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CC0007 Science and Technology for Humanity

# Healthcare Challenges at Societal Level

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# Views of Healthcare

**In healthcare, we can look at specific diseases:**

- Study their causes, effects on humans, find ways to investigate, treat those affected, manage the complications, if any, and think about how to prevent them or mitigate their effects.
  - Examples: Ischaemic heart disease, cancers, metabolic diseases



# Views of Healthcare

We can also look at specific groups of people, the kinds of diseases they get and how to diagnose and treat them:

- Age groups, e.g., children, women, elderly
- Defined groups, e.g., those living in a particular environment, occupational groups, racial groups (heredity, diet, cultural practices, social norms)



# Healthcare at Societal Level

- “Population Health”

- The health outcomes of a group of individuals, including the distribution of such outcomes within the group. These groups are often geographic populations such as nations or communities, but can also be other groups such as employees, ethnic groups, disabled persons, prisoners, or any other defined group.  
*(Institute of Healthcare Improvement, USA)*

- Applying this locally:

- People living in a geographical area within Singapore
  - Age or occupational related groups, e.g., school children, taxi drivers, retirees

- Implications to healthcare funding:

- How healthcare budgets should be allocated to meet needs (...not wants)

# Useful Resource: Statistics Singapore

The screenshot shows the homepage of the Department of Statistics Singapore. At the top, there's a navigation bar with links for 'What's New', 'Find Data', 'Publications', 'Our Services, Tools & Surveys', 'Standards', 'Who We Are', 'Careers', and a search function. A banner at the top encourages survey responses to business and price surveys. Below the banner, the page title is 'Population and Population Structure'. A sub-header states that statistics on Singapore's population are compiled by the Singapore Department of Statistics. The main content area features three visual sections: 'Infographics / Dashboards / Videos', 'Singapore Population' (with a map of the city), and a 'Population Trends' dashboard showing a line graph and a pie chart of permanent residents and non-residents.

# Some Trends From These Statistics

- Increasing number of elderly population:  
**Percentage of resident population aged 65 and above** increased from 9% in 2010 to 16% in 2021
- **Old age support ratio** (number of people aged 20–64 per resident aged 65 and above) fell from 10.5 in 1990 to 7.4 in 2010 to 4.0 in 2021
- Number of **people living alone** increased from 9.9% in 2011 to 15.6% in 2021 (not limited to elderly)

Statistics Singapore. (n.d.). *Latest data on Singapore's population*. Retrieved July 13, 2022 from <https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-structure/latest-data>



# Changing Demographics and Implications

- **What does increasing number of elderly really mean?**
  - More elderly = more people with frailty?
  - More well elderly and a changing workforce?
- **Longer durations of chronic disease?**
  - More people with co-morbidities and end-organ failures?
  - Better disease control with longer disability free (or less severe) lives?
- **Changing workforce?**
  - More retirees and greater dependence on society for support?
  - Shifting retirement age, extended employment, new careers?
- **New shifts in health and social care?**
  - Redefining ageing...



# Solutions-Oriented Approach Rather than Problem-Oriented Approach?

- **Increasing number of elderly**
  - Increasing number of active and productive older people who can still contribute to the larger society
- **Environmental modifications to support care of the elderly**
  - Creating new environments that allow older people to continue active, meaningful and productive lives
- **Healthcare burden of older population**
  - Creating meaningful career opportunities for younger people (including “young olds”!)
- **Costs of supporting the elderly**
  - Keeping older people economically productive in creative ways (it doesn't always have to be work!)
- **A burden to the young**
  - Create mutual support amongst older populations—self sufficiency, with some help

# Common Health Issues: View From Two Angles

## Medical

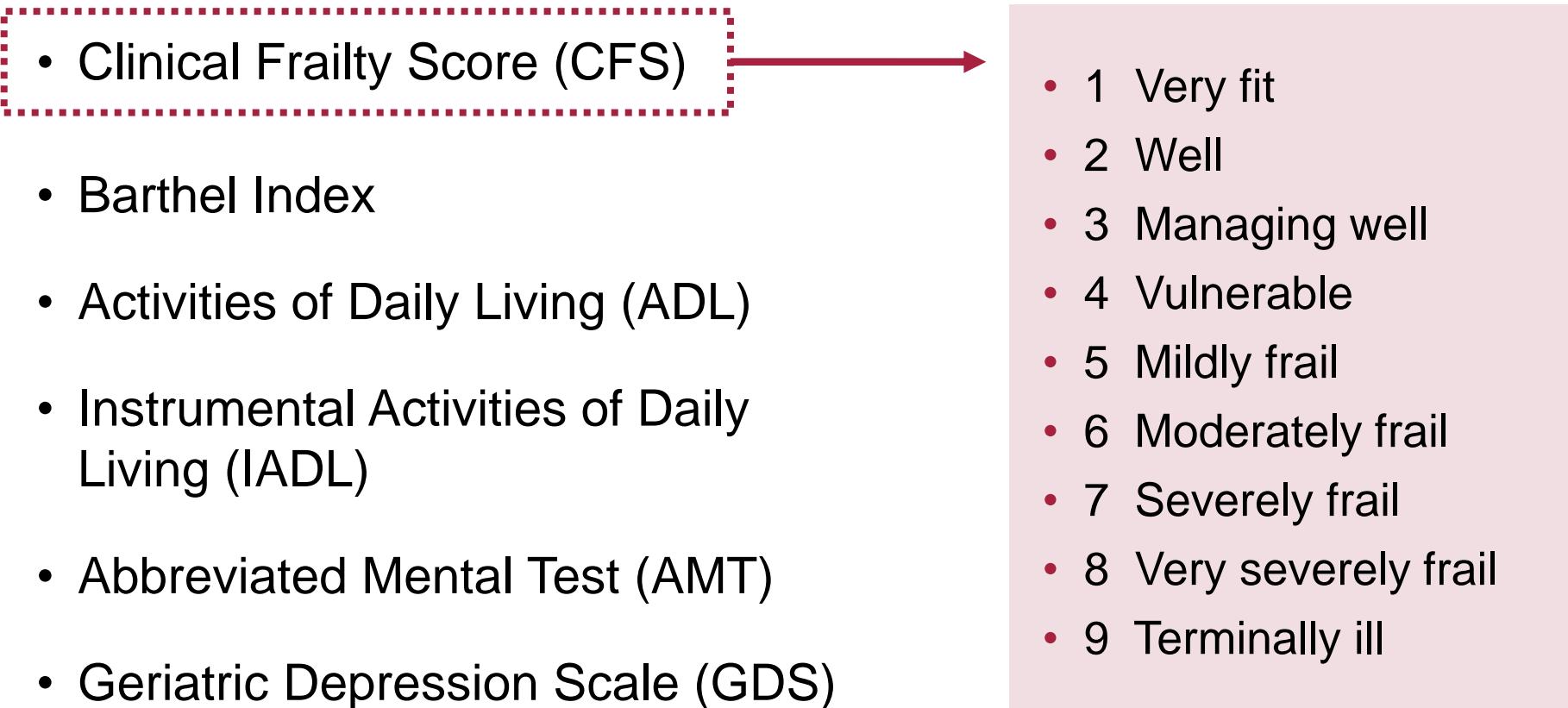
- Cataracts
- Chronic heart and lung diseases
- Osteoporosis, fragility fractures, osteoarthritis
- Neurological diseases
- Cognitive impairment
- Depression
- Multiple medications
- Malignancies

## Functional

- Visual impairment
- Decreased effort tolerance
- Chronic pain, impaired hand function, impaired mobility
- Memory impairment, increasing dependence on caregivers
- Disturbed behaviour
- Sleep disturbance
- Adverse effects



# Functional Assessment Scales

- Clinical Frailty Score (CFS)
  - Barthel Index
  - Activities of Daily Living (ADL)
  - Instrumental Activities of Daily Living (IADL)
  - Abbreviated Mental Test (AMT)
  - Geriatric Depression Scale (GDS)
- 
- 1 Very fit
  - 2 Well
  - 3 Managing well
  - 4 Vulnerable
  - 5 Mildly frail
  - 6 Moderately frail
  - 7 Severely frail
  - 8 Very severely frail
  - 9 Terminally ill

Rockwood, K., Song, X., MacKnight, C., Bergman, H., Hogan, D. B., McDowell, I. & Mitnitski, A. (2005). A global clinical measure of fitness and frailty in elderly people. *Canadian Medical Association Journal*, 173(5), 489–495.  
<https://doi.org/10.1503/cmaj.050051>

# History on Aged Care in Singapore (From the 1980s)

## Report on the problems of the aged, 1984 ("Howe Yoon Chong Report")

- Need to set aside individual savings and government funding for aged care

## Homes for the Aged Act 1988

- Regulation of aged care homes
- Aged care homes, nursing homes, chronic sick unit

