

Research Booklet

Transformation for elderly communal housing

All rights reserved. This book or any portion thereof may not be reproduced or used in any manner whatsoever without written permission of the author.

Colophon

Delft University of Technology
MSc Architecture, Urbanism and Building Sciences
Track Architecture
MSc3&4 Dwelling Graduation Studio
AR3AD110 Designing for Health and Care

Student

Sander Velsink
4863739

Supervisors

Birgit Jürgehake
Lex van Deudekom
Leo Oorschot

02-07-2024

Transformation for elderly communal housing

A research in the needs and demands of elderly for a transformed utility building to grow old in together and healthy.

Preface

This research booklet is the first out of two booklets composed for the graduation project Designing for health and care at the faculty of Architecture, Urbanism and Building Sciences at the TU Delft. The graduation course Designing for Health and Care focusses on problems in today's healthcare industry by researching and creating new and innovative concepts for the various facilities and buildings that fall within this theme.

I chose this course both because of the way architectural design is taught and the theme of the course. This course is all about user based design, where it is important to understand the target group you are designing for and designing from their perspective rather than from a more top-down principle. This way of designing is in my opinion very strong and gives the architect the opportunity to work close together with the user of the building therefore creating a building that actually works well for the user.

The other interesting part of this studio was the theme. The studio had a fairly free theme and as long as you would stay within the topic of health and care, you were free to choose your own project. This really appealed to me. At the same time this course offered, as part of the research, a fieldwork experience where we as researchers would "live" in an existing institution connected to your research topic. This extraordinary experience seemed very interesting to me and is in line with my own interest in user based design.

I chose for the topic of elderly housing because this is a problem we hear a lot about. Next to the Dutch housing crises the healthcare system is also under pressure due to rising life expectancy. However, when we look at the Dutch policy we can see a contradiction. Many elderly are living in houses that are often too big for them. They used to live there with their family, but they never moved to a smaller house when their children moved out of the house. This can be seen as one of the beginning problems of the overall Dutch housing crisis. But rather than encouraging elderly to move out of these houses, the Dutch government has adapted a policy where they encourage elderly to continue living at home. I thought this can be done differently and that is why I chose this topic.

Of course these two problems are very complex and therefore this research on itself will not be a total solution to both the (elderly) housing crisis and the healthcare problems for elderly. But I hope it will be at least an inspiration for other students, architects and policy makers to look into different ways of housing the vulnerable elderly whilst improving their social, physical and mental health.

Contents

Abstract

1. Introduction
 - 1.1 Problem statement
 - 1.2 Research questions
 - 1.3 Research methods
 2. Utility Building Transformation
 - 2.1 Current situation and policies
 - 2.2 “Transformatiepotentiometer”
 - 2.2.1 Offices
 - 2.2.2 Shops
 - 2.2.3 Industrial buildings
 - 2.2.4 Social/Public buildings
 - 2.3 Conclusion
 3. Elderly housing
 - 3.1 Current housing types and preferences
 - 3.2 New housing forms
 4. Co-housing
 - 4.1 Co-housing for elderly
 - 4.2 Communal spaces
 - 4.2.1 Common rooms
 - 4.2.2 Hallways
 - 4.3 Communal activities
 - 4.4 Apartment design
 - 4.5 Scale
 - 4.5 Conclusion
 5. Mixed living
 - 5.1 Mixed care demands
 - 5.1.1 Willingness to help out
 - 5.1.2 Proportions of group mix
 - 5.2 Mixed generations
 - 5.3 Who decides who joins the community
 - 5.4 Facilities
 - 5.4.1 Elderly facilities
 - 5.4.2 Importance and maximum travel time of the facilities
 - 5.5 Conclusion
 6. Conclusion
 7. Discussion
 8. Bibliography
- Appendixes

Abstract

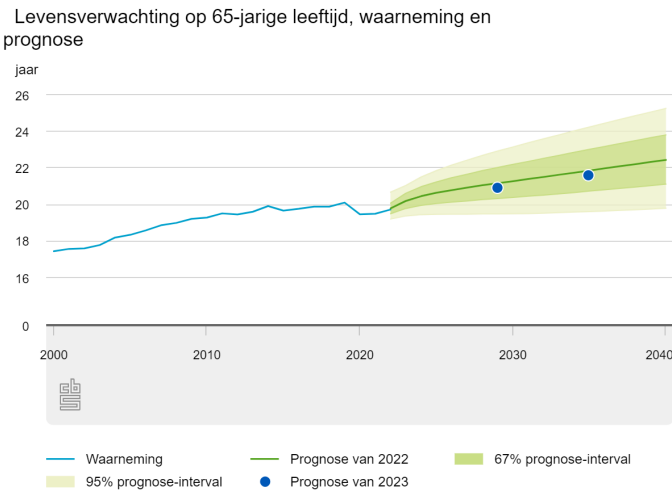
Keywords: Elderly housing, co-housing, mixed living, building transformation

The Dutch elderly housing system has a gap for vulnerable elderly. The Dutch policy on elderly care is to continue living at home for as long as possible and moving into a nursing home with 24h care when living at home is not possible anymore. However, a large group of elderly is not served by this policy. This group is the group of so called vulnerable elderly. Living at home might be tough for them because of the incidental care they need, but moving into a nursing home is unnecessary. For these groups of elderly a new housing form is needed. In order to create this new housing types, transformation of existing vacant buildings could be a solution. Empty plots to build on are become increasingly more scarce and with the climate crisis the existing building in The Netherlands should be renovated in order to improve their sustainability. In this thesis research was done on what design guidelines would be needed in order to create a new social housing complex out of an existing building. The results show that a form of co-housing with mixed living for elderly could be a solution. In these co-housing complexes the emphasis lies on creating social connections through shared spaces. These social connections improve both mental and physical health, whilst at the same time relieving pressure on the Dutch care system by increasing informal care between resident. The results of this investigation are a number of design guidelines which need to be implemented in an existing utility building for transforming this building into a succesfull co-housing for elderly. These desgin guidelines are combined into a building concept showing the basic design ideas for creating a senior co-housing complex with mixed living.

1. Introduction

1.1 Problem statement

Because life expectancy is rising, elderly are living longer and therefore more and more elderly people need help. When getting older, elderly people get small complaints that are not only mental but also physical (think of diseases such as arthrosis, but also things like visual limitations or loss of hearing). Because of this the elderly people need some assistance in their daily life. Since these issues are not too big and ever present, permanent care and therefore living in a nursing home is not necessary. Therefore, we see a gap between elderly living at home and elderly living in a nursing home. Most elderly can still live at home but just need a little assistance in some of the tasks in their daily lives.



The Dutch government has adapted a new policy where they encourage elderly to keep living in their own homes for as long as possible to reduce pressure on the elderly healthcare system of The Netherlands (Ministerie van Volksgezondheid, Welzijn en Sport, 2018). This policy coincides with the wish of the elderly to keep living at home (Akkermans et al., 2020). However, elderly that stay at home are causing different kinds of pressure on the healthcare system. They are still in need of (incidental) care which is provided by a corporation called "Thuiszorg". Because all the elderly keep living at home they are scattered around the city and therefore the caretaking of the elderly is very inefficient because of the travel times.

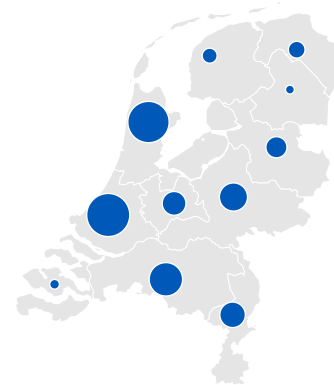
Research showed that many elderly want to keep living at home because of their independence. They like to still have their own home where they can keep to their own rhythms and habits and where they can receive visits from their family and friends at all times (Akkermans et al., 2020). Currently there are already some initiatives that are trying to tackle some of these problems such as the Knarrenhofjes and Erfdelen, but are these options sufficient and meeting all the

wishes and demands of the elderly?

Another problem that we can see is the fact that most of the current projects for elderly housing exist out of new buildings, instead of transformation of the existing building stock of The Netherlands. The New European Renovation wave encourages the European countries to think more about renovation instead of new developments in our current and future building projects since this is more sustainable (European Commission, 2020). The Dutch government adapted this way of thinking by introducing a new residential building policy where the transformation of existing (abandoned) buildings is encouraged (Rijksdienst voor Ondernemend Nederland, 2022).

The current building stock of The Netherlands contains over 200.000 abandoned buildings (Centraal Bureau voor de Statistiek, 2022). These abandoned buildings can form a solution for the housing problem of the elderly and therefore this topic will be researched. This will be done by using the following research question: **Which architectural interventions can be introduced in an existing utility building to create a living environment that improves the care and prevents health issues for vulnerable elderly in The Netherlands?**

Leegstand (n), 2023
Selectie: Totaal verblijfsobjecten



Aantal objecten:

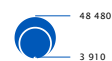


Image 2: Vacancy per province (CBS, 2023).

Theoretical framework

The research is based on three different subjects: renovation, elderly housing forms and elderly care. Each of these three subjects are important for various reasons. Therefore, it is good to have a look at the already existing research on these three different topics and to pick out the aspects that are important to this research.

Transformation

An important part of the European Green Deal is the renovation of both public and private buildings. To achieve this and put this topic higher on the agenda in the building sector, the so-called European Renovation Wave was initiated (European Commission, 2020). In this document the European Committee talks about the importance of renovation and how this improves the sustainability goals of the European Union and on the way this topic is promoted using initiatives such as the New European Bauhaus and investments.

When we look at the document, we can see that most of the motivation to renovate buildings is for improving the sustainability of the buildings. The committee states that 85-95 percent of the buildings standing in 2050 are already built and therefore to improve sustainability and reach the European climate objectives these buildings should be renovated to meet the new demands for sustainability (European Commission, 2020).

However, renovation is not necessarily transformation and therefore it is important to see why transformation could be the solutions for these problems in The Netherlands.

To find an answer for this we can have a look at the Dutch governmental policy on housing. The Netherlands is dealing with a big housing crisis which is getting bigger every year. In 2022 former minister of housing Hugo de Jonge send a letter to the Dutch government to explain his solution for dealing with the housing crisis. Here he states that he wants to increase the number of houses that will be created by means of transforming buildings into housing units. This is important because these transformations are more flexible and at the same time it is more durable because of increased circularity and futureproofing (De Jonge, 2022).

Elderly housing forms

To research the housing wishes of the elderly, it is important to know which types of housing there are and how these types of housing can be rated. Therefore, the research "Woonprofielen van senioren" from the bureau Platform 31 will be used as a basis for this research (2020). This research creates a selection of 10 types of elderly housing which are rated on various criteria by the elderly themselves. This research is part of the literature research on the housing wishes of elderly and this research will be complemented by other literature sources to get a view from more different perspectives on these types of housing. Nevertheless, the criteria which Platform 31 used to rate the different housing types will be the guiding criteria for this part of the research. Platform 31 created 10 dimensions which they used to rank and rate different types of housing. Not all dimensions are used in this research because their relevance

diminished due to the limitations of the research. This leaves the following dimensions:

1. Individuality
2. Living area
3. Participation/control
4. Facility sharing
5. Durability
6. Comfort

Elderly healthcare and prevention

Before research about architectural interventions for the elderly can be done, it is important to have a look what health challenges these elderly in The Netherlands face. To understand this, we must first ask ourselves: what is health? When we look at the definition of health by the WHO we can see they divided the topic of health into three sub-topics: physical, mental and social well-being. This definition is still used today (World Health Organization, 1946). However, this definition is 77 years old and we can see that there is some criticism of this definition. Huber et al. wrote an article where that address this criticism and they come up with six dimensions which make up the definition for positive health (2016). When we put these six dimensions next to the three subtopics of health defined by the WHO, we can see there is some overlap, and these six dimensions can be clustered in the three subtopics of health defined by the WHO resulting in the following classification of health:

1. Physical health, consisting of body functions and the ability to properly function daily.
2. Mental health, consisting of mental functions and the experience of quality of life.
3. Social health, consisting of social participation and the spiritual dimension.

