discipline that the patient is referred to. In addition, it will be possible to compare intake data across different health conditions, services, and disciplines. Besides smoother exchange of patient-data, combining and comparing data could possibly lead to new insights and improved care provision.
Also in the literature it has been emphasized that implementing the ICF solely in rehabilitation settings (like in Chapter 4) is not enough for reforming health care. Stucki (2016) for instance emphasizes that only if the ICF is universally adopted by medical colleagues, and - ideally - is integrated into the health care system at large, it can be used optimally as a general shared language for clinical practice, evidence-informed policy and research. Accordingly, it seems logical that integration of the ICF needs to start with closely related disciplines, such as Dutch clinical oto-audiology care settings.

**Screening versus effect measurement**

We chose to operationalize the Brief CSHL into an intake tool that could facilitate standardized screening of problems and contextual factors relevant to adult’s functioning. With functioning as a multidimensional construct, it is important that all aspects that need further examination or actions would be highlighted. For effect measurement however, multiple items per sub-construct are required to obtain reliable outcomes. It was discussed within our project group that including more items per sub-construct would yield a too lengthy questionnaire and therefore would imply an unacceptable burden for the patient (Chapter 5). If effect measurement of treatments using the intake tool would be desired in the future, the intake tool would need to be adapted or complemented. In Chapter 5 we already highlighted the option to combine the intake tool with validated symptom-specific questionnaires. Such an approach would enable the measurement of treatment or intervention effect on sub-constructs. A possible disadvantage would arise in patients with multiple complaints across various sub-constructs. They would need to complete multiple questionnaires, resulting in a considerable burden. An appealing alternative would be a computer adaptive testing (CAT) version, created with Item Response Theory (IRT) to shorten the list of items required for effect measurement. This way, the individual patients only complete items that are suitable to their situation. Therefore, the use of CAT may improve data quality and collection efficiency, further facilitating the use of PROMs.

**Theory-based approach for implementing the intake tool**

Following the recognition of the importance of patient-centred care, and capturing outcomes that matter to patients, there is a growing international momentum for standardising patient outcome assessments in clinical practice across health care fields. However, as outlined in Chapters 6 and 7, the implementation of PROMs is often suboptimal, limiting its effectiveness in clinical practice. Systematic reviews on the impact of using PROMs in clinical practice (e.g., 15-20) consistently report methodological limitations with regard to design and analysis of the studies evaluating the impact of PROMs. In addition, the studies in these systematic reviews demonstrated an incomplete understanding of the mechanisms by which the PROM in clinical practice operates. Assumptions that health care professionals can and will automatically implement new interventions into their daily practice is naïve. Barriers to and enablers of PROM-use in clinical practice have been highlighted in various studies, and international best practices to guide PROM collection in
clinical practice have been established. Examples are the ISOQOL User’s Guide and its recently published Companion Guide on how to Implementing Patient-Reported Outcome Assessment in Clinical Practice\textsuperscript{21, 22}, and the Framework for implementing PROs in clinical practice\textsuperscript{7}. It has been argued that implementation of PROMs should be founded on theory that provides a foundation for understanding, designing, and evaluating implementation processes (e.g.,\textsuperscript{4}). Moreover, the linking of theory with intervention design is consistent with the advice given in the Medical Research Council (MRC) guidance on the development of complex interventions\textsuperscript{23, 24} (See Table 1, first column). The use of theory in the development and evaluation of interventions, and the importance of implementation is also advocated by one of the key Dutch research organization (ZonMw)\textsuperscript{25}. Despite this call for the use of theory during the development phase of intervention development, there is very limited information or advice on how to choose an appropriate theory. So, the recommendations are there, but the practical experiences with theory-based PROM implementation have only been documented to a limited extent. By way of operationalization of the development phase of the MRC framework, we used the Behaviour Change Wheel (BCW). The stages of the BCW, and their steps that are described in Chapter 7, strongly match the phases of the MRC framework, and have been linked to them by Sinnott et al. (2015)\textsuperscript{26} (See Table 1, second column). Although the BCW framework that was used in our implementation studies is not new, and also has been used in audiology research before\textsuperscript{27, 28}, we believe that researchers and health care professionals might benefit from our applied example of an implementation intervention development process in this unique setting in this series of studies. Moreover, to our knowledge, this work is innovative because the vast majority of studies integrating PROMs in clinical practice have not used (behavioural change) theory approaches in (the development of) their implementation interventions.

