Project
Long-Term Care in Motion (LTCMo)

Guidebook Describing the Intervention Components

Version¹, July 2014

Authors:

Carl-Philipp Jansen⁵, Katrin Claßen⁵, Mona Diegelmann⁶, Klaus Hauer⁵,⁶ & Hans-Werner Wahl⁶

¹Department of Geriatric Research, Agaplesion Bethanien Hospital, Geriatric Center at Heidelberg University, Rohrbacher Str. 149, 69126 Heidelberg

²Institute of Psychology, Department of Psychological Aging Research, Heidelberg University, Bergheimer Str. 20, 69115 Heidelberg

© 2014, Carl-Philipp Jansen, Katrin Claßen, Klaus Hauer & Hans-Werner Wahl

¹Please note that the current version of the guidebook is preliminary, reflecting the current state of the project development. It will be updated continuously and complemented by practical experiences and recommendations at a later point of the project flow.
Address for Correspondence:
Carl-Philipp Jansen
Department of Psychological Ageing Research
Institute of Psychology, Heidelberg University
Bergheimer Str. 20
D-69115 Heidelberg, Germany
carl-philipp.jansen@bethanien-heidelberg.de

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission from the authors.
Information on Authors

Carl-Philipp Jansen, MA, is research assistant at the Department of Psychological Ageing Research at the Institute of Psychology at Heidelberg University, Germany. He received his Master’s Degree in Sports Science in 2012 at Karlsruhe Institute of Technology. His research activities include exercise training programs for older adults, nursing home research, activity and dementia, and sensor-based assessments.

Dr. Katrin Claßen is research assistant at the Department of Psychological Ageing Research at the Institute of Psychology at Heidelberg University, Germany. She received a Diploma in psychology (2007) as well as a doctorate degree (2012) at the Heidelberg University. Her research activities include the understanding of the influence of psychological factors regarding technology acceptance in old age as well as the impact of the introduction and use of assistive technologies in in-patient and out-patient settings. Furthermore she is accomplishing an advanced vocational training in cognitive behavioural therapy at Heidelberg University, Germany.

Mona Diegelmann, BSc, is doctoral student at the Department of Psychological Ageing Research at the Institute of Psychology at Heidelberg University, Germany. She received her Bachelor’s Degree in Psychology in 2012 at Jena University and currently finishes her Master’s Degree in Psychology at Heidelberg University. Her research activities include time-to-death-related development of depressive symptoms as well as depressive symptoms and activity in nursing home residents.

Prof. Dr. Klaus Hauer is associate professor at the medical faculty of Heidelberg University and director of the research department at the Bethanien-Hospital/ Geriatric Centre at Heidelberg. He received his PhD in sport science in 1995 and an advanced equivalent of a medical PhD (Habilitation) in 2005 at the University of Heidelberg. His research focuses on rehabilitation of motor and cognitive function, development and evaluation of assessment methods, and ambient assisted living. He is author of more than 120 scientific publications and reviewer in international peer review journals. His scientific work has been awarded with a number of highly renowned research prizes, among those the Cochrane award for methodological de-
velopment, Wilhelm Woort award of applied ageing research, award for brain re-
search in Geriatrics, and Damper research award for prevention and rehabilitation.

Professor Dr. Hans-Werner Wahl is Professor of Psychological Aging Research at
the Institute of Psychology, Heidelberg University, Germany. He received his Ph.D. in
psychology from the Free University of Berlin in 1989. His research activities include
the understanding of the role of physical-technological environments for ageing well,
adaptational processes in the context of age-related chronic functional loss, proc-
esses of awareness of ageing in a lifespan perspective, and intervention research.
He is the author or editor of 20 books and more than 200 scholarly journal articles
and chapters related to the study of adult development and aging. He is co-editor-in-
chief of the European Journal of Ageing and a member of the editorial board of The
Gerontologist. He is also a fellow of the Gerontological Society of America (GSA) and
has received the 2008 Social Gerontology Award and the 2009 M. Powell Lawton
Award of the GSA. He has also been a fellow of the Marsilius-Kolleg of Heidelberg
University.
Table of Contents

1. Ambition and goals of this guidebook .................................................. 6
2. Why should residents’ physical activity be enhanced? ......................... 9
3. Fundamental principles of doing interventions in a nursing home setting ............................................................................................................. 11
5. Description of Serious Games approach for residents ....................... 26
6. Description of competence training for staff ......................................... 28
7. Resume and Outlook

References ........................................................................................................ 40
1. Ambition and Goals of this Guidebook

The ambition of the present guidebook is to describe the intervention components and respective implementation issues used in the interdisciplinary research project “Long-Term Care in Motion” (LTCMo). LTCMo is part of the consortium “INNOVAGE—Social Innovations Promoting Active and Healthy Ageing“ (Health-F3-2012-306058\(^2\)) that is funded by the European Commission. The overall aim of INNOVAGE is to generate knowledge that is able to raise the healthy life expectancy (HLE) and overall quality of life in older adults. In particular, INNOVAGE aims to showcase a range of social innovations able to contribute to this overall goal. LTCMo aims to contribute to this overarching goal with a focus on physical activity (PA) related behaviour in the nursing home setting (NH; Jansen, Claßen, Wahl, Diegelmann, & Hauer, submitted; Jansen, Claßen, Wahl, & Hauer, under revision). The guidebook will be updated by experiences made during the intervention phase at the end of the project. In a first step LTCMo assesses baseline activity behaviour and activity promotion as established in the institution by referring to residents’ as well as institutional/staffs’ perspective in a target nursing home ecology selected for the purpose of the study. In a second step, a socially innovative and evidence based intervention meant to increase PA of nursing residents is developed and evaluated (Comparison of pre- and post-assessment and 3-month follow-up; see time schedule in Figure 1).