These three subtopics of health combined with the connected dimensions will be used as a basis to determine the health challenges of elderly in The Netherlands and how to prevent or care for these health challenges.

Hypothesis

Even though the government policy is for elderly to keep living at home as much as possible and this coincides with the wishes of elderly. I believe living at home is not a total solution. When the elderly get older the rising demand for more care is inevitable which makes providing individual care near to impossible. Next to that the world of elderly gets smaller the more they age because their ability to move gets less, causing the risk of feeling isolated and lonely. Therefore, I think a form of grouphousing is a good solution for these elderly. In housing communities the elderly can help each other with small daily tasks improving

independence and reducing pressure on the Dutch care system. Next to that the elderly can continue having social interactions within or near their house with people of similar age, which could improve social health. By sharing facilities and staying active whilst maintaining these facilities elderly both get a feeling of purpose in the later stages in life and physical health issues are prevented.

Of course, there are many types of grouphousing and not all these types might fit the needs and wishes of the elderly. In this research there will be a study about the different types of grouphousing which types fit the needs and wishes of the elderly. Next to that the research will also show how these types of grouphousing can be introduced in the transformation of an existing building.

1.2 Research questions

Main research question:

Which architectural interventions can be introduced in an existing utility building to create a living environment that improves the care and prevents health issues for vulnerable elderly in The Netherlands?

Subquestions:

- Which type of buildings are suitable for transformation into elderly housing?
- What are the needs and demands of elderly concerning the way they live and how are they living now?
- Which principles of co-housing can be introduced into an elderly living housing complex to improve health and care and how can these principles be shaped architecturally?
- Can mixed living be a solution to relieve pressure on the Dutch professional caresystem and how can this be incorporated in a housing facility for elderly people?

1.3 Research methods

The research started with a fieldworkweek at an elderly housing complex in The Netherlands. During this fieldwork the research consisted of two parts. The first part was research by observations, looking at the building, it's layout and spaces to see what design tools are used to design for elderly. The second part of this fieldworkweek research consisted of interviews of residents using a narrative format. These interviews were performed during the communal activities of the elderly to get a grip on their social interactions.

After the fieldwork week the research was continued as follows: first and foremost, literature research has been done on: transforming buildings into housing, elderly housing wishes, (elderly) co-

housing and mixed living. This literature research is then validated, combined, and complemented by case studies and a fieldwork experience.

For the research into building transformations some researches performed by an expert team in real estate transformations have been consulted. The results from this research are validated using several other literature sources by experts on these specific topics.

For the research into elderly housing wishes, research and literature by Springco Urban Analytics and Platform 31 (2020) are consulted. The results from this research are then combined validated and complemented by other literary sources and results from the fieldwork.

For (elderly) co-housing and mixed living multiple literature sources combined with fieldwork results and some building case studies have been used to come up with design guidelines for creating a new concept into housing elderly.

In Appendix A the research flow diagram can be found.

Definitions

- Elderly: People aged 75 years and older. This is the group described in the government program "Langer Thuis" and usually this group is more likely to use the care system (Ministerie van Volksgezondheid, Welzijn en Sport, 2018).
- Location conditions: All relevant criteria on which a building location and building type might be selected (Definition by author).
- Living environment: The combination of the built environment and social systems that are presented to the inhabitants to create a place where these people can live their daily lives (Definition by author).
- Transformation: A complete change in the appearance or character of something or someone, especially so that that thing or person is improved. (Cambridge University Press, n.d.)
- Vulnerable elderly: Vulnerability for elderly is a process where physical, mental and/or social limitations in functioning can increase the risk of negative health outcomes (Translated from Dutch), (Ministerie van Volksgezondheid, Welzijn en Sport, 2015).
- "Cohousing on the other hand, is different and a narrower and more particular model of housing with a strong link between people" (Czischke in Oorschot, 2021). People come together to create an intended community where the emphasis lies in creating strong social connections through sharing common spaces and helping each other (Oorschot, 2021).

What to include/exclude

This research will focus on the elderly and their housing situation in The Netherlands. Worldwide research on elderly and case studies will be excluded from the research since elderly healthcare situations and the way elderly are treated can be different throughout the world (contrary to the Danish model... the Dutch model is oriented towards rental within the public housing sector) (Labit, 2015). The research will focus on finding a solution for Dutch elderly within The Netherlands. However, literature about design solutions for certain health issues of elderly that are also relevant for Dutch elderly will be incorporated into this research.

Next to that this research will focus on the scale of the building and its direct surroundings such as the yard. Architectural interventions on both the interior and exterior will be researched and the outdoor space directly around to the building(complex) will be included within this research. The larger scale such as neighbourhood influence or even location within the city or country will be excluded from the research.

Of course, there is a fast diversity in elderly but also in people in general. Not everyone is interested in living together for various reasons. However, many people are, and this research will focus on those people who have an interest in living together.

Finally, this research will focus on elderly without a disease which requires 24/7 care. Designing shared spaces and community-based care is very hard for these elderly, especially since their demands are very different. Next to that there already are existing solutions for housing these elderly in the form of nursing homes.

Describe your output

In the end my research will provide me with information on transformations of existing utility buildings and which types of buildings are generally concerned suitable for transformation into elderly housing. Once a building is deemed suitable for transformation, this research will provide me with the basic architectural interventions required for elderly housing and the extra interventions needed to meet the social demands and housing wishes for the elderly. These design guidelines can then be used to come up with a concept to transform an existing utility building into a social housing complex for elderly.

2. Utility building transformation

2.1 Current situation and policies

To understand how existing buildings can be transformed into housing and which buildings are suitable for transformation. First, we must look at the current situation in The Netherlands and how this topic is being treated. On January 15th 2014 the Dutch government introduced the so called "expertteam vastgoedtransformatie" which was a team of professionals from different disciplines concerning real estate and the transformation of real estate. This expert team was founded to put building transformations higher on the political agenda and to help municipalities and other parties involved in building developments realizing successful building transformations by providing information and knowledge during the process of development (Rijksdienst voor ondernemend Nederland, 2014). In July 2022 this expert team published a document called "Transformatie in cijfers: Heden, verleden en perspectief". In this document the expert team looks back on the building transformations that happened in the year between 2012 and 2022, and it looks to the future and provides recommendations on how to increase the amount of transformations in future years.

Housing transformations in previous years

When we look into the numbers of the years between 2012 and 2022 it becomes clear that office buildings are the biggest suppliers of transformation houses. The graph below shows the number of buildings that are transformed. Here we can see a split of residential buildings, offices and shops as the main suppliers with each around 20% of the total amount of buildings transformed. However, when there is a closer look into the amount of square meters that are transformed, office buildings rise to a share of 40% of the total amount of square meters. This is mainly because office buildings usually being larger than the other building types and therefore providing more square meters of transformed real estate per building. Next to that offices are often easier to transform into housing because their construction is more similar to a housing structure than other structures such as shops (Transformatie van kantoorgebouwen, 2007).

2.2 "Transformatiepotentiometer"

The expert team Vastgoedtransformatie has selected 3 other types of buildings next to office buildings where they see opportunities for transformation. These types are Shops, Industrial buildings and public/social real estate. However, for these buildingtypes it is harder to determine if they are suitable for transformation. In order to determine the potential for transformation of

these types of buildings a new system called the "transformatiepotentiometer" is created by the expert team. This system orders the different types of buildings into three potentials for transformation.

- The first scale of potential is called the low hanging fruit. These are buildings that are easy to transform because they are in the right area and have the right technical aspects to make transformation possible.
- The second scale of potential requires a political intervention to make transformations possible and to put transformations on the agenda of developers.
- The third scale of potential requires a redevelopment of the larger area the building is situated in. This area redevelopment is necessary because transforming the building alone does not create an attractive living area.

Offices

In the last paragraph we can conclude that the past taught us that office buildings are most often transformed and one of the reasons provided for this is their technical similarity to housing. However, there is also another reason why office buildings were transformed this much in the past and that is simply their availability. After the start of the economic crisis in 2008 a lot of office buildings became vacant and after a couple of years of vacancy the owners started to investigate other uses for the empty office buildings (Rijksdienst voor ondernemend Nederland, 2014). With the aftermath of the COVID crises two years ago, there are again many office buildings remaining vacant and therefore providing a supply that might be suitable for transformation into housing. However, with the current high demand of housing there is the need for more new houses than offices only might supply. The Dutch government has adopted a new policy where on a yearly basis 15.000 new houses should be realized using transformation. With this policy not only office buildings but also other vacant buildings should be considered for transformation.

Shops

For shops vacancies raised after Covid and this is not expected to change much in the coming years. Because shops are mainly in an already populated area the location of these buildings is good for transformation into housing. In the end RaboResearch concludes that there is a total of around 1.000.000 square meters of vacant shopping space that is suitable for transformation into housing (2021). The problem though with transforming shops is that this is mainly possible

on smaller scale, larger warehouses are more difficult to transform because of high costs due to technical difficulties or non-cooperating owners of the buildings (NVM-Business, 2021).

Industrial buildings

For industrial buildings research showed that vacancy is low and sometimes there even is scarcity (CBS, 2022). However, inner-city industrial areas are changing shape and shifting more towards mixed-use urban area (Stec group, 2014). These mixed-use areas often also include housing. Because of the scale and the open structure of the buildings it is possible to create complexes with many functions and introduce new liveliness in the city. Because of the scarcity in the industrial sector, it is hard to find vacant office buildings ready for transformation. However, the buildings that are suitable for this, especially in the inner city, have good technical possibilities for transformation and because of their location creating housing is a good option.

Public/social real estate

Transforming public and/or social real estate is mostly a local solution. The vacancy is not too high and often when buildings become vacant they either get sold fast or they are being reused with new (temporary) functions. Registration of vacancies of public/social real estate is not organized too well and therefore opportunities for transformations are not always properly noticed (Rijksdienst voor ondernemend Nederland, 2022). Because of the

various types of the public/social buildings they do not always have the technical properties to be suitable for transformations. However, many buildings such as school, community houses etc, are suitable for transformation (source). Especially school buildings are an important type of public real estate to look at for transformation. In certain neighbourhoods school buildings might become vacant in the future due to the aging of the population of the neighbourhood (Rijksdienst voor ondernemend Nederland, 2022). Next to that, schools are state-owned and when they become vacant the state returns the buildings to the municipality to either repurpose or redevelop them. This gives great opportunities for transformation because the building and the surrounding plot is already owned by the municipality and therefore there are no ownership problems for transforming these buildings.

2.3 Conclusion

The past has taught that office buildings are a good and relatively easy option for transformation into housing. Not only because of their technical similarities to housing, but also because of vacancy number amongst office buildings are high and therefore there are lots of office buildings that can be transformed. However, office buildings are not always in the most convenient or desired location and therefore they are not always a good option for transformation. When we look at vacancy numbers of buildings other than office buildings we can see many more options for transformation such as shops, schools, industrial buildings and healthcare facilities.

	Vacancy (buildings) (CBS, 2022)	Vacancy (m²) (CBS, 2022)	Local/national potential	Architectural potential	Scale	Transformation potential
Offices	8.240	3,5 million	National	Open structure	Large building	Very high
Shops	10.040	2,6 million	National/local	Little renovation needed	Small building/building complex	High
Industrial building	14.120	6,7 million	Local	Open structure	Building complex	Varying
Public/Social building	5.270	2,0 million	Local	Structure/facade	Varying	Varying

Image 3: Table Transformation potential buildings by current function (Author, 2023)

Studies into these types of buildings have proven that, although not always as easy as office buildings, transforming these buildings into housing is possible. Especially buildings already owned by the municipality are a good option to explore further for transformation since these buildings also have less administrative restrictions for transformation and they are most often located in areas where housing would be a good fit.

