

An Innovative Person-Centered Model for Provision of Mental, Social and Medical Care for People Living with Dementia

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How to cite this paper: Berlo, A. van, Kwisthout-van der Ouderaa, M.D.W. and Kayser, L. (2024) An Innovative Person-Centered Model for Provision of Mental, Social and Medical Care for People Living with Dementia. *Health*, 16, 970-983.
<https://doi.org/10.4236/health.2024.1610066>

Received: September 10, 2024

Accepted: October 27, 2024

Published: October 30, 2024

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Abstract

Globally there is an increased digitalization going on with an increasing number of people having access to the internet, having smartphones and now also in many countries being expected to access health-related information and schedule appointments through websites, apps or web-based portals. Healthcare providers have also adopted this with an increasing number of public or private organizations providing web-based portals as well as app interfaces to some of the largest electronic healthcare systems. The benefit of this is easier access, more efficient provision of services, increased transparency and improved workflows. This may increase the population's capability to manage their conditions and reduce the contacts to, thereby burdening healthcare professionals. But not all will be able to benefit from this digital (r)evolution. Those who will not be able to include people with dementia. For people with dementia to also be able to take advantage of digital health tools and services, it will require planning and involvement of caregivers. In 2017, we presented the Epital Care Model as a framework to organize an efficient people-centered cross-disciplinary and cross-sectoral way to organize activities, roles, responsibilities and describe geographical locations and used technologies in response to individuals' specific diagnoses and everyday changes in their condition. In 2021, an EU-funded project was initiated to investigate how living labs and scaling up could be done building upon the ECM. One of the living labs was organized around an organization providing care to PWD in Netherlands. In the period 2021 to 2024, we have tried to identify ways for how the ECM could be used to digitally enable the services provided by the organization. In 2022, the care organization tanteLouise started a project originally named Daycare Centre2.0 (now called "Van Thuis Uit" meaning "From Home"), together with healthcare

insurance company CZ, and developed a model for onboarding people with dementia and introducing them to specific interventions based on their personal goals and needs. We here present how the ECM and the “Van Thuis Uit” can be mapped within each other to create synergy in creating a healthcare setting for people with dementia. This work may serve as a model for other conditions, where individuals are likely to need more intensive support from their informal caregivers due to a relatively rapid progression of the condition or development of severe impairments. Examples here can be neurologic conditions such as multiple sclerosis and amyotrophic lateral sclerosis or the final stage of conditions that require palliation.

Keywords

Dementia, Health Service Organization, Long-Term Health Conditions

1. Background

Worldwide it is expected that digitalization of how health and care are provided will increase people’s participation in the management of their health, reduce the number of in-person contacts, enable more proactive responses to changes in condition, increase mental well-being and reduce the burden on the declining workforce [1] [2]. From a strategic and organizational perspective, it is intended to work at both an organizational, interpersonal and individual level, ensuring the support of resources for procurement, development and implementation of standards and involvement of people, their informal caregivers and societal organizations [1] [3] [4]. This also includes how to increase people’s level of empowerment and digital health literacy [3] [5]. In almost all EU countries, there now exist national health portals, most or all hospitals use electronic health records that can be accessed by patients and general practitioners and community-based organizations such as municipalities are required to use electronic documentation.

A sustainable and efficient solution will require reorganization of the responsibility for the care of the individuals enabling the sharing of data and changes in legislation as well as technical developments. It is also recognized that it will require education and training at all levels, administrators, healthcare professionals, patients or citizens and their informal caregivers [6]. Interestingly, there is less awareness of those living with impairments, who will become disabled as requirements for digital communication and interactions are imposed on them [7] and those who have disabilities that cannot be compensated or alleviated by technology.

In a plethora of digital health tools and services, it may be difficult to navigate and obtain the benefits of the digital transformation of healthcare, in particular, those with low levels of health and digital health literacy [8]. One group that has special challenges is people with dementia (PWD). This group is challenged by a set of symptoms associated with an impairment of cognitive functions severe

enough to affect the performance of everyday activities. Dementia involves a serious deterioration of functions that are necessary for the elaboration, recuperation, and communication of stories. Dementia profoundly affects individuals' narrative agency. It also affects the memory, hence both anxiety, frustration and apathy are seen in individuals suffering from the illness [9].

Organization of services and provision of tools aimed to enable and support individuals in need of health care will need to be adapted to the needs that PWD have and also take their special needs for involvement of relatives or other individuals in their network of informal caregivers into consideration [10]-[12].