## Home nursing

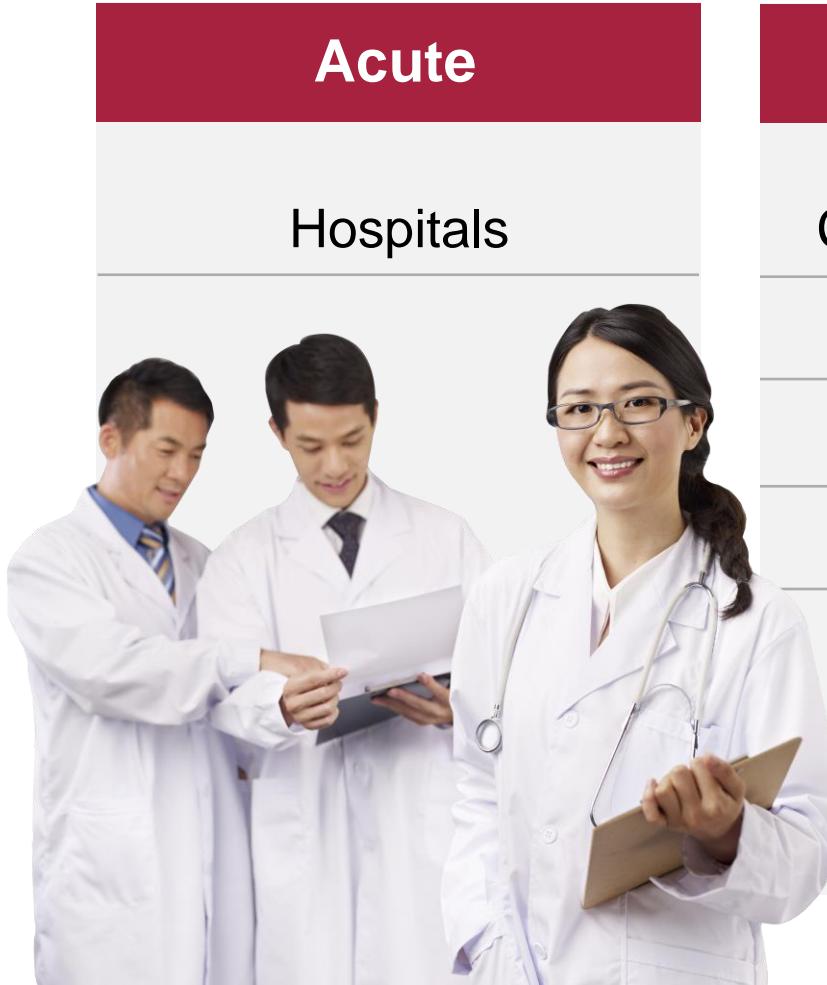
Home Nursing Foundation

- Senior Citizens' Health Care Centre (SCHCC)

## Growth, rebuilding and restructuring of hospitals



# Community Services for the Elderly: 1980–90s



## Acute

Hospitals

## Intermediate

Community hospitals

Day rehabilitation

Home care

Hospice care

## Long-term

Nursing homes

Sheltered homes

Hospices

Day care

Home care

Home hospice

# Challenges in Managing Frail Elderly

- Different disease patterns and responses to treatment
- Complex chronic disease; combinations of diseases
- Physical and mental conditions
- Increasing need for subacute/rehab care
- Evolving social structure:
  - Fewer children to support
  - Smaller nuclear family
  - → decrease in informal caregivers
  - → decrease in societal capability in caring for the frail elderly
  - Caregiver stress



# **Geriatric Syndromes (“Giants of Geriatrics”)**

**In 1965, Bernard Isaacs - UK geriatrician coined the following terms:**

- Immobility
- Instability (subjected to falls)
- Incontinence
- Impaired intellect/memory
- Inanition (diet issues)

**In 2017, John Morley, US geriatrician further added:**

- Sarcopenia, frailty, cognitive impairment, anorexia of ageing—harbingers of falls, hip fractures, depression, delirium

# Care Integration

- With many settings to look after the continuum of illness for one patient, care can be fragmented.
- High risk of care fragmentation for frail elderly, whose health needs traverse across different/multiple sectors by different care providers.
- Integrative care model offers care that is patient-centred, recognising that *health and social outcomes are interdependent*.



# Example:

Mr A (80-year-old retiree) has hypertension, diabetes and high cholesterol for many years. He used to be active and independent. Due to arthritis in his knees, he stopped exercising and his control of blood sugar is also poor.

He feels more socially isolated now that he can't go out with friends like he used to.

What kind of problems may we anticipate?

- Risk of stroke and heart disease from high risk factors
- Diabetic complications that may affect function—visual, sensory, infections
- Pain and functional decline, falls
- Depression, caregiver stress

# A Greater Challenge/New Approach: Anticipatory Care

1. What are the existing problems?
2. What other problems do we anticipate in the coming future?

Medical issues	Functional issues	Social issues
<ul style="list-style-type: none"><li>• Progression of disease</li><li>• Likelihood of new disease</li><li>• Prolonged effects of treatment</li></ul>	<ul style="list-style-type: none"><li>• Decline in physical or mental function</li><li>• Disease progression/disuse or deconditioning</li></ul>	<ul style="list-style-type: none"><li>• Potential care crisis and placement issues</li><li>• Potential ethical or legal issues</li><li>• Elder mistreatment or abuse</li></ul>

# Team Approach

- Specialists
- Family physician
- Nurse
- Nurse clinician
- Advanced nurse practitioner
- Pharmacist
- Medical social worker
- Psychologist
- Physiotherapist
- Occupational therapist
- Prosthetist
- Orthotist
- Speech therapist
- Dietician
- Case managers
- Operations team

Patient, family  
and caregivers



# The Straits Times Report

| THE STRAITS TIMES | THURSDAY, JANUARY 19, 2017 |

## Public healthcare gets new look

The public healthcare landscape will be restructured into three clusters, down from the current six. Facilities that fall within the same region will be grouped together, and these include general hospitals, community hospitals and polyclinics. The shift is slated to be formally completed by early next year.

WEST	CENTRAL	EAST
<b>National University Health System</b>	<b>National Healthcare Group</b>	<b>Singapore Health Services</b>
<ul style="list-style-type: none"><li>General hospitals: National University Hospital, Ng Teng Fong General Hospital</li><li>Community hospital: Jurong Community Hospital</li><li>Primary care: Bukit Batok Polyclinic, Choa Chu Kang Polyclinic, Clementi Polyclinic, Jurong Polyclinic, Queenstown Polyclinic, *Bukit Panjang Polyclinic, *Pioneer Polyclinic</li><li>National specialty centres: National University Cancer Institute, Singapore; National University Heart Centre, Singapore; National University Centre for Oral Health, Singapore</li><li>Medical school: Yong Loo Lin School of Medicine, National University of Singapore</li></ul>	<ul style="list-style-type: none"><li>General hospitals: Tan Tock Seng Hospital, Khoo Teck Puat Hospital, *Woodlands General Hospital (name to be confirmed)</li><li>Community hospitals: Yishun Community Hospital, *Woodlands Community Hospital (name to be confirmed)</li><li>Primary care: Ang Mo Kio Polyclinic, Geylang Polyclinic, Hougang Polyclinic, Toa Payoh Polyclinic, Woodlands Polyclinic, Yishun Polyclinic, *Sembawang Primary Care Centre</li><li>National specialty centre: National Skin Centre</li><li>Specialised hospital: Institute of Mental Health</li><li>Medical school: Lee Kong Chian School of Medicine, Nanyang Technological University</li></ul>	<ul style="list-style-type: none"><li>General hospitals: Singapore General Hospital, Changi General Hospital, *Sengkang General Hospital</li><li>Community hospitals: Bright Vision Hospital, *Outram Community Hospital, *Sengkang Community Hospital</li><li>Primary care: Bedok Polyclinic, Bukit Merah Polyclinic, Marine Parade Polyclinic, Outram Polyclinic, Pasir Ris Polyclinic, Sengkang Polyclinic, Tampines Polyclinic, *Eunos Polyclinic, *Punggol Polyclinic</li><li>National specialty centres: National Cancer Centre Singapore, National Dental Centre Singapore, National Heart Centre Singapore, National Neuroscience Institute, Singapore National Eye Centre</li><li>Medical school: Duke-NUS Medical School</li></ul>

NOTE: \*Future institutions

Source: MOH  
STRAITS TIMES GRAPHICS

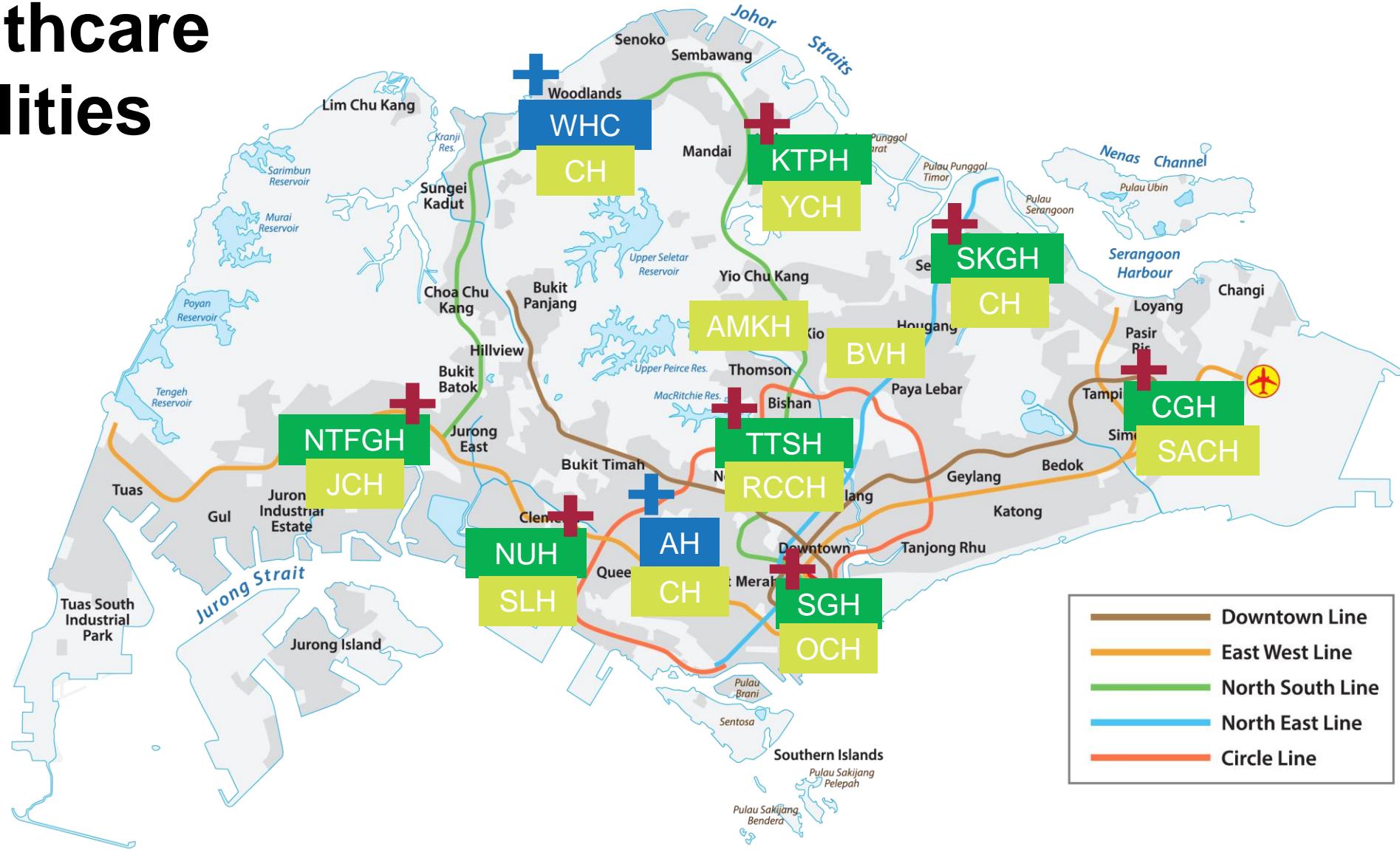
Poon, C. H. (2017, January 19). Public healthcare gets new look. *The Straits Times*. <https://www.straitstimes.com/singapore/health/public-healthcare-sector-to-be-reorganised-into-3-integrated-clusters-new>