Therefore, with the current housing crisis and the need of as many new houses as possible, not only office buildings should be looked at as options for transformation, but also schools and other vacant buildings owned by the municipality are suitable for transformation.

3. Elderly Housing

In this research the housing wishes of the elderly is divided into two subjects. First there will be research into the type of housing the elderly prefer to live in. This research is important to understand the way elderly are living and the social connections they wish to have within their building(block). Another important part of this research is the willingness to live together or to share their building with other target groups such as elderly with a higher care demand or other generations. This research is followed up by having a closer look at the interior of the building. How should the apartments/rooms of the elderly look like and which non-living spaces should the building contain?

3.1 Current housing types and preferences

Based on a study amongst elderly in the province South Holland, Springco (a Dutch urban analytics company) created 10 living profiles for elderly in The Netherlands (Grote Omgevingstest Zuid Holland, 2018). Using these 10 living profiles Platform 31 did an investigation into the housing wishes for elderly (2020). This study looks at the needs and wishes of the elderly and how these needs and wishes connect to the existing stock of elderly housing.

The 10 profiles developed by Springco are:

1. A place of your own: Free and social
2. A private domain: Privacy and peace
3. A Basic place: Functional and social
4. A residential building: Comfortable and familiar
5. A family home: Familiar and close
6. A city apartment: Dynamic and independent
7. A neighbourhood block: Social and lively
8. A parkapartment: View and landscape
9. A residential court: Together for each other
10. Senior apartment: Independent aging

Image 4: 10 Housing profiles for seniors (Hagen, 2020)

The results from this research showed that profiles 3 and 5 are the most popular and they provide almost half of the demand for housing by the elderly. The other half is made up by the other 8 profiles and this demand is spread more or less equal amongst these profiles. When we look at the care aspect of the different profiles, the research shows that profiles 3, 9 and 10 are the most demanded. Even though care could be provided to all profiles, the other 7 profiles are mainly chosen because of the quality of living and the care aspect is not considered in that choice. In this research the focus is on the social and care aspect of the housing and therefore the focus will be further on the living profiles 9 and 10. However in the end it is good to reflect on the results of this research by Platform 31 and to see how design solutions developed for

these profiles could also be implemented in the other profiles without changing the aspects for these profiles that causes the seniors to choose for this option.

3.2 New housing forms

Due to rising costs and staff shortages for elderly care, the whole field is shifting from a less institutionalized care system towards a system where the care for elderly is mainly focused on informal care practices by other elderly or other people close to the elderly such as family or friends. It is important to state that this change in care giving is mainly the case for elderly without the need for intramural care. Of course, intramural care can not just be provided by everyone and the (medical)care for these elderly will, for the main part, remain in the hands of the professionals.

However, for the relatively vital elderly, a lot of care does not have to be provided by healthcare professionals since the problems these elderly have do not always require medical care. Up until now a large number of these vital elderly have lived in assisted living facilities (AFL). In these facilities they could live independently, but when needed they have the opportunity to make use of the collective (healthcare)facilities of the building (Spierings, D. et al., 2012). These facilities can also provide a good outcome for intramural care. Because elderly are clustered here and facilities are shared elderly generally have more social connections with each other and therefore there often is also the willingness to help each other out when needed. However, with the new government policy where elderly are pushed to continue living at home for as long as possible, the healthier elderly who would usually take care of the less healthy elderly in the ALF's are not moving onto these facilities anymore and therefore these elderly cannot provide informal care to the less healthy elderly anymore (Spierings, D. et al., 2012).

Next to that we notice that not all elderly can or want to continue living at home. They do not always have the financial means to buy the care they need and their houses are not always suitable for growing old in (Nivel, 2014). Finally, we can also see that social connections are very important for elderly people. The main reason for them to not want to move out of their house is the loss of social connections in the neighbourhood. Proper social connections and social interactions reduces the feeling of loneliness amongst elderly and this could increase life expectancy up to 7 years (Steverink, 2016).

To keep up with the changes in the Dutch elderly care system and to comply with the Dutch policies of elderly living at home as long as possible to reduce healthcare costs and staff shortages. There is the need for new (elderly)housing types

where social interactions and informal care are at the starting point of the development of these housing units. To ensure the possibility for informal care to be provided these new housing types might also have to cater to elderly with different healthcare demands. This makes sure that elderly do not have to move when their demand for care grows.

4. Co-housing

When considering the statement about the importance of social connections for the elderly. A form of co-housing might be a good opportunity. As mentioned in the definition of co-housing by Darinka Czischke in paragraph 1.3.2, co-housing is all about creating and strengthening the social connections and mutual aid (Czischke, 2019).

Literature shows that there are four preconditions that need to be met in order to make this type of housing. These conditions are management of communal spaces and activities, apartment design, group diversity and scale (Labit, 2015). Some of these preconditions are related to each other. For example the scale of the building has an influence on the group diversity and the presence of communal spaces and the design of the apartments can be linked together as well. Some of these preconditions also consist of multiple aspects. For example when looking at the management of the communal spaces it is possible to look both at which communal spaces are required and requested, but also on the balance between public and private. Is the entire community based on voluntary participation or are there also certain aspects that need to be obligated in order to make sure certain tasks in the community are performed well and everyone participates in the required way?

In this chapter the preconditions communal spaces and activities, apartment design and scale are explored and researched further. The precondition group diversity is partially covered in the precondition scale and will be elaborated on further in chapter five where we look at mixed living in elderly co-housing. But first it is important to understand the principles for co-housing for elderly and how this might require changes in the way elderly are used to living now.

4.1 Co-housing for elderly

There is one main aspect in elderly co-housing that is different from regular elderly housing complexes or nursing homes and this is the management of the complexes. In the Dutch elderly care system mainly institutions are responsible for providing the care and activities for the elderly residents. The residents themselves are not too involved in the decision making process and the organization of the complex. However in co-housing this is different.

In co-housing the participation of the residents in the development, but most importantly the maintenance of the complex is key. The residents should be involved in the management of the complex but also in the creation of social connections via activities and other forms of meetings between residents (Czischke, 2019). The residents know best which services are needed within the building and which activities are liked

most. Because of the limited resources of elderly in both organizational and financial means, the development process of a co-housing is still mainly in the hands of the institutions providing the co-housing. But the management of the complex consisting of the maintenance and interior of the communal spaces and the provided activities is mainly controlled by the residents themselves in contrary to existing housing forms. A good example of this is the "røring" method from Habion (Liv-Inn, 2020). Here we can see that residents are involved in every part of the decision making and Habion acts as an external party with an mainly enabling role rather than deciding role (see image 4).

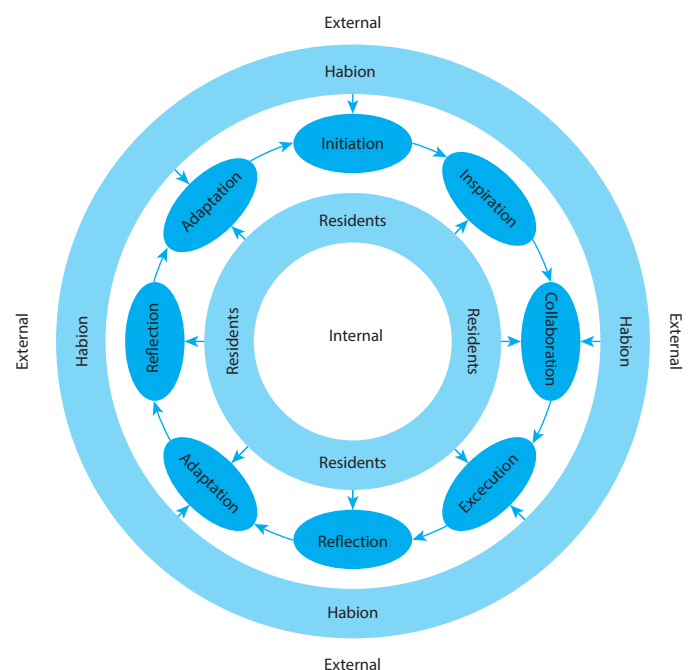


Image 4: Røring method Habion with involvement wheel
Illustration by author, from Liv-Inn, 2020.

4.2 Communal spaces

An important part of co-housing are the communal spaces. This is where the people are living together, get to meet each other and form strong social connections. The level of shared spaces can vary a lot between different co-housing complexes (Oorschot, 2021). For this reason it is important to indicate which spaces can be shared and which spaces elderly are willing to share. Especially for elderly this is an important topic because even though they are willing to create social connections and interact with others, they also want to have their own private space to retreat to and to be when they are not feeling like being social.

General shared spaces in co-housing are the living room, kitchen, dining room and laundry room (Oorschot, 2021; Van de Sande, 2019; Bramford, 2005). When looking at research about the willingness of elderly to share spaces, we can also see that these are the spaces that elderly are

most willing to share. Spaces such as bathrooms and bedrooms are deemed private and therefore the willingness to share these is very low (See image 5) (Bouwman, 2019). An important thing to state here is that the elderly are willing to share certain facilities, given the fact that they would still also have the facilities in their own private homes.

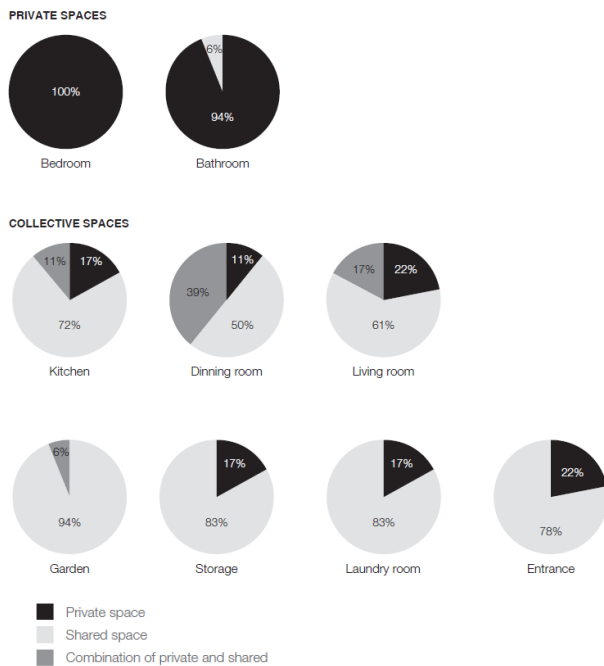


Image 5: Elderly willingness to share spaces (Bouwman, 2019).

4.2.1 Common Rooms

Especially the living room as communal space is an important factor. The residents can come together here for some coffee in the morning and start their day in an active and social way (Van de Sande, 2019). However, next to the living room and the daily coffee morning other activities are appreciated as well. These activities could be held in the living room as well but it is also possible and most often even appreciated more if there are multiple common rooms where these activities can be held. Two examples of this are the two common rooms from the fieldwork location. Where one room is used for the daily coffee mornings and smaller activities and the other room is used for bigger activities (see image 6). The same can be seen in The complex Liv-Inn from Habion. This building contains, next to the living room combined with kitchen, multiple common rooms with each their own theme for specific activities (see image 7).

One final note regarding the common rooms is the fact that these should always be accessible and not only during activities. From the fieldwork we could see that the common rooms were only opened during activity moments and this discourages elderly for meeting up in informally

whilst these meetings are also very important in elderly co-housing and sometimes even preferred over organized activities (Heren 5 Architecten, 2016).