This guidebook focuses on relevant steps to implement the project and on the description of LTCMo’s PA intervention components. Doing so, we take a practical and application-oriented approach. The research design of the study has been summarized in an article which has been submitted for publication and will be available at short notice for those

\(^2\)http://www.innovage.group.shef.ac.uk/
interested in methodological issues of the project (see Jansen et al., submitted, for details).

Figure 1: Time schedule of intervention components and respective assessments

The guidebook addresses NH leading personnel, such as directors or care managers with an interest in enhancing their residents’ PA and by this, also their quality of life at large. Doing so might also increase the NH’s reputation as many elders as well as their relatives are interested in an active and healthy lifestyle when moving to a NH. The guidebook also addresses other key professionals in NH settings such as physiotherapists, activity coordinators, nurses or ward managers. The guidebook may also be of interest to organizations (e.g., senior organizations) engaged in improving the lives of older people. That said, those being involved in policy issues related with aging may also find the documents helpful. Finally, we hope that the guidebook may also stimulate new PA related intervention research in the context of NH settings.

Regarding its goals, we assume that this guidebook should enable professionals with sufficient basic expertise (e.g., in the area of PA training
with frail older adults; see also for more details later in the book) to plan and replicate what LTCMo is doing. It is also obvious that we are ready to interact with potential professionals interested in going for such a replication of our program.

The guidebook’s approach is as follows: First, we provide background on why PA promotion in the NH ecology makes a lot of sense. Second, we give fundamental principles that are valid of any attempt to positively influence the NH setting by means of interventions. Third, we highlight the multi-dimensional nature of our program and describe the various intervention components. We start with the PA training for NH residents, consisting of group based exercise training and specific individual training, by describing its aims, giving a definition of the target group, participants’ and practical requirement. We then describe a serious game driven training approach. This is complemented by a staff training scheme.
2. Why should Residents’ Physical Activity be Enhanced?

As is well-known, the majority of the current nursing home population is beyond the age of 80 years and characterized by high rates of multi-morbidity, frailty, mobility impairment, severe cognitive deficits, and depression. In terms of day-to-day behaviour, an essential feature of nursing home residents is their very low PA, even compared to non-institutionalized older adults in advanced old age. However, PA is not only an important marker of physical impairment, but also an essential pathway to improve quality of life and enhance cognitive and social functioning of old and very old individuals. That said, empirical evidence supports rather large positive effects of PA on a range of important endpoints such as cardio-vascular fitness, gait and balance, fall reduction, cognitive function, and well-being in the general older population. Moreover, PA training has revealed sizable positive effects in terms of physical and functional ability related endpoints in those with dementia-related disorders, if efficiently tailored in its application format to the remaining competencies of this specific group. There is also beginning evidence that PA can unfold positive effects in the nursing home setting, such as increased activity and social involvement, but the existing research in this area has remained scarce and inconclusive. However, making interventional use of the PA pathway as means for prevention and enhancement of quality of life of nursing home residents has found very limited attention worldwide so far.

Therefore, LTCMo aims to enhance residents’ PA as it may prevent impairment in functional, psycho-social, and cognitive performance. The implemented intervention focuses on functional and strength exercises, thus it is meant to improve key motor functions necessary for mobility, autonomy, and motion security (i.e., standing, walking, sitting down, and
standing up). However, PA is not only an important marker of physical impairment, but also an essential pathway to improve quality of life and enhance cognitive and social functioning of old and very old individuals. Training aspects also focus on specific and non-specific cognitive goals (e.g., as represented in the serious games approach) or focus on psycho-social status (e.g., by increasing self-efficacy). Against this background, the promotion of PA is highly relevant to improve NH residents’ living conditions and quality of life.

Going further, by considering NHs as potentially having characteristics of *total institutions*, many NH residents may feel powerless and low in self-efficacy. In addition, staff may tend to enhance dependency-supportive behaviour (e.g., ignoring independent eating, but supporting dependent eating). Therefore, there can be no doubt that staff significantly contributes to a major extent to residents’ PA related behaviour as staff may have the means to effectively hinder or promote residents’ behaviour. That said, LTCMo aims to enable staff members to use specific ways of communication to motivate residents to be more physically active.
3. Fundamental Principles of Doing Interventions in a Nursing Home Setting

Before going into details of our intervention program, we outline a number of fundamental principles that may help implementing new concepts in the NH settings.

➔ Get connected to the institution (Guests, not intruders)

Nursing homes represent highly structured institutions with a large number of well-established routines and practical constraints, which are often not obvious for an external person. Such constraints and routines may follow a rationale which may deviate or even contradict research interests. Actors in such an institution, e.g., residents, staff or management, also may have diverging interests. As the success of a project such as LTCMo heavily depends on acceptance by the institution, setting specific routines and interests will have to be taken into account. Acceptance and support are not granted and will have to be merited. As a general recommendation, respect for the setting and actors should be mandatory. Study team members may therefore rather behave as guests—and not as intruders—in any given situation. Time and resources invested for those issues may pay off when the project is implemented. Some considerations may help to get accepted when starting a NH-project.