In response to the need of PWD and their caregivers, we here propose a new model for organizing and providing care for PWD, based on our prior experiences coming from two different backgrounds, somatic care and care for PWD, merging two innovative models into one.

In the following, we propose with a health policy perspective, how a model for providing digitally enabled health care services to people with long-term health conditions (LTHC); the Epital Care Model (ECM) [13] can be merged with a new Dutch model "Van Thuis Uit", which recently has been developed by tanteLouise, an organization that provides care to PWD with a particular focus on activities that may delay referral of PWD to institutionalized bed places.

The objective of this opinion article is to inform policymakers and health service organizations involved in the care of PWD about this new way to organize their efforts and services in a proactive, efficient and person-centered way.

2. The Principles of the Epital Care Model

The ECM is a generic model for organizing and providing health and care targeting specific needs, values and personal goals in relation to one or more diagnoses and being responsive to changes in a condition. The Epital Care Model [13] [14] is a way to engage, enable and empower people to the extent that they wish to by coaching, facilitating and having an empathetic approach.

The intent of ECM is to inform the cross-disciplinary and cross-organizational provision of healthcare, to be agile, efficiently utilize resources, and provide timely care near the service users, based on patient-reported and monitoring data which are both relevant for an individual's diagnosis.

The ECM consists of six stages, where ECM1 is when an individual lives in their habitual condition assisted by the necessary health and care resources, including regular visits to primary and hospital medical services with routine visits. At this stage, the individuals also participate in physical and social activities provided by both health and care organizations, local patient organizations as well as community services. The individuals are assisted in living as independently as possible taking their habitual condition into account. IN ECM1, the individual is also assisted by a virtual communication, response and coordination (VCRC) service, to whom they regularly actively or passively send their data. The VCRC service together with an app serving as a dashboard also serves as a one-point of contact if

any questions arise in relation to their condition. In case of deterioration in their physical or mental condition, the VCRC service will initiate responses according to a plan based on best practices within the identified underlying diagnosis. This may include the initiation of pharmaceutical or non-pharmaceutical interventions (ECM2). This may also result in the involvement of other caregivers from the primary health and care sector. If a clinical assessment of the condition is needed, an outgoing function manned by e.g., paramedics, registered nurses or other relevant health professionals will make a home visit and together with a virtually available physician perform the necessary investigations including point of care paraclinical examinations (ECM3). In case of a need for home hospitalization (ECM4) or referral to a monitoring place at a community-dwelling in-house service (ECM5) this will be coordinated by the VCRC service, which will also provide access to a virtual specialist physician and other needed medical resources. If none of the activities in ECM2-ECM5 are sufficient to mitigate a hospitalization, then the individual will be referred to a hospital (ECM6).

The transition to a stage above the level of ECM1 is just a focused effort, which in most healthcare systems will already be available, but not mapped or made available using the same documentation systems. It may also be different healthcare provider organizations that are responsible at each stage. It is therefore required that there is established a CRC that can coordinate and request the necessary resources. To do this efficiently, it is required that all involved stakeholders can agree upon which resources, *i.e.*, staff, responsibilities, technologies and activities belong to each of the stages. Also, what defines a stage in the first place. Here, the principle in the ECM is to use filters or gates building upon specific events or triggers. These events are communicated to the VCRC service based on data reported by the service user or data acquired and reported directly through wearables or other digital tools used by the individuals.

For each individual, a filter should be defined based on diagnose-specific variables defined by medical specialists. Personalization is also needed, with the establishment of thresholds for each variable, based on measurements when the individual is in their habitual state. Since the habitual state may decline over time, the personalized threshold should be adjusted regularly.

3. How the Epital Care Model Can Be Used with PWD?

Up until now, the ECM has been primarily used to inform the organization of services to people living with COPD, Ischemic heart failure and diabetes. There is a need for a validation of the model for other conditions, including multi-morbidity, neurologic and mental disorders. This will require the identification of clinical pathways and relevant monitoring and patient-reported data which can be used to inform the description of activities and responsibilities in each stage as well as how the filters or gates can be designed. Here, it is of interest to include PWD, as this is a group of individuals with a high dependency on their informal or formal caregivers and in addition to this a group who may also experience

problems in making judgments themselves.