Image 6: Common rooms in plan and picture at fieldwork by author.

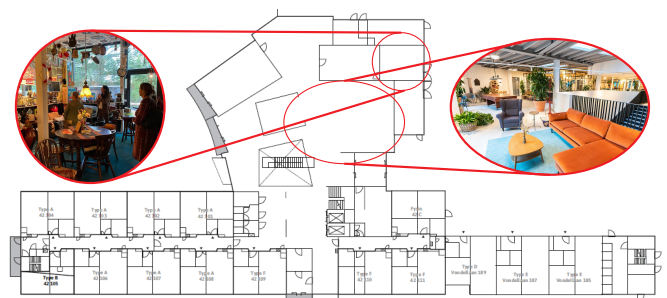


Image 7: Common rooms in plan and picture at Liv-Inn by author, from Liv-Inn, 2020.

4.2.2 Hallways

Another, (often overlooked) shared space is the hallway. In many of the current housing facilities for elderly these hallways are nothing more than just a hallway and therefore they can sometimes look and feel somewhat clinical (see image 8). However, literature shows that hallways could also be a good place for meeting each other. Everyone has to use them to get from and to their house and here the chance of meeting your neighbour is quite large. At the same time elderly do not always want to meet others during social activities but more informal meetups in for example hallways are also greatly appreciated (Heren 5 Architecten, 2016).

Therefore hallways should also be designed in such a way that they stimulate informal meetups amongst the elderly residents. This can be done by widening hallways at certain spots to create small areas where for example a sitting area can be located. But another way is by creating all hallways connected to a bigger common space that is furnished in such a way to encourage informal meetings between residents. (see image 9)



Image 8: Uninviting and clinical hall way from the fieldwork location (picture taken by author, 2023).

4.3 Communal activities

As mentioned before in paragraph 4.1 co-housing implies that the residents are responsible for the organisation of activities and the maintenance and decoration of communal spaces. In order to make sure that these activities are actually organised and that the people in the co-housing facility are involved in the community, some co-housing complexes have a set of rules that obligate their residents' participation in certain activities (Oorschot, 2021; Labit, 2015).

However, when we look at the existing elderly housing facilities and the participation in activities we notice that quite a lot of activities are organised and attendance is relatively high amongst the elderly, even though the organisation and attendance is on voluntary basis. Elderly in existing co-housing forms are in search of purpose in their lives and therefore very willing to organise activities (Labit, 2015). An important part to make this realise is the freedom to organise, as mentioned in paragraph 4.2.1. The elderly resident must have the opportunity to be able to organise their own activities according to their own interests, this freedom for an organisation should not only come from the institution providing the housing, but also from the design of the common spaces, they should be designed as such that the elderly residents have the opportunity to give the spaces their own twist and decorations (see image 7).

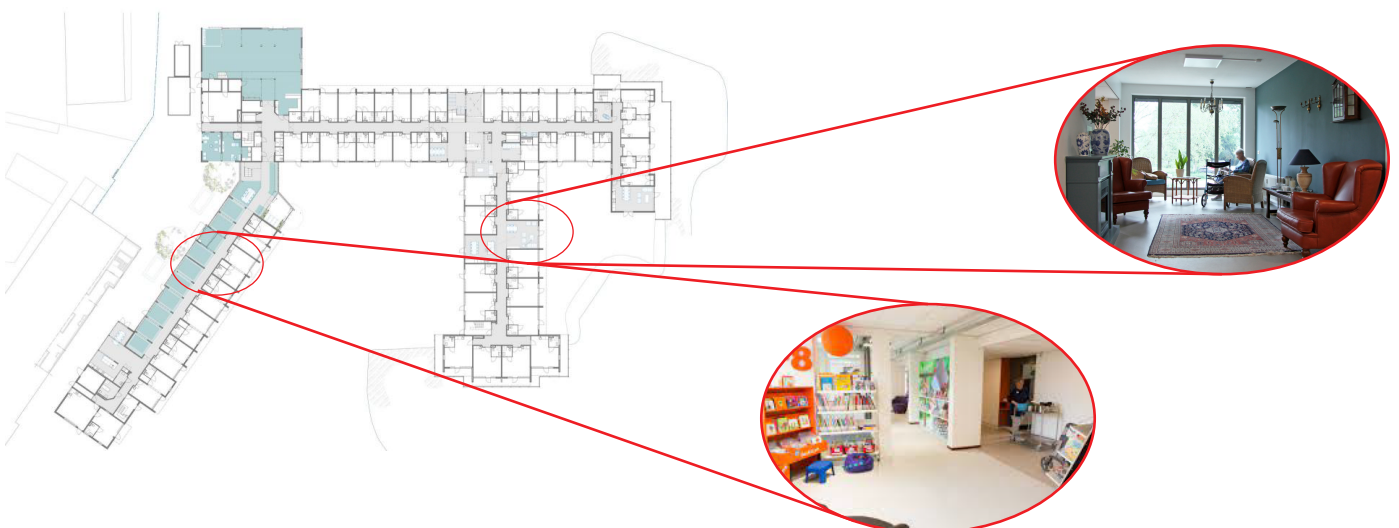


Image 9: Cozy hallways in 'T Kampje Loenen. On the right the widened hallway with setting area, on the left houses directly connected to communal area. Illustration by Author. (Studio Interactivo, 2015; Atelier Pro, 2016)

4.4 Apartment design

Next to the communal spaces, the private spaces in a co-housing facility are also very important. Especially for elderly people privacy is an important topic and they want to have the possibility to return to their own apartment and not be obligated to share every single facility with the community. As can be seen on image 5 in paragraph 4.2, some spaces such as kitchens and common rooms can be shared. But at the same time the elderly also want to have the opportunity to stay home and use their own private facilities. Therefore it is also important that each elderly home is still equipped with all facilities, nevertheless these facilities can be of lesser than full quality to encourage people to use the shared facilities as well (Bouwman, 2019).

Another important part about the apartment design in co-housing is the connection to the communal areas. As mentioned in paragraph 4.2.2 already these connections now are often through hallways with little personality and with little encouragement for informal meetups while this is appreciated by residents (Heren 5 Architecten, 2016).

Fieldwork also showed that visual connections to the communal areas are also important. The fieldwork location had a communal hobby room on every floor that was decorated in specific themes (for example library, hobby and pool/biljarts) (see image 10) However, the manager from Habion of the building mentioned that the spaces are barely used. When questioning why, the theorist came up that the residents do not have the proper connection to this common room and therefore do not know what is going on there. This theorist was mainly based on the fact that the placement of this common room was rather anonymous with no windows to the hallway (See image 10). When participation during a communal activity this theory got confirmed when several residents of the building entered the common room with the question if they could join the activity even though they did not sign up because they did not know the activity was happening.



Image 10: Common rooms per floor at fieldwork location. Left the anonymous entrance, right the common room (author, 2023).

4.5 Scale

The desired scale of the co-housing complex is dependent on three different topics. Social quality, quality of care and the financial feasibility. The last topic is left out in this research because this research focuses on improving elderly care via the way they live and not about the financial systems there are to support these housing forms.

Research on community housing schemes in The Netherlands has shown that there is a difference in appreciation of scale between villages and cities (Spierings, 2014). In villages a smaller housing complex is appreciated because of the larger informal contact between residents themselves, but also between residents and caretakers. However, even though work satisfaction amongst the caretakers is higher in smaller scale living, the overall well being of residents is only slightly higher than in larger scale living.

In cities a larger scale living is appreciated more because of the increased amount of care and services provided within the complex and the increased diversity in activities (Spierings, 2012). The elderly living in the city are less interested in informal social connections between themselves and the caretakers and are more interested in the facilities and amenities the complex has to offer.

Therefore the recommendation for community group living in villages is between 25 and 120 housing units per complex and between 80 and 350 housing units per complex in cities. These numbers imply a turnover point between 80 and 120 units per complex where social interactions are still kind of informal whilst a good enough amount of facilities and activities is still offered.

However, an important notice is that these numbers are based on community housing schemes in general and not only focuses on co-housing. When looking at co-housing we can see that the group scales are usually up to a maximum of 20-30 units per community group (Bamford, 2005). This is about co-housing groups and there is the possibility to place multiple of these groups into one co-housing complex, still sharing the overall facilities of the entire complex.

4.6 Conclusion

Co-housing is a good option for vulnerable elderly. Besides the the positive effects on physical and mental health due to the residents staying more active (Czsuchke, 2019), the increased amount of social contacts are also greatly appreciated and can lead to a better quality of life and even an increase in life expectancy (Steverink, 2016).

However, as mentioned this co-housing requires the residents to play a more active role in the organisation and management of the complex with the role of the housing institution reduced. This idea of enabling the resident to be more active in the management of the complex should also come back in the design of the common rooms, resulting in the first design guideline which is as follows:

- Common rooms should be designed in such a way that they enable the residents to decorate and use them in a way they please. While at the same time providing flexibility for changing needs.

In co-housing the common rooms are very important, we can see that these common rooms are used both for organising activities for the residents, but also for creating a place where residents can informally meet up. Therefore these common rooms should be accessible 24/7 and the resident should be able to shape these rooms the way they want. Another important aspect of these common spaces are the connection to them. When the common spaces are connected to the private rooms of the residents, they are more likely to use these common rooms because they know what is going on there. Leading to the following two design guideline:

- At least 2 common rooms should be created. One where activities can be organised and another one where more informal meetups between residents are encouraged.
- Common rooms should must have a more direct connection to the common rooms.

Next to the common rooms, other facilities are shared as well. Research showed that the elderly are willing to share other facilities in the buildings as well. These facilities should therefore also be integrated in the co-housing complex.

- The following facilities in a co-housing complex can be shared: Kitchen, garden, laundry room, entrance and storage.

But at the same time the residents also want to have the possibility to have privacy and not be forced into sharing every facility at all times.

- Therefore every housing unit should contain the following private housing facilities: bathroom, bedroom, living room and kitchen/pantry.

Continuing on the topic of privacy, research showed another important building aspect that is of importance, the hallway. Instead of the closed

and clinical hallway we often see in nursing homes these hallways should be designed in such a way that they encourage neighbour interaction and that these become meeting places rather than just a logistical place. However, at the same time the careful balance between private and public should be maintained as well. This results in the following 2 guidelines:

- Hallways should be designed in such a way that they encourage informal meetups between residents.
- Hallways should provide a smooth transition from the private rooms of the residents to the public spaces where activities are held.

The final aspect of this research was the scale of the building carefully balancing the quality of the care and social connections provided with the facilities and group diversity. Literature on general community housing for elderly showed that there is a tipping point between 80-120 housing units where the complex could offer sufficient facilities whilst maintaining a good quality of personal care and social relations (Spierings, 2014). When looking at co-housing in specific, we notice that groups are smaller because of the deeper social connections. When combining these two results we can make the following statement: The desired scale of the building is dependent of the amount of facilities nearby. This results in the following design guideline:

- The scale of the building can be with a maximum of 80-120 units, divided in living groups with a maximum 20-30 housing units, depending of the amount of facilities offered in the neighbourhood.



Image 11: Illustration of design guidelines for elderly co-housing (author, 2024).

5. Mixed living

When looking closer into the concept of co-housing we can see that people comes together through a shared vision on how to live together. This results in the population of co-housing communities being very diverse with people from different religions, backgrounds and educational levels, as can be seen in the quote from Darinka Czischke below:

“The aim of co-housing is to create a village context or intergenerational communities with people of different ages and different households to complement each others needs and services and sharing and helping each other.” (Czischke in Oorschot, 2021)

Co-housing is not only about creating social connections, but also about using them to help each other out when needed. In this chapter this aspect of people helping each other out through mixed living is looked into further. This topic is becoming increasingly important because of the rising costs and staff shortages in the professional elderly care.

