

HEALTHY CITY DESIGN 2019

A FRAMEWORK FOR A HEALTHY NEIGHBOURHOOD/ PRECINCT



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MINISTRY OF HEALTH
SINGAPORE

Office for Healthcare Transformation

Outline

- 1. Background of Singapore**
- 2. Introduction to the Healthy Precinct Project**
- 3. Healthy Precinct Framework**
- 4. Applying the Healthy Precinct Framework**

About Singapore



Size: 721.5km²

Total Population: 5.703mil

Population Density: 7,866 per Km²

Demography:

- Multi racial mix of Chinese, Malay, Indian, Others
- Rapidly ageing population

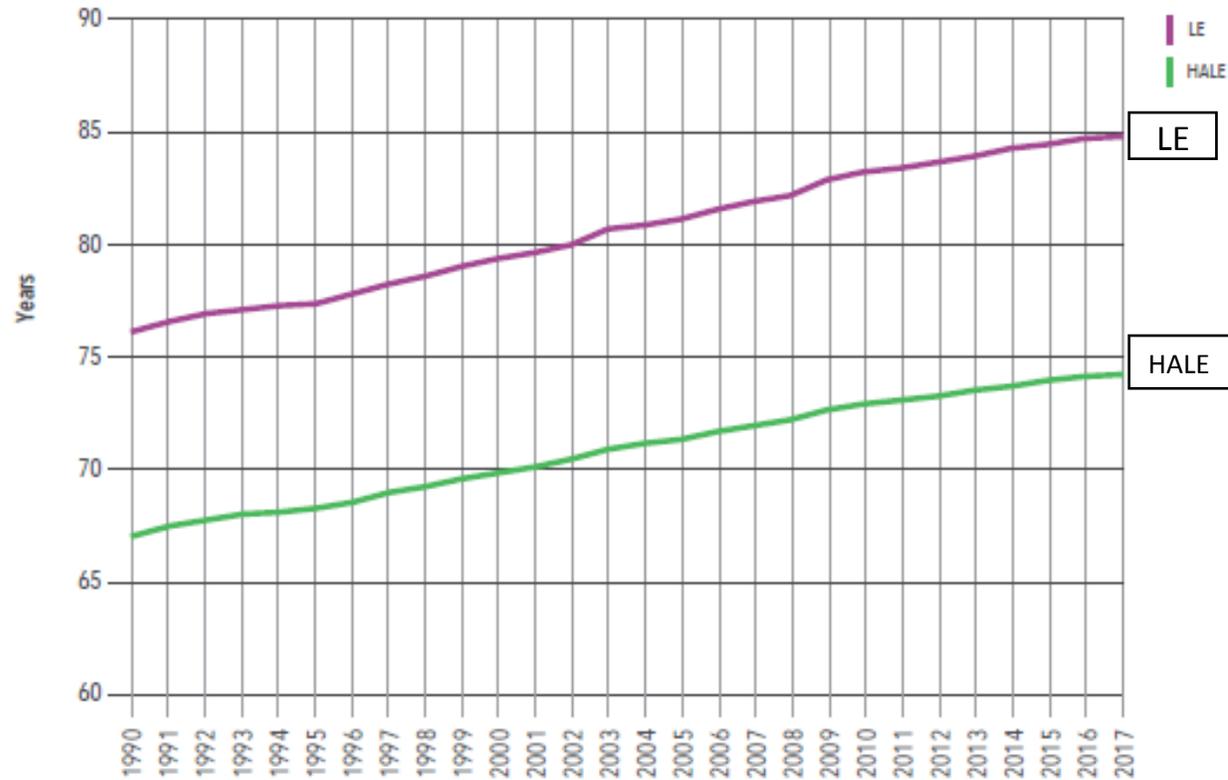
Housing distribution: 80% live in public housing



Longer but not necessarily Healthier lives

FIGURE 1

Life expectancy and healthy life expectancy at birth in Singapore, both sexes, 1990–2017



The Burden of Disease in Singapore, 1990-2017 (BOD Report, 2017)

❑ Singaporeans are living longer

❑ Between 1990 and 2017, life expectancy at birth in Singapore rose 8.7 years, to **84.8 years**. Healthy life expectancy at birth, however, rose only 7.2 years, to **74.2 years**.

❑ More years spent in poor health

The Healthy Precinct Project

Why Precincts?

1. A precinct-based approach can help **focus the collective efforts** of government agencies and the community on a smaller area with a targeted population
2. Engender a sufficiently **high level of community engagement and partnership** that would make interventions more sustainable
3. Testing evidence-informed health promotion priorities with the aim to **scale** efforts



