Reimagining the Boundaries
— way to integrated and assimilated nursing homes in Singapore

Dr.

University of Singapore

Declining Fertility Rates

Total Fertility Rate

Dragon Year 1988: 1.96

Dragon Year 2000: 1.60

Dragon Year 2012: 1.29

1.82

1.14

Life Expectancy

Females Have Higher Life Expectancy

Female

83.3 Years — 2008
84.5 Years — 2013
85.4 Years — 2018

78 — 80 — 82 — 84 — 86

Male

2008: 78.4 Years
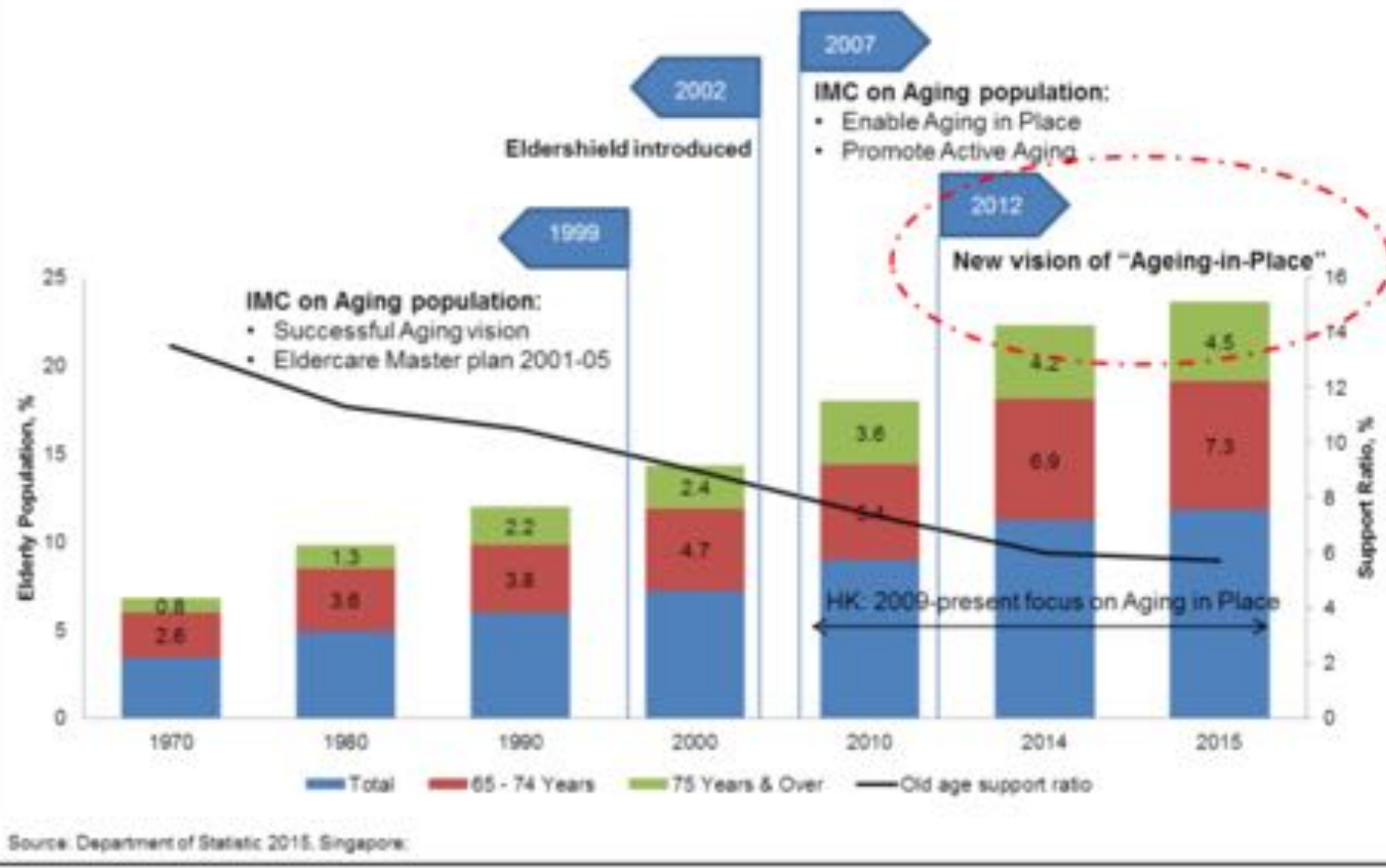2013: 80.1 Years
2018: 81.0 Years
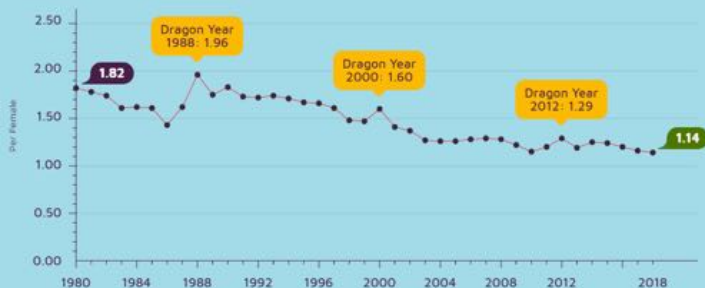
Data pertain to the life expectancy at birth of the resident population (i.e. Singapore citizens and permanent residents). Data for 2018 are preliminary.

FUTURE OF LONG TERM CARE IN SINGAPORE

RESEARCH PROJECT *supported by NRF under its L2 NIC programme*

"Designing Future-ready and Sustainable Nursing Homes for Person-Centric Care Models in Communities"

Objectives of research project

- Support **innovative care models;**
- Proposed typologies for **affordable and quality care**;
- **Seamlessly assimilate nursing homes into the community;**
- Achieve **buildability and operational efficiency**; and
- Have a **multidisciplinary** and collaborative approach.

Foci of design research

- To create **supportive and enabling environments** through design;
- To enable the shift from the traditional care model in NHs to the **Person Centric Care model**;
- To **encourage community integration with the NH**; and
- To create future ready and sustainable nursing homes with **technology integrated into** its design, care model and construction techniques.