### TABLE 1. MRC framework phases of intervention development and linked BCW stages

<table>
<thead>
<tr>
<th>MRC phases\textsuperscript{23}</th>
<th>BCW stages\textsuperscript{8}</th>
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<tbody>
<tr>
<td>1. Identify the evidence base</td>
<td>1. Understand the behaviour</td>
</tr>
<tr>
<td>2. Identify/develop theory</td>
<td>2. Identify intervention options</td>
</tr>
<tr>
<td>3. Model process and outcomes</td>
<td>3. Identify content and implementation options</td>
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#### Integration of the intake tool into a digital system

A key recommendation to facilitate the implementation of PROMs in clinical practice that is often reported in the literature, is to support PROM data collection and analyses in a computer-based system\textsuperscript{22, 29, 30}. Practical advantages provided by computerized administration include no missing data due to otherwise skipping of questions and automated scoring, inputting, and storing. Issues with administration have been shown to be important barriers to the uptake of PROMs in clinical practice\textsuperscript{29-31} and were found in the study of Chapter 6 of this thesis as well. Moreover, the digital integration of PROMs in Electronic Health Records (EHR) was an important enabler that also emerged from our study (Chapter 6). Not surprisingly, this was especially found important by the HHPs.
Unfortunately, the full integration of the intake tool into the EHR system was not possible during the timeframe of the PhD project, despite significant efforts to establish this. Therefore, we opted for the existing online portal called KLIK (www.hetklikt.nu). We chose KLIK, because it is especially suitable for facilitating the use of PROMs in clinical practice, which is fully in line with our methods. Other benefits of using this system include that it has already undergone some optimization following experience in different clinical care settings, and that ongoing ICT support is in place. Shortcomings are that the format of KLIK could not be fully specified to the intake tool, in the sense that tailoring the lay out of the tool was possible only to a limited extent. For example, the log-in page is not content-specific to the (aims of) the intake tool. However, the most significant downside of a separate online system is that extra actions are required to integrate the PROM-data into the general EHR system, and thus also not allow for direct integration with other (relevant) patient data. It is desirable that the intake tool will be integrated in the EHR in the future, by linking KLIK to the EHR system or preferably by integrating the PROM in itself directly in the EHR.

**Broader implementation context**

In this thesis the main focus was on the perspectives and needs of the end-users of the intake tool: patients and HHPs. This is an important starting point for successful implementation of the tool. However, implementation involves a larger context\(^8\) that may be challenging. This was also faced when attempting to integrate the intake tool digitally in the EHR system. The challenges underline the complexity of the implementation context and emphasized the importance of the various actors playing a role, at a hospital level setting (e.g., facilitating integration of tools into the EHR), and possibly even up to the setting of professional organisations (e.g., guidelines) and government (e.g., mandating the use PROMs in clinical practice). It is important to be aware of these actors and their influencing role in the failure or success of the integration of PROMs in clinical practice.

**Generalizability of our results**

For a tool to be effectively implemented, the precondition is that it is tailored to the specific context and organizational structure\(^8\). The current version of the intake tool is intended for use in the Dutch system, and for Dutch patients. This currently limits its applicability to Dutch speaking patients only and to a clinical oto-audiology care setting. The generalizability of the intake tool’s suitability to other countries with other care systems is thus unsure. The translation of the intake tool to other languages and the validation of this version to the particular cultural setting would be future steps that could be taken.
INTERNATIONAL PERSPECTIVE