Public Housing Blocks in Singapore

PILOT SITE

Area: ~9.5km²

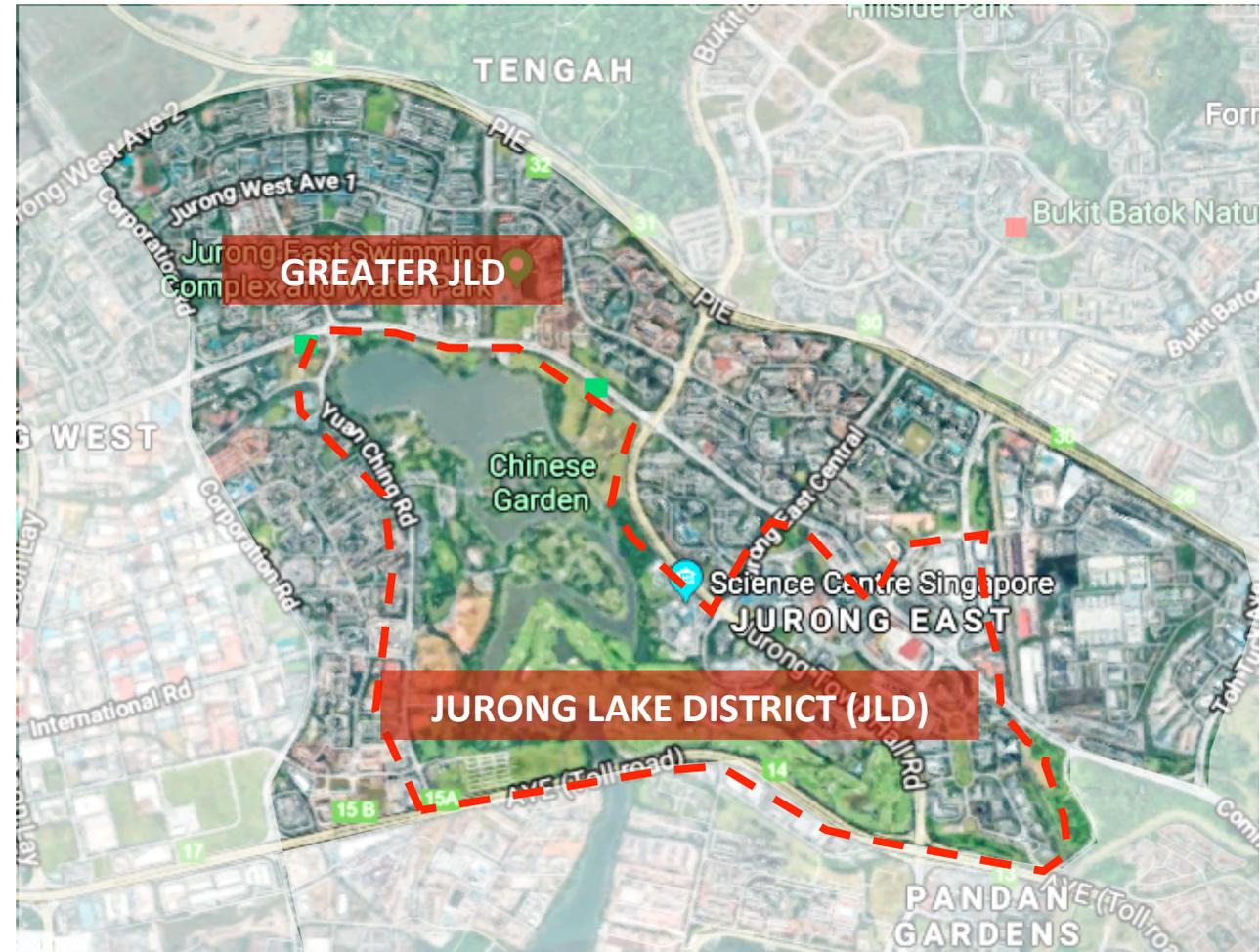
Total Population: ~250,000

Demography:

- Mature estate with higher proportion of elderly
- Large working population

Landuse description:

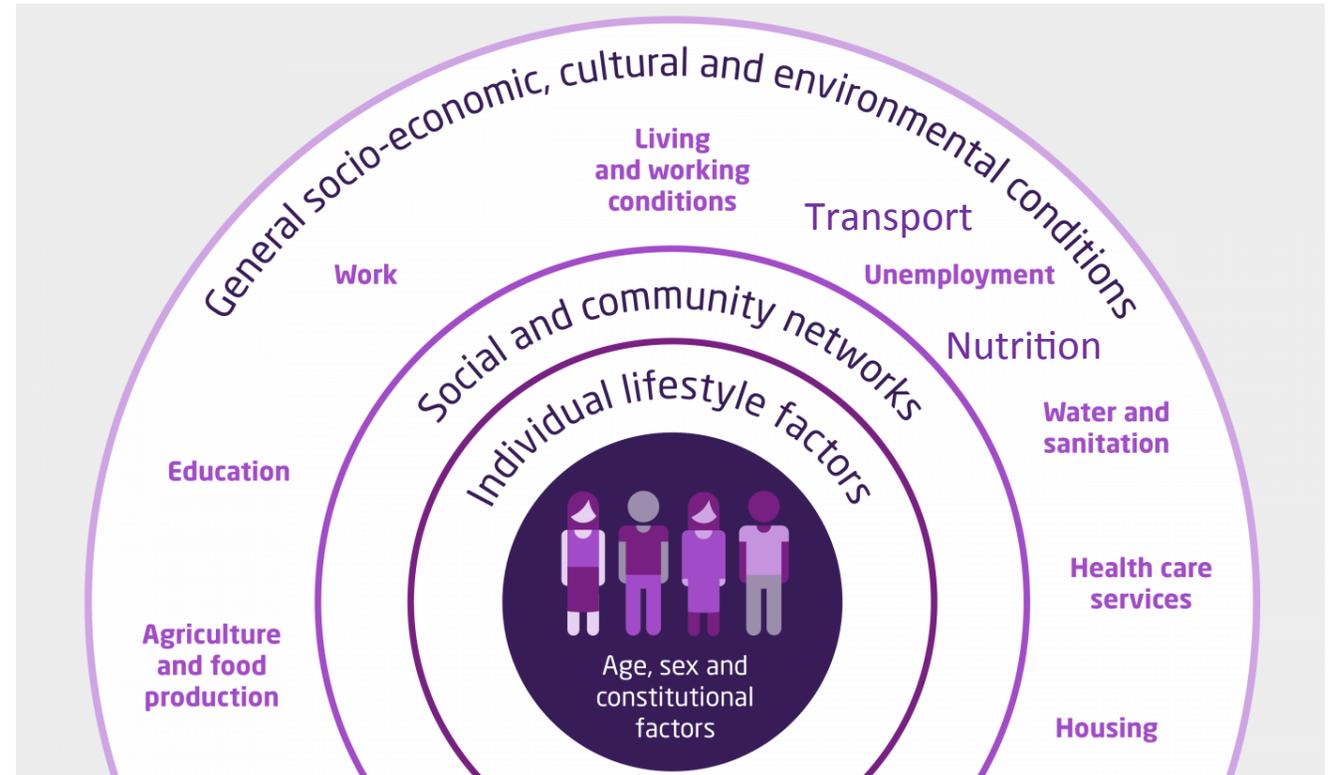
- **Jurong Lake District (JLD):** To be redeveloped into offices, retail, residential and recreation (completed after 2040)
- **Greater JLD Region :** High-rise, high-density residential area



Using A Health Determinant Lens

*‘The range of behavioural, biological, socio-economic and environmental **factors** that **influence** the **health status** of individuals or populations.’*

–Adapted from the World Health Organization 1998.