In the following, we present how provision of support from both human and technical actors should be organized to meet both the mental, social and physical needs of PWD and their informal caregivers' needs. This is based on studies during the last three years [15] as well as numerous conversations with colleagues with a high expertise in dementia.

4. Considerations on Adapting the Epital Care Model for PWD

Specific differences need to be addressed when describing roles, responsibilities, activities and contexts for PWD and their informal caregivers based on the published version of the ECM [13].

4.1. Differences: Medical Care versus Mental and Social Care

The Epital Care Model (ECM) consists of six stages and serves as a template for how a digitally enhanced health service can be provided based on patient's medical needs. People with moderate to severe dementia often also have medical needs, including COPD, diabetes mellitus and heart failure. However, the biggest task for managing dementia is not medical but mental and social care. This is because the individuals living with dementia are rarely able to manage their condition themselves and therefore caregivers play a pivotal role by having taken over a part of the PWD's expected management of their overall condition providing a kind of assisted management; self-management by proxy. This adds a dimension to the description of the informal caregivers' role and responsibilities as these are not only dependent on fluctuations in the condition that the ECM primarily targets, but also on the relatively rapid decline in cognitive function, which requires a new way of thinking in the description of the informal caregivers teamed up with the PWD including the dynamics between them.

Therefore, it is important to map the needs of PWD together with their informal caregivers for each part of the ECM into descriptions of the involved actors' roles, responsibilities and locations as well as the involved technologies with a focus on the legal and social implications.

Another perspective is how technology is used. People with COPD or heart disease manage their health enabled by digital health tools, such as spirometers and pulse oximeters to monitor pulmonary function or a weight and blood pressure monitor to follow the heart condition. The data is used as a shared resource where the patient can use the data to discuss their condition with their caregivers, who in turn can also contact the patients if they see trends that indicate a need for changes in medication or non-pharmacological interventions.

The digital tools used in relation to PWD differ from those used for self-monitoring and dialogue with the formal caregivers by more reporting on events such as fall detectors, most of them being passive, such as GPS or movement detection, and some mainly intended for the formal or informal caregivers, such as sleep monitoring. Sleep monitoring may also be used as a self-monitoring tool and as a

dialogue tool for people with mild to moderate cognitive impairment or for planning and dialogue between formal and informal caregivers, when the PWD has moderate to severe cognitive impairment.

In the description of holistic care for PWD informed by the ECM, it is also important that the “filters”, which is made up of trigger events and monitored data thresholds, which will require a change in how the services are provided, e.g. change in roles, responsibilities and potentially involvement of other actors. Parameters that should be considered are: increase in fall frequency, disorientation, decrease in or lack of certain daily habits, such as visits to the toilet or fridge and changes in sleep pattern. Also, geo-fencing, which helps to alleviate the burden of caregivers, may add to a meaningful data set for monitoring. It remains to be clarified if changes in pulse rate, or dermal conductance can be used to monitor changes in the physiologic condition and predict medical disease episodes.

4.2. Similarities in the Six Stages of the ECM

In the following we present how the six stages of the ECM have been used to organize a service for a somatic diagnosis, *i.e.* COPD, and compare it with a tentative description used in the context of PWD based on experiences from an unpublished development project with PWD and their informal caregivers. The data about COPD builds on Phanareth *et al.* 2017 and 2021 [13] [14]. The information from Netherlands builds partly on inspiration from an EU project and on a Dutch project, which both have taken place in a healthcare organization for PWD, tanteLouise, which over two years has developed a new concept, “Van Thuis Uit” (meaning “From Home”), together with the healthcare insurance company CZ. The main goal was to keep PWD out of the nursing home, in response to an increasing shortage of professional careers and a strongly growing number of PWD in the next decades. The focus is on the group of PWD with moderate to severe dementia who still live independently at home (ECM1) but are close to admittance to a nursing home (ECM6).

The From Home concept suits well with the onboarding and ongoing planning in ECM1. It consists of an individual action plan for people with dementia, including several interventions: offering the PWD an “active ageing” program, a better day rhythm program, an individual implicit learning program through the errorless learning method [16], as well as psycho-social support and relevant technology. All the programs are offered in a daycare center 2.0, which is open 7 days a week from 10.00 to 20.00. Technology is offered in the home of the PWD. When needed based on the condition or relation to the informal caregivers, the PWD can stay in the center in one of the short-stay apartments (ECM5).