# Healthcare Cluster

Integration of health  
and social services



# Healthcare Facilities



# Healthcare: Moving Forward

## Beyond Hospital to Community

- Managing regional health
- Transforming primary care
- Developing aged care in the community

## Beyond Quality to Value

- Ensuring appropriate care
- Making healthcare manpower more efficient through innovation

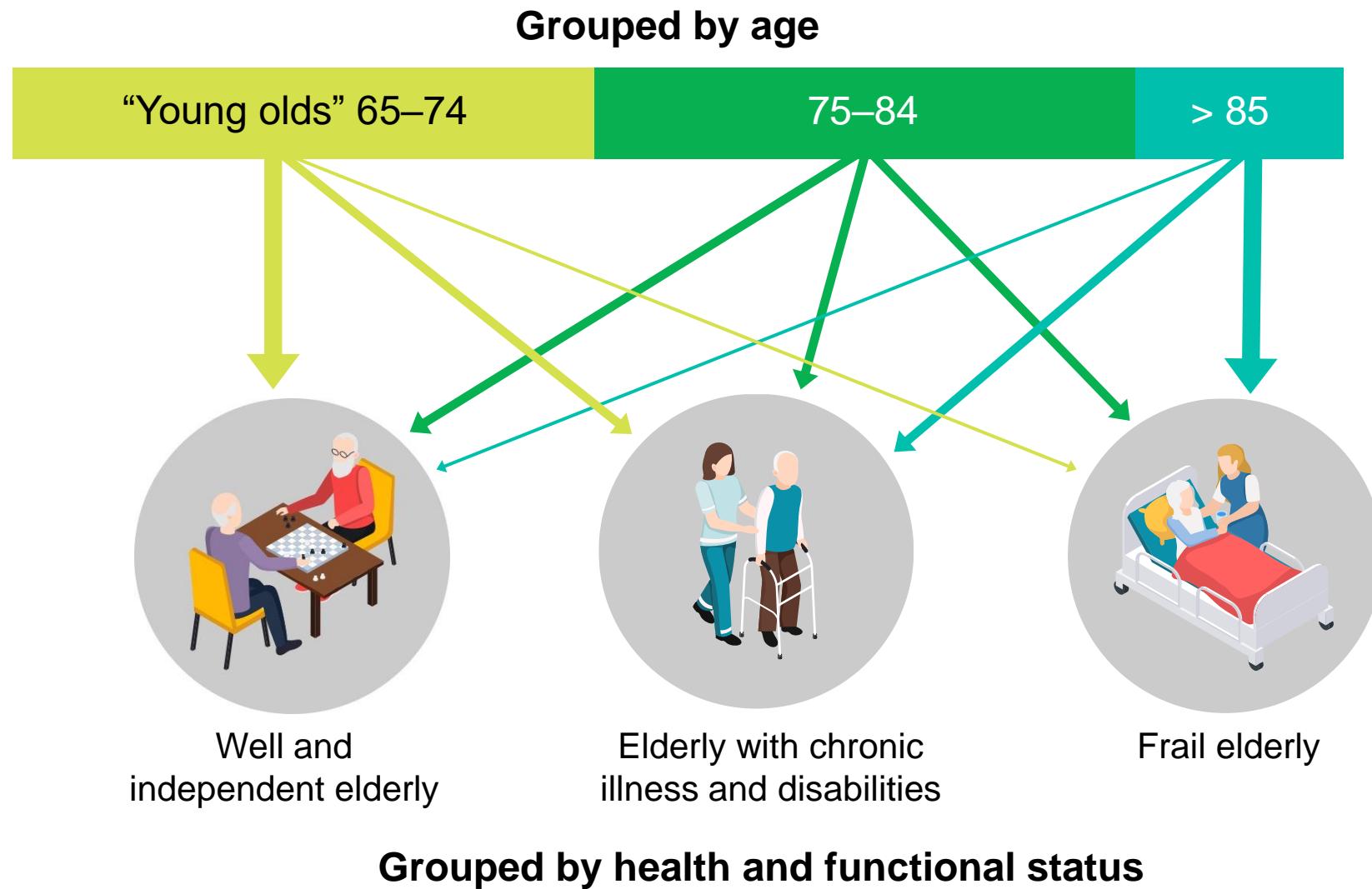
## Beyond Healthcare to Health

- Ageing actively
- Moving upstream to health; war on diabetes

• **Better Health • Better Care • Better Life**

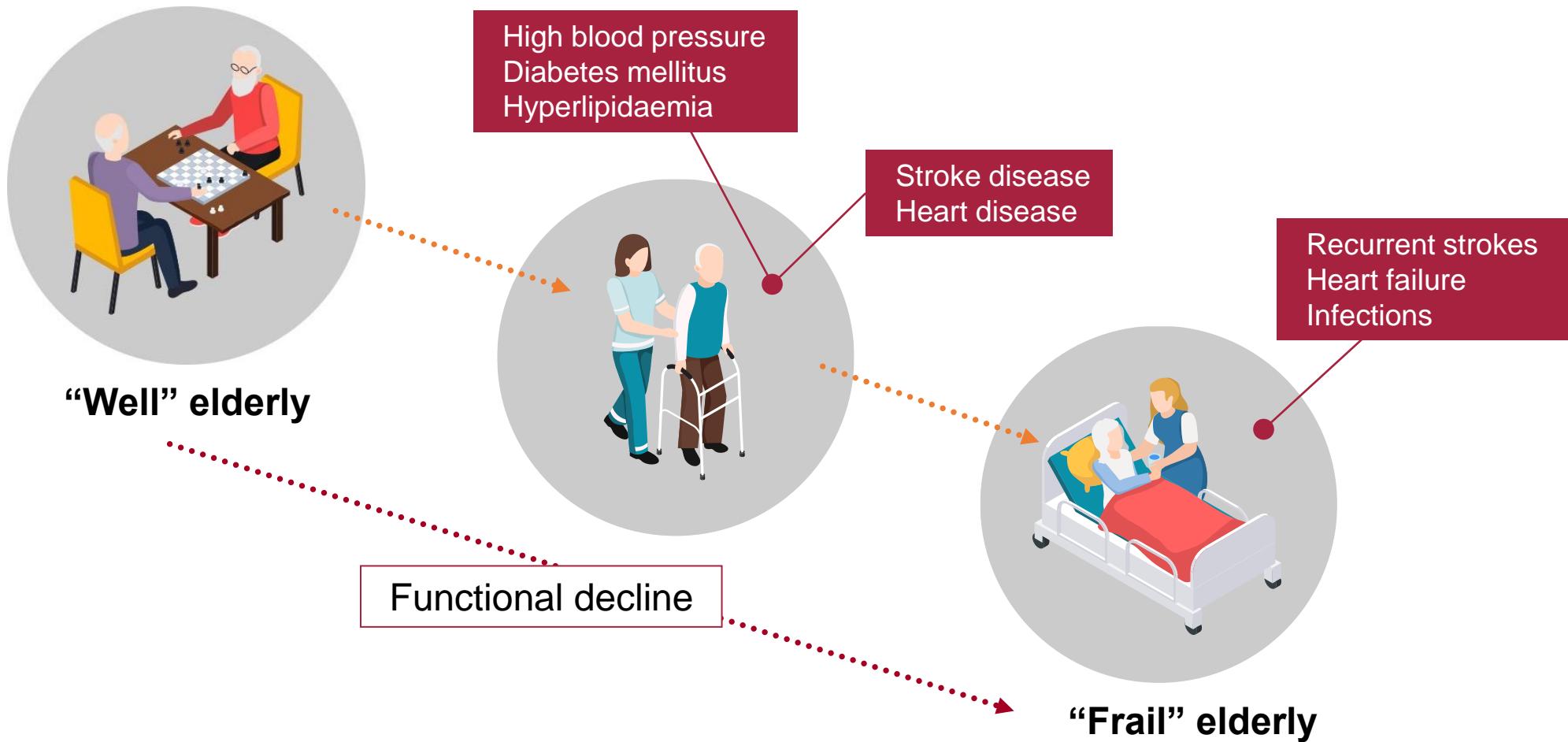


# Who are the Elderly?

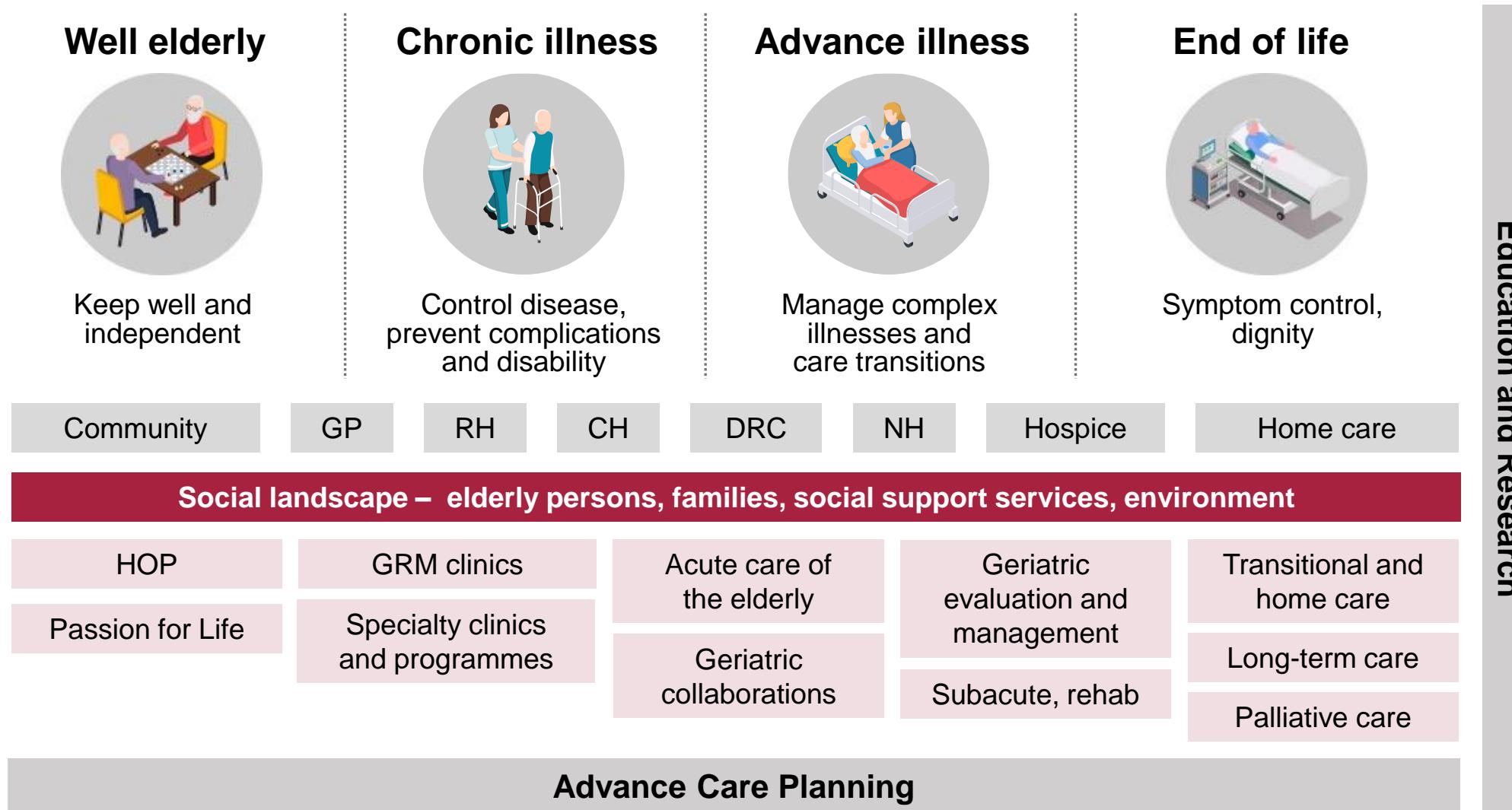


# Ageing and Disease

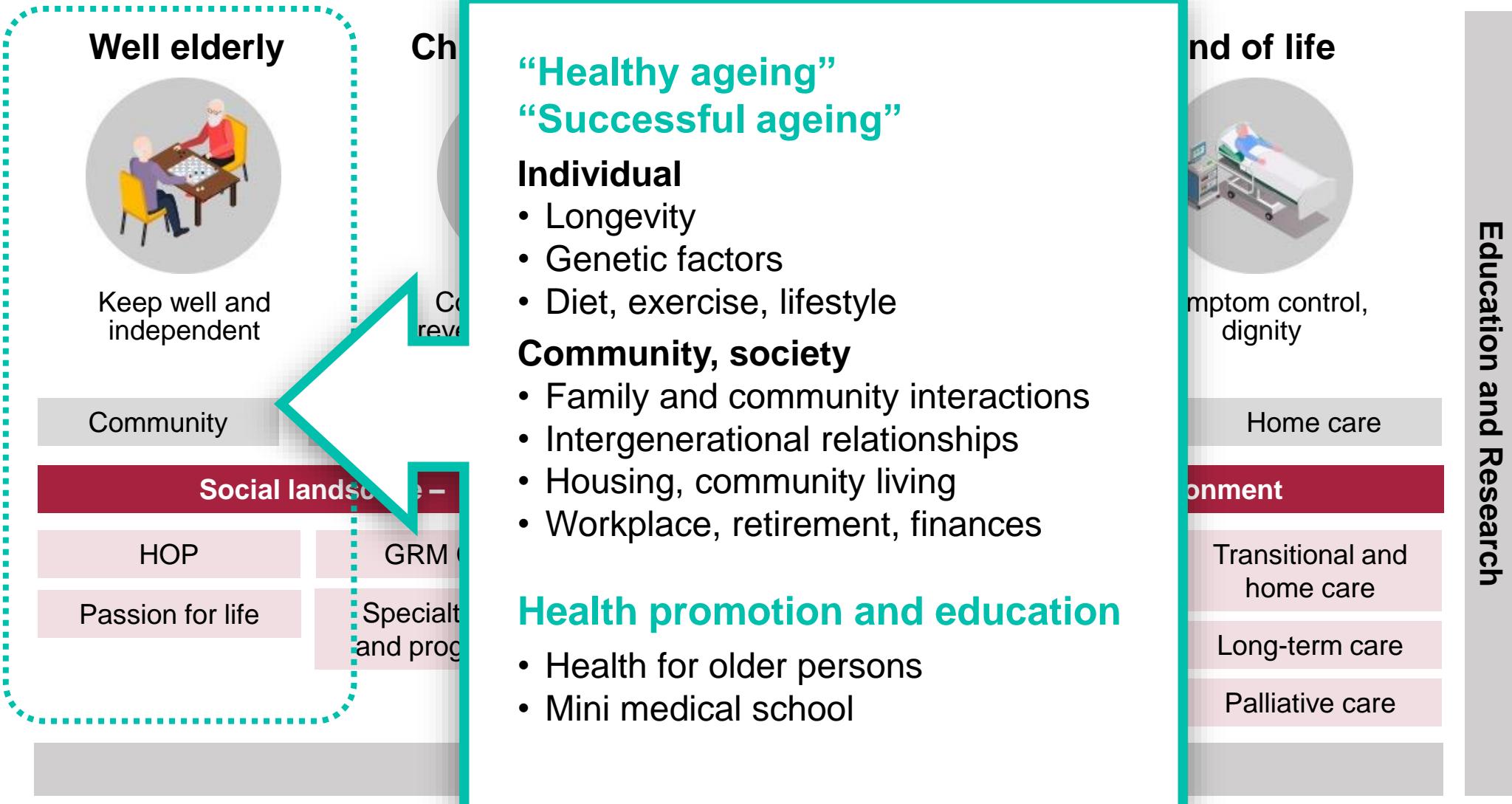
What do we do at each step to prevent decline?