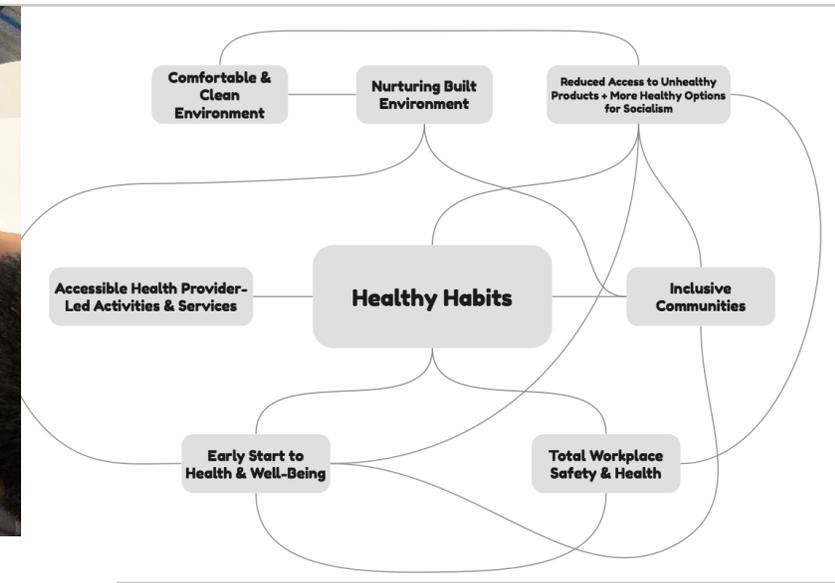
Adapted from Dahlgren and Whitehead's (1993) model of determinants of health, cited in the King's Fund (2013).

DERIVING A FRAMEWORK

- **Process:**
 - Curated and prioritized key influences from a list of 30 Socio-environmental Determinants with an initial group of agencies through a workshop
- **Outcome:**
 - Prioritised Determinants & First cut of the Healthy Precinct Framework



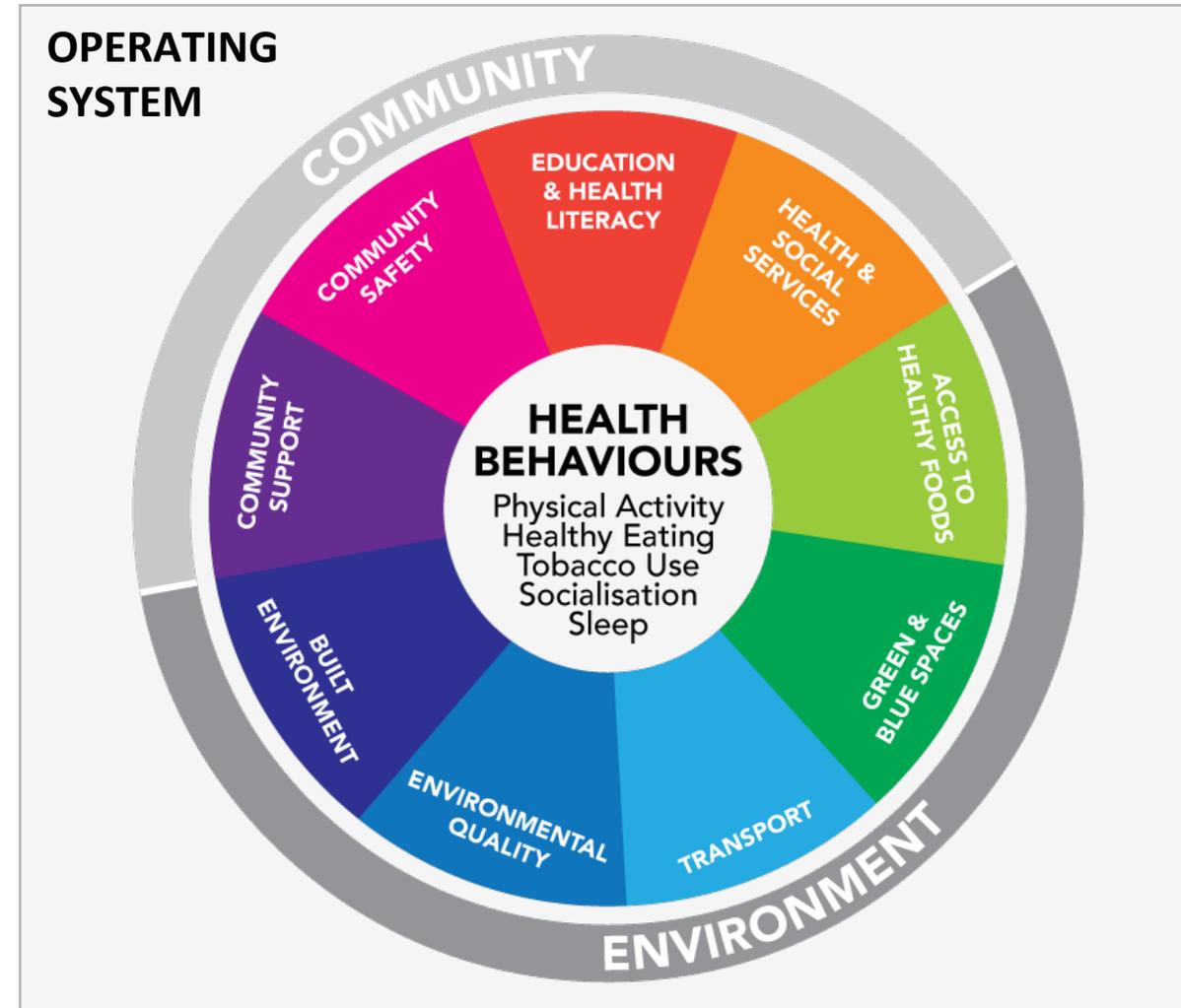
Q5. What do you think are the key health pain points at a neighbourhood scale?