➔ Informing management, staff, and residents

Information of planned activities is an important prerequisite of any project. The information process may be used not only for delivering news but also to get in contact with persons. As within the formal hierarchy of
an institution, information processes, targets and types of deliverance may be tailored to the addresseees. Residents will represent a different target group requesting different ways of information.

As a first step, the leading management should be addressed to inform about the project and achieve a supportive relationship and a formal “go”. Major target of this step is to clarify concerns and convince the management of the positive effects of the project. As with other target groups, it is always helpful to take the perspective of professionals in institutions as starting point. Major pros may be represented by quality management or advertising/publicity/sales promotion issues. Optional cons may touch concerns about use of additional (labour-) resources, acceptance of residents and staff. Information may be delivered in different steps and different approaches. Formal and less formal talks accompanied by a clear study description will help to get support. Hierarchies with the management will have to be respected with the leading persons to be informed first. The support of the management is crucial for any further steps.

Once the management promotes the project, staff should be informed and involved as their support of the project is essential for its successful implementation. A number of persons working with residents may have concerns about additional workload and evaluation of their individual work to be delivered to the management. Most colleagues working in the institution will not have any training or insight in scientific work, which may mystify or devaluate project proceedings. Comprehensive information about project plans, limitations, and goals may help to smooth critical considerations. With reference to the complete restriction to forward information concerning residents and staff to managements or the public
as requested by ethical boards for project proceedings will help to clear out concerns related to employment law or ethical issues. Another issue will be to address the potential positive consequences of the project on staff level, which may include everyday issues such as less care support for residents trained in motor key functions as targeted in the project or more general institution related considerations (e.g. security of job in a well-led institution supporting innovative projects). To develop an understanding of the project aims and also develop a focus of attention for project goals will also help implementation. Because of the overwhelming impact of persons working in the institution, in this project, staff training is a major intervention approach. To get a personal, informal access it may prove sensible to be present for some time at the site to be available for less formal requests. Daily shift changes may represent an adequate organisational opportunity for information of staff. At a given time, a formal general information meeting including staff and management will also be performed.

Finally, residents should be informed and motivated to participate. As many residents rely on their relatives’ opinion and/or have a legal representative, informing residents include relatives and their legal representative, respectively. It proved sensible to address residents personally to take care of their specific questions, needs, and preferences. For those residents who have a legal representative, the respective person may be pre-informed via phone call and thereafter provided with written information. With respect to participation in scientific studies the information process is strictly formalized. Both the participants and legal representative, in case such a person has been nominated, will have to be informed by verbal as well as written information confirmed by a signature (written
informed consent). Depending on the ethical vote, such a proceeding may be mandatory.

→ Learn about and evaluate existing activities within the institution

The project aims to increase PA and social participation in nursing home residents. That said, a major problem for scientific projects in real life institutions is described by the fact, that the institutions have established roles and routines which may be endangered by the start of the project. The sustainability of successful project standards might be endangered, when study resources will no longer be available and engaged, well trained study personnel will leave. To develop an intervention strategy tailored for the target group and the institutional setting, it is therefore mandatory to document and evaluate the existing activities in a highly structured environment such as a nursing home. Four major considerations will lead the process:

- Do not question established and successful structures and show respect for staff and residents

Keep in mind that research projects have their own conditions and aims which may not be identical with institutional request. It is a simple fact that studies have a limited time frame, in which such projects interfere with the daily routine of institutions such as a nursing home. Many of the established structures have their history and very often have been developed with good reason and may also be tailored to the personal resources in settings. A useful routine, interrupted by a study project, may only be restored with substantial effort. Modifications of established processed and activities may lead to negative personal feeling (e.g., to be insufficient). In case study standards proof their feasibility and efficacy they might nevertheless be introduced in existing structures (see com-
ment below). The critical assessment of proceedings in non-scientific settings may rise formal (documentation and formal evaluation of work) and individual (perception of own work) concerns in staff and their activities. It may be extremely helpful to learn about residents’ needs, limitations, and potentials; or perception of work strains, demurs against, and motivational resources for the project by staff; as well as specific nursing home routines like everyday care, meal, and activity schedules, which may interfere with planned project activities. A nursing internship for external project collaborators offers comprehensive insight into those issues and may help to get incorporated into the setting.

- **Learn about the background and feedback of the activities offered**

Established activities within institutional settings have their own history and conditions, which may not be obvious at first glance. Partly those activities are triggered by strictly content-related criteria (e.g. improvement of quality of life/activity). Partly also formal (such as QA) criteria, lack/abundance of space/equipment/media, training or individual preference of staff, or preference/ability to take part in residents create activities. For a successful implementation of project standards it is useful to consider all those different perspectives and try to make use of those which may support study targets or sustainability of project standards when the projects runs out. The resident perspective might be extremely interesting to get an impression of preferences and routines of the main target population of the project.