Van Thuis Uit can be seen as a multi-intervention concept in which mutually reinforcing building blocks can be used as needed. The assumption is that the implementation of the concept in practice has several effective combinations of building blocks, which are used to support the various needs of the PWD. This concept proved to be very successful in a one-year trial and will be made

permanent, both in other regions of tanteLouise and by other care organizations in Netherlands.

It should be noted that stage 5 was originally proposed in the context of healthcare systems where municipalities are responsible for primary care and nursing homes. In other countries, such as France and Netherlands, where the municipalities do not have acute beds or similar local services, this could be offered by other forms of local clinics or as part of a hospital rehabilitation service.

The model is intended for all people diagnosed with dementia (PWD) from mild to severe. The earlier the PWD is included in the services, the higher is likelihood of acceptance of technologies and services as the impairment becomes more severe, but it will remain very challenging to involve persons with mild cognitive impairment in the described process of services.

People’s motivation to work on goals converted into a personal action plan is conditionally necessary, otherwise the use of services and interventions will be less successful. As soon as a PWD is recognized, despite what ECM stage they belong to, a screening can be carried out by, for example, the case manager, to inventory in which area there are health issues and requests for help. It is then important that a personal action plan is drawn up together with the PWD to determine which services and/or interventions can be used. In the first stages of ECM, the services will mainly focus on virtual assistance and technologies. In later stages (from 4), other interventions also become important in the context of self-reliance, health promotion and combating stillness and loneliness. Such as an “active ageing” program, a “better day rhythm” program, an “individual implicit learning” program. This can be done at home, in a day activity center, temporary admission or at the nursing home. After implementing the personal plan, an interdisciplinary consultation is held periodically to determine the impact of the services and interventions used. In this way, it can be determined whether services and/or interventions should be scaled up or down or whether someone moves on to the next stage of the ECM.

Figure 1 provides a visual representation of the process:

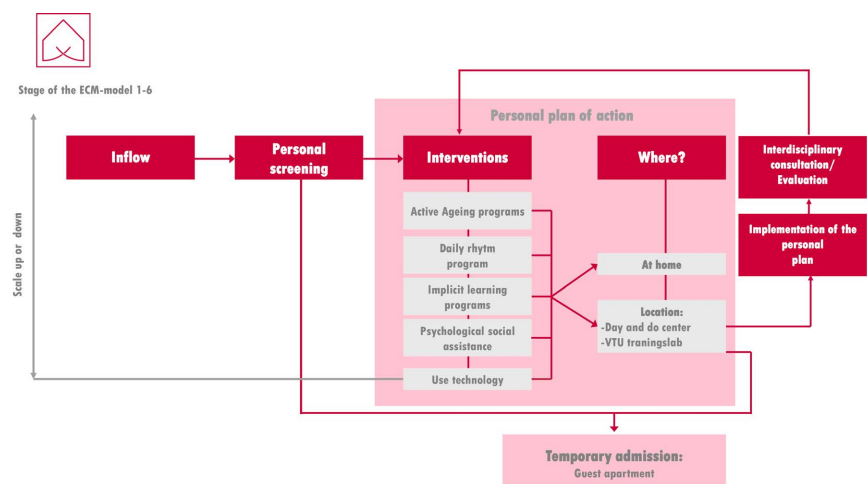


Figure 1. Copyright tanteLouise, 2023. Designed by Marcha Kwisthout.

5. The Adaptation of the ECM in Practice by tanteLouise

5.1. ECM1

The focus in this stage is to support the PWD in living at home with a social life to the extent they are able to and increase their self-efficacy and -management. This may be obtained by providing a safe environment for both the PWD and those who care for them, regardless of whether it is a co-habitant person or an informal caregiver living close to or at some distance from the PWD.

The involved actors are:

- Informal caregivers: spouse (living together with the PWD), son, daughter, son/daughter-in-law, grandchildren (living together or separate from the PWD) or a neighbor/friend.
- Formal caregivers: general practitioner, occupational therapist, physiotherapist, home care nurse, community nurse, home help, geriatric consultant/case manager, psychologist, neurologist, geriatrician.

Formal caregivers belonging to the same or different organizations provide homecare, home help and individual training, e.g. occupational or physiotherapist. The general practitioner or other primary health care doctor is in communication with specialists such as geriatricians. All involved actors are coordinated by a geriatric consultant who also may serve as case manager or head of a group of case managers.