Discussions and photos from 'Defining a Healthy Precinct' Workshop, April 2019

HEALTHY PRECINCT FRAMEWORK

- **Description:**
 - Behaviour-driven framework that hypothesizes relationships between 9 **socio-environmental determinants** of health behaviours and 5 key **health behaviours**
- **Purpose:**
 - Provides structure for synergistic participation between multiple agencies that impact health promotion at precinct level (*Health in All Policies*)



MOHT HEALTHY PRECINCT FRAMEWORK
(to be refined further)

DERIVING THE 5 BEHAVIOURS

- Physical Activity
- Healthy Eating
- Socialisation
- Sleep
- Tobacco Use

Leading risk factors contributing to DALYS, Singapore, both sexes, 1990-2017

2017 rank		% of total risk-attributable DALYs	total % change in risk-attributable DALYs 1990-2017
1	Dietary risks	10.1%	2.9%
2	Tobacco	7.9%	3.8%
3	High blood pressure	7.6%	6.5%
4	High blood sugar	7.0%	14.1%
5	Obesity and overweight	6.4%	141.0%
6	High cholesterol	4.2%	-4.1%
7	Occupational risks	4.0%	17.7%
8	Air pollution	3.4%	17.2%
9	Impaired kidney function	2.7%	32.3%
10	Child and maternal malnutrition	1.7%	-35.4%
11	Drug use	1.6%	88.6%
12	Alcohol use	1.2%	91.4%
13	Low physical activity	1.1%	9.1%

Leading causes of DALYS, Singapore, both sexes, 1990-2017

2017 rank		% of total DALYs	total % change in DALYs 1990-2017
1	Cardiovascular diseases	14.2%	11.7%
2	Cancers	13.3%	48.2%
3	Musculoskeletal disorders	12.6%	99.8%
4	Mental disorders	10.2%	70.9%
5	Neurological disorders	6.6%	104.6%

The Burden of Disease in Singapore, 1990-2017 (BOD Report, 2017)

Imperative to act on modifiable risk factors to reduce disease burden in the population

PRELIMINARY BEHAVIOUR GOALS*



PHYSICAL ACTIVITY

Increase no. of Singaporeans who:

- Achieve recommended steps/day
- Achieve recommended time spent performing moderate PA/week
- Reduce no. of hours spent sedentary



HEALTHY EATING

Increase no. of Singaporeans who:

- Achieve recommended daily caloric intake
- Achieve recommended servings/food group
- Reduce unhealthy snacking



SOCIALISATION

- Improved the quality and quantity of social relationships
(To be defined further)



SLEEP

- Achieving recommended no. of hours of sleep *(to be defined further)*



TOBACCO USE

- Reduce the no. of Singaporeans who smoke
- Reduce the no. of cigarettes smoked/day per individual

**Goals are broad enough to be achievable for different socio-economic groups*

WHY THE 9 DETERMINANTS?

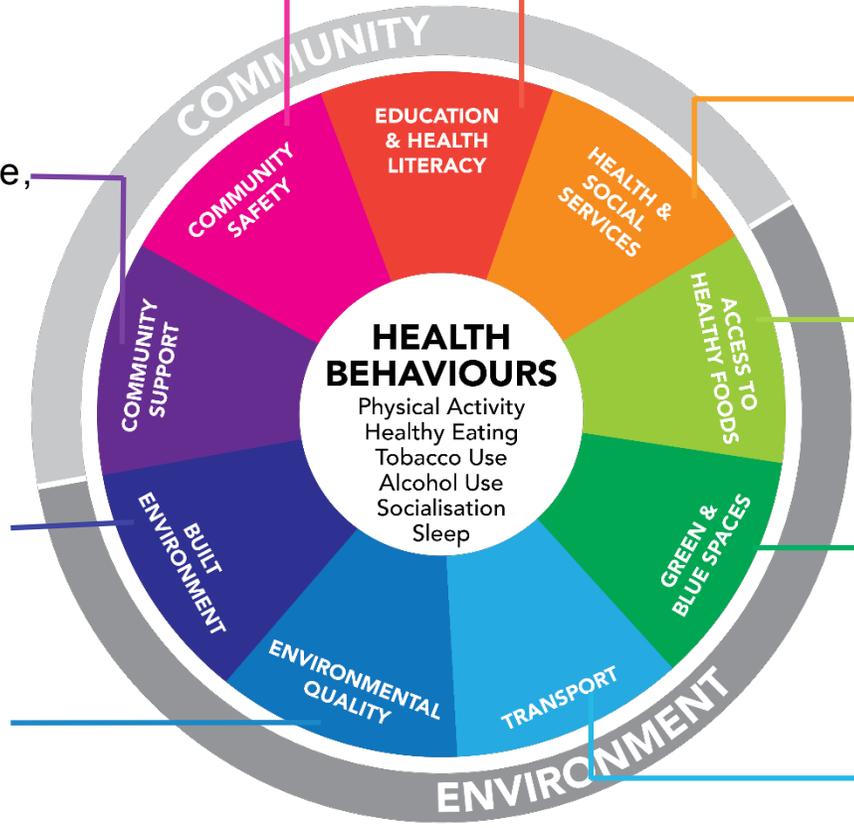
- Health is influenced by factors beyond the domain of healthcare provision
- The determinants are key social and environmental influences that have been identified to impact the 5 health behaviours at a precinct level in Singapore

Community Safety
 Low crime and a safe environment for all to live healthily

Community Support
 Forming inclusive, engaged and vibrant communities

Built Environment
 Built environment, including public spaces, that promote healthy living

Environmental Quality
 Minimise and control air & noise pollution



Education & Health Literacy
 Being able to make informed choices for healthy living

Health & Social Services
 Access to affordable, good quality services & programmes for all

Access to Healthy Foods
 Healthy food options that are readily convenient & affordable