Methods

- Literature searches and reviews
- Evaluation of existing nursing homes in Singapore on various grounds (care aspects, design, incorporation of technology, integration with the community, etc.)
- Study and modification of established assessment tools to evaluate NHs
- Using a multi-disciplinary approach to collect and evaluate data to collect holistic and coordinated information.

Teams involved

- Lead research team: NUS Centre for Ageing Research in the Environment (CARE) – Lead PI: Assoc Prof Fung John Chye, NUS
- Care research: Geriatric Education Research Institute (GERI) and National University Hospital (NUH)
- Social research: Duke-NUS CARE
- Collaborating agencies: URA, MOH, MOHH, AIC, BCA

METHODOLOGY
Overcoming the boundaries between disciplines

Tools used for NH evaluation

1. Wisconsin + (Wisconsin Person-Directed Dementia Care Assessment tool, enhanced with "**space**" and "**time** of the day" information for relevant indicators)
- REIS+ (Residential Environment Impact Scale tool, enhanced with "space" and "time of the day" information for relevant indicators)
- **Physical mapping**
- **Activity mapping**
- **Design ethnography**
- **Sensory perception mapping**
- Dementia Care Mapping (DCM)
- Focus group discussions (FGDs)
- Interviews with residents and staff
- DemQoL (Dementia Quality of Life)
- European Quality of Life-5 Dimensions (EQ-5D-5L)

The research team referred to assessment tools like EAT (Environment Audit Tool) and SEAT (Singapore Environment Audit Tool - in development) when developing the physical and activity mapping research protocols.

SEAT (Singapore Environment Audit Tool – in development)
Wisconsin Tool
REIS (Residential Environment Impact Scale)

Physical   **Natural**   **Social**   **Symbolic**

SPACE AND ACTIVITY HIGHLIGHTS

The overall staggered layout and self-containment of the households results in low visibility of one space to another, hindering surveillance, but increases privacy in the spaces.

Spaces:
Bedrooms
Living Rooms
Circulation Spaces

SPATIAL ANALYSIS

Privacy

Space Configuration

CARE HIGHLIGHTS

Caregivers experience surveillance issues when residents are in more private nooks.

Space:
Living Rooms
Corridor

LEGEND

- ● Bedrooms
- ● Living Rooms
- ● SCC
- ● MPH
- ● Garden
- ● Entrance Lobby
- ● Circulation spaces

Ability

High ability, less support required from the environment.

Low ability, more support required from the environment.

Years

Declining ability of elderly over the years

Increasing support from the environment over the years
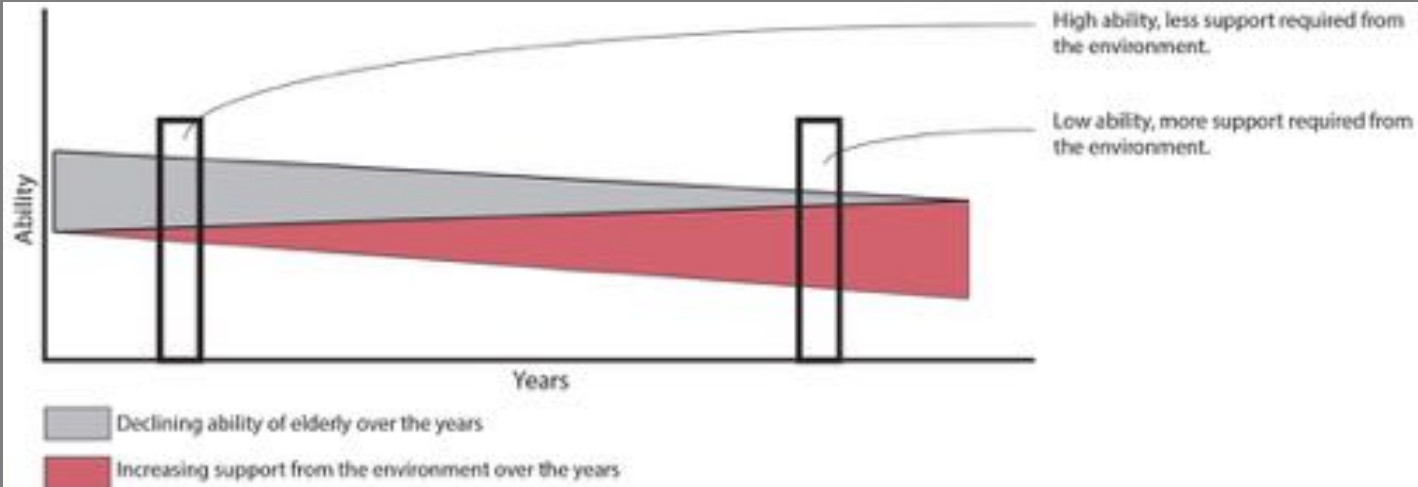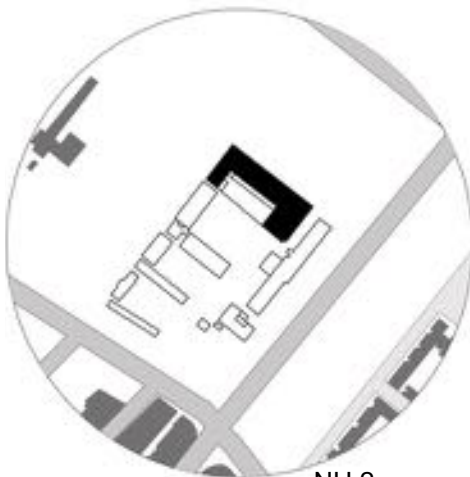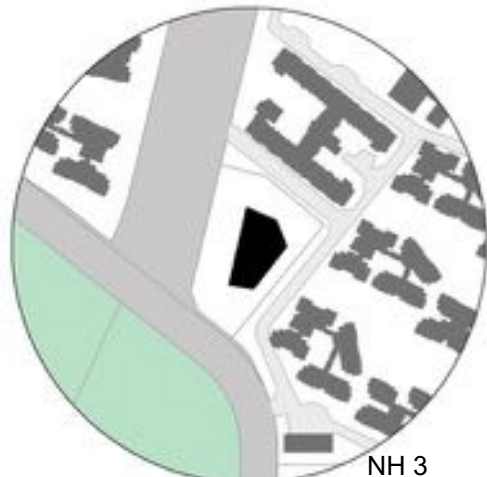
NH 1