Mixed living can have different meanings, it can be about mixing elderly with different care demands, as has happened before in the Dutch healthcare system. But it can also be about mixing different generations that can help each other out with certain tasks, as mentioned in the quote from Czischke above. In this research these two types of mixed living are looked into further.

5.1 Mixed care demands

Mixing elderly people with different care demands is already a topic in the Dutch elderly care system. Already since the 1980's elderly people with slight to no care demand are mixed with elderly with a moderate care demands in so called assisted living facilities (ALF's) (Spierings, 2012). However, an important difference between this type of mixed living and the type of mixed living proposed in this research is the fact that mixed living is used here as a tool to increase informal care amongst elderly, whilst in the ALF's care was provided by external organisations and the main importance was the slight increase in social contacts.

When researching mixing different groups of elderly together, two important aspects are important. First it is important to see how much elderly are willing to help each other out and which factors are influencing this willingness to share. Next to that it is important to see if there are implications on social, physical and mental health of the residents due to mixing different care demands and to what extent this group mix can be succesfull. These two topics are researched in this paragraph.

Willingness to help out

Research amongst elderly by Martijn Bouwman (2019) has shown that there are several tasks which elderly say they are willing to help out with (see image 12). These tasks are categorised and from this categorisation we can see that the elderly people are willing to help each other out, but usually only with smaller tasks. Bigger or more private tasks such as medical tasks are often deemed too personal (Van de Sande, 2019).

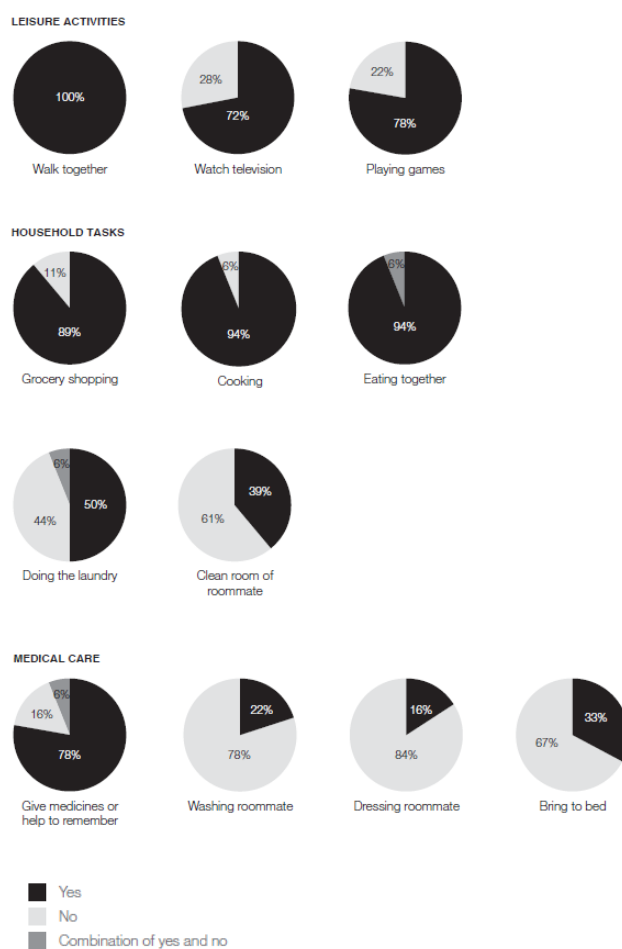


Image 12: Elderly willingness to provide informal care (Bouwman, 2019)

However, another important aspect in the willingness to help each other out is the social connection the elderly have with one another. Elderly often do not want to be personal caregivers, a result which also came back in the fieldwork where one resident told about how he had to help out a neighbour who had fallen during the night even though he was not supposed to because he is not the caregiver for this person. Several researches showed that elderly are willing to help each other out more when their personal connection with each other is better (Labit, 2015; Van de Sande, 2019). Therefore co-housing with elderly with a mixed care demands could be a working solution due to the increased and deeper social connections.

Proportions of group mix

Now that the willingness to help out is researched the following question can be asked: What are the proportions in which elderly mixing can be applied and are there downsides in mixing certain groups of elderly. It is important to have the right balance in mixing elderly with a higher and lower care demand. This balance is important because there has to be enough healthy elderly who are able and willing to help the elderly with a higher care demand. At the same time it is also important to prevent the complex from getting feeling too much of a care facility rather than a living facility for the healthier resident because this might lead to them not deciding to move there (Spierings, 2012).

First of, research has proven that there are downsides to group mixing, especially when groups of relatively healthy elderly people are mixed with elderly with a high to permanent care demand. In a complex where social connections are very important being confronted with the poor health of people in the same age category can be very confronting and impacting mental health (Spierings, 2012).

At the same time it can be very hard for these people to socially integrate in these communities and therefore we see that people with a permanent care demand are often moved out of the communal living facility (Van de Sande, 2019).

Keeping these aspects in mind and looking at literature about group mixing the following proportions of group mix are recommended:

- Light to no care needed: 30-50%
- Medium care needed: 20-40%
- Permanent care needed: 10-30%

Image 13: Proportions of group mixing (Spierings, 2014)

Important to notice here is that Spierings used the classification from the government to indicate these types of group mixing (Algemene Wet Bijzondere Ziektekosten). This indication has been changed to the "Wet langdurige zorg" with slightly different classifications. When comparing the classifications to each other the following definitions of light, medium and permanent care can be defined: Light care: VV 3 or lower, medium care: VV 4 or 5 and high care VV 5 or higher (Ministerie Volksgezondheid, welzijn en sport, 2015).

Even though mixing higher care demands into a co-housing community is riskfull, research did point out that residents do often appreciate the presence of a 24h care facility in their building even if they do not necessary need it. They like to have the option and feeling of security knowing that this facility is present (Spierings, 2014).

5.2 Mixed generations

As mentioned in the paragraph above the healthier elderly keep living at home more due to the government policy and the undesired care-mark of the assisted living facilities. A solution for this could be to mix the care-demanding elderly with target groups from other generations. This way these different groups can be helping each other out in certain tasks. For example a young family where the parent help the elderly out an elderly resident with certain tasks as cleaning the house or doing groceries while the elderly resident can babysit the children of the family when needed.

From literature we can find a contradiction regarding this topic of mixing younger generations with elderly people in a single living facility.

On one hand we can find the more theoretical literature where this group mixing is encouraged for the above mentioned reasons of the younger people being in a better state to help elderly people out due to their generally better health. At the same time we can again see that mixing younger people in a living facility for elderly is encouraged to reduce the care-mark of this facility (van de Sande, 2019).

Nevertheless the more practice-oriented literature, in the form of researches amongst elderly housing complexes and their residents, shows that the actual mixing of these target groups does not always work. The different target groups are in different phases in their life and therefore they are not always interested in creating strong social connections with people of different generations (spierings, 2014; Labit, 2015). An example of this is the combined housing project Abtswoudse bloeit where a nursing home is combined with student housing through a shared common room with kitchen. There is a form of target group mixing, but this is generally just through bigger activities organised for the entire housing complex. Therefore the stronger social connections that make people willing to help each other out are not created and informal help is less than theorised. Intergenerational mixing could work, but then more effort should be put in to create strong social and lasting social bonds between the residents of different age groups. Just placing them together with the idea that they will mix will not work.

5.3 Who decides who joins the community?

When researching group mix in co-housing another important question came up. This question is who decides who can join the co-housing community. Since co-housing is about strong social connections it is important that the people living in these co-housing facilities have a similar view on how to live together. When this view on living together is not shared conflict in the co-housing facility may arise. (Labit, 2015, Van de sande, 2019).

Often housing corporations used a certain selection procedure to select residents they seemed fit for certain community housing complexes. This selection procedure often led to discrimination and therefore in 2023 the Dutch government has adapted a new law that limits this selection procedure and makes it more transparent (Ministerie van Binnenlandse zaken en Koninkrijksrelaties, 2023).

Because co-housing is about the way the residents are living together it might be best to make the current residents choose who they think fits best in their community. An example can be found at the Liv-Inn in Hilversum, where an entrance committee existing of residents, a delegate of Habion and sometimes a care professional and municipal worker, decide whether the new resident would be a good fit for the complex (Liv-Inn, 2020). Important here is that this check is done using clear criteria to make sure discrimination is eliminated.

5.4 Facilities

Even though in paragraph 5.2 intergenerational living was deemed unfit for a co-housing community for elderly, earlier research in paragraph 3.1 has proven that the elderly do like to have a connection to younger generations. This connection could be made through connecting the building to its neighbourhood. Elderly housing facilities are often placed in central areas of the village or neighbourhood due to the close proximity that is required amongst elderly. Research has shown that therefore the housing facility in order to blend in better with the neighbourhood should also provide facilities for this neighbourhood.

In this paragraph two things regarding these facilities are looked at. First, the facilities themselves are looked into. What facilities do the elderly need in their housing and what facilities can elderly housing provide for the neighbourhood?. The second part that will be looked at is how important are these facilities for both the residents and the neighbourhood and what is the maximum distance elderly are able/willing to travel for these facilities.

5.4.1 Elderly facilities

Research into elderly facilities has come up with the following table for facilities in elderly housing: Good to notice is that these facilities are based on a welfare/care division rather than an internal external division and in Dutch. Therefore in image 14 a table with the functions in English and division in internal/external functions has been made.

	Algemeen	Welzijn	Zorg
Basis	Winkel/toko (ZGN, KB) (Openbaar) Vervoer (KB)	Huiskamer (KCWZ) Recreatieve bezigheden/ recreatieruimten (KCWZ,KB) welzijn ouderen (KCWZ)	Directe hulp noodsituaties (KCWZ) Inpandig zorgsteunpunt (KCWZ) Alarmering (KCWZ)
Kwaliteit	Receptie (KCWZ, ZGN) Huismeester (ZGN) Was- en linnenverzorging/wasserette (ZGN) (KB) Atrium/wintertuin (KCWZ)	Kapper (ZGN, KB) Internetruiimte (ZGN) Stilte- en Gebedscentrum/Kerkdiensten (ZGN, KB) Geestelijke verzorging (KB) Café (ZGN, KB) Restaurant (KCWZ, ZGN) (KB) Rokersruimte (ZGN)	Slaapwacht (KCWZ) Huishoudelijke hulp (KCWZ) Maaltijdservice (KCWZ) Huisarts (KCWZ) Fysiotherapie (KCWZ, KB) Overbruggingshulp of tijdelijke opname KCWZ,KB) 24uursbeschikbaarheid zorgpersoneel (KCWZ) Groepsverzorging/dagopvang (KCWZ, KB) Verzorging (KCWZ) Verpleging (KCWZ) Begeleiding (KCWZ)
Extra	Post/ bankfaciliteiten/ pinautomaat (ZGN, KB) Receptie 24 uur bemand (ZGN)	Pedicure (ZGN, KB) Bibliotheek (ZGN, KB) Fitness (ZGN, KB) Schoonheidssalon (KB) Zwembad (ZGN, KB) A la carte restaurant(ZGN)	Kantoor voor thuiszorg (KCWZ) (ZGN) (KB) Diëtist (KB) Ergotherapie (KB) Logopedist (KB)

Image 13: Facilities in elderly housing combined with the luxury scale of the facilities (Spierings, 2014)

Next to these facilities found in literature, two more facilities can be found that could or should be integrated in the co-housing complex.

The first facility is a second-hand shop. This facility was found during the fieldwork week. At the fieldwork location there also was a small second-hand shop which was run by the elderly residents of the complex. The second-hand shop had several advantages. First of all it created an internal place where elderly could get rid of items they did not need anymore or items that would be left behind when moving out. Whilst resident could also get the stuff they might need from this second-hand shop, which prevents them from having to travel to non nearby shops. Meanwhile, this second-hand shop provided a low bar for mixing people from the neighbourhood with residents of the building. Both groups of people came to visit the second-hand shop and due to its cozy furnishment people often starten talking to each other in informal conversations. Therefore a second-hand shop would be a good fit for an elderly living complex.