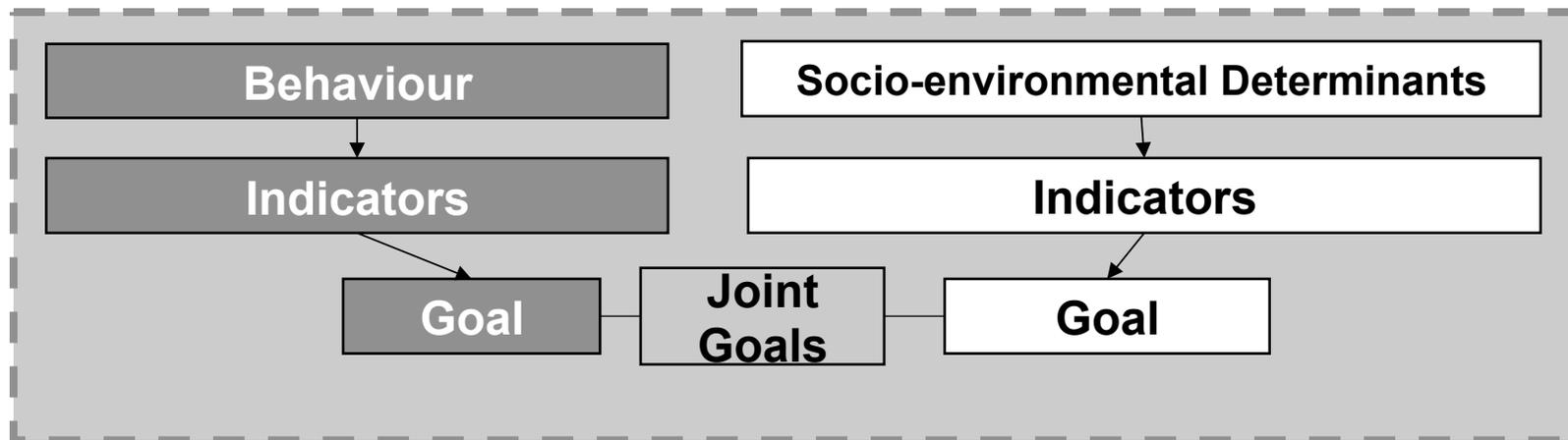
Green & Blue Spaces
 Access to attractive green/blue spaces to relax, exercise and spend time

Transport
 Efficient, comfortable, & convenient modes of transport for end-to-end transport within a precinct

APPLYING THE FRAMEWORK

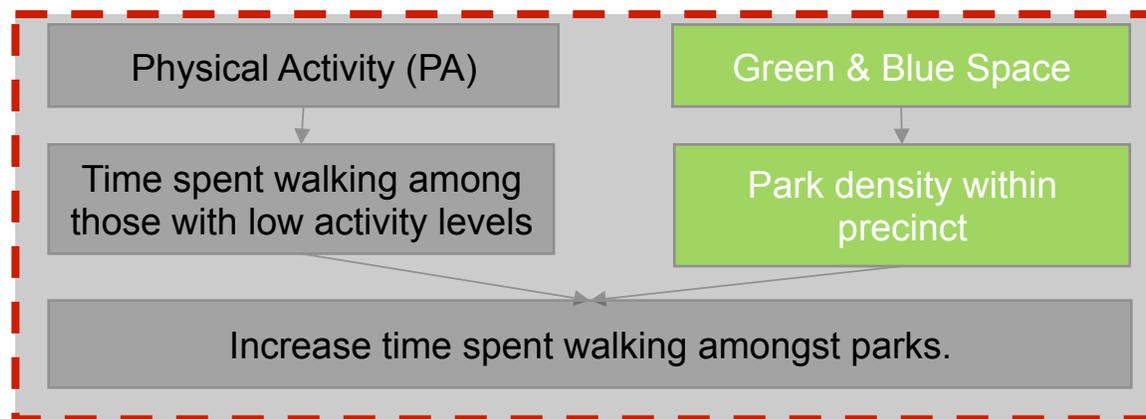
Fleshing out the Framework into an Index

- Behaviour indicators worked out with health agencies



- Socio-environmental determinant indicators worked out with non-health agencies

Illustrative Example



Examples of Evidence-based Behaviour-Determinant Relationships

* Denotes evidence from local literature in Singapore

Behaviour	Access to Healthy Foods	Built Environment	Health/social services
Physical Activity		<ul style="list-style-type: none"> • Access to health-promoting facilities* • Neighbourhood walkability • Land-use diversity* 	<ul style="list-style-type: none"> • Availability • Accessibility • Quality (targeted) • Affordability (cost, incentives)
Healthy Eating	<ul style="list-style-type: none"> • Affordability* • Availability* • Accessibility* 	<ul style="list-style-type: none"> • Accessibility* of fast-food outlets • Density of fast-food outlets • Density of F&B advertisements 	<ul style="list-style-type: none"> • Availability of nutrition programmes* • Access to healthcare professional advice*
Socialisation		<ul style="list-style-type: none"> • Destinations (e.g. public spaces) • Population Density • Distance from home to street/public space 	<ul style="list-style-type: none"> • Availability of educational programmes • Affordability
Sleep		<ul style="list-style-type: none"> • Road intersection • Population density 	<ul style="list-style-type: none"> • Availability of healthcare professional advice*

Examples of Evidence-based Behaviour-Determinant Relationships

* Denotes evidence from local literature in Singapore

Behaviour	Transport	Environmental Quality	Green/Blue Space
Physical Activity	<ul style="list-style-type: none"> • Accessibility of active transport (e.g. walking, cycling) • Availability of infrastructure for active transport • Availability of facilities for active transport • Accessibility of public transport • Variety of public transport • Frequency of public transport 	<ul style="list-style-type: none"> • Air quality • Ambient temperature 	<ul style="list-style-type: none"> • Availability (park density) * • Accessibility (traveling distance/public transport access) * • Design of green space*
Healthy Eating	<ul style="list-style-type: none"> • Accessibility to healthy food sources 		
Socialisation	<ul style="list-style-type: none"> • Travel distance (barrier to visiting other facilities and participating in community programmes) 	<ul style="list-style-type: none"> • Air quality • Ambient temperature 	<ul style="list-style-type: none"> • Availability of community programmes in green spaces
Sleep		<ul style="list-style-type: none"> • Traffic noise levels 	<ul style="list-style-type: none"> • Greener neighbourhoods