- **Evaluate activities with respect to the project aims**

The environment in well-led nursing homes is usually highly structured with common activities leaving only limited space for additional activities as planned in study projects. It is therefore necessary for the project organization to document established activities to identify optimal time pe-
riods for project sessions and to prevent overload or distress of residents and staff. To summarize the state of the art for established activities with respect to the project aim, also the frequency/regularity, content/target of activities, the quality and training of staff and overlap, or conflict to project standards will have to be documented. The evaluation of these activities will help to identify activities, which may fit with the project goals and persons which may be motivated to install standards after termination of the project. A time table with brief description of all these criteria will allow an overlook to plan project activities.

- **Try to integrate project standards in established activities**

Project standards, which have proven feasible and effective during the intervention phase, may get lost when the project will be terminated. To ensure sustainability of activities, even when performed at a smaller scale, the translation of project standards in existing, optionally also in newly founded activities, is mandatory. The detailed analysis of existing activities as described above may help to install project standards. The integration of staff during the project phase and the additional training of interested persons, able to take up such standards, will allow recruitment of persons in the institution committed to the project goal. The management of the institution should be integrated in this process to allow committed staff to become active protagonists of ongoing activities. It might be helpful to use the management perspective to balance requested additional resources for such implementation with added value for institutions (e.g. marketing/quality assessment).
4. Description of Physical Training Component for Residents

Aims of the intervention program

PA has preventive effects on impairments in functional, psycho-social and cognitive status, which is why low levels of PA may lead to health risks and a deterioration of a multitude of somatic as well as psycho-social factors. Therefore, the overall goal of the program is to enhance physical activity in nursing home residents. The physical exercise intervention includes multiple exercise approaches: supervised group sessions, specific training in severely impaired persons, and a serious games approach. The training is based on functional and strength exercises and aims at the improvement of key motor functions, i.e., standing, walking, sitting down and standing up. As those represent basic motor functions for mobility, motion security, and independence, an improvement may increase PA in general. Additionally, the intervention pursues the goal to improve psycho-social outcomes such as participation, self-efficacy, depression and quality of life.

Table 1: Summary of Intervention Aims

- Modification of activity behaviour in residents, i.e., promotion of PA/enlargement of life space
- Promotion of motor function in residents
- Promotion of psycho-social and cognitive resources in residents
- Transition of competencies to NH staff
- Sustainability of activity conditions by permanent establishment of the program
**Target group of program**

The program “Long-Term Care in Motion – Physical Activity Promotion in Long-Term Care” is specifically designed for the target group of nursing home residents, characterized by old age, advanced frailty, multi-morbidity, including motor and cognitive impairment. However, such characteristics do not preclude participation in general. Despite the high prevalence of impairments, impairment levels may differ a lot. Especially the motor and cognitive status has high impact on the ability to take part in project activities.

**Physical and cognitive requirements of participants**

To participate in the exercise training, residents have to be able to stand (supervised group sessions), or able to step (supervised stepping video game), or able to stand with close supervision and support (specific training for persons with severe motor impairment). Apart from very severe cognitive impairment, cognitive status does not limit participation in group sessions; however it represents an exclusion criterion for the serious games approach. Residents with distinct behavioural problems resulting in disturbance of exercise activities or residents with advanced postural deficits will not be included in exercise group sessions. However, they will still be eligible for a specific individual training which is based on exercises used in the group training and adapted to the individual abilities of the participants in a one-to-one training situation.

Exercises are not supposed to cause overexertion or pain. If this is the case, the exercise has to be interrupted or stopped. If participants show overt symptoms of exertion or fatigue, the responsible physician should be consulted in advance (and during the program, if needed).
Personnel requirements

The group exercise sessions should be supervised by a trained instructor (e.g., physical therapist, sports scientist) and, depending on group size, at least one assistant to provide highest possible safety of participants. Staff members can be trained to supervise training sessions in order to take over the training after the end of the intervention period. The training program will have to follow a resident centred approach, adapted to the special needs of the participants (e.g., sensory losses or dementia). Because of the high prevalence of cognitive impairment instructors are trained to use communicational strategies developed for use in patients with cognitive impairment (see Table 2).

Table 2: Overview of communicational strategies (Schwenk, Oster, & Hauer, 2008)

<table>
<thead>
<tr>
<th>Verbal instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• gain attention of participants</td>
</tr>
<tr>
<td>• give short and proper instructions</td>
</tr>
<tr>
<td>• use positive wording (e.g., “Please stay seated” instead of “Don’t stand up”)</td>
</tr>
<tr>
<td>• link movements with associations (e.g., “Stand still as a tree”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-verbal instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• demonstrate exercises (“mirroring”)</td>
</tr>
<tr>
<td>• give tactile support (e.g., for correction of movements)</td>
</tr>
<tr>
<td>• give rhythmic support (e.g., “and back… and forth…”)</td>
</tr>
</tbody>
</table>

Establishing a stable personal relation with participants is a key element for adherence and motivation. Therefore, it is advisable not to exchange personnel during the program. Personal conversations are of high importance in this context. An instructor should be able to show interest in the
needs of the participants and find time for personal conversation, e.g., while bringing participants to the training room. In this way the instructor can gather information regarding physical and mental condition which may also be important to consider when conducting the training.

Organizational requirements

Participants are divided into exercise groups of a maximum of eight residents. For safety reasons a ratio of four participants to one supervisor or assistant should be given.