The PWD will take part in out-of-house activities in an activity or day-care center and participate in other offers provided by the civil society.

Insights and safety are ensured by using technology to assist and monitor the PWD. This primarily consists of a base station with a clock, a calendar and reminders which are located in the home. A GPS unit is often integrated into a wristwatch or mobile personal safety alarm/sensors to detect falls and activities in the home. The monitored data will inform both designated persons, which are in most cases, the informal caregivers, as well as the case manager(s).

For pharmaceutical intervention in case of agitation or sleep problems, an automatic medication dispenser may be available in the home to be used after agreement with the case manager.

Regular medication is administered based on an individual plan which can be administered by informal or formal caregivers, dosage packages or (semi-)automatic dispensers.

Non-pharmaceutical interventions such as the aforementioned technologies will be introduced in collaboration with the PWD and their caregivers coordinated by the case manager.

The case manager will, as a coordinator and being part of a response and coordination service/center, visit the PWD regularly depending on needs and signs of change in the habitual condition. This will take place at least every 4 - 6 weeks. At the visits needed resources of homecare and home help will be assessed and negotiated with the involved organizations to be able to provide the most efficient palette of services to enable the PWD to live at home and to relieve the burden of the

relatives. The meetings might be supplemented with regular virtual contact to the coordination and response service CRS to help the PWD and their informal caregivers to articulate their needs and to set goals for the next period.

5.2. ECM2

The focus in this stage is to virtually support acute and subacute changes in the condition and serve as a social interaction for both PWD and informal caregivers.

The hub here is a VCRC service, which is accessible 24/7 and manned with certified staff either being case managers or working by delegation from these. The workplace can either be physical or virtual, but the main requirement is that the CRS staff are always accessible and have access to information about the caller and their personal plans and requirements. Also, the CRS function should be supported by a platform that provides access to data from other health and care services and contains documentation and guidelines with decision support.

The VCRC service should be backed up by a medical doctor or geriatrician to be able to provide assistance in case of both mental and physical changes. The VCRC service should also be able to initiate an ECM3 response with a home visit from a healthcare professional. Or extend the services in ECM1 by contacting home help or home care.

The contact between the PWD, their informal caregivers and VCRC service might be precipitated by either a changed stage of one or more of the installed technologies or when a phone or virtual contact is needed by the PWD or informal caregiver. These calls can either be to ensure or need calls e.g. with agitation, fever or irregular bodily functions.

5.3. ECM3

The purpose of this stage is to make on-site in-person assessments when virtual contacts are not enough. This visit may be by a case manager, a registered nurse, a paramedic or a similar professionally trained and certified healthcare personnel to the function and with access to technology and equipment. The goal is to identify health, mental or social issues that need acute or subacute intervention. This may include examination for infection including urine stix and point of care equipment to measure infection parameters and electrolytes to exclude dehydration.

5.4. ECM4

The focus here is to establish a safe and supportive home environment with more regular monitoring and extended home care and regular rounds. This stage is mostly aimed at situations where a medical condition supersedes the dementia condition and leads to more regular medical supervision.

5.5. ECM5

The focus here is on providing a stable environment around the PWD which can

serve as a temporary base outside the home to train skills and re-enable self-management. For this, PWD will stay temporarily in a specialized local short-stay apartment. This may in particular be needed when a change has taken place in relation to the informal caregivers' support or the condition has worsened, e.g. by a course of infection, which even may have led to an episode of delirium.

5.6. ECM6

The focus here is an intermediate referral to a specialized medical center that can treat more severe medical conditions. Specifically in case of PWD, this function may also be covered by a care center, which is a nursing home. In particular, as severe forms of cognitive impairment may result in decisions to provide palliative care instead of specific curative medical treatment. Also, the care center may be the solution if the network that can be set up in ECM1 at home cannot support daily living activities without impacting the physical, mental and social well-being. Here the PWD should be considered to be in an ECM1 Support status.