Examples of Evidence-based Behaviour-Determinant Relationships

* Denotes evidence from local literature in Singapore

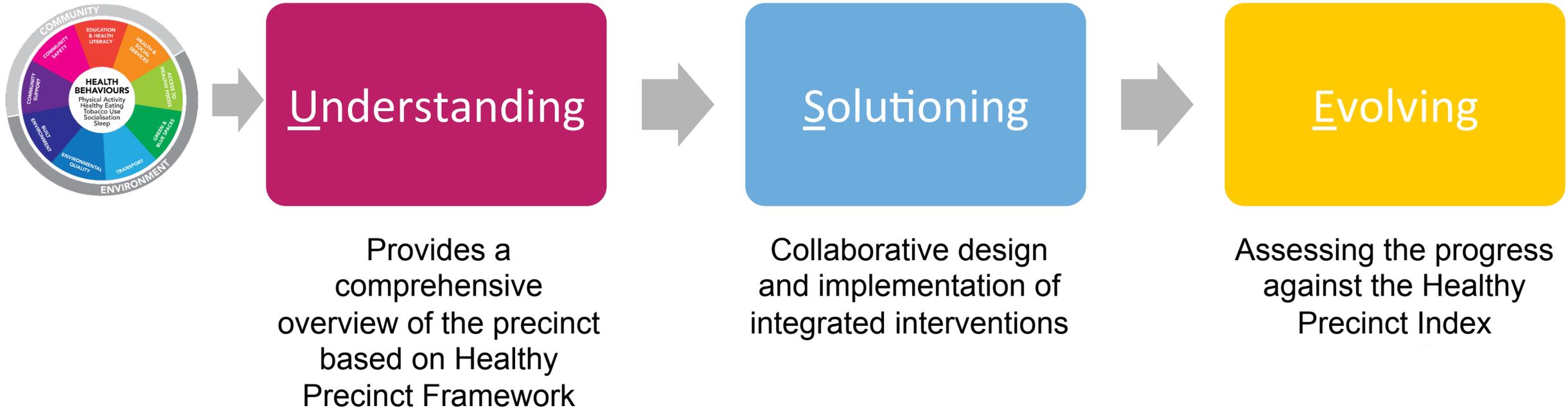
Behaviour	Education & Health Literacy	Community Safety	Community Support
Physical Activity	<ul style="list-style-type: none"> Education levels 	<ul style="list-style-type: none"> Perceived neighbourhood safety * Crime rate 	<ul style="list-style-type: none"> Perceived social support (older adults)* Programmes with social elements*
Healthy Eating	<ul style="list-style-type: none"> Parental influence* 	<ul style="list-style-type: none"> Perceived neighbourhood safety 	<ul style="list-style-type: none"> Family/household norms * Workplace norms*
Socialisation	<ul style="list-style-type: none"> Education levels (isolation) 	<ul style="list-style-type: none"> Perceived neighbourhood safety* Crime rate 	<ul style="list-style-type: none"> Social support *
Sleep	<ul style="list-style-type: none"> Education levels 	<ul style="list-style-type: none"> Perceived neighbourhood safety* Crime rate 	<ul style="list-style-type: none"> Social norms (friends/family)

'Healthy Precinct Framework' Workshop, Sep 2019



Applying the Healthy Precinct Index in Precincts

- For the first pilot site, U-S-E will validate the Healthy Precinct Framework iteratively