To ensure homogeneity of the groups, group composition is determined according to residents’ motor and cognitive status, i.e., based on impressions and results derived from performance-based tests and cognitive screening. Groups are divided into three performance categories (see Table 3). In this way, they can be differentiated more easily and too excessive or too few demands for participants can be avoided. The selection of exercises for the groups is based on remaining functional abilities. Persons in category four are the ones eligible for the specific individual training.
Table 3: Performance categories of groups according to functional status

| Category 1       | • Ability to walk longer distances without walking aid  
|                 | • Ability to stand up and sit down without holding on to a chair |
| Category 2       | • Unstable walking without aid or stable walking with aid  
|                 | • Ability to walk short distances without walking aid  
|                 | • Sit-to-stand requires holding on to a chair |
| Category 3       | • Very unstable walking with walking aid  
|                 | • Inability to walk short distances without walking aid  
|                 | • Standing up requires major effort |
| Category 4       | • Unsuitable for group training for compelling reasons (e.g., deviant behaviour, inability to follow commands) |

Especially in a sample including participants with cognitive impairment it is advisable to take account of certain organizational aspects in order to facilitate group organization (see Table 4).

Table 4: Organizational aspects helpful for training with cognitively impaired adults (Schwenk et al., 2008)

- Always use the same room for the training
- Keep constant and simple organizational forms with clear structure
- Internal differentiation should be possible
- Training should be conducted in small groups to ensure safety and close supervision
- Organization of training should guarantee highest possible safety
As exercise training inevitably increases risk exposure, safety aspects are of particular importance. In addition to the personnel itself, the compliance to certain organizational aspects helps to ensure safety. One of these aspects is to use the double chair circle, which allows participants to hold on to a chair and sit down whenever necessary. It is also important to keep participants in familiar surroundings, i.e., to use a room on the same floor or living area where group participants live. This should be a closed room with enough space for each participant, e.g., a staff room, TV- or hobby room, depending on the facilities of the nursing home. Open rooms are unsuitable because participants may easily be distracted.

In addition to its safety aspects, the double chair circle allows for internal differentiation, which means that each participant is able to train in a group and according to his/her individual performance level (e.g., with/without holding on to a chair) at the same time.

**Equipment requirements**

Two stable chairs (ideally with side armrests) have to be available for each participant in order to be able to build a double chair circle. Equipment needed for the exercises are balloons, balls, balance pads, and different devices to be used in a walking course, e.g., porcupine balls, ropes and steps.

**Practical implementation**

The exercise intervention relies on the existing evidence of successful PA intervention in multi-morbid, frail, older persons with and without cog-
nitive impairment (Hauer et al., 2001; Hauer et al., 2012; Schwenk, Zieschang, Oster, & Hauer, 2010) and is at the same time specifically tailored to the needs of the target population of physically and cognitively impaired nursing home residents. Thus, its bottom line is a rigorous focus on functional and strength exercises and the improvement of key motor qualifications necessary for mobility, autonomy and motion security. Training is performed in static and dynamic sitting and standing positions. Table 5 shows an example of exercises used in the progressive functional and strength training.

Table 5: Example and collection of exercises

<table>
<thead>
<tr>
<th>Progressive functional and strength training</th>
<th>Description</th>
<th>Organization</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome</td>
<td>Welcome of participants</td>
<td>Provision of a familiar surrounding</td>
<td></td>
</tr>
<tr>
<td>Enquiries on well-being and specific inci-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dents such as falls or injuries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking exercises</td>
<td>Walking course</td>
<td>Improvement of walking performance and walking security</td>
<td></td>
</tr>
<tr>
<td>Stepping tasks (e.g. knee lifts)</td>
<td>Walking course (with different obstacles)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual-task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength training exercises (while standing; exemplary)</td>
<td>Squat (with chair support)</td>
<td>Double chair circle; 2 – 3 sets of 10 – 15 repetitions each;</td>
<td></td>
</tr>
<tr>
<td>Leg abduction (with chair support)</td>
<td>Improvement of sit-to-stand transfer, stair climbing and balance stabilization of one-leg-stand/trunk stabilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip flexion/extension (with chair support)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calf raise while standing (with chair sup-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>port)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional training exercises (exemplary)</td>
<td>Stand up and sit down</td>
<td>Double chair circle;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shifting of weight while standing</td>
<td>Increase of complexity and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Step combinations while standing</td>
<td>Improvement of pos-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Walking while standing</td>
<td>tural control, dynamic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>balance, gait and sit-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>to-stand transfer</td>
<td></td>
</tr>
</tbody>
</table>

23
Walking course (use obstacles if possible) intensity according to training progress;

The level of difficulty should be increased with caution. In the beginning, simple exercises should be conducted and frequently repeated. To further motivate participants, constant positive feedback should be given. When basic motor functions are stable, participants can progress to advanced levels of exercise, i.e., complexity and challenge of tasks can be increased. The points listed in Table 6 should be taken into account for implementation of the training.

Table 6: Important points for training implementation

- Increase level of difficulty with caution
- Use simple exercises with clear structure
- Give positive feedback constantly to reinforce motivation
- Frequently repeat exercises

- *Exercise Group Sessions*

The standardized 45 minute sessions are offered twice a week over a 12-week period. In accordance with the participants’ progress, the intensity of the training will be adjusted individually.