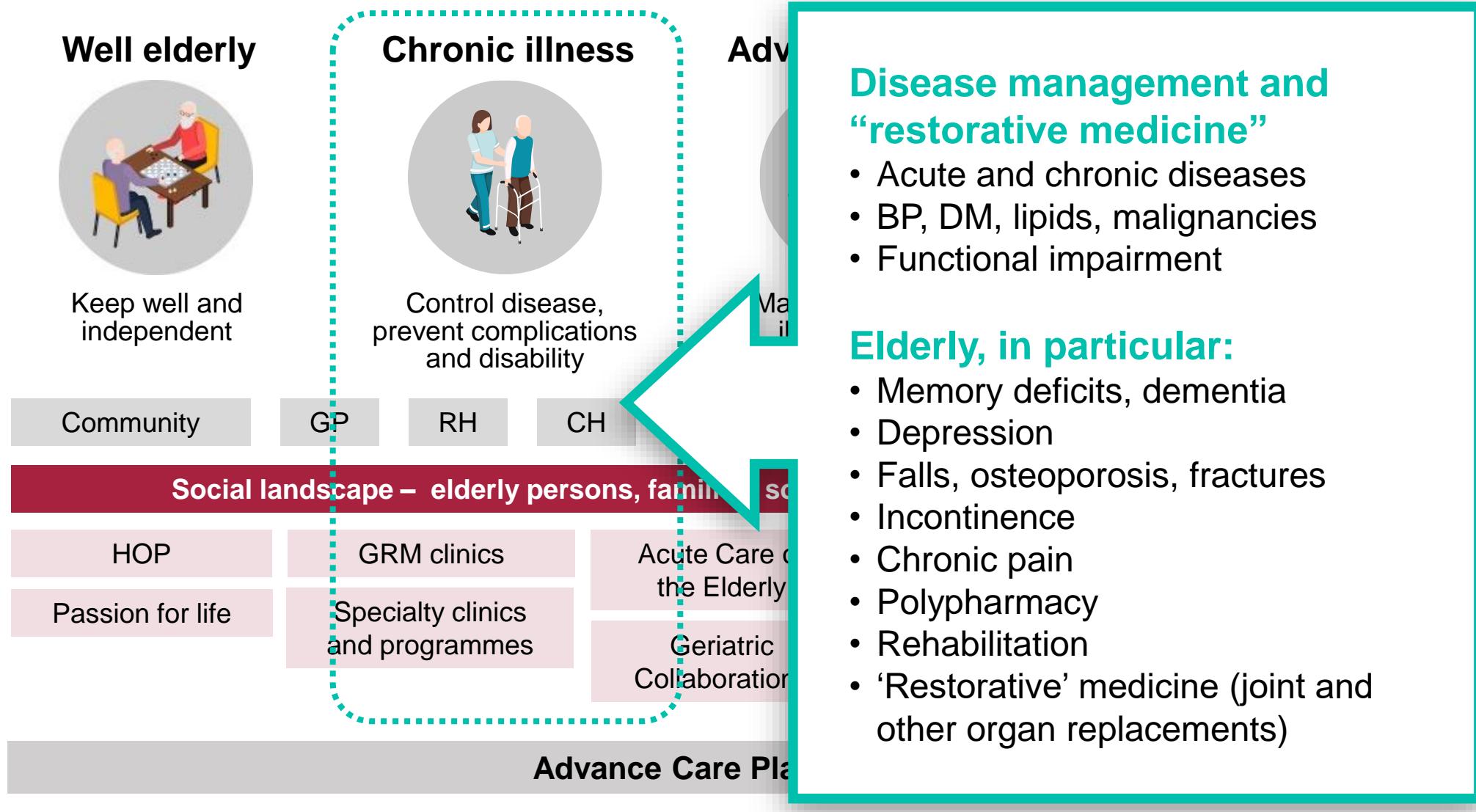
# Eldercare Landscape



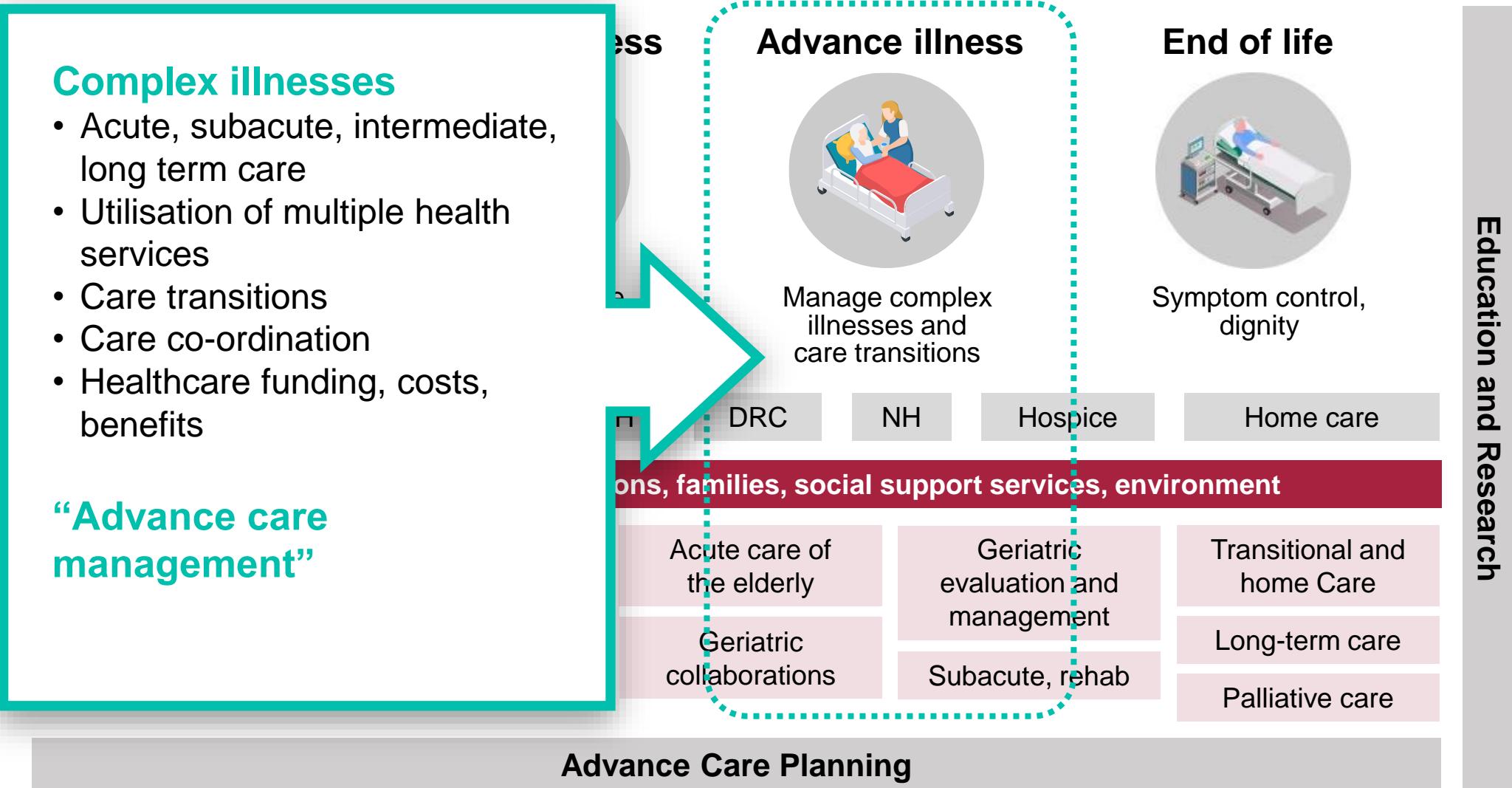
# Care of the Elderly



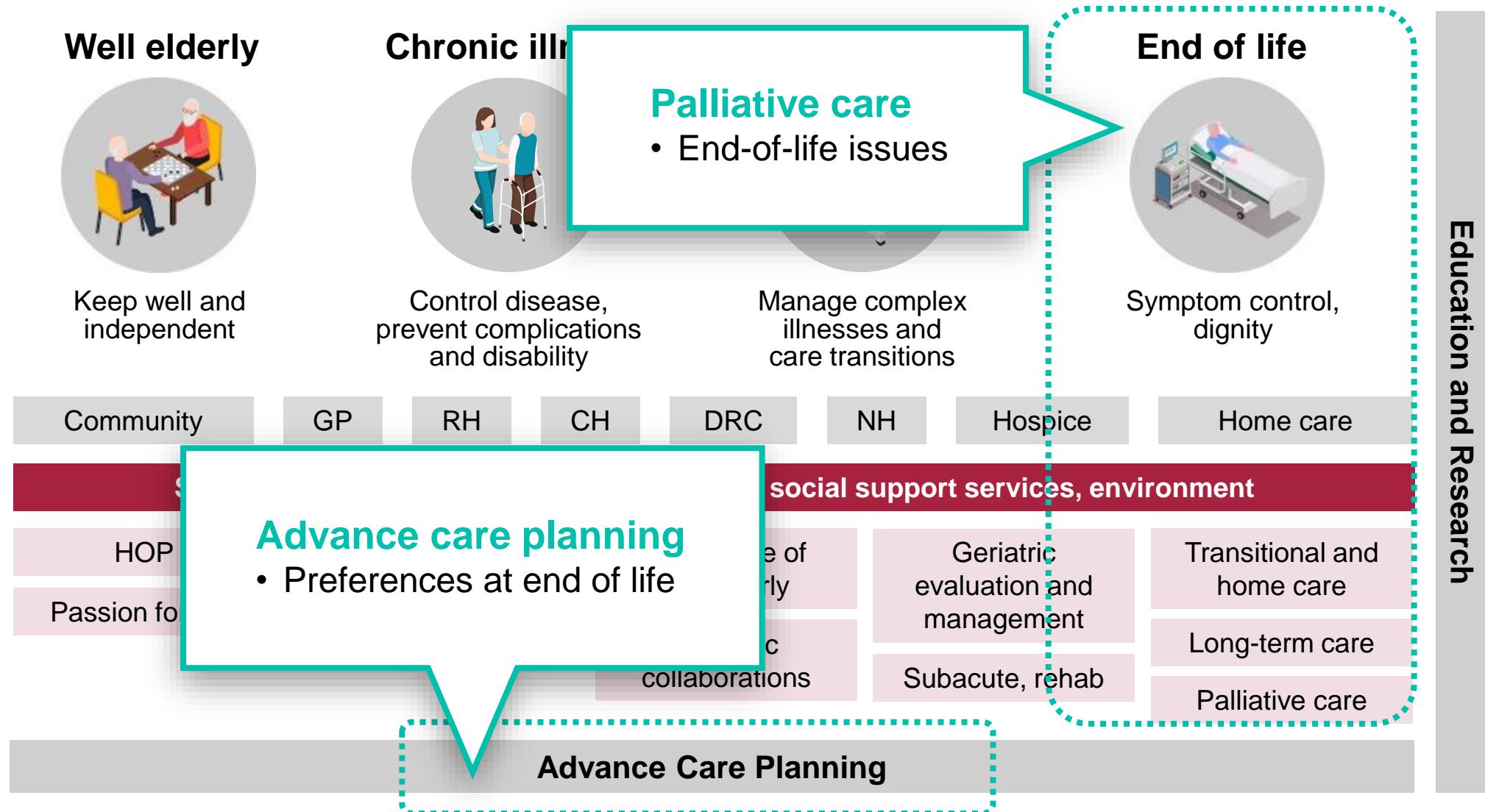
# Care of the Elderly



# Care of the Elderly



# Care of the Elderly



# Funding of Healthcare: Government, Insurance, Self, Welfare

## Medisave

- Compulsory savings in Central Provident Fund (CPF)

## Medishield, Medishield Life

- Catastrophic medical insurance

## Medifund

- For low-income group

## Eldershield

- Long-term disability insurance

## Other government schemes

- PG, CHAS, IDAPE, CTG, FDW, SMEF



M E D I S A V E

# Newer Trends

The screenshot shows the homepage of the Agency for Integrated Care (AIC) website. The top navigation bar includes links for e-Services, Partner's Portals, and a search icon. Below the navigation is a horizontal menu with links to Financial Assistance, Care Services, Caregiving, Body and Mind, Blog, and Resources. The main content area features a large orange banner on the left with the text "Dementia-Friendly Community" and a smaller illustration of a park scene on the right. The park scene includes a yellow tent labeled "DEMENTIA-FRIENDLY SINGAPORE", a giraffe, and various people of different ages. Below the banner, the breadcrumb navigation shows "Home / Body And Mind / Dementia-Friendly Community". On the right side of the page, there is a "Font Size" control with options "A" and "A".