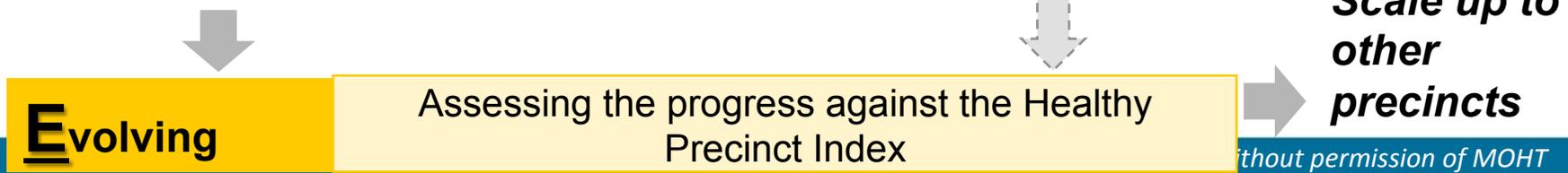
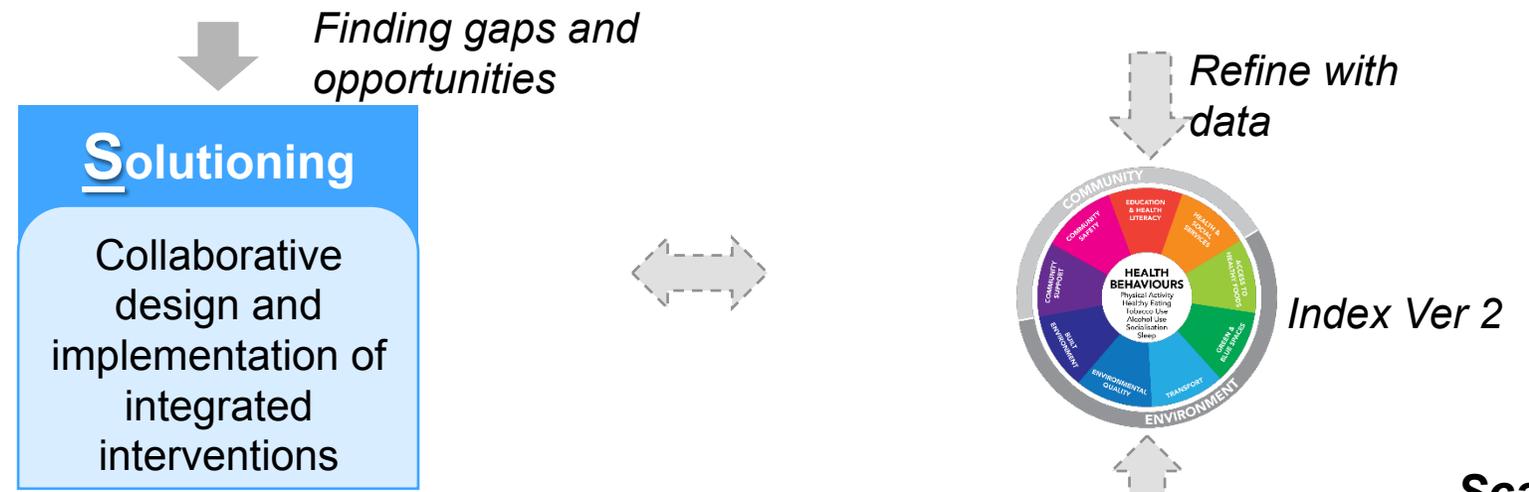
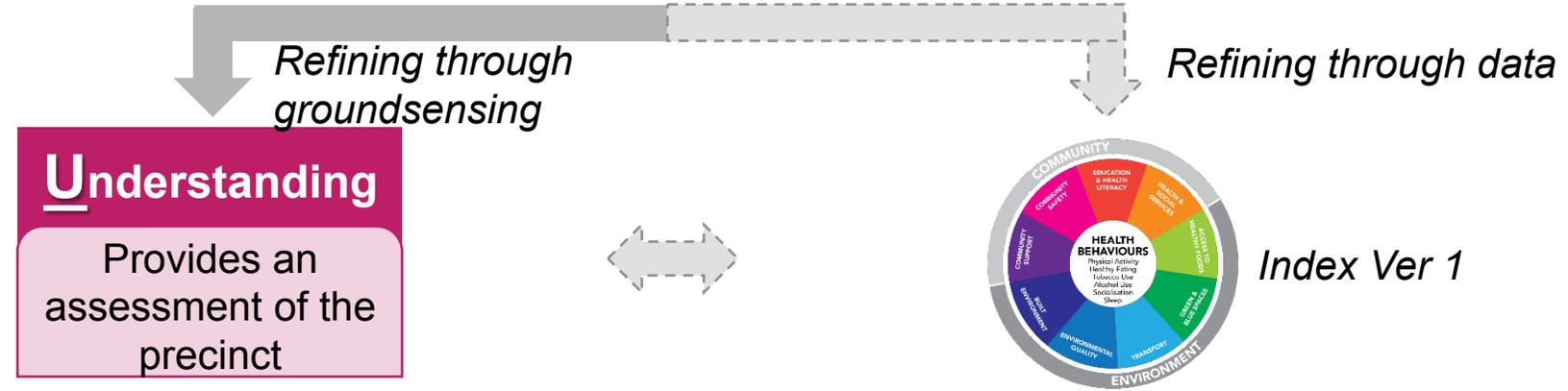
U – S – E

Testing the Healthy Precinct Index



Flesh out framework (workshop)

- **Using the framework in Jurong:** Focus and provide parameters for exploration through U-S-E
- **Two-pronged approach:** Evidence-based approaches to refine the index, using big data and groundsensing findings.



Testing the Healthy Precinct Index

- Understanding Phase

- **Quick Groundsensing** : Mixed methodologies to refine indicators (e.g. do people actually perform physical activities in parks, why and why not?)
- **Big data analysis** : Relevant datasets helps to find associations between behaviours and determinants. (e.g. how does city walkability affect physical activity?)