Another facility is one that has been mentioned before in paragraph 5.1 already, the 24h care station. Research showed that a 24h care station where one or multiple nurses could stay is very much appreciated by residents of elderly housing facilities. Even if they do not always need it. This nursing gives them a safe feeling, knowing that they can get help any moment of the day when something goes wrong (Spierings, 2014).

This nursing station can be occupied permanently or temporarily when the residents' health is lower, depending on the size of the complex and the financial implications of this.

5.4.2 Importance and maximum travel time of the facilities

As seen in image 13 a division in facilities has been made according to the importance of facilities. Of course a great diversity of facilities that can be placed in a housing facility for elderly but this should also not be too much. Therefore a division in function importance can be good. This division shows how important it is to have certain facilities in or near the building and which facilities are less important.

At the same time the neighbourhood in which the elderly housing is located also offers a variety of facilities which might be on this list. When these facilities are close enough to the building they do not need to be placed within the building again. To determine if these facilities are close enough the importance qualification can be combined with maximum travel times for elderly. These travel times are categorised in the following way:

- 200 meters: Basic facilities
- 500 meters: Welfare facilities
- 750 meters: Extra facilities

This qualification is made using the qualification for travel times by the Kenniscentrum Welzijn en Zorg (2009) and TNO (2010).

Here basic facilities can be defined as facilities that are visited almost on a daily basis. Welfare facilities are facilities that are visited on a nearly weekly basis and extra facilities are visited on a monthly basis.

With these classifications in mind the following table can be drawn up (see image 14):

	Internal	External
Basic 200 meters	Common room Kitchen Nursing station	Public transport Supermarket
Welfare 500 meters	Laundry room (Winter) garden	GP Pharmacy Church/chapel Second hand shop Library
Extra 750 meters	Reception 24h care	ATM/bank Fitness Hairdresser Nail salon Restaurant

Image 14: Facilities in elderly housing combined with the maximum travel time to these facilities (author, 2024)

5.5 Conclusion

Research has shown that mixing elderly people with different care demands can be a good idea for elderly co-housing. The elderly are willing to (temporarily) help each other out with certain tasks (see image 12) and the increased social contacts causes the elderly to be willing to help out beyond their regular aid limits as well (Labit, 2015; Van de Sande, 2019). However the mix of care demands should be right and people with a 24h care demand are often not desired in the co-housing community due to the fact that this can be confrontational for the healthier residents and the residents with higher care demands have more trouble integrating in the group (Spierings, 2014). Therefore the following two design guidelines can be determined:

- The group mix of elderly with a different care demand should be along the following lines:
30-50% low care demand
20-40% medium care demand
10-30% high care demand
- Mixing elderly with a 24h care demand is not very suitable for co-housing. If integrated place these people in a separate wing or building with the possibility to use the facilities of the co-housing complex and join the larger communal activities.

Another way of mixed living is through intergenerational co-housing. Even though this concept sounds good in theory, conflict and the decline of communal life are two main reasons for intergenerational co-housing not working out. These issues are a bigger risk with intergenerational co-housing versus exclusive elderly co-housing, because of the larger difference between target groups.

Nevertheless the elderly do like to mix with other generations and therefore the housing facility could provide for the neighbourhood as well. By adding certain facilities that draw in people from the neighbourhood while at the same time still providing for the residents as well stronger connections between residents and their neighbourhood are created, causing more liveliness in the building and improving health of the residents. Therefore the following design guideline regarding facilities is proposed:

- Include external facilities in the housing complex serving both the residents of the complex and the people from the neighbourhood.

Which facilities to include depends on the existence of nearby facilities in the neighbourhood. Two facilities that caught special attention, these two facilities are interesting for the complex in two ways and should therefore be added as well:

- Add a second hand shop to the complex.
- Add a 24h care module to the complex.

6. Conclusion

In order to improve elderly health and care and close the gap in elderly housing market, transforming existing vacant utility buildings into a co-housing complex with mixed living for elderly can be a good option.

Which type of buildings are suitable for transformation into elderly housing?

Transformation of buildings is a growing topic in The Netherlands and when looking back at the past few years offices seem an easy and good option for transformation into housing. However research has also pointed out that there are other types of utility buildings that are suitable for transformation as well. These building types are: Shops, industrial buildings and public buildings (Rijksdienst voor Ondernemend Nederland, 2014).

However, for elderly housing some extra requirements are needed in order to make the building suitable for transformation. These requirements are mostly based on buildings scale and location in the urban context. Comparing the characteristics of these four types of utility buildings to the requirements of elderly housing, one type of utility building pops out, the public/social building. These buildings are often located in or near urban centres with a scale that makes them suitable for transformation. A special building type within this category are schools, because of the aging of urban centres and increased efficiency in the Dutch educational system, more and more school buildings could become vacant in the future (KAW-architecten, 2020). This fact combined with their good location within the city and scale makes them a good option to explore further for transformation into elderly housing.

What are the needs and demands of elderly concerning the way they live and how are they living now?

Research amongst the elderly population has proven that the proven living style for elderly is either in their own family home or in a living facility where shared activities are organised and care facilities are provided when needed (Hagen, 2020). When looking deeper into these two profiles we notice that the main reason they are popular is because of the social contacts in the living facility and the neighbourhood connection in the family homes. With these two important wishes for elderly housing in mind the following design guideline for elderly housing can be drawn up:

- Create a form of elderly housing where social connections between residents are improved and neighbourhood connections are maintained.

Which principles of co-housing can be introduced into an elderly living housing complex to improve health and care and how can these principles be shaped architecturally?

Research has shown that co-housing could be a good option for housing the elderly in the housing gap. Next to the positive effects on physical and mental health (Czischke, 2019) the increased and stronger social contacts are also appreciated and research has even proven that this can lead to a better quality of life and increased life-expectancy (Steverink, 2016).

Many of the regular principles of co-housing can be implemented in a building for elderly co-housing. One principle though, needs to be slightly altered and this is the principle of the organisational structure of the co-housing facility. Usually the development and management stage is completely in the hand of the residents, but in the case of elderly housing it is better for a housing institution to be involved as well. However, the role this housing institution should be limited to enabling the residents in the things they want to organise within their complex.

Research has shown that in order to create a successful co-housing complex for elderly the preconditions in four categories need to be met (Labit, 2015). Research in these four categories has resulted in the following preconditions that are translated into design guidelines:

- Common rooms should be designed in such a way that they enable the residents to decorate and use them in a way they please. While at the same time providing flexibility for changing needs.
- At least 2 common rooms should be created. One where activities can be organised and another one where more informal meetups between residents are encouraged.
- Private rooms should must have a more direct connection to the common rooms.
- The following facilities in a co-housing complex can be shared: Kitchen, garden, laundry room, entrance and storage.
- Therefore every housing unit should contain the following private housing facilities: bathroom, bedroom, living room and kitchen/pantry.
- Hallways should be designed in such a way that they encourage informal meetups between residents.
- Hallways should provide a smooth transition from the private rooms of the residents to the public spaces where activities are held.
- The scale of the building can be with a maximum of 80-120 units, divided in living groups with a maximum 20-30 housing units, depending of the amount of facilities offered in the neighbourhood.

Can mixed living be a solution to relieve pressure on the Dutch professional care system and how can this be incorporated in a housing facility for elderly people?

Research has determined two types of mixed living that could provide a solution for relieving pressure on the care system and increasing informal care.

However important to state is that in neither of these two forms of mixed living the extra care provided by co-residents can substitute the actual informal and professional care these elderly need and so there are still facilities and care takers needed to provide this care (Van de Sande, 2019).

Looking deeper into these two types of mixed living, has shown that mixed living amongst elderly (combining elderly with different care demands) is a better solution than intergenerational living. Even though in the intergenerational living the quality of informal care provided can be better, research shows that forming social connections can be harder and the communal feeling within these complexes could fade over time. Therefore, when intergenerational living is to be applied more effort needs to be put in the creation of strong social bonds between residents to create and maintain this communal feeling. With this information in mind the following design guideline concerning mixed living can be drawn up:

- The group mix of elderly with a different care demand should be along the following lines:
 - 30-50% low care demand
 - 20-40% medium care demand
 - 10-30% high care demand

However as mentioned already in chapter three, the residents of the elderly housing do like to have a connection with their neighbourhood. With the often central placement of the complex in the neighbourhood this connection could easily be made through shared facilities. Facilities that serve not only the residents of the housing complex, but also the residents from the neighbourhood gives liveliness to the complex and adds to the creation of social connections, improving the health of the elderly. Research on these facilities can be concluded in the following three design guidelines:

- Include external facilities in the housing complex serving both the residents of the complex and the people from the neighbourhood.
- Add a second hand shop to the co-housing complex.
- Add a 24h care module to the co-housing complex.

Design concept

With these results in mind the main question of the research (Which architectural interventions can be introduced in an existing utility building to create a living environment that improves the care and prevents health issues for vulnerable elderly in The Netherlands?) can be answered by combining the design guidelines. With the combination a scheme can be produced for spatially creating a co-housing for elderly. These scheme is presented on the next page (see image 15)

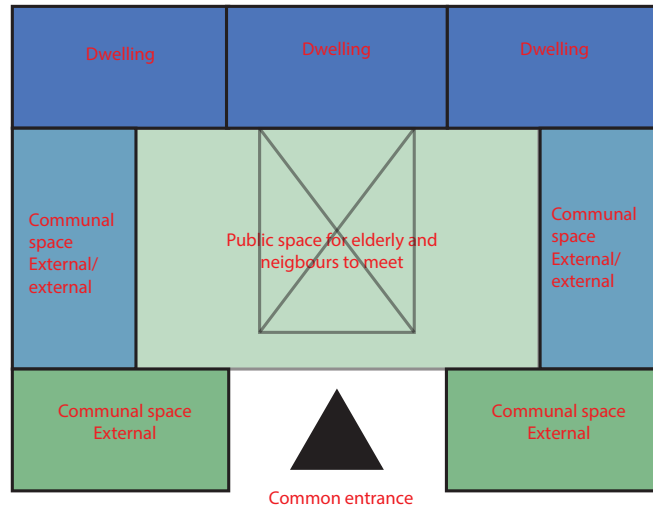
The co-housing complex consists of a largely public ground floor where the more public common spaces of the residents are combined with the spaces that provide facilities for both residents and people from the neighbourhood. These spaces are all connected through a large public square that can be entered from the common entrance and where the different target groups can meet up in an informal way. On this groundfloor dwellings can be placed as well, these dwellings are connected to the public square via a smooth transition between private and public.

On the first floor space is reserved for the residents of the buildigns. The first floor consists of open hallways that offer spaces where the residents can informally meet. These hallways are visually connected to the common rooms on this floor and the public square on the ground floor. The hallways again form the buffer between private and public, reducing disturbance whilst maintaining strong connections to the public areas.