NH 2

NH 3

NH 4

NH 5

NH 1

NH 2

NH 3

NH 4

NH 5

DAYROOM
WARD
CORRIDOR
BATHROOM
NURSE STATION
MAIN LOBBY

Scales & Boundaries

- Lack of technology to connect bed-bound residents to the outside of the NH
- Lack of manpower and surveillance for bringing out wheelchair-bound residents (lack of automated technology)
- Schedule of the NH and strict meal times (4 in 5 NHs)—confining residents to the home
- Lack of interaction between the surrounding community and the NH—physical and social isolation of the NH
- Occasional visits by family members in spaces within the NH that are not close to the dwelling areas of the residents
- Occasional outings: "*Then, we [nurses] cannot bring them out for shopping everyday, but...after we know that he likes to shopping, we will make arrangements... [to] bring them out maybe once a month, or once a week, with other residents as an outing, something like that.*"
- Staff support residents' preference to go for outings: "*So for example, if this person wants to be able to go on an outing or move independently on the bed despite having some physical disability... we [the nurses]... may just have to work with the care attendant, to look at whether there are assistive devices or whether there are actually ways that the care attendant can help to train [the resident] everyday to an eventual state where this person can do it on their own.*"
- A resident thinks the nurses control whether residents get to go for outings: "*If you don't go for activities, you will not get to go for outings.*"

Connections to the city (macro) & neighbourhoud (mezzo) scales from the NH (micro)

	NH 1	NH 2	NH 3	NH 4	NH 5	
Macro Scale (within the city)						
Mezzo Scale (within the neigh- bourhood)						
Micro Scale (within the home)	●○		○	○		Entrance
			○	○		Circulation
	●●○○	○	○	●○	●	Living Rooms
	●●○			●		Bedrooms

● Traces of/ connection to the city found within the NH (technology, view of city networks, murals, images etc.)

○ Traces of/ connection to the neighbourhood found within the NH (murals, fixtures, view and sound, technology, etc.)

Digital

Using technology to keep residents connected to the outside world.

Real time technology that can assist staff and residents medically or keep residents connected to their families, or too keep them engaged.

Analogue

Traces of the city scale found in the NH through decorations and views to the outside.

Not functional links, and may not always be used by residents.

Newspapers, wall murals, view of MRT tracks, proximity to the park connector etc.

Digital + Analogue
(2 out of 5 Hs)

Only Analogue
(3 out of 5 NHs)

Macro Scale

TIME – SPACE coordination and multisensory orientation

Mural in corridor and living spaces –
artistic interpretation of macro scale environments

Bringing in the sense of the quotidian

EXIT
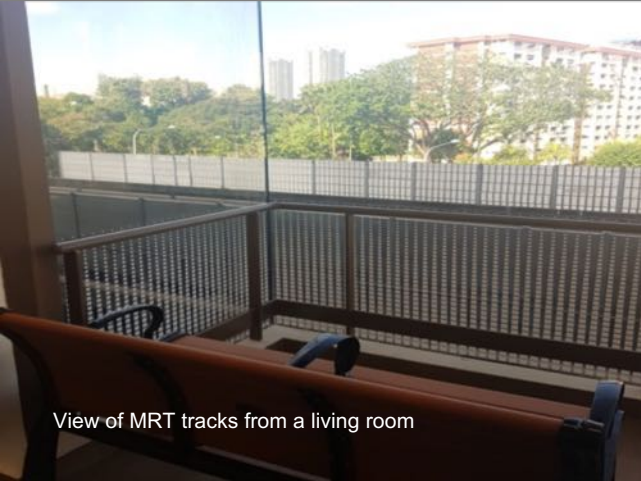
Green

Bringing the macro scale elements into the NH (Analogue methods)

View of MRT tracks from a living room

Proximity to park connector and MRT

Bringing the mezzo scale into the NH (Analogue methods)