- *Specific individual training*

This training is conducted once a week for 45 minutes and individually tailored to each participant. It consists of contents of the group sessions which are adapted to the impairment and function of each individual in a very particular way. As participants of this training have very special re-
quirements, these contents are utilized in a one-on-one situation and thus on an even more personal way than group sessions.
5. Description of the Serious Games Approach for Nursing Home Residents

Theoretical framework of the Serious Games approach

In general, exercise training is based on repetitive and standardized training tasks, which guarantee effectiveness, but will not attract a part of participants. An alternative mode to motivate persons to be active is represented by a serious games approach, in which motivational aspects are driven by a game setting, and effectiveness is supported by a “serious”, evidence-based exercise task.

The game based training addresses both motor and cognitive performances. The stepping task focuses on dynamic postural control, which is mandatory for motor key features such as standing or walking and represents the most effective training approach with respect to fall prevention in older adults (Sherrington et al., 2008).

The cognitive task relates to cognitive sub-performances such as temporal-spatial orientation, executive functions, timing/reaction time, action in inhibition, attention-related motor cognitive (dual)-tasks, representing important features for motor control and early markers of cognitive decline. An important feature of this type of Serious Games is immediate referral to stored previous performance and respective feedback of progress and goal achievement, leading to a direct motivational support. Challenges are individually tailored as the program depends on previous individual performance level or basic assessment to prevent overtaxing of users. The standardized program has been adjusted to the performance level of frail older adults with and without cognitive impairment in pilot testing prior to the intervention.
Practical implementation

The Serious Games approach used is a stepping video game which is based on a modified version of “StepMania dance and rhythm game” (Pichierri et al., 2012; see Figure 2).

![Figure 2: Screenshot of the game and stepping platform (Pichierri, Coppe, Lorenzetti, & Murer, 2012).](image)

It is constituted as a supervised cognitive-motor training that is conducted in small groups of three to four residents with only one person playing at a time. To play the game, the participant has to stand on a dance plate which is connected to a computer via USB. The dance video game screen is projected on a TV screen. A display of squares moving up, down, right or left across the screen cues each move and participants have to execute the indicated steps (forward, backward, right or left) when the moving square is congruent to the squares at the top, bottom, right or left side of the screen (see Figure 2). Alternately, participants will have to perform 10 levels of 90 seconds duration each. Progression of performance is controlled by modification of the difficulty level (higher movement speed of the squares) and individually adjusted according to performance in the previous level.
6. Description of Competence Training for Staff

Theoretical framework

Competence training for staff members (CTS) is based on a combination of theoretical approaches and residents’ corresponding processes, which are relevant for their physical activity (PA) when looked upon from different perspectives. CTS aims to stimulate and foster these processes. The included concepts are based on three theoretical traditions: (1) health psychology approaches, (2) self-regulation and co-regulation approaches, and (3) life span motivational models, though knowing about theoretical overlapping.

Regarding health psychology the training builds on motivational theories (e.g., Self-Determination Theory by Deci & Ryan, 1985) which address the question why someone does or does not behave in a certain way. The framework of Motivational Interviewing or work on the Positivity Bias, for example, name ways to practically influence motivational components of behaviour. Self-regulation Approaches (e.g., Social Cognitive Theory by Bandura, 1977) assume that persons can achieve their goals despite barriers (e.g., age-related functional impairments), as they selectively influence their actions, emotions, cognitions, or intentions, for instance. Co-Regulation Approaches address the question how certain ways of interacting and communicating (e.g., baby talk) may influence vulnerable persons’ autonomy. The knowledge on clinical action is highly relevant in this context. Life-span motivational models (e.g., Socio-Emotional Selectivity Theory by Carstensen, 1991) assume a goal-focused, mainly conscious, and functionally adaptive process of selection and active arrangement of the social context that aims at an age-adequate re-
arrangement of the social context as well as at a (re-)activation of social resources in order to maintain well-being.

**Empirical basis of CTS**

Though a large body of research identified factors promoting as well as factors preventing PA, research lacks findings concerning this matter in older persons, especially in the context of a nursing home.

Regarding *motivators and barriers* to PA, factors like social support, self-efficacy, individual choice options, perceived security, regular performance feedback, or positive reward have been named. Furthermore, individually adjusted interventions including personal activity goals and the providing of information on local offers have been considered as relevant. Regarding the special role of *persons with dementia* (PWD), it is relevant to enable them to get in touch with others, to give them the sense that they contribute something relevant, as well as to provide them the chance of reminiscence. Furthermore, the right dose of the interventions’ complexity, flexibility, and exchange with relatives of PWD across a longer period of time is important as well as the consideration of psychic and physical risks.

Staff members are one of the most important parts of residents’ social ecology. They may feel challenged by interventions in several ways. For example, an intervention may require extra work, changing shifts, or being flexible. Staff members focus partly on performing tasks as smoothly as possible and not to the advantage of PWD. For example, they may prioritize physical care and safety over residents’ autonomy. The nursing home director’s support is highly relevant for the implementation of interventions in institutions.
CTS’s basic approach

It is our utmost concern to translate theoretical concepts on the promotion of PA in advanced age considering empirical findings to everyday behaviour. In doing so, we aim to enable staff members to use specific ways of communication in order to motivate residents to be more physically active. We aim to increase the awareness of residents’ health and motion behaviour, self-efficacy, control beliefs, self-regulation, and autonomy, as empirical evidence name these as crucial factors for being physically active. The resulting change in staff members’ interactional behaviour is hoped to enable residents to use their potential and their competencies optimally.