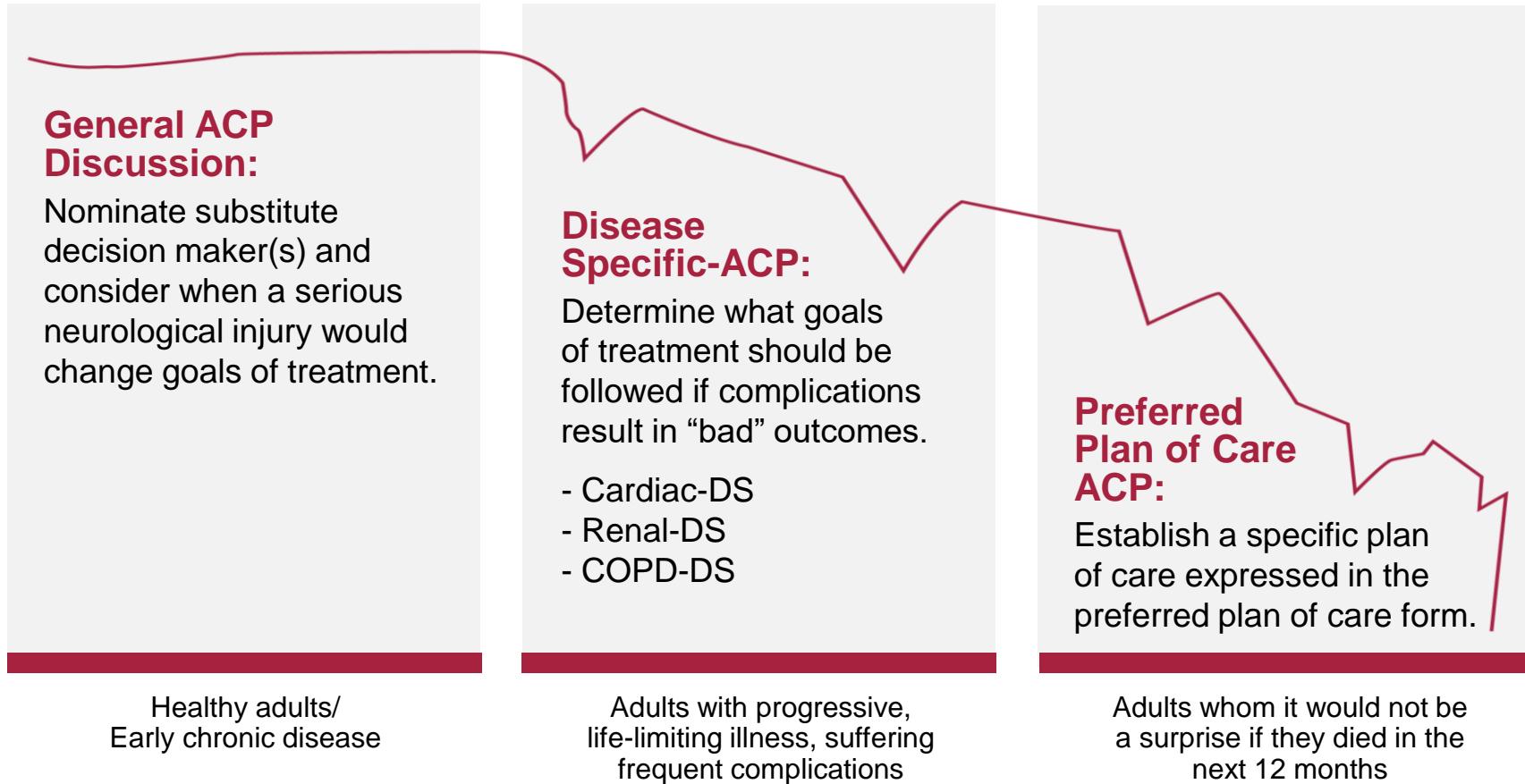
## What is A Dementia-Friendly Community (DFC)?

It is a community where people are aware of this condition and understand how to make their neighbourhoods safe and easy to navigate in.  
It's a place where persons with dementia and their caregivers can live as independently as possible, while feeling:

- Safe (represented by a circular icon with a keyhole and a plus sign)
- Comfortable (represented by a circular icon with a bed)
- Loved (represented by a circular icon with a heart)
- Respected (represented by a circular icon with a thumbs-up)

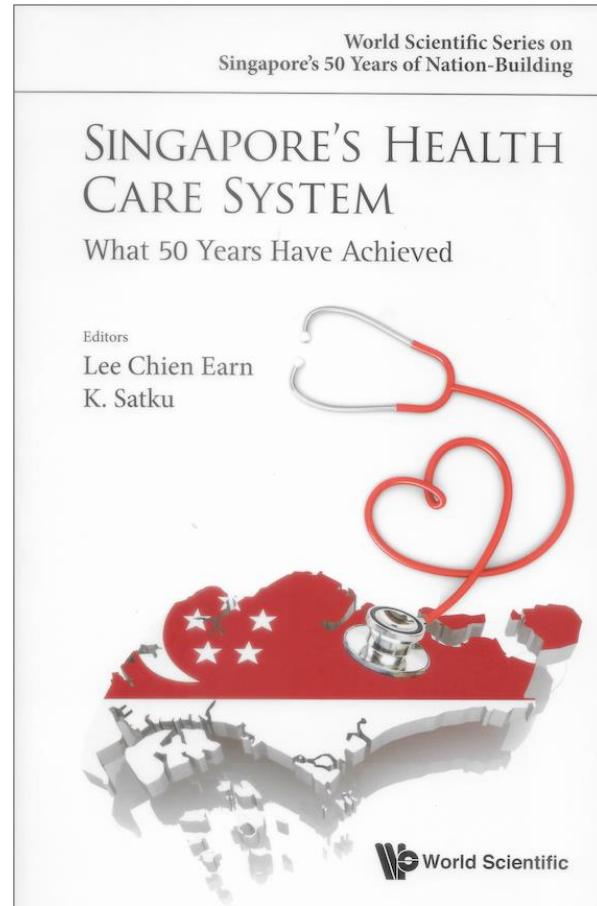
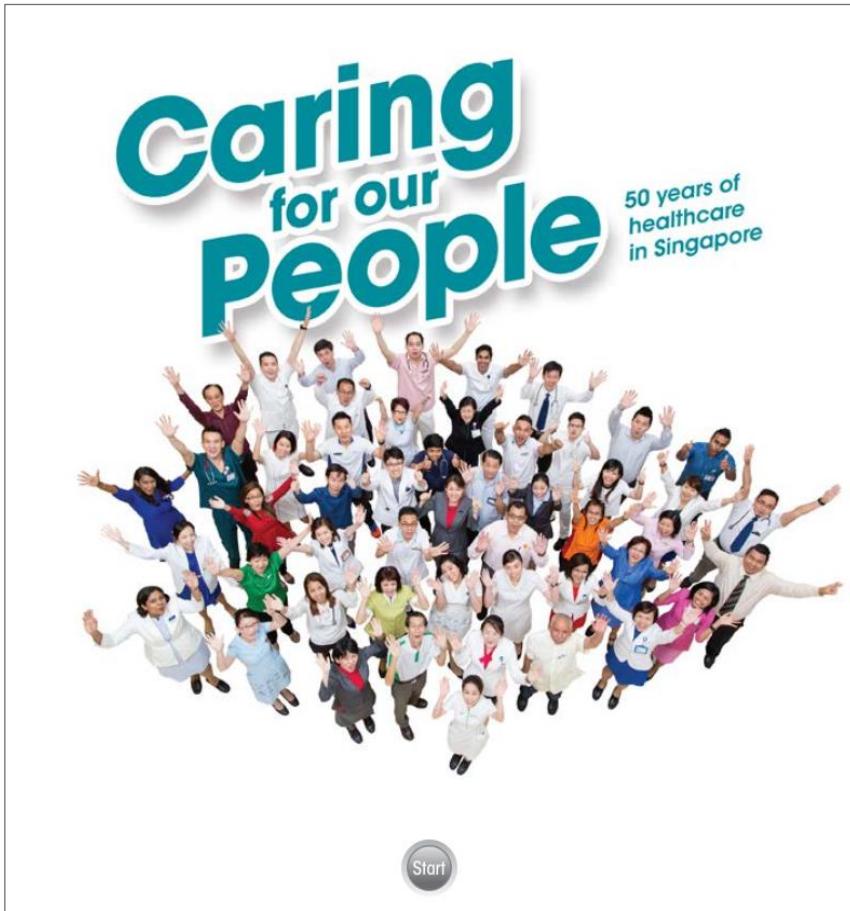
Ask Alice @ AIC (Beta)  
Type your question ...

# Stages of Advance Care Planning (ACP) Over the Lifetime of Adults

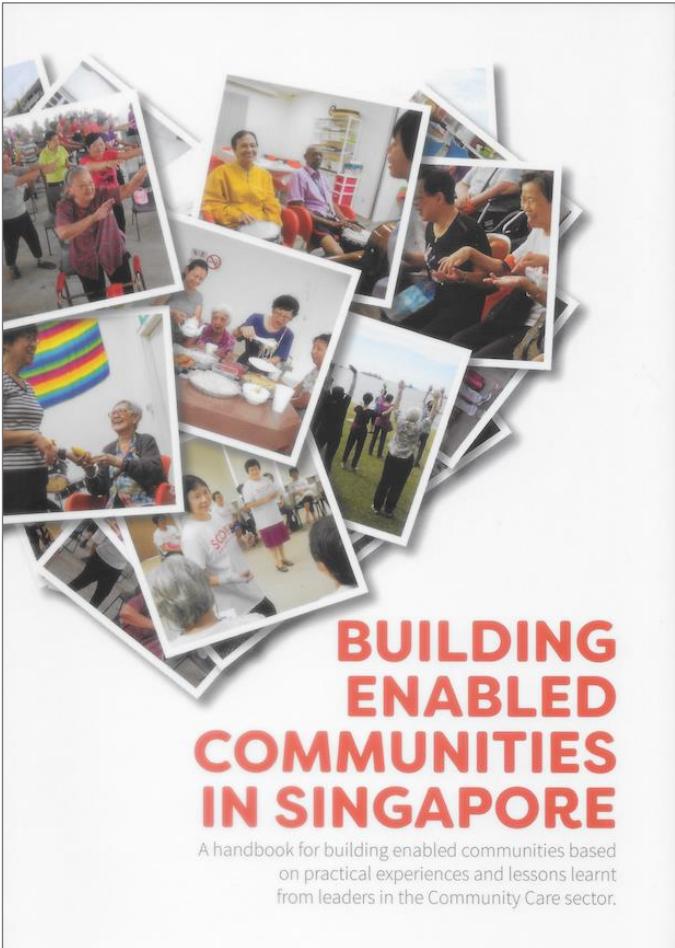


Agency for Integrated Care, Singapore. Adapted from Respecting Choices, Gundersen Health System, Wisconsin, USA.