View and sounds from adjacent primary school

Wallpaper with a city theme

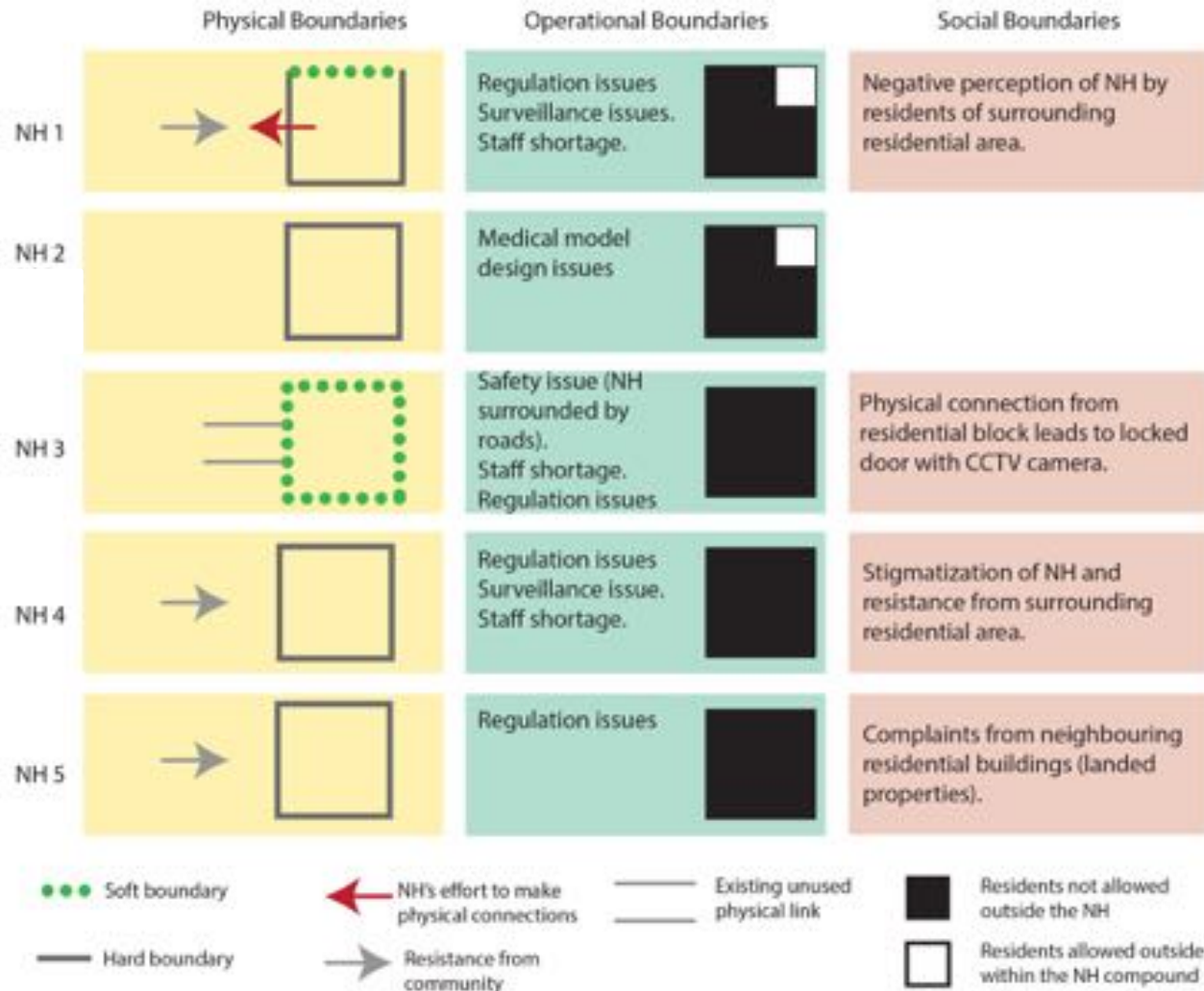# Bringing the macro and mezzo scales into the NH (Digital methods)

Using iPad

Watching TV

Mezzo Scale

	Physical Boundaries	Operational Boundaries	Social Boundaries
NH 1		Regulation issues Surveillance issues. Staff shortage.	Negative perception of NH by residents of surrounding residential area.
NH 2		Medical model design issues	
NH 3		Safety issue (NH surrounded by roads). Staff shortage. Regulation issues	Physical connection from residential block leads to locked door with CCTV camera.
NH 4		Regulation issues Surveillance issue. Staff shortage.	Stigmatization of NH and resistance from surrounding residential area.
NH 5		Regulation issues	Complaints from neighbouring residential buildings (landed properties).

Legend:
- ●●● Soft boundary
- ⬤ NH's effort to make physical connections
- ─── Existing unused physical link
- ■ Residents not allowed outside the NH
- ─── Hard boundary
- → Resistance from community
- □ Residents allowed outside within the NH compound

Social boundaries

Five years ago, about 40 residents signed a petition against a nursing home that was set to be built on an empty plot of land facing blocks of flats in ███████████

One man said at a dialogue session that "the old folk will be groaning right into my house".

NEW REALISATION

There is a need to be accommodating. We're all going to grow old some day.

PRE-SCHOOL TEACHER ███████████ whose flat faces the ███ home in ███████████

OPINIONS CHANGE

People tend to be resistant when changes are announced, but when they reap the benefits, they change their minds.

███████████ RESIDENT ███████████ by

99

Such sentiment has dissipated. Residents encourage tolerance over minor issues. Some now even volunteer at the home.

The ███ Home ███████████ is set to mark its official opening next month, having been operating for more than a year, and has become "accepted as an integral part of the town", MP for ███████████ told The Sunday Times.

"Some residents have family members who are residing in the home and find the proximity a welcome convenience. There are also residents who have taken to volunteering at the home."

This was despite teething issues, such as the complaint that the home's public announcement system was loud, he said. It has since adjusted the system's placement and volume, and informs residents ahead of special events.

When contacted, the home declined to comment.

Physical link to residential blocks

Closed and locked door of NH.
Surveillance camera at the door.

Safety issue for elderly within
that space in the NH.

Potential to tap on facilities of residential estate

Locked back door of NH.

Driveway of residential estate-
safety issue.

Social acceptance from
surroundings, since NH and
residential estate were
constructed at the same time.
(diluted social threshold)

Potential to tap on neighbourhood park.

Road in between park and NH.

Safety issue for elderly to cross
the road independently -
manpower shortage.

Physical boundary

Operational boundary

Social boundary

Harsh physical boundary

Gardens: bringing the mezzo scale into the micro scale
– not always on the ground floor