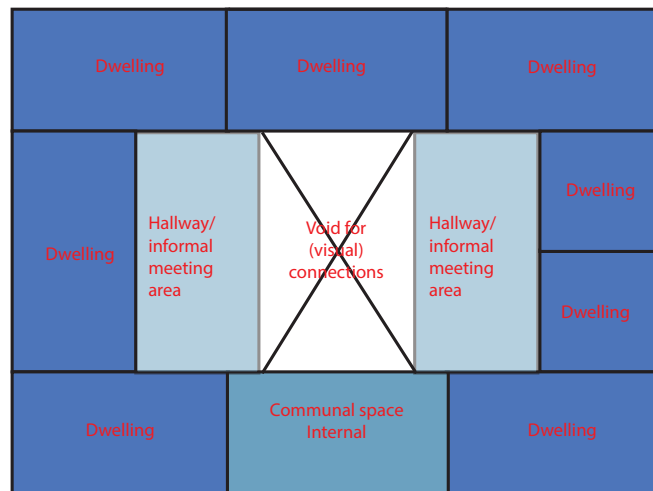
As can be seen in the section of this scheme, the different floors are connected to each other using atriums again providing visual connections between private and public, motivating elderly to come together in the common areas.

Ofcourse this concept is very schematical and can not be one on one copied into an existing building. However the principles explained in this scheme are the most important principles for creating a co-housing complex for elderly and therefore these are the architectural principles that can be introduced in an existing school building that has become vacant.

Typical Floorplan Ground Floor



Typical Floorplan First Floor



Typical Section

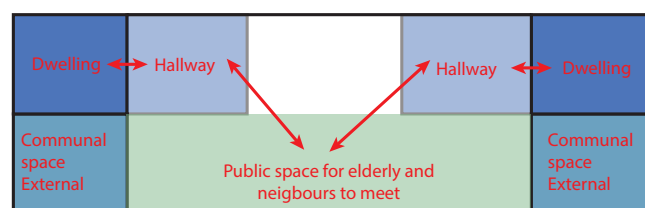


Image 15: Elderly co-housing concept (author, 2024)

7. Discussion

This research has mainly focused on defining architectural interventions for introducing a communal housing concept for elderly into an existing building, with the emphasis on the housing concept.

Transformation

Due to the limited research size and time the choice has been made to mainly focus on the housing concept and make use of a limited scope for researching the building transformations. Based on research by a group of government experts combined with the additional requirement for elderly housing an overview has been presented of utility buildings that are generally considered to be options for building transformation, mainly due to their adaptable structure, location in the urban area and availability of these buildings. However, not every single one of the buildings belonging to each of the categories might be suitable for building transformations. Therefore in order to exactly determine which buildings are and are not suitable for transformation in elderly housing further research is required. Especially research in the physical qualities of the specific buildings is needed in order to determine the feasibility of a transformation.

Next to that there are also many forms of building transformation ranging from complete reuse of the building to partly demolition and reuse of the structure or even only the building concept. This research addressed solely the possibility to transform existing utility buildings into housing and not to what extent the buildings could be transformed, this also required further research.

Co-housing and mixed living

In the research co-housing has been suggested as a form of social housing to fill the gap between living at home and living in a nursing home. Mainly the upsides of this type of housing have been discussed, but it is also important to understand the downsides that can come from this type of housing. At the same time it is also important that co-housing might not provide the full solution to fill this gap, but presents one of the options for the elderly to continue living independently whilst still having facilities and strong social connections nearby.

Therefore it is also important to understand that co-housing might not be a solution for everybody. As mentioned by Czischke already co-housing is a form of housing where like minded people come together to form a community based on their shared principles on how to live (Oorschot, 2021). Research has also proven that the housing demands of elderly can be very different and therefore not everyone would like to live in a complex where social connections and

sharing spaces are this important. Co-housing is a solution, but not for every elderly person in The Netherlands. For the people not interested in living in a co-housing complex other types of living should still be available and this should therefore also be researched further.

In this research architectural design guidelines for co-housing and mixed living have been proposed based on the research on the elderly wishes of living and designing for social contacts in elderly housing. With drawing up these guidelines financial and regulational limitations are not taken into account. The design guidelines and the concept following from this present the ideal image for creating a co-housing with mixed living for elderly, but in theory some of these guidelines might not be possible to implement in certain projects due to financial or regulational limitations. For example the 24h care unit is not feasible for every project depending on the scale of the project (Singelenberg, 2012). Finally we are also dealing with an existing building on a predetermined site and therefore the conditions of this building and the site might also limit the implementations of certain design guidelines.

Research method

Due to the large quantities of available literature and researches on this topic, I have decided to base this research mainly on literature with the case-studies and the fieldwork as means to confirm and add to the research result. Next to that for every topic multiple researches have been consulted in order to make sure that the results from these researches are valid and not subject to subjectivity of the writer or research respondents. The literature that was used is based on research from recent case-studies and interviews in The Netherlands, making the results of these researches very applicable and relevant. With interpreting and implementing the results from this literature, changes in the Dutch legislation and the care system between the publication of the literature and the writing of this research have been taken into account and sometimes new rules or definitions of certain concepts have been continued in the results of this research.

Overall this research has tried to provide a valuable options for the problems in nowadays elderly care and housing. Over the last decades we have seen many changes in the Dutch laws and regulations concerning elderly housing. This causes uncertainty in what the future will bring, but this new concept for elderly housing will hopefully inspire designers, decision makers and the elderly themselves to think about more permanent and future proof solution for elderly housing. Which is necessary with the ever changing elderly population.

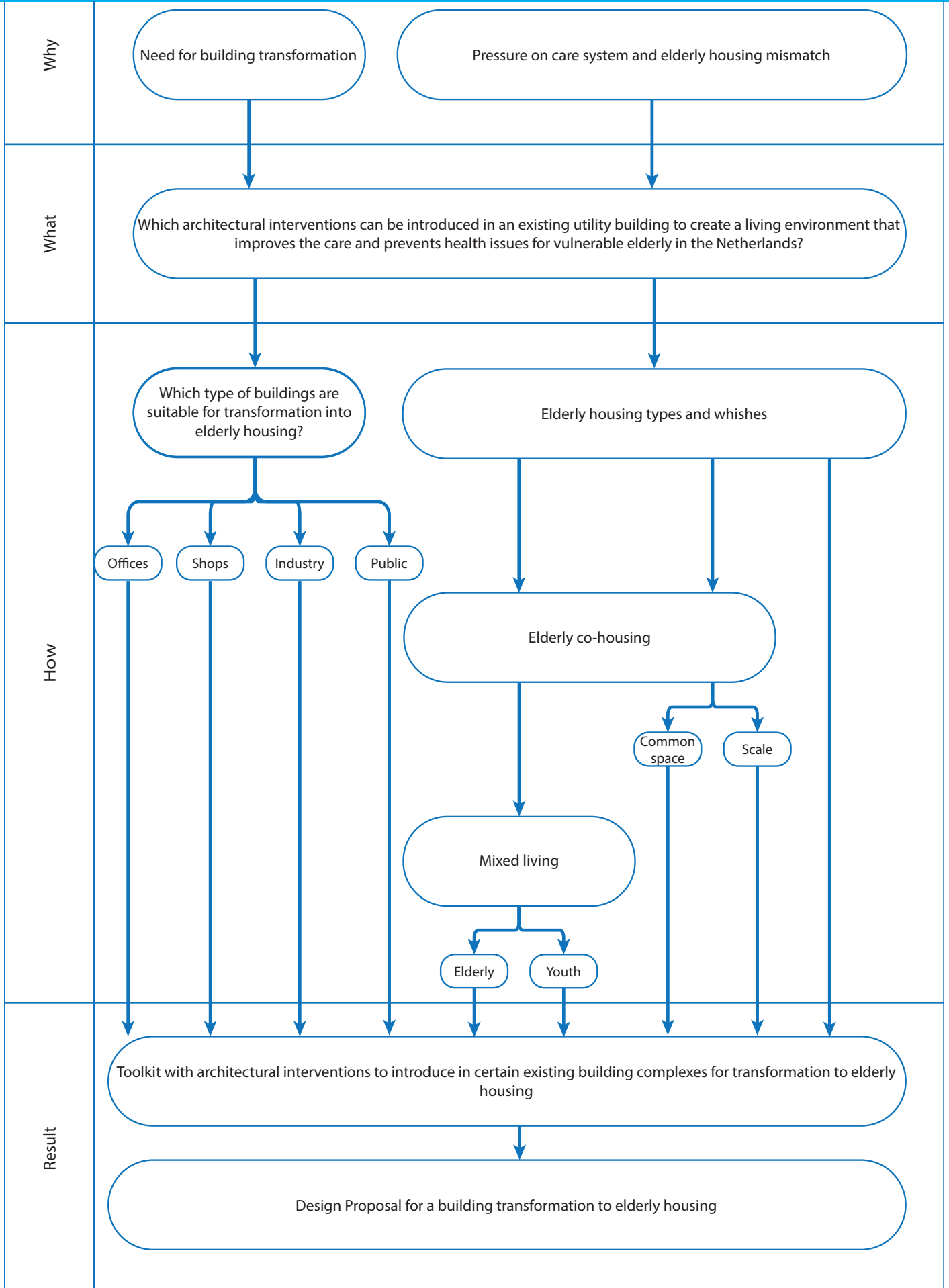
8. Literature

1. Aalders, M & Ouwehand, A. (2021). Transformatieatlas retail: van miljoen vierkante meter lege winkels tot woningen. RaboResearch.
2. Akkermans, M., Kloosterman, R., & Reep, R. (2020, August 10). 55 plussers over hun (toekomstige) woning. Centraal Bureau voor de Statistiek. Visited on Oktober 10 2023. <https://www.cbs.nl/nl-nl/longread/statistische-trends/2020/55-plussers-over-hun--toekomstige---woning/>
3. Bouwman, M. (2019) Master Thesis Fun by grey. TU Delft.
4. Bookman, A. (2008). Innovative models of aging in place: Transforming our communities for an aging population. *Community Work Fam.* 419-438.
5. Bramford, G. Cohousing for older people: Housing innovation in The Netherlands and Denmark. *Australasian. J. Ageing* 2005, 24, 44-46.
6. Cambridge University Press. (n.d.). Cambridge Academic Content Dictionary. Retrieved on November 6 2023. <https://dictionary.cambridge.org/dictionary/english/transformation>
7. Centraal bureau voor de statistiek. (2022). Landelijke monitor leegstand. Retrieved on Oktober 27th 2023 on https://dashboards.cbs.nl/v3/landelijke_monitor_leegstand/.
8. Czischke, D. (2019). Collaborative Housing: The resurgence of collectively self-organised and self-managed housing in Europe.
9. De Jonge, H. (2022, June 10) Versnelling woningbouw [Letter of government]. Retrieved from <https://www.rijksoverheid.nl/documenten/kamerstukken/2022/06/10/kamerbrief-over-versnelling-woningbouw>
10. European commission. (2020, Oktober 14). A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives. Brussels: Office for Official Publications of the European Communities.
11. Hagen, G.J., & Neijmeijer. (2020, july). Woonprofielen van Senioren. Platform 31/ Springco Urban Analytics. Retrieved on Oktober 24th 2023 on <https://www.platform31.nl/artikelen/woonprofielen-van-senioren/>
12. Heren 5 architecten. (2016). Stadsveteranen. Retrieved from: <https://issuu.com/heren5architecten/docs/160616-stadsveteranen-definitiefboek> on December 30th 2023.
13. Huber, M., Vliet van, M., & Boers, I. (2016). Heroverweeg uw opvatting van het begrip gezondheid. *Nederlands Tijdschrift voor Geneeskunde*. Retrieved on Oktober 25th 2023 <https://www.ntvg.nl/artikelen/heroverweeg-uw-opvatting-van-het-begrip-gezondheid>.
14. Jürgenhake, B. & Boerenfijn, P. (2022). An interdisciplinary research method for new models for elderly living environments in an aging society. *The Evolving Scholar*, 1-18.
15. KAW Architecten. (2020). Ruimte zat in de stad.
16. Klerk de, M., Verbeek-Oudijk, D., Plaisier, I., & Draak den, M. (2019). Zorgen voor thuiswonende ouderen. Sociaal Cultureel Planbureau.
17. Labit, A., (2015). Self-managed co-housing in the context of an aging population in Europe. *Urban Research & Practice*. 8:1. 32-45. DOI: 10.1080/17535069.1011425
18. Lennartz, C. (2018). De Transformatieatlas Retail van de Rabobank. RaboResearch.
19. Lennartz, C. (2017). De transformatieatlas van de Rabobank. RaboResearch.
20. Liv-Inn. (2020) Reuring-methodiek. Retrieved from: <https://www.liv-inn-thuismaken.nl/reuring-methodiek/#1> on January 18th 2024.
21. Ministerie van Binnenlandse zaken en Koninkrijksrelaties. (2023). Wet goed verhuurderschap.
22. Ministerie van Volksgezondheid, Welzijn en Sport. (2015). Ouderen van nu en straks: zijn er verschillen in kwetsbaarheid?
23. Ministerie van Volksgezondheid, Welzijn en Sport. (2018). Programma Langer thuis.
24. Ministerie van Volksgezondheid, Welzijn en Sport. (2015). Regeling langdurige zorg.
25. Nivel. (2014). Overzichtsstudie: Ouderen van de toekomst. Nivel.
26. NVM-Business. (2021). Transformatie Winkelruimte.
27. Oorschot, L. (author). (2021). Nederlands kantelpunt: Darinka Czischke about the freedom to choose your way of living in collaborative housing. Web publication/site, 1M Homes initiative.
28. Rijksdienst voor Ondernemend Nederland. (2014). Nationaal Transformatie Loket voor vastgoed. Retrieved on December 11th 2023 <https://www.rvo.nl/onderwerpen/expertteam-woningbouw/nationaal-transformatie-loket>
29. Rijksdienst voor Ondernemend Nederland. (2022). Transformatie in cijfers: Heden, verleden en perspectief.
30. Rutte, J., Voorbergen, F., De kort, E. & Van der Molen, G. (2013/2014) Verkleuren met behoud van maximaal grijs. Stec groep.
31. Spierings, D., van der Voordt, DJM., & van Biene, M. (2012). "The Desirable Scale": Weighing social quality of as-sisted living facilities. In ISG*ISARC World Conference 'Who is afraid of aging?' (pp. 1-7)
32. Spierings D.G.M., Van der Voort, D.J.M. & Van Biene, M.A.W. (2014) Promotieonderzoek De wenselijke schaal. Raboud Universiteit Nijmegen
33. Steverink, N. (2016). De kracht van sociale relaties: De invloed van sociale relaties op