# Publications (2015 and 2016)

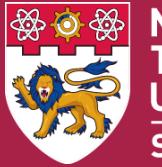


# Publications (2018)



**Lien Foundation 2018**

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# Health Economy, Silver Economy

Assoc Prof Goh Kim Huat, NTU



# Silver Tsunami



2010

2020

2030

**9%**

aged 65  
and above

**15.2%**

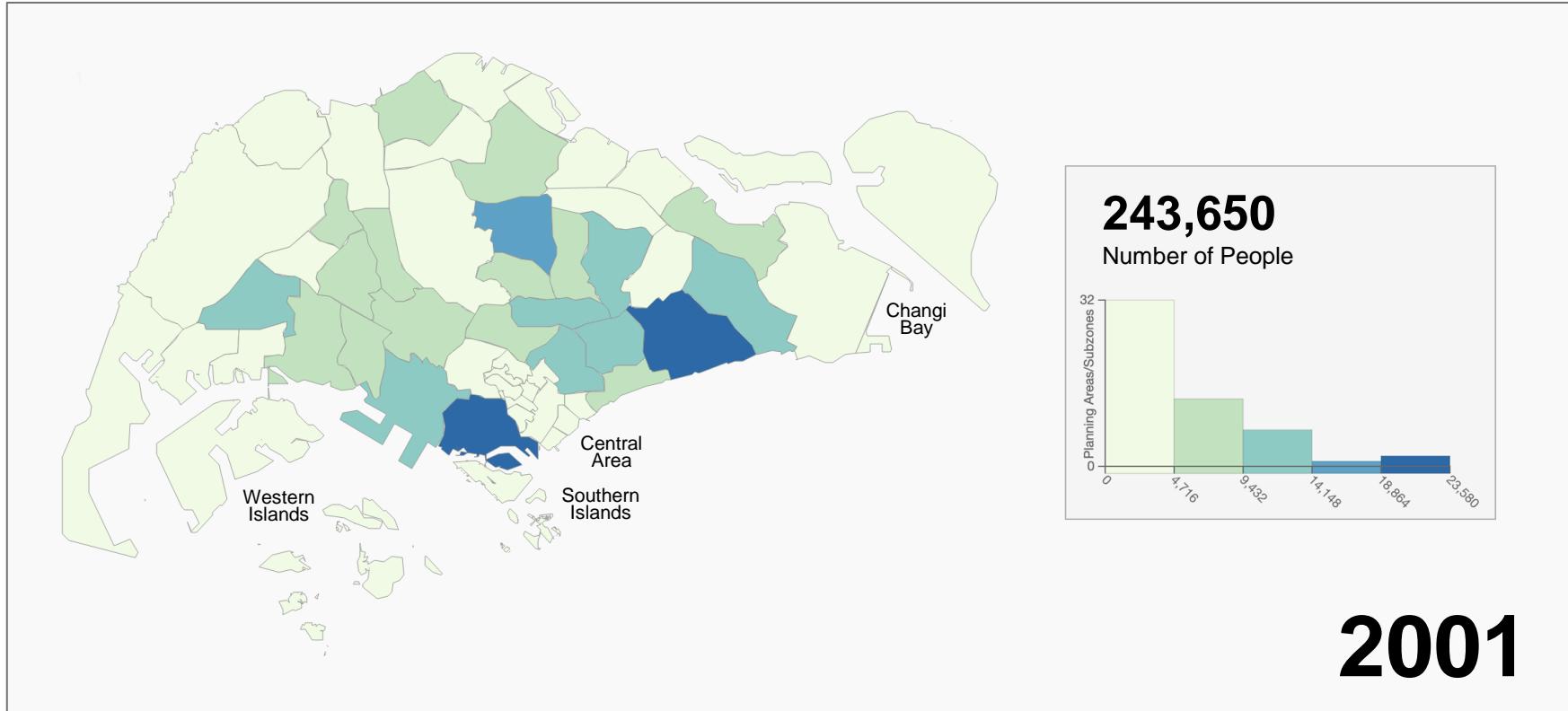
aged 65  
and above

**25%**

aged 65  
and above

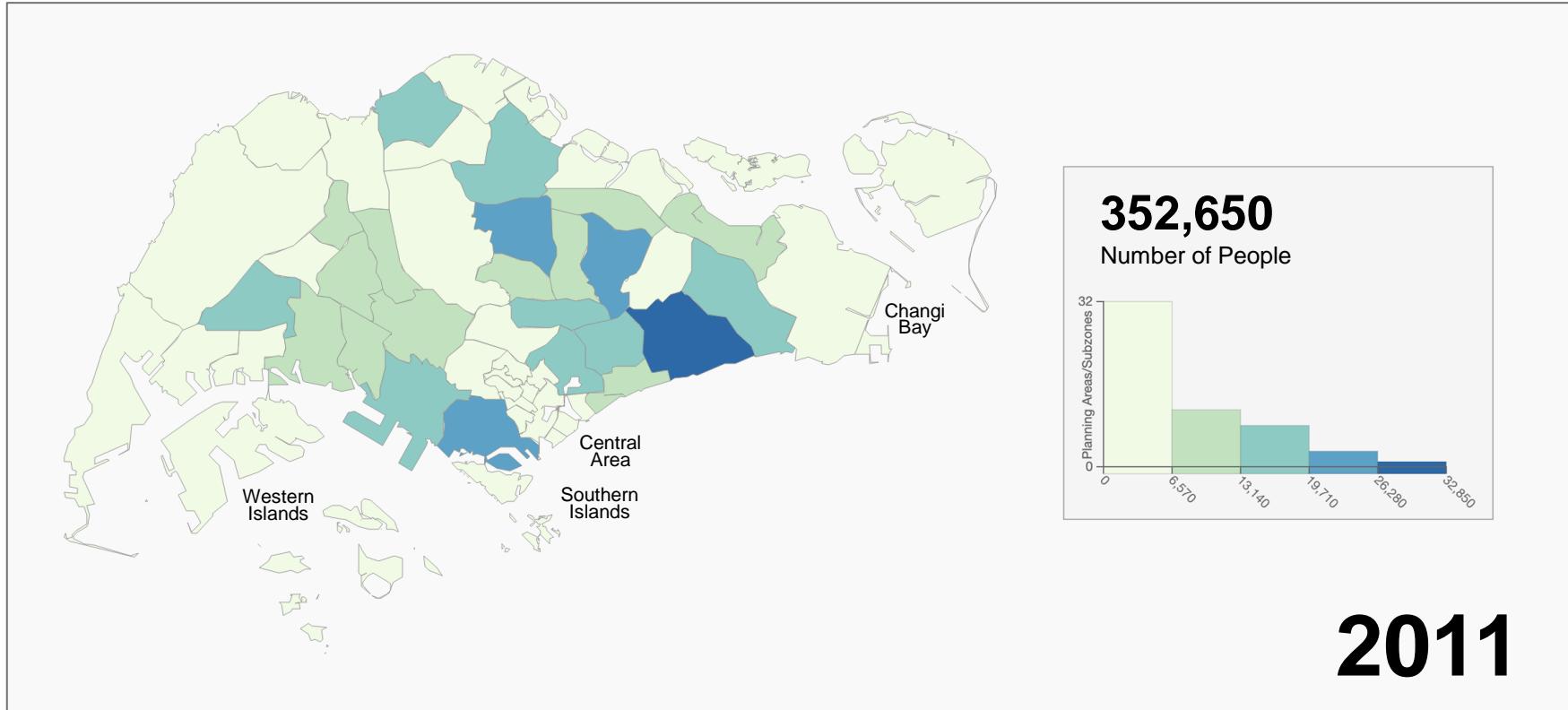


# Distribution of Residents Older than 65 in 2001



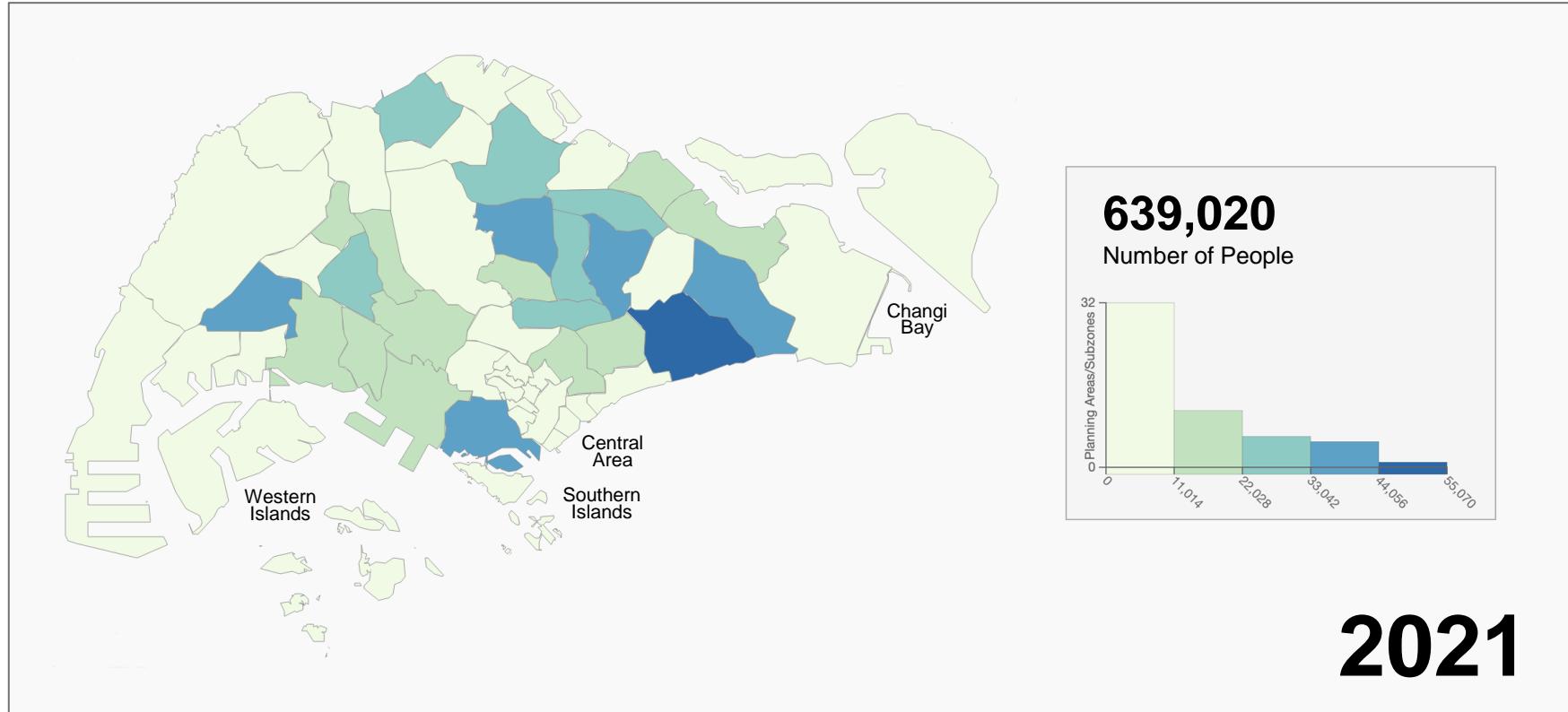
Singapore Land Authority and Department of Statistics. (n.d.). Resident population by planning area/subzone and age group [Map]. OneMap. Retrieved June 29, 2022 from <https://popquery.onemap.gov.sg/>