- Issues of comfort and accessibility in a hot and humid climate
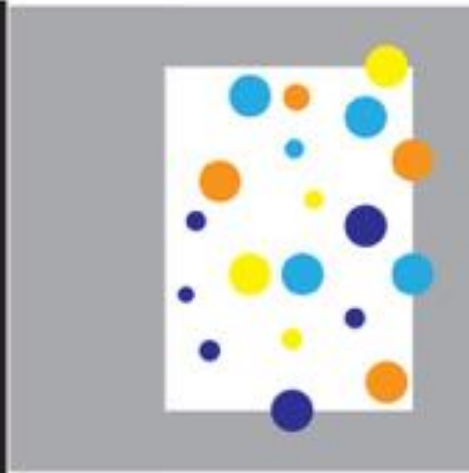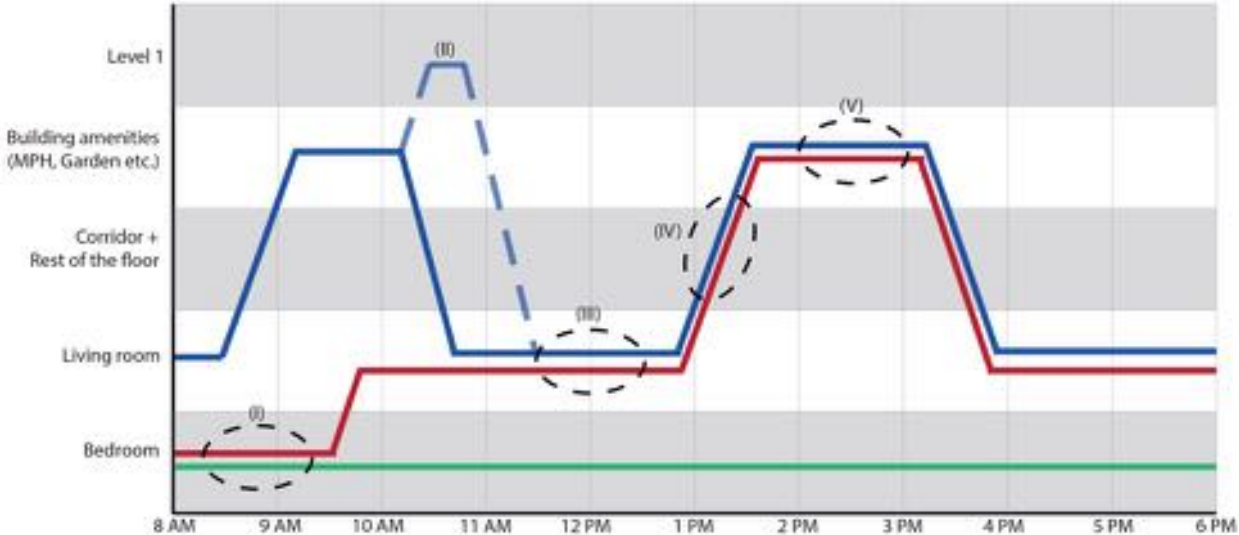
- Ground floor green areas

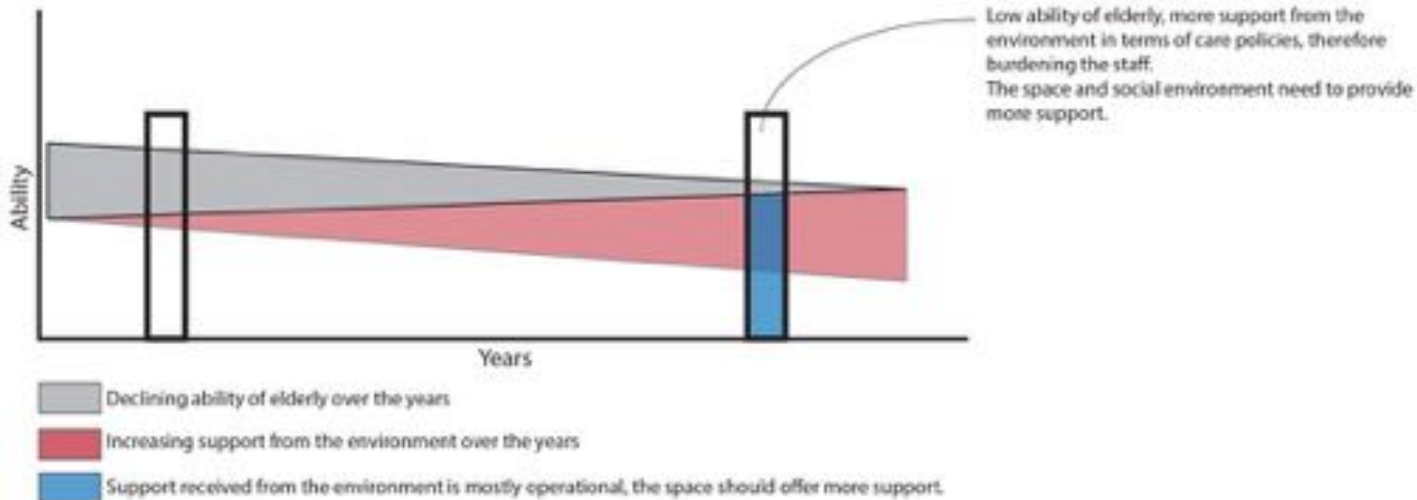Design | Care Model | Social environment

Micro Scale

	Level 1
Building amenities (MPH, Garden etc.)	
Corridor + Rest of the floor	
Living room	Ambulant / Wheelchair bound
Bedroom	Bedbound

8 AM 9 AM 10 AM 11 AM 12 PM 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM

	(I)	(II)	(III)	(IV)	(V)
Activity	Bedbound: lying in bed	Ambulant: accessing other levels	Sitting in the living room	Moving to another level for activity.	Group therapy
Physical qualities (of boundary)	Lack of assistive technology. No view of the outside from many beds (for bedbound residents).	1 in 5 NH: Occasionally residents access air conditioned spaces on other floors, by choice.	Easy surveillance, staff shortage, fall risk outside living room. Lack of automated assistive tech (for wheelchairs)	Queuing at circulation spaces due to shortage of lifts and wheelchairs taking up space.	4 in 5 NH: porous boundary between rehab space and adjacent green space. Thermal comfort provided by air conditioning.
Operational qualities	Staff ratio- difficult to have personalized attention for each bedbound resident.		Staff shortage to monitor corridors.	Group therapy requires many residents to move to a different floor at the same time.	Schedule of NH, not by choice.
Social qualities	1 in 5 NH: mixing of residents of different abilities ensures crossing social boundaries among residents.	1 in 5 NH: talk to the security staff, not with other residents in the same space.	Interaction among residents within the same space.		

NH 1: (some) beds with a view

- Bedroom

Low ability of elderly, more support from the environment in terms of care policies, therefore burdening the staff.
The space and social environment need to provide more support.

Ability

Years

Declining ability of elderly over the years

Increasing support from the environment over the years

Support received from the environment is mostly operational, the space should offer more support.

Aaron Antonovsky - Theory of Salutogenesis

The collective sense of coherence (SOC)

Comprehensibility -- the cognitive component;

Manageability--------- the instrumental or behavioural component;

Meaningfulness ----- the motivational component.