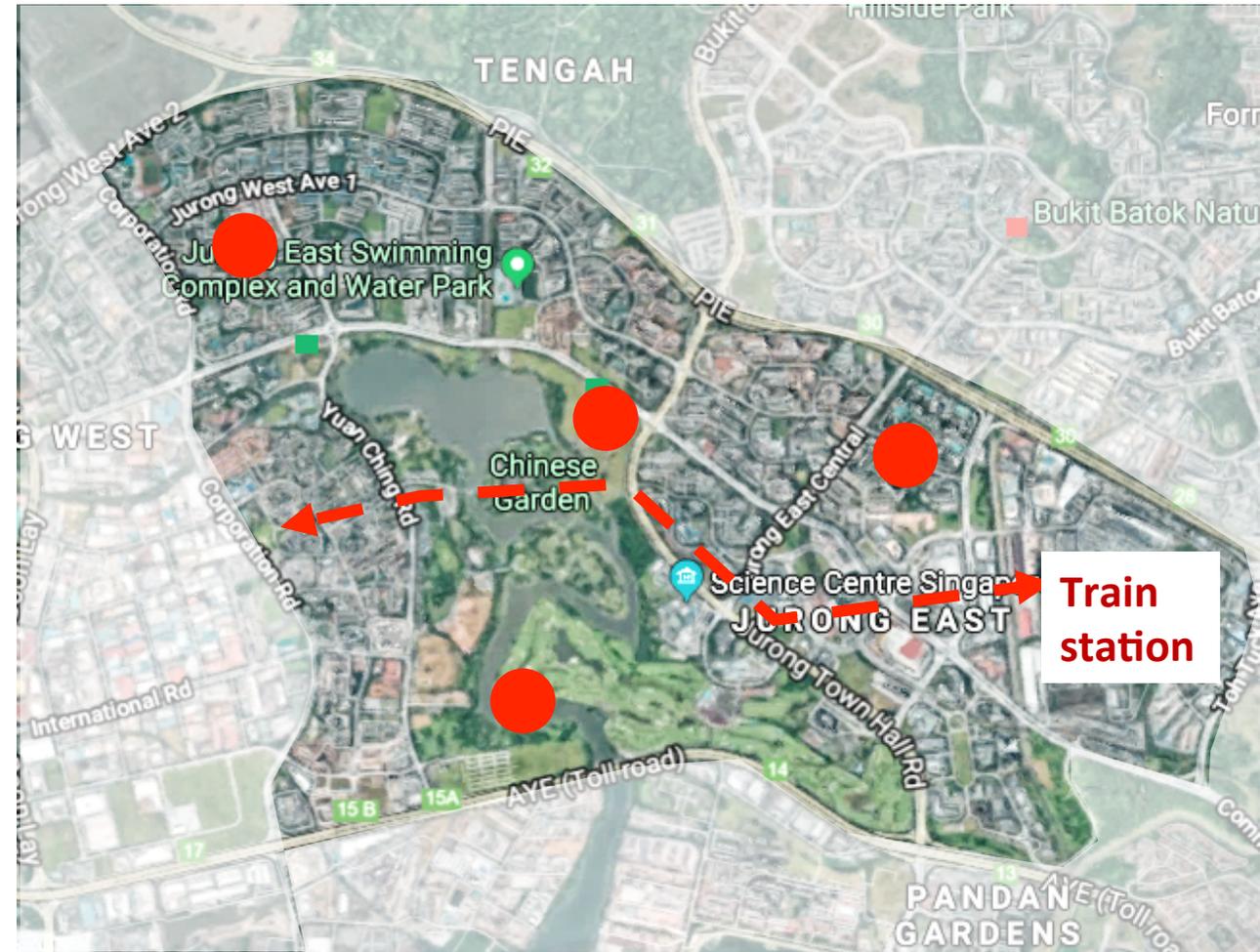


Co-creating and implementing innovative interventions

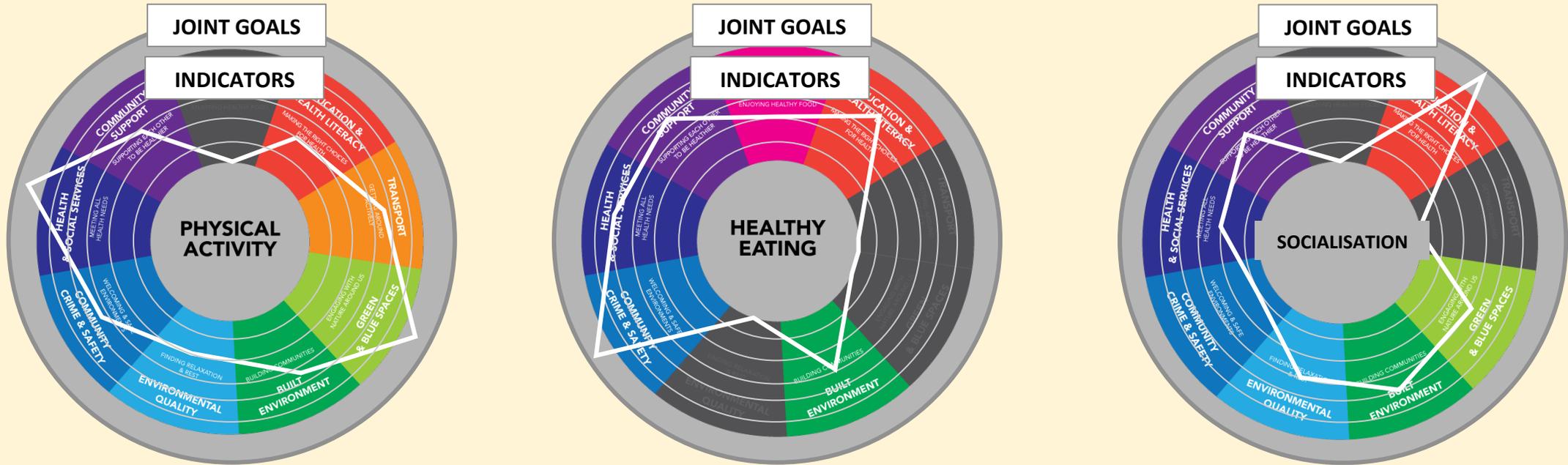
- Solutioning Phase

- **Methodology:** Co-creating a contextual action plan and co-designing solutions with stakeholders (e.g. govt agencies and community)
- **Illustrative examples:**
 - Improving **wayfinding** and walking experience to increase prevalence for walkability in pilot site.
 - Implementing **food foraging** parks with healthy eating programmes

Illustrative examples



Illustrative Healthy Precinct Dashboard for Evolving Phase



Evaluating through:

- Short term (utilization, process evaluation)
 - Medium term (behaviour change)
 - Long term (health outcomes)

Illustrative Envisioned Outcome



Health Behaviour :	Determinant : Built Environment
Physical Activity	<i>How does neighbourhood walkability influence total number of steps/day?</i>

Applying the socio-demography lens



UNDERSTANDING
 Groundsensing + Data analytics at Jurong
 (e.g. Visualization from Strava app heatmap on walking in Jurong)

Co-SOLUTIONING
 Wayfinding with Jurong Lake Gardens as a shortcut destination between transport nodes



EVOLVING
 Number of steps taken in Jurong Lake Gardens has increased

Summary

Fleshing out Framework

Understanding

Solutioning

Evolving

Baseline assessment

Co-created Action Plan

Short-term

Health Goals & Indicators

Health & behaviour prevalence

Participatory planning

Solution utilization rates

SOME CONSIDERATIONS MOVING FORWARD

Determinant Goals & Indicators*

Asset Mapping & Determinant Audit

Healthy Precinct Index:

How prescriptive and specific should the Index be?

1a) Healthy Precinct Index

Beh-Det relationship (data analysis + groundsensing)

Healthy Precinct Dashboard:

What is the frequency and granularity of the data collection?

1b) Healthy Precinct Index (Ver 2)

Needs assessment
Community engagement (Interviews, FGD etc.)

Evolving phase:

How does confounding factors of healthy behaviours impact the way we measure and evaluate implemented solutions?

Ground Observations

Co-created Solutions

strategies/guidelines

Medium-term

Behavioural Change

Long-term

Health improvement

6) Healthy Precinct Dashboard (inform government agencies on decision making)

Thank You



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