Primary approach: communication training

Studies found certain ways of communication (patients’ education, self-monitoring, and goal setting, verbal encouragement) and rewards to affect PA. Motivational reasons are named as crucial factors for inactivity. Motivational Interviewing may be considered a “novel alternative in promoting physical activity” (Brodie & Inoue, 2005, p. 523); it may convey confidence in one’s own PA as well as it may enable one to develop own motivational and coping strategies concerning physical activity.

Requirements and aims of the communication training

Based on the theoretical and empirical foundations, the change in staff members’ communicational and interactional behaviour is meant to promote the following components on the part of the residents (see Table 6).
Table 6: Components to be promoted, staff requirements and intervention requirements

<table>
<thead>
<tr>
<th>Component to be promoted</th>
<th>Staff requirements</th>
<th>Intervention requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autonomy</strong></td>
<td>provide and grant residents leeway in decision-making, offer opportunities to try behaviours</td>
<td>empathy, positive regard, value-free conversation (Rogers); convey the problem of the corruption effect; Motivational Interviewing</td>
</tr>
<tr>
<td><strong>Health benefit/advantages of PA</strong></td>
<td>have sufficient knowledge on chances and risks; convey an optimistic view to residents</td>
<td>convey information to staff members; challenges staff members’ attitudes and age stereotypes (esp. on PWD)</td>
</tr>
<tr>
<td><strong>Self-efficacy beliefs</strong></td>
<td>appreciate residents’ competences, emphasize their confidence, encourage, consider fears</td>
<td>convey an attitude of empathy and positive regard; convey techniques to express positive, self-worth enhancing statements</td>
</tr>
<tr>
<td><strong>Control beliefs</strong></td>
<td>support residents in attributing success to their own competences, failures to external sources; encourage residents to try again</td>
<td>provide information on the role of control beliefs; convey techniques to express positive statements</td>
</tr>
<tr>
<td><strong>Self-regulatory competences</strong></td>
<td>support residents to recognize and to use chances of selection, optimization, and compensation</td>
<td>develop chances of selection, optimization, and compensation</td>
</tr>
<tr>
<td><strong>Considering individual preferences</strong></td>
<td>know residents’ individual preferences and needs and respond to these</td>
<td>convey techniques to explore needs</td>
</tr>
<tr>
<td><strong>Social support, social exchange</strong></td>
<td>involve residents in social interactions to promote their activity; give residents the sense that they contribute something relevant (esp. PWD)</td>
<td>convey a positive attitude towards PA; develop opportunities to connect PA with social interactions (e.g., involve residents in housework); address safety concerns</td>
</tr>
</tbody>
</table>
Implementation

The competence training is offered to nursing staff and is integrated into their regular in-house training schedule. The training comprises twelve sessions: eight 1-hour-sessions including theoretical as well as practical contents and four 30-minutes-sessions serving as case discussions and feedback-loops. Each session is offered twice a week to facilitate staff attendance. To encourage motivation, participants will get compensatory time off or financial compensation.

Evaluation

After each session staff members fill out a short evaluation form. This instrument provides information on the following: interest in session content, structure and pace of session, comprehensibility and practical relevance of contents, learning effect, evaluation of practical exercises, response to personal matters, atmosphere, experienced fun during session, intention to attend next session, general evaluation and possibility to provide additional comments.

At the end of the 12-week training there is a more extensive evaluation. In addition to the contents listed above it asks for consequences of the training on staff-resident-interactions.

CTS – Contents

Staff members will get education about the role of PA in later life, about the role of aging stereotype in this regard, about barriers and facilitators of being physically active and about ways to overcome related obstacles.
They will learn about how to use communication and interaction techniques to encourage residents to be more active (e.g. positivity, Motivational Interviewing). In role plays staff members will get extensive practice opportunities. The aim of the subsequent four case discussions is to jointly discuss the practical application of communication strategies in caring routines, to develop strategies for upcoming challenges and to monitor the achievement via feedback-loops. The envisaged contents of CTS are indicated in Table 7.

Table 7: Contents of the competence training for staff members

<table>
<thead>
<tr>
<th>Session</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and overview over training program</td>
</tr>
<tr>
<td>2</td>
<td>Importance of PA in (old) age: theoretical input and joint discussion</td>
</tr>
<tr>
<td>3</td>
<td>Change of behaviour: theoretical input and joint discussion</td>
</tr>
<tr>
<td>4</td>
<td>The role of age stereotypes in caring routines: theoretical input and joint discussion</td>
</tr>
<tr>
<td>5</td>
<td>Communication strategies I: Theoretical input and practical exercises</td>
</tr>
<tr>
<td>6</td>
<td>Communication strategies II: Theoretical input and practical exercises</td>
</tr>
<tr>
<td>7</td>
<td>Communication strategies III: Theoretical input and practical exercises</td>
</tr>
<tr>
<td>8</td>
<td>Feedback on practical application of communication strategies in caring routines and development of respective solutions</td>
</tr>
<tr>
<td>9</td>
<td>Case discussion and development of respective solutions</td>
</tr>
<tr>
<td>10</td>
<td>Case discussion and development of respective solutions</td>
</tr>
<tr>
<td>11</td>
<td>Case discussion and development of respective solutions</td>
</tr>
<tr>
<td>12</td>
<td>Case discussion and development of respective solutions</td>
</tr>
</tbody>
</table>

Concerning the theoretical meta-perspective, module 1 particularly addresses a health psychology as well as a motivational psychology approach’s contents. Modules 5-7 mainly contain components from the
self-regulation and co-regulation approaches as well as the agency of the knowledge on clinical action. “Applying methods” will majorly convey techniques of person-centered counselling according to Rogers as well as by Motivational Interviewing.