	Activity	Physical qualities	Operational qualities	Social qualities
(I)	Bedbound (lying in bed)	Lack of assistive technology No view of the outside from many beds.	Staff ratio- difficult to have personalized attention for each bedbound resident	1 in 5 NH: mixing of residents of different abilities ensures crossing social boundaries among residents.
(II)	Ambulant (accessing spaces on other levels)	1 in 5 NH: Occasionally residents access air conditioned spaces on other floors, by choice		1 in 5 NH: talk to the security staff, not with other residents in the same space.
(III)	Ambulant (sitting in the living room)	Easy surveillance, staff shortage, fall risk outside living room		Interaction among residents within the same space.
	wheelchair bound	Lack of automated assistive tech		
(IV)	Moving to another level for activity	Centralization of large spaces on a different floor requires residents to move. Queuing at circulation spaces due to shortage of lifts and wheelchairs taking up space.	Group therapy requires many residents to move to a different floor at the same time.	
(V)	Group therapy	Closed doors 4 in 5 NH: porous boundary between rehab space and adjacent green space. Thermal comfort provided by air conditioning.	Schedule of NH, not by choice.	

- Circulation spaces (corridors and lift lobbies)

Living room

NH 2: Living room not visible from the corridor (Surveillance issues)

NH 1: Small nook in the corridor, unused. (Surveillance issues and inaccessibility)
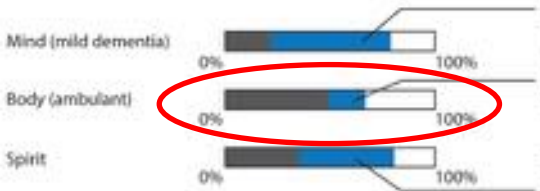
NH 1: Institutional-looking corridor

Ground floor

NH 1: Residents in the entrance lobby, one of the few air-conditioned spaces in the NH.

1) Resident M in NH 4: Occupying and personalizing a common table in the living space

Resident Profile:

Support from the environment:

- Having enough tables in the room to allow the resident to personalize one.
- Other residents and staff not objecting to him doing so.

- Comfortable and spacious environment for resident to place personal things.

- Allowing for expression of self, pursuing interests, feeling of belonging to the environment.

2) Resident A in NH 5: Bringing personal dressing table into NH bedroom (2 bedded)

Resident Profile:
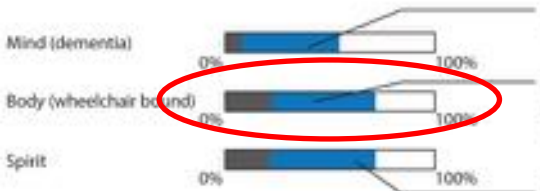
Support from the environment:

- Having the option of smaller bedrooms.
- Having enough space in the bedroom for personal furniture.
- Helps with easy identification of space.

- Proximity between dressing table and bed allows easy access for wheelchair bound resident.

- Care policies and environment allowing personal furniture enables attachment to personal space, sense of home.
- Encourages self grooming and boosts self esteem.

Resident profile

Environmental support

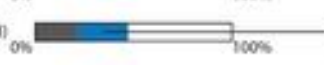Environmental support provided according to resident's profile

3) Resident T in NH 1: Personalizing individual space in shared bedroom

Resident Profile:

Mind (mild dementia)
0% — 100%

Body (wheelchair bound)
0% — 100%

Spirit
0% — 100%

Support from the environment:
- Having spacious cabinets that allow for personal belongings.
- Care policy and staff encouraging residents to personalize their beds.
- Helps resident identify their bed.

- Enough space within the room to park wheelchair next to bed.
- Allows for easy transfer of resident to and from bed.
- Allows for holistic sense of personal space

- Allowing for expression of self, sense of home and belonging.
- Expression of privacy in a shared bedroom.
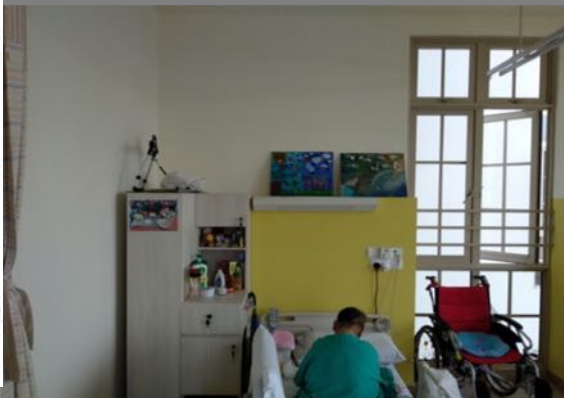
4) Resident B in NH 1: Cooking for themselves and some other residents in common kitchenette

Resident Profile:

Mind (non- dementia)
0% — 100%

Body (assisted, ambulant)
0% — 100%

Spirit
0% — 100%

Support from the environment:
- Social support from staff and other residents who allow him to cook in the common kitchenette.
- Helps with skill retention and maintaining behaviour and habit.