zelfmanagementvaardigheid, gezondheid en welbevinden. Rijksuniversiteit Groningen.

34. Van de Sande, J. et al, (2019). Senior Co-Housing in The Netherlands: Benefits and Drawbacks for Its Residents. International journal of Environmental Research and Public Health.
35. Van der voortd, T. (2007). Transformatie van Kantoorgebouwen. 010 Uitgevers.
36. World Health Organization. (1946, July 22). Constitution of the World Health Organization.

Appendix A: Research Flow Diagram



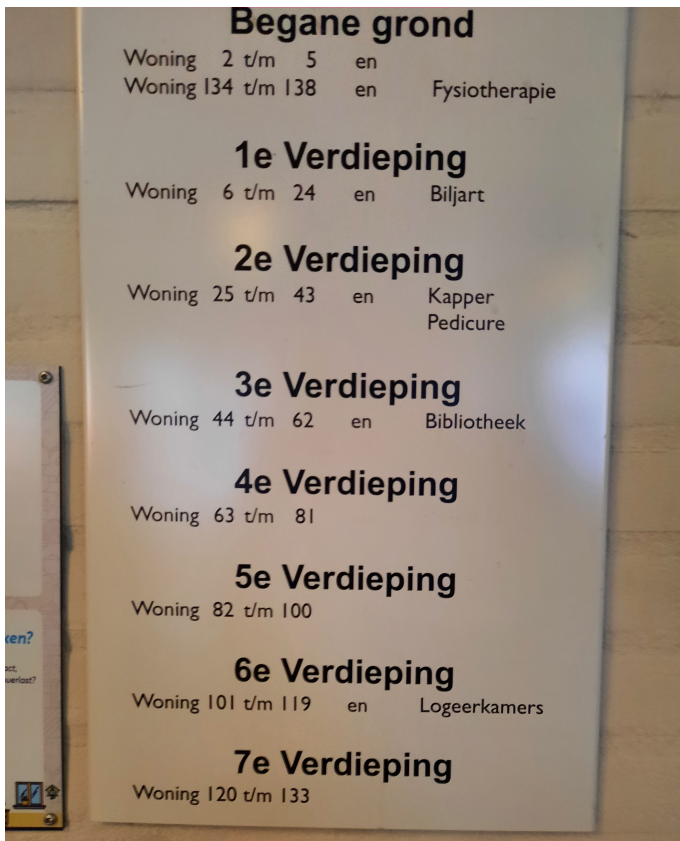
Appendix B: Fieldwork observations



One of the main observations of the fieldwork location have been the dark and unpersonal hallways of the complex. These hallways were considered only as a logistical principle getting people from the entrance of the building and the common areas to their own houses. Without places to comfortably stand to have a small chat with neighbours. These hallways encourage elderly individuality which might lead to isolation and loneliness. Even though the complex itself provides activities and common spaces for the elderly to meet, with the goals of preventing loneliness.

<i>Datum</i>	<i>Tijd</i>	<i>Activiteit</i>
Do 16 nov 2023	14:00 – 16:00	Valpreventie
Zo 19 nov 2023	14:30 – 17:00	Soos
Wo 22 nov 2023	7 ^e t/m 4 ^e etage	Glazenwassers
Do 23 nov 2023	3 ^e etage t/m BG	Glazenwassers
Do 23 nov 2023	17:00–19:00	Wereldkeuken
Do 30 nov 2023	15:00 – 16:00	Valpreventie (DvE)
Do 3 Dec 2023	14:00–17:00	Grandcafé
Di 5 Dec 2023	13:30 – 17:00	Spelletjes middag
Do 7 Dec 2023	17:00 – 19:00	Wereldkeuken
Wo 13 Dec. 2023	12:00–14:00	Kerstbrunch

In the fieldwork complex many weekly/monthly activities are organised. Activities are organised by the residents committee with approval of the care taker and Habion. Residents are notified of these activities through these pamphlets in the elevator and notification board. Some of the activities are from external parties that organise the activities but other activities are also organised by the residents themselves. These self-organised activities are very much looked forward to by the residents since they are considered very "gezellig" and the residents can have more personal involvement in the activities by incorporating their hobbies in the activities.



Next to the two common rooms used for the daily coffee activity in the morning and other activities. The complex also has three common rooms located on different floors. These common rooms were all decorated in their own way (library, pool/biljarts room and hobby room). However, when asked about these rooms, the care taker admitted that the rooms are barely used. One resident talked about the library and how she, especially during COVID, times appreciated how she could get books from there to read without having to leave the building. One of the reasons the common rooms are not used that much might be because of their closed character. Most common rooms are placed along a corridor without windows and with a regular door like all the private rooms. This is not very inviting and therefore the resident might not feel too invited into using the room. Next to that the residents cannot see what is going on in the room when they pass by and this also does not motivate them to stop by and make a small conversation or join in what is going on.





Appendix C: Fieldwork interview quotes

Please note that these interviews have been conducted in Dutch. The questions and answers are translated into English for this research. This might however cause some translation issues.

Interviewer: I heard you are a part of the residents committee, why did you become a part of the committee and what do you organise?

Resident: I joined the residents committee because I like to organise things and do things together with other people. I like cooking very much and therefore I am mainly organising cooking activities, such as the Oma's soep activity today and the weekly world kitchen meal.

"During an activity where students make soup and conversation with the elderly to battle loneliness"

Student: there was a problem with communication, the idea was that you would all make the soup together in small groups but now we will just make the soup ourselves.

Resident: Oh yeah, I would not have joined if we were supposed to make the soup ourselves. I could have also just made soup on my own in my room then.

Interviewer: I see there is a tram stop just across the road, do you like to have the opportunity to leave the building and travel somewhere with Public Transport?

Resident: Oh yes, I like it very much to take the tram and go to Scheveningen. I am from The Hague so it is nice to be able to go back sometimes.

Resident: However, this tram is not working very well for us because there is a step to enter the tram and we all have a walker. So it is very hard for us to get in the tram. Everything should be on the same level.

Interviewer: I noticed there are many activities being organised do you like that? And do you go to a lot of activities?

Resident: No I do not go to many of the activities, I don't like them all and it gets a bit boring to have the same activity with the same people all the time. I like to go to the more special activities and for the rest I go to other clubs and organisations to have activities there.

Interviewer: Do you still make dinner for yourself often?

Resident: Oh yes, I think on our age making healthy dinner for ourselves is very important. It is a lot better than those microwave dishes from the supermarket.

Another resident: No, I only eat microwave dishes from the supermarket. I am 90+ years old now, so making dinner is not really possible for me anymore.

Another resident: Sometimes I order food, but

often there is a minimum amount you need to buy, this is too much for me so that can be annoying. Ordering food is very convenient though.

Interviewer: I also saw that in Delft there is the so called BUDD bus (groceries and activities service Delft), do you use their services often?

Resident: Yes they are amazing! They offer fun tours to unknown places that we cannot visit ourselves anymore. The prices are low and there are always some people with us for guiding us and taking care of us for during the activities.

"During the afternoon where the second hand shop of the building is opened"

Interviewer: I heard you are one of the people running the second hand shop, are you a resident here and can you tell me something about the second hand shop?

Resident: Yes I am living in this building and I am one of the persons running the second hand shop. Here we sell second hand items, mostly from residents here, to the residents of the building but also to people from the neighbourhood. We try to keep the prices low so everyone can come here and leave with something nice again. At the same time visiting the second hand shop is a good reason for people to talk to each other and have a small chat. Another resident: It is really nice to have the second hand shop here in the building. A couple of weeks ago my chair broke and I had to buy a new one. Instead of having to travel to a furniture shop with my children I could just buy one here and ask some of my neighbours to help me bring it upstairs.

Interviewer: Where do you get the things from that you are selling here?

Resident: Usually we get them from the people living in this building. When the residents do not need certain things anymore they bring it here for us to sell. But also when one of the residents dies the family can leave some of the stuff they do not want to keep so they do not have to throw it out themselves but we can sell it again to someone who might still be able to use it.

Interviewer: Do you know how many people are living there and do you know many of them?

Resident: I think there are around 138 houses, I know many of the residents from the coffee activity in the morning, but not everyone joins that, so I don't know many of my direct neighbours.

Interviewer: There are a lot of digital ways that can help out elderly with certain tasks, how do you think about that?

Resident: Yes it is very nice, I have many apps on my Ipad. But sometimes they are hard to understand.

Appendix D: Design guidelines



Common rooms should be designed in such a way that they enable the residents to decorate and use them in a way they please. While at the same time providing flexibility for changing needs.



At least 2 common rooms should be created. One where activities can be organised and another one where more informal meetups between residents are encouraged.



Hallways should provide a smooth transition from the private rooms of the residents to the public spaces where activities are held.



Hallways should be designed in such a way that they encourage informal meetups between residents.



The scale of the building can be with a maximum of 80-120 units, divided in living groups with a maximum 20-30 housing units, depending of the amount of facilities offerend in the neighbourhood.



The following facilities in a co-housing complex can be shared:
Kitchen, garden, laundry room, entrance and storage.



Therefore every housing unit should contain the following private housing facilities: bathroom, bedroom, living room and kitchen/pantry.



Include external facilities in the housing complex serving both the residents of the complex and the people from the neighbourhood.



Add a second hand shop to the co-housing complex.



Add a 24h care module to the co-housing complex.