In the following the sessions of CTS will be described in more detail. Each session starts with a brief feedback on the previous session and with a discussion of outstanding issues if needed and ends with a short summary and outlook.

Session 1: Introduction and overview of training program

In this session staff members get an overview of the complete long-term care in motion program. They get to know the aims of the project and the research staff involved. Attention is drawn to the overall benefits and challenges of the project as well as to personal potential of the staff members themselves. The training contents are shortly presented, an outlook is given and upcoming questions are discussed.

Session 2: Importance of physical activity in (old) age: theoretical input and joint discussion

In this session staff members learn about the potential of PA in old age and in particular in PWD. The session starts with a joint reflection on personal reasons for being physically active or not before discussing pros and cons for being physically active in old age. Empirical data on demographic statistics as well as age stereotypes is presented with regard to PA and positive consequences of PA for older adults (also for those with dementia) are addressed. Impaired motor functions associ-
ated with dementia are presented as well as dementia-related changes in basic motor functions (e.g., gait disorders, limitation in sit-to-walk-transfer, risks of falling). Information on a PA training especially developed for persons with dementia is provided as well as central points that have to be observed in this regard (e.g., type of exercise, verbal and non-verbal communication).

**Session 3: Change of behaviour: theoretical input and joint discussion**

This session is about change of (activity) behaviour and related challenges. After discussing individual experiences considering behaviour change, empirical data on behaviour change (e.g., smoking, alcohol consumption) is presented. Information on the phases of behaviour change is provided (pre-contemplation, contemplation, preparation, action, maintenance) and each phase is discussed with regard to PA in nursing home residents (e.g., which factors keep nursing home residents in a rather inactive status). Ways to overcome potential barriers are discussed jointly afterwards.

**Session 4: The role of age stereotypes in caring routines: theoretical input and joint discussion**

In this session the role of age stereotypes in caring routines is discussed with regard to fostering dependency/independency in nursing home residents. Information on the definition of age stereotypes, on empirical data on gains, losses and risks expected to come along with older age as well as on subjective age are provided. Socially predominantly age stereo-
types are described and the resulting consequences are critically examined. For this purpose video sequences are shown illustrating in an exemplary way how different types of staff behaviour influence the dependency/independency of nursing home residents. In a subsequent discussion, strategies fostering independence in nursing home residents are worked out together.

**Session 5-8: Communication strategies I-III: Theoretical input and practical exercises**

These sessions aim at enabling staff members to interact with residents in a way that encourages their PA. Staff members get information about how to structure conversations actively. Techniques such as listening actively, communicate clearly, paraphrasing, expressing contents personally and using meta-communication are presented in this regard. Special attention is drawn to communication techniques with regard to PWD as well as to challenging conversation situations (e.g., dealing with anger, sadness, aggression, personal attacks). All techniques are examined in more detail in practical exercises (e.g., role plays). Staff members get the opportunity to talk about the experiences they made using the techniques every day so that upcoming challenges can be discussed timely.

**Session 9-12: Case discussion and development of respective solutions**

The aim of the case discussions is to jointly discuss the practical application of the communication and interaction strategies in caring routines, to
develop strategies for upcoming challenges and to monitor the achievement via feedback-loops.
7. Resume and Outlook

PA is not only an important marker of physical impairment, but also a pathway to improve quality of life and to enhance cognitive and social functioning of old individuals. Yet, making interventional use of PA training as a means for prevention and enhancement of quality of life of nursing home residents has found very limited attention worldwide so far. LTCMo aims to install and assess a socially innovative intervention in the nursing home ecology by means of a multidimensional intervention program (resident and staff oriented) with the potential to promote PA in nursing home residents. In this guidebook, we have described the pillars of this intervention as it currently stands. We are currently in the process of executing the program in two nursing home ecologies backed by a complex assessment procedure that we see as a natural lab approach. Our hope is that we will be in a position to report on positive outcome of the program in the not too far future.

Although our study is faced with methodological challenges (e.g., rather small sample size; no randomized control trial), we believe that our approach has something to offer and indeed has some unique characteristics that may have the potential to contribute to the enhancement of nursing home residents’ quality of life and at the same time further PA-related research with vulnerable populations at large.
Acknowledgements

This work is part of the ongoing project “INNOVAGE - Social Innovations Promoting Active and Healthy Ageing” and its subproject, “Long-term Care in Motion,” funded by the European Commission (Health-F3-2012-306058). We thank the European Commission for their support. The content of the guidebook does not represent the opinion of the European Community and the Community is not responsible for incidental use.

We would also like to thank the residents and staff of the nursing homes in which we are able to conduct this study, particularly their directors, Michael Thomas and Sonja Wendel, as well as Kurt Hoffmann, Ina Lebeda, and Wolfgang Merkel.

We would also like to thank Dr. Nana Notthoff for valuable discussions while developing the staff component of the program.
References