- Proximity between kitchenette and bedroom in household layout.
- Staff help resident personalize the kitchenette with equipment.
- Kitchenette height and layout support resident's wheelchair requirements.
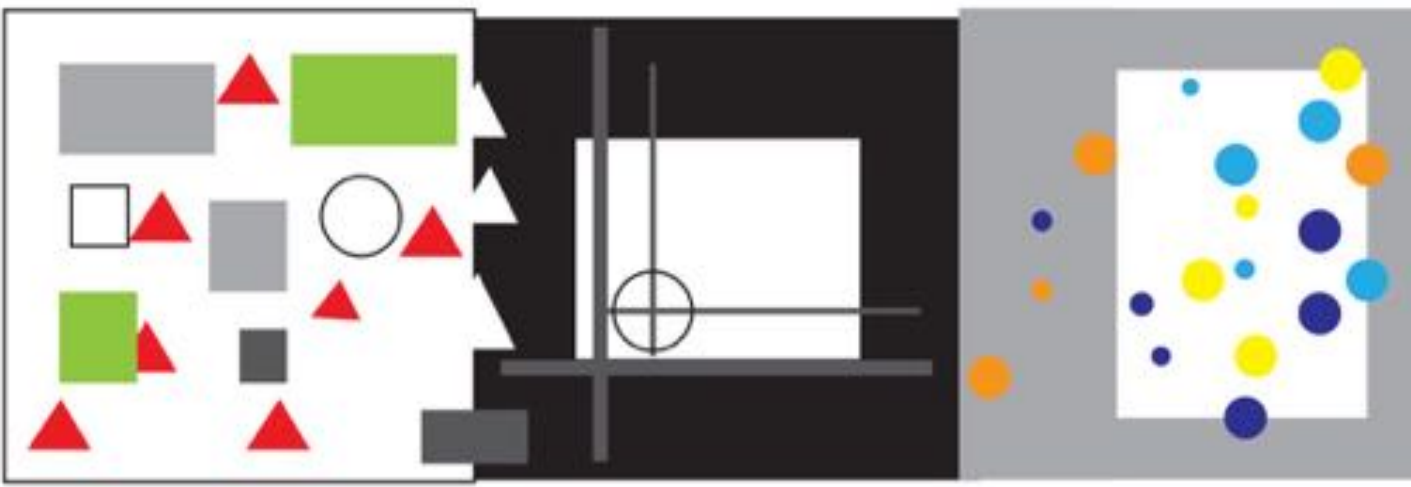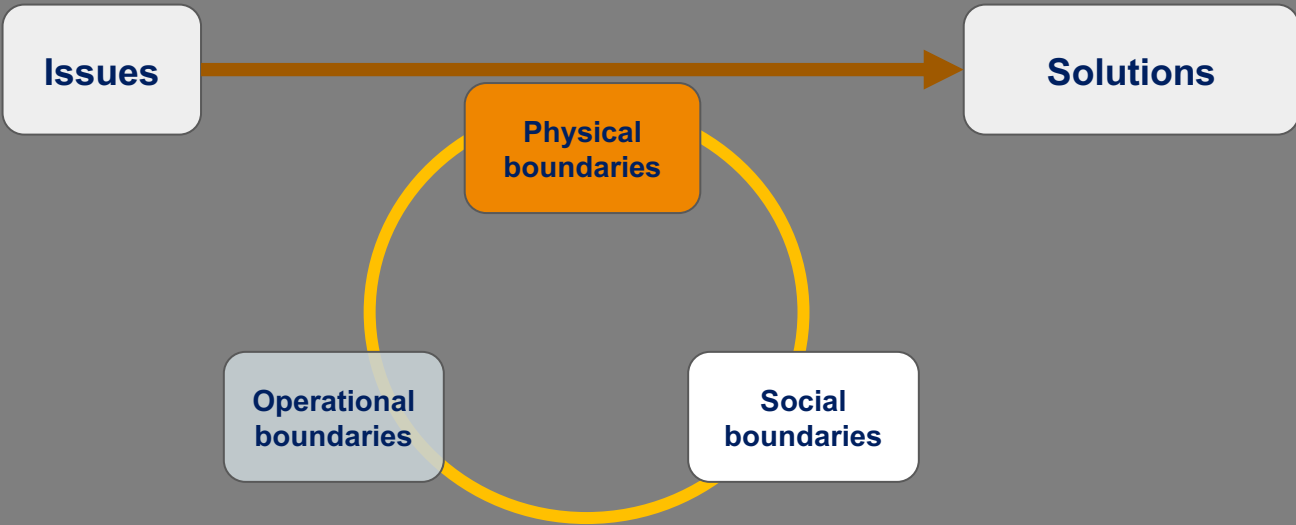
- Encouragement from staff and other residents.
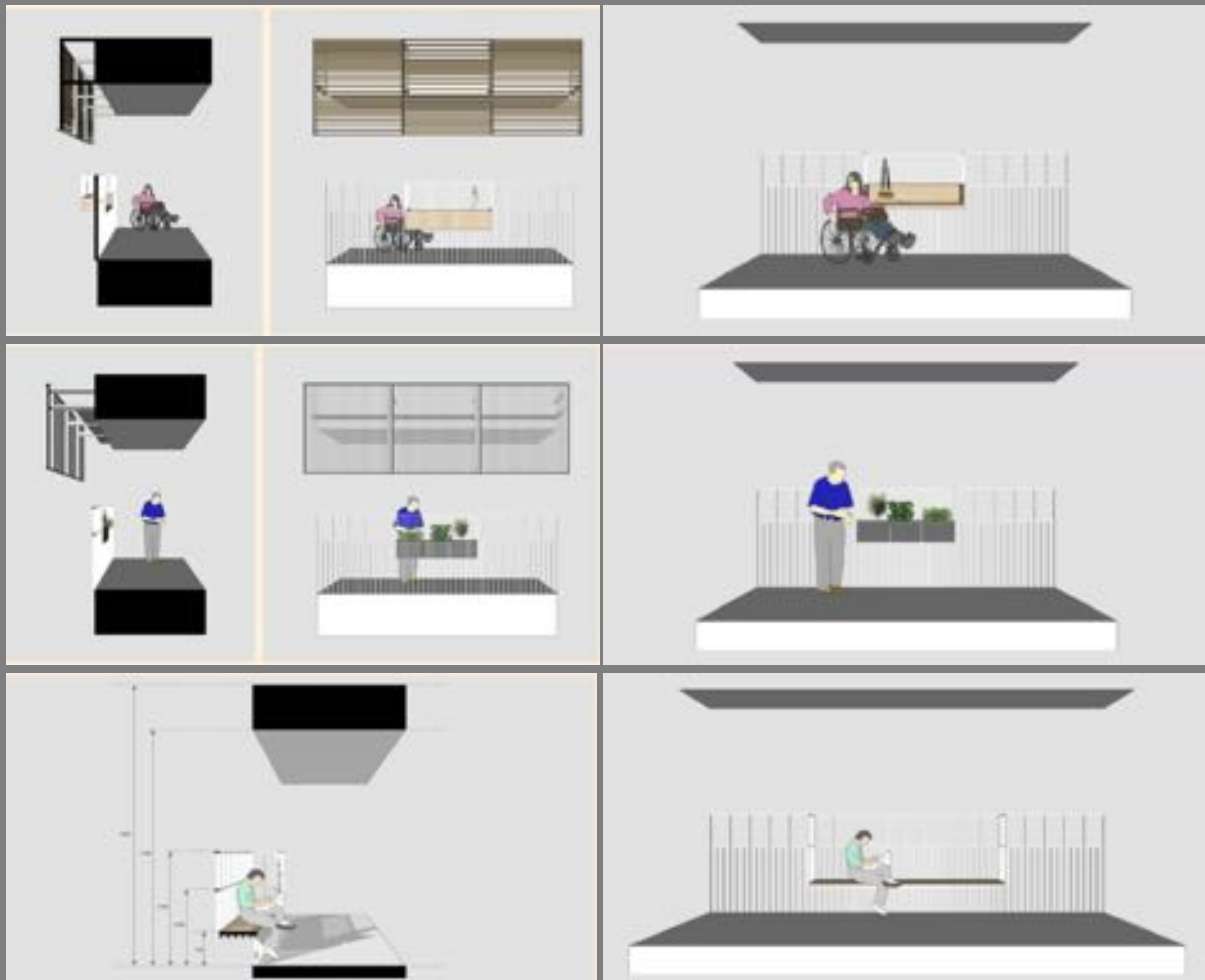- Staff and peers allowing resident to cook allows for a sense of gratification and purpose.