International perspective on the Brief CSHL

As already mentioned in the General introduction and in Chapter 5, there are other initiatives to integrate the ICF Brief CSHL into clinical (oto-)audiology practice. In the USA, Alfakir and Holmes (2018) developed a questionnaire based on ICF category descriptions and ICF qualifiers, to measure the presence and magnitude of the constructs measured by the particular ICF categories\(^{32}\). It is meant as a clinical tool to capture interactions between the general domains of the ICF, and to assist health care professionals in their decision making\(^{32}\). Recently, an Swiss project was announced that focusses on the development and implementation of a PROM that is based on the Brief CSHL\(^{33}\). No results are yet available. From the studies in this thesis it is apparent that practicable forms of the ICF CSHL should be tailored to the specific context and specific aim of the instrument. Collecting information on the same ICF-categories enhances communication and comparability of patient(s) (outcomes) that enrolled in the (oto-)audiology context internationally. The practical experience with operationalizing, implementing, and using the ICF CSHL in clinical practice in the Netherlands, could be combined with the experiences of the other initiatives. This is important to guide further development and implementation of the CSHL for use in clinical practice, research, and education, and to seek international collaboration and alignment in these processes, so that comparison can be facilitated. This is in line with objectives of the international rehabilitative audiology working group on the further development process of the Core Sets (International Collegium Rehabilitative Audiology (ICRA)\(^{34}\)). Of note, the ICF CSHL are dynamic, and it is expected that after their global application the content of the Core Sets will be revised and will evolve over time. For example, in Chapters 2-3 we proposed the inclusion of the ICF category ‘sleep function’ and Personal Factors. In addition, in Chapter 5, we opted for the expansion of ear and hearing categories. It is important to learn from ongoing initiatives on applying the ICF CSHL in practice. The collaboration on the patient record study in Mayo Clinic (Chapter 3) was a valuable experience in this regard, and maintenance of such collaborations and extension to other settings or countries should be considered. This with the ultimate aim of strengthening the support for the application of functioning information (by using the ICF) in ear and hearing care, and thereby patient care internationally.

Operationalisation and implementation of other ICF Core Sets

The implementation of the ICF in clinical care is worldwide, and across many health conditions, a pressing topic and an ongoing process\(^5\). One important implementation strategy is the development of Core Sets. Over 40 other ICF Core Sets have been developed\(^{35}\), and also many initiatives have been taken to operationalize them into practical tools for clinical practice. Depending on the specific aims, the ICF categories of the Core Sets were operationalized into guidelines, PROMs, and toolboxes. The ICF Research Branch website forms a valuable platform where all relevant projects and publications are listed (www.icf-
In Chapter 5, a few of the PROM-based instruments have been listed. Literature on the implementation of these Core Sets is limited. To our knowledge, one other project specifically focused on the implementation of the Core Sets, namely that of rehabilitation of hand conditions. The Lighthouse Project Hand was initiated to operationalize, implement, and use the ICF Core Sets for hand conditions into a monitoring tool in the institutions of the statutory accident insurance in Germany. To facilitate its implementation, strategies include teaching materials, manuals and an e-learning tool for clinical practice and research. These seem similar to the implementation intervention components that we proposed in this thesis, but a description on how these strategies exactly were developed is lacking. Reporting the process is important to be able to learn from each other. This with the aim to improve implementation and optimize the dissemination of the ICF in specific health care systems.

Therefore, it might be beneficial to define a “Phase III” in the WHO development process of ICF Core Sets to underline the importance of and to carefully guide the implementation of the Core Sets. In the current development process model, the description of Phase II is limited to “introducing the Core Sets in practice”. The description includes the validation of the Core Sets, and the development and implementation of ICF-based instruments. A separate, well-defined implementation phase, with a theory-based approach, would increase the chances for successful implementation. It should be realized that this is a challenging assignment though, as implementation science is developing rapidly and application of the Core Sets is dependent on its specific goals in clinical practice.

![Figure 2: Proposal to include Phase III ’implementation’ to the Core Set development process](image)

**FIGURE 2. Proposal to include Phase III ‘implementation’ to the Core Set development-process**
IMPLICATIONS FOR CLINICAL PRACTICE

The results of the studies presented in this thesis are relevant for current health care provision, which faces the challenge of implementing and operationalizing the biopsychosocial perspective and patient-centred care. The international ear and hearing field, as well as Dutch guidelines promote an ICF-based approach to hearing rehabilitation. It is preferred that in this approach, attention is paid to the limitations and problems experienced by hearing impaired individuals in carrying out activities and participating in society, as well as the influence that the environment and personal factors have. The provision of value-based health care, and the focus of a patient-centred approach, including an equal partnership between the patient and health care professional, to hearing rehabilitation is also underlined in these guidelines and recommendations.

The work in this thesis showed that current oto-audiology intake standards would need to be adapted to meet the standard of the ICF Brief CSHL, and to reach to full potential of applying structured PROMs. The findings of this thesis are encouraging in that important steps have been taken towards creating a tool that facilitates individualized clinical otology and audiology services from a biopsychosocial perspective, in a potentially patient-centred way. Regarding the intake tool’s implementation a multifaceted intervention is designed, and encouraging findings are that patients were generally enthusiastic about its aim, and that despite important barriers, also audiologist and ENT surgeons acknowledged its potential.