6. Discussion

The new model for organizing and providing care for PWD presented here is a proposal, with detailed suggestions, based on two separate models which have been proven in two different fields, care of LTHC and care of PWD. The proposal is the result of a 45-month collaboration between academic, clinical and industrial partners, which has led to a broader understanding of the two kinds of patient populations and differences as reported here, but also similarities in how pro-active, digitally enabled, efficient, person-and goal centered care can be organized. It is of particular interest how the "Van Thuis Uit"'s initial on-boarding and personalization of services and activities aimed at PWD can enrich the ECM and add a new dimension to it. The ECM was originally developed to engage, enable and empower people to the extent they wish to, by applying a coaching, facilitating and empathetic approach. Testing this model has been successful in people with COPD and heart failure. People with moderate to severe dementia, however, lack the cognitive capabilities to carry out most of the activities described in the model. Their informal caregivers can in most cases act on behalf of them or help them in certain situations. Although persons with dementia in general require more social support and care than medical assistance, the ECM can very well be used in the transition of traditional care to more digitally enabled care, as the ECM-based tasks include provision of social support [17]. The model will contribute to the inclusion of PWD taking advantage of digital health and digital tools and may thereby also contribute to an increased well-being of PWD and their caregivers as international strategies address [1] [2].

We have here demonstrated how the recent development in a Dutch organization providing health care to PWD, "Van Thuis Uit", with its specific interventions targeting different needs and the PWDs' personal goals can be mapped with the ECM creating a synergy. This may help other organizations providing health

care to PWD to organize their services to be more efficient, person-centered taking the benefits of a reorganization and be digitally enabled.

Since the presentation of the ECM in 2017 [13], it has been discussed how the model can be evolved to areas other than somatic diagnosis. The model has been tested in Denmark, within psychiatry, as a proof of concept for a few individuals with a combination of a psychiatric course and a need for social integration with the VCRC service acting as a combination of an in-person and virtual service (unpublished data).

With the SMILE project we found a forum for new discussions on whether the ECM could be used for PWD. In the project it was not immediately found feasible and several initiatives in the first year failed. Based on the challenges we identified and the differences between supporting and digitally enabling PWD and their informal caregivers compared to people with COPD or heart conditions as described in Table 1 we expanded on what activities and technologies would be needed.

Table 1. Proposal of how each stage of the ECM model can be adapted to people with dementia in relation to the current description for people with somatic long-term health conditions.

Stage	Living with COPD	Persons with dementia
1	<p>Digitally facilitated active and independent living</p> <p>In this stage people live their life connected to the ECM services in accordance with their personal needs, values, and preferences. This stage is possible even in the face of serious health issues. Support for the active informed patient, in terms of self-management support, is fundamental both here and at all other stages of the funnel.</p> <p>The local pharmacies offer regular evaluation of prescriptions for enrolled individuals. Enrolled citizens have an acute medicine box with prescribed medication for acute exacerbations, which allows the virtual physician to initiate urgent treatment at home. The participants are offered free use of the empowerment network services.</p>	<p>Active and Independent Living</p> <p>In this stage, people live their life connected to the ECM services in accordance with their personal needs, values, and preferences. This stage is possible even in the face of serious health issues. Support for the active informed informal caregiver, in terms of self-management support, is fundamental both here and at all other stages of the funnel.</p> <p>The local pharmacies offer regular evaluation of prescriptions for enrolled individuals. Enrolled people have a Baxter roll which helps the patients themselves to take the medication without support. Others may wander; for them mobile alarm or watch with GPS tracking are being used. The participants are offered free use of the empowerment network services.</p>
2	<p>Virtual clinical management</p> <p>The participant makes use of virtual support through <i>one-point-of-contact</i> with immediate response and 24/7 availability, also including access to the virtual physician.</p> <p>The Response and Coordination Centre provides e-consultations with relevant healthcare professionals. Proactive treatment may be started using the acute medicine box.</p>	<p>Virtual Assisted Living</p> <p>The informal caregiver makes use of virtual support through <i>one-point-of-contact</i> with immediate response and 24/7 availability, also including virtual access to a physician. The CRS provides e-consultations with relevant healthcare professionals. The informal caregiver will track the PWD at wandering, but if there is no informal caregiver available, also the staff at the CRS, often case managers, may be involved.</p>
3	<p>Virtual Assisted Living with Assistance from Home Care Mobile Healthcare Professionals</p> <p>Virtual assistance is added with mobile support in the participant’s home, such as physical visits from the Mobile Acute Team. The empowerment network can still be used in this stage, and all stages listed above.</p>	<p>Virtual Assisted Living with Assistance from Home Care Mobile Healthcare Professionals</p> <p>Virtual assistance is added with mobile support in the participant’s home, such as in-person visits from the case manager. The empowerment network can still be used in this stage, and all stages listed above.</p>