# Distribution of Residents Older than 65 in 2011



Singapore Land Authority and Department of Statistics. (n.d.). Resident population by planning area/subzone and age group [Map]. OneMap. Retrieved June 29, 2022 from <https://popquery.onemap.gov.sg/>

# Distribution of Residents Older than 65 in 2021



Singapore Land Authority and Department of Statistics. (n.d.). Resident population by planning area/subzone and age group [Map]. OneMap. Retrieved June 29, 2022 from <https://popquery.onemap.gov.sg/>

# Impacts of Ageing on the Economy

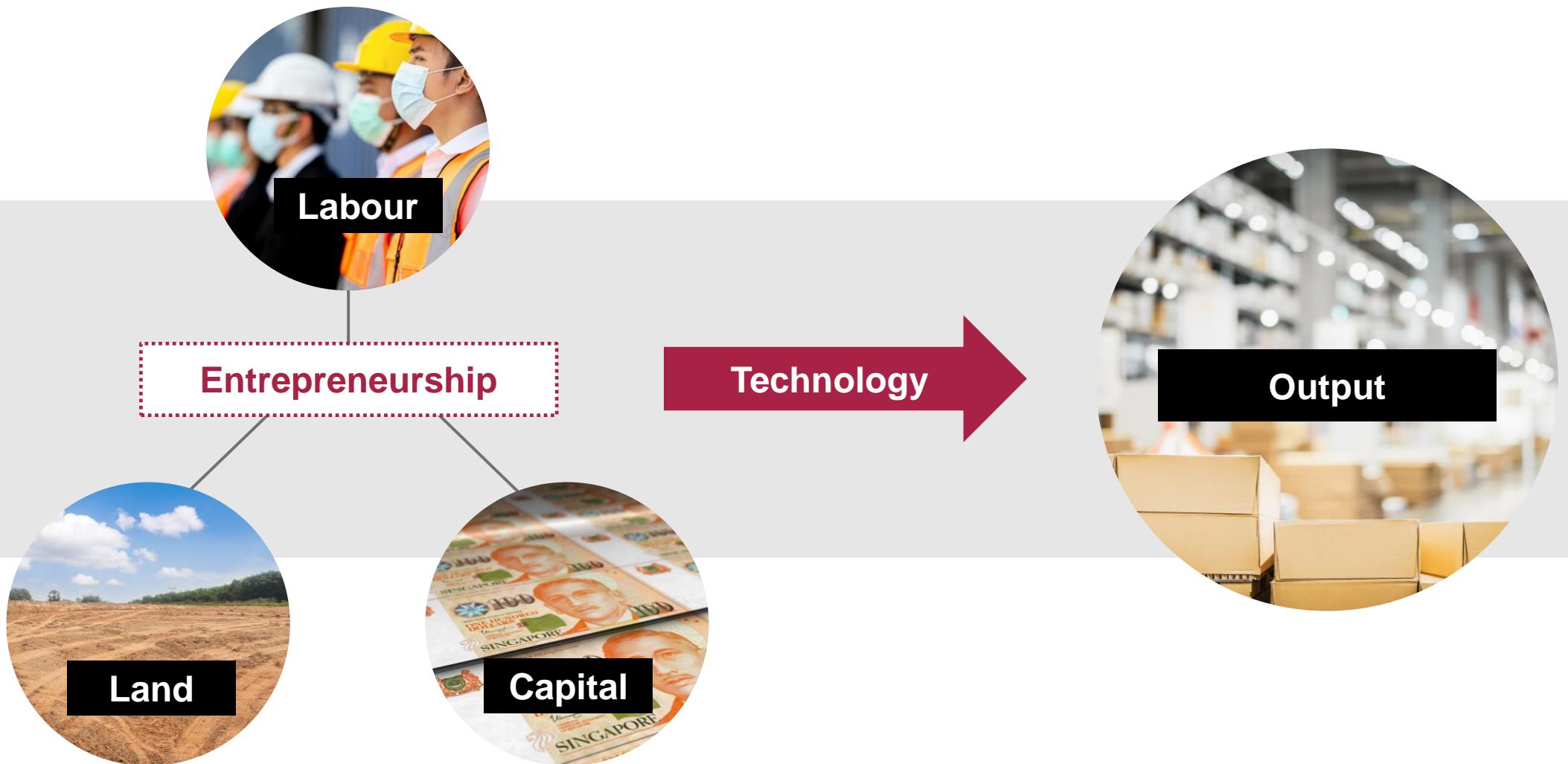
## Production



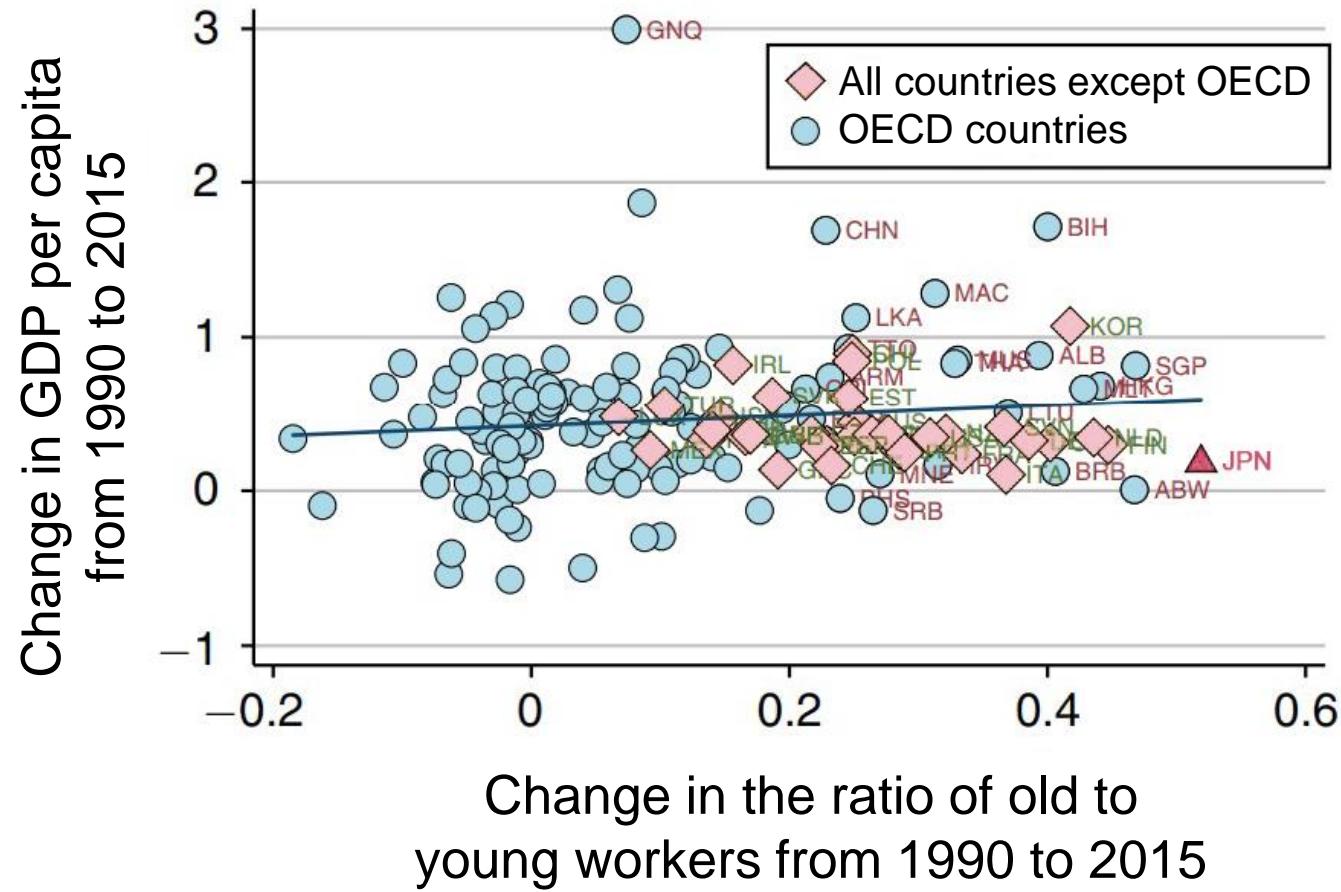
## Consumption



# Production Economics



# Technology as the Silver Lining?



Adapted from Acemoglu, D. & Restrepo, P. (2017). Secular stagnation? The effect of aging on economic growth in the age of automation. *American Economic Review*, 107(5), 174–79. <https://doi.org/10.1257/aer.p20171101>

# Consumption

## Public goods: Produced by government

- Public healthcare
- Social security and needs
- Environment accessibility
- Defence

## Private goods: Produced by commercial entities

### Services:

- Private healthcare
- Social/lifestyle needs

### Products:

- Durables: Electrical appliances, mobility aids, etc.
- Consumables: Nutrition



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