The application of the ICF in different health care settings and populations in this thesis (i.e., ophthalmology and oto-audiology setting, diagnostics and rehabilitation, and national and international setting; Chapters 2-4), provides support for the external validity of the ICF as a reference framework in the intake.

The aim of our ICF-based e-intake tool is not to replace profession-specific methods. Rather, it is an aid for the management and treatment of, and communication with, the patient besides other (clinical) tools, profession-specific assessments, methods and knowledge. Whether the intake tool will improve patient-centred care, as already mentioned, will partly depend on the success of implementation of the use of the intake tool. As shown in this thesis, implementing the intake tool in the oto-audiology setting requires a significant shift in how HHPs view their role, how outcome feedback is framed, and how data are integrated and used for intake practice improvement. These aspects require that certain measures need to be taken regarding the design and implementation of PROMs, such as our intake tool, in this setting. The studies in this thesis focused on short-term objectives regarding the implementation and regarding the introduction of the intake tool in clinical practice. Longer term-objectives would relate to optimizing the content and use of the intake tool in clinical practice, and will likely only be successful if ongoing training, interactive sessions, as well as
reflections on progress and feedback (with HHPs), are provided and shared\(^42\). Moreover, a sustainable approach to using the intake tool requires significant long-term commitment of budget, a coherent system, and active support from the organization\(^43,44\). The work in this thesis supports the view of Kyte and colleagues in the sense that a bottom-up approach generates PROM-related insights that are relevant to patients and health care professionals\(^45\). However, from the work of Gibbons and Fitzpatrick (2018) it is clear that although the bottom-up approach is important for support for the introduction of a PROM, it subsequently requires a top-down approach. In other words, broader coordination ‘from above’ is crucial too\(^43\). In summary, it is a two-way avenue.

**RECOMMENDATIONS FOR FURTHER RESEARCH**

Based on the work described in this thesis, several recommendations for further research can be formulated. Firstly, as mentioned, knowledge is needed to determine cut-off scores that can help guide the HHPs in further referral or actions for treatment or rehabilitation. Regarding the development of strategies for responding to the outcomes of the intake tool, additional work is required into existing possible effective treatment options and referral paths that correspond with ‘problem’ areas of functioning. Furthermore, research on various patient groups will provide knowledge on the specific needs patients have and, consequently, this should facilitate better tailoring of care provision. As mentioned earlier in this chapter, currently, a field-test study is ongoing in which the intake tool is administered to all new patients who apply for ear and hearing care at our department. This study is expected to provide valuable information for the definition of cut-offs and formulation of treatment strategies.

The research in this thesis covers the first stage of the UK MRC Framework for the development, evaluation and implementation of complex interventions\(^23\) (i.e., the development stage of the complex intervention, see above). We incorporated the BCW to help us design a complex intervention to change the behaviours of patients and HHPs. With regard to the process to the actual implementation of the intake tool, future research goals can be formulated using the remaining stages of the MRC Framework: piloting the implementation intervention and testing the intervention for feasibility prior to evaluation, involving a process evaluation and economic evaluation (MRC stage 2), evaluation of the implementation intervention, including assessing its effectiveness (MRC stage 3), and, finally, the actual implementation (MRC stage 4). In addition, further research will have to show whether the ICF-based e-intake tool in its current form is suitable and relevant for all patients visiting the audiology clinic and ENT practice. Also the suitability of the tool in otology and audiology practice needs to be further investigated. For example, it should be studied whether the final implementation of the tool should be discipline-specific. The optimization of the intake tool will be an ongoing process, requiring continuous evaluations, if necessary, followed by modification.
The actual translation of the implementation intervention, and specific content in the manual, workshop, and design and functionalities of the intake tool is needed. This intervention would also need to include further engagement and collaboration with relevant stakeholders (e.g., feedback of patients and HHPs, and organizational support).

Also the (cost-)effectiveness of the intake tool needs to be researched, to be able to determine the actual gain of the implementation of the intake tool in patient outcomes. Parameters to measure the success of the intake tool may include patient-health care professional communication (e.g., topics discussed during the intake appointment), diagnosis and recognition, utilization of services and referral pathways, and patient experience (e.g., satisfaction with the intake procedure).

Finally, data collected with the intake tool may be used to differentiate between different patient groups within and between disciplines. In addition, further studies may aim to investigate the application of the intake tool in other (international) centres, with the aim to enhance comparability of data across all audiology and otology settings in the Netherlands as well as internationally.
REFERENCES