Continued

	Out-mitted at Home	Out-mitted at Home
4	<p>The goal is to enable the participant to stay in their home as long as possible without compromising safety. Treatment, monitoring, and follow-up by both virtual and mobile teams can be intensified, corresponding to an inpatient setting.</p> <p>The Doctors play an essential role in this setting, being proactively available virtually and responsible for the treatment in the citizen's home, while having the MAT nurses as the <i>eyes and hands</i> at the point of care in the home. The empowerment network is not activated in stages 4 and 5, in which services are switching towards traditional healthcare deliveries.</p>	<p>The goal is to enable the PWD to stay in their home as long as possible without compromising safety. Treatment, monitoring, and follow-up by both virtual teams, case managers and home care nurses can be intensified, corresponding to an inpatient setting. The virtual physicians play an essential role in this setting, being proactively available virtually and responsible for the treatment in the PWD's home, while having the case managers as the <i>eyes and hands</i> at the point of care in the home. The empowerment network is not activated in stages 4 and 5, in which services are switching towards traditional healthcare deliveries.</p>
	Admitted to local community care facility	Admitted at "Day and Do centre"
5	<p>If required, the participant is moved to a local health clinic equipped with basic hospital facilities, including 24/7 physical availability of certified ECM health professionals.</p>	<p>If required, the PWD is moved to a local Day and Do centre, where the PWD can stay temporarily (24/7). It is equipped with basic nursing home facilities, including 24/7 physical availability of certified caregivers professionals.</p>
	Admitted to hospital	Hospital/Nursing home
6	<p>If the former services and efforts are insufficient, the citizen is admitted to a hospital with specialized health care services.</p>	<p>If the former services and efforts are insufficient, the citizen is admitted to a nursing home with specialized social care services.</p>

But first with an introduction to the project "Van Thuis Uit" in 2022 by tante-Louise as described here and shown in **Figure 1**, we were able to understand how the ECM can be used as a scaffold. The combination of these two models seems to act in synergy and promising in relation to advice further initiatives. The From Home model adds specific interventions and services and can thereby also be used to help to inform the future work. This remains to be investigated. This added value to the ECM by the work from tanteLouise may also help to develop services and provision of physical, mental and social health for people with other conditions, where individuals are likely to need more intensive support from their informal caregivers due to a relatively rapid progression of the condition or development of severe impairments. Examples here can be neurologic conditions such as multiple sclerosis and amyotrophic lateral sclerosis or the final stage of conditions that require palliation. More work is required to establish descriptions for gating parameters for when PWDs should be allocated from one stage to another and how informal caregivers can be involved more specifically as defined by triggers that can be initiated by monitoring or self-reported data.

The proposed model is a generic conceptual model inspired by amongst others Netherlands and prior research. For each healthcare service system, it will need to be adapted to the way a particular region or country provides healthcare. Here it is important to notice that this will probably require the existing healthcare system to reorganize to be able to provide a more coherent and efficient service for PWD with less consumption of medical services, less burden on informal caregivers and

less in-person contacts building on a proactive data-informed organization.

A strength of this work has been the collaborative work between the authors representing industry, clinic and academia which has been essential to understand the challenges and opportunities. A limitation of this work is the lack of documentation on efficiency and how the activities will run in an everyday setting outside a project period.

A limitation of this proposal is that it remains to be tested with respect to efficiency and feasibility on a larger scale. Also, there may be aspects to consider when using the new model in other regions of the world, where health and care for PWD may be more difficult to provide with involvement across disciplines and organizations. Cultural adaptations may therefore be needed.

7. Conclusion

With this opinion, we propose how to organize future mental, social and physical care for PWD in a way that can respond to the PWDs, and their caregivers' needs. Using the inspiration from the ECM which contributes both to descriptions of how digital health can enable services and virtualize some of them and can inform about how PWD reported or monitored data can be used to provide more efficient responses just in time and informed by thresholds based on earlier gathered data. In the coming years, it remains to be investigated which kinds of digital health tools are most appropriate to be used, how workflows should be refined and how new roles of responsibilities of caregivers may change. Then, it will be possible to conduct larger studies to document the efficiency and cost benefits.

Acknowledgements

Thank you to Ms. Patricia Deleuran and Ms. Julie Kikkenborg for assistance in preparing the manuscript for publication. This research was funded by the European Union's Horizon 2020 Research and Innovation Program under grant 101016848.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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