Legend:
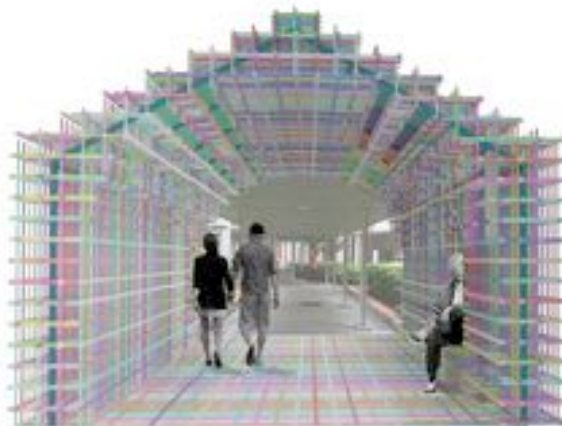- � Resident profile
- ■ Environmental support

Change in approach from:

Issues → **Solutions**

To:

Physical boundaries

Operational boundaries

Social boundaries

Study of improved boundary conditions for a new nursing home

Cheong Tze Shenn

BIO Sphere
Heng Yin Jie Shannon

PLAN VIEW
SCALE 1:20 @ A3

360-degree projection for
Virtual Reality simulation
SCALE 1:50 @ A3

Weighted mechanical base with
electromagnetic stabilisation
SCALE 1:50 @ A3
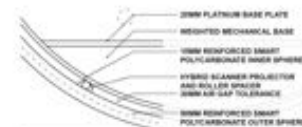
SECTIONAL DETAIL - MATERIALITY
SCALE 1:10 @ A3

SECTION
SCALE 1:20 @ A3

The Bio-Sphere is a mixed-usage encasement that allows users to undergo preliminary check ups at the ease of one's neighbourhood. When not in medical use, the sphere provides a short term entertainment for the user with the used of integrated virtual and augmented reality systems and projections, while encapsulating the user in a safe and mobile environment.
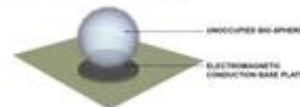
In the event of a medical emergency or an ominous negative health check up result, the user will be encased within the Bio-Sphere, and "rolled" towards the nearest Hyperspeed Transport Tube Channel for easy access to the nearest medical facility. With 360-degree inner projections, the user will be kept in a controlled and calm environment, while the Bio-Sphere itself moves at a fast speed, mitigating time wastage and panic attacks similar to that possibly experienced in a fast moving ambulance.

HYPER-SPEED TRANSPORT TUBE SECTION
SCALE 1:50 @ A3

Design	Care Model	Social environment
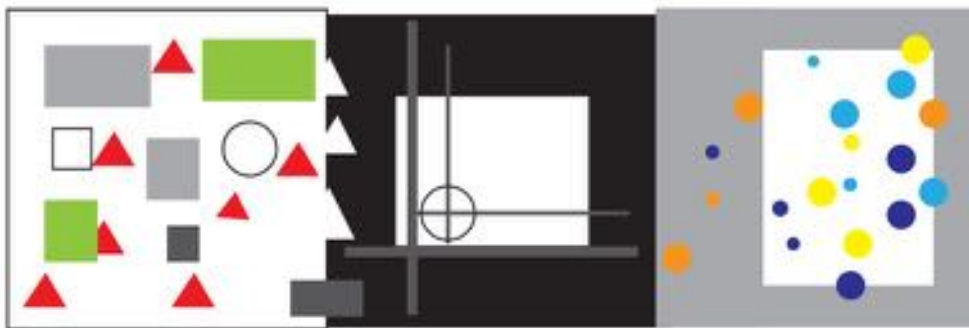
"**Lao Tzu** describes a space, a gap that is not so much empty as waiting to be filled and transformed by experience:

*We make a vessel from a lump of clay; **it is the empty space within the vessel that makes it useful***

*We make doors and windows for a room, **but it is these empty spaces that make the room habitable***

Thus, while the tangible has advantages, it is the

intangible *that makes it useful*

"Our body, mind, and spirit
are the three treasures of life"

jing, qi, and shen

THANK YOU

future urbanscape and the sense of **volatility**, **negotiations** and **subjectivity** as its essence

Crystal Wong

NORTH-WEST VIEW OF MOBILITY NETWORK IN THE COLLECTIVE HOUSING

Food waist treatment plant, food surpluses, food production …. and park

Toh Hui Shang

Toh Hui Shang