Centre for Ageing Research & Education

CAREExpert PROGRAMME

Wednesday, 27 Jan 2021
9am - 10.30am SGT
Webinar via Zoom

Impact of a Rapidly Ageing Population on Emergency Care in Singapore

SPEAKER

Professor Marcus Ong Eng Hock
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DukeNUS Medical School

Impact of a Rapidly Ageing Population on Emergency Care in Singapore

Professor Marcus Ong

Senior Consultant and Clinician Scientist

Dept of Emergency Medicine, Singapore General Hospital

Director Health Services and Systems Research (HSSR)

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Director, Health Services Research Center (HSRC), Singhealth Services

Director, Health Services Research Institute

Medical Director, Unit for Prehospital Emergency Care (UPEC)

Senior Consultant, Ministry of Health, Hospital Services Division

Director, Prehospital and Emergency Research Center (PERC)

Duke NUS Medical School

care
education
research

Clinician Practicing at SGH Department of Emergency Medicine

Scientist running a research program in Prehospital and Emergency Care

Director of Health Services Research program at Duke-NUS and Singhealth


StarHub 4G 7:18 AM 96%

HOME

PREMIUM

SGH doctor on mission to boost CPR training

Associate Professor Marcus Ong, 48, has pushed for more people to be trained in cardiopulmonary resuscitation, including spearheading training sessions in schools, offices, community clubs and religious organisations through the Dispatcher Assisted first Responder programme. ST PHOTO: KEVIN LIM

PUBLISHED APR 05, 2018, 5:00 AM SGT

Providing immediate help can raise cardiac-arrest sur

Started Data Science research unit at Singhealth

National EMS Medical Director,
Unit for Prehospital Emergency Care (UPEC)

Chairman of Pan Asian Resuscitation Outcomes Study and Past President of Asian Association for EMS

UNIT FOR PRE-HOSPITAL EMERGENCY CARE
UPEC
SINGAPORE

Singapore: Then and Now

Saturday Dec 19, 2020 THE STRAITS TIMES

TheStraitsTimes

Asian economies lead ranking of most efficient healthcare systems

HONG KONG • As a pandemic ravaged the world, Asian economies led by Singapore, Hong Kong and Taiwan topped a ranking of most efficient healthcare systems.

The Bloomberg Health-Efficiency Index, first conducted in 2013, tracks life expectancy and medical spending to determine which healthcare systems have the best outcomes.

This year's results include the impact of Covid-19 on mortality and gross domestic product (GDP) in 57 of the world's largest economies.

These measures helped many Asian territories improve their standing on the list since their generally aggressive coronavirus responses kept cases and deaths relatively low.

Brazil and Russia joined the United States in the bottom tier, reflecting relatively low life expectancies along with high Covid-19 mortality and weaker economic outlooks.

"Efficient health systems are often in places that have limited natural resources and therefore prioritise policies that rely on people potential," said Professor Pisonthi Chongtrakul in the Faculty of Medicine at Chulalongkorn University in Bangkok.

"Success in combating Covid-19 has come in places that coordinated among government bodies and were willing to let health experts call the shots, which helped create a clarity of public messaging," he said.

To measure efficiency during the pandemic, two adjustments were made to the original ranking formula: The 2020 table includes the one-year change in GDP based on an October forecast by the International Monetary Fund, as well as the Covid-19 toll on each economy.

For example, a 2020 GDP contraction of 6 per cent led to a six point subtraction from the total score, while a death toll or new confirmed cases of 100,000 deducted 11.5 points.

The US ranks among the bottom 10 per cent under this method as well as the formula used before Covid-19, which simply measured spending against life expectancy. America's low scores reflect a middling average lifespan, the world's biggest outlays on medical care, along with the largest Covid-19 caseload.

Using the formula adjusted for the pandemic, eight of the world's 10 most efficient health systems are in Asia-Pacific.

Singapore and Hong Kong top the list, while Taiwan, New Zealand, South Korea and Thailand leapfrogged many territories based on their Covid-19 statistics.

"The pandemic has underscored the fact that economic health is dependent on public health, which is in turn dependent on adequate public spending on health," said Dr Poonam Khetrapal Singh, the World Health Organisation's South-east Asia director, in a report last Saturday.

"In ordinary times, every dollar invested in health yields an average return of between US$2 and US$4, which can be up to 20 times higher in low- and middle-income countries," Dr Singh said.

India does not meet the minimum metrics, though it is among the nations hardest hit by the pandemic. BLOOMBERG

Most efficient healthcare

Ranking tracks life expectancy and medical spending in 57 economies, with this year's index including Covid-19's impact on mortality and GDP.

Rank	Economy	Score	*Change	Healthcare cost (% of GDP)	Life expectancy	Covid-19 mortality
1	Singapore	67.79	+1 ▲	4.4%	83.15	4.96
2	Hong Kong	64.89	-1 ▼	6.2%	84.93	14.94
3	Taiwan	51.69	+12 ▲	6.6%	80.69	0.29
4	South Korea	50.79	+2 ▲	7.6%	82.63	10.63
5	Israel	46.44	-2 ▼	7.4%	82.8	335.72
6	Ireland	45.22	+1 ▲	7.2%	82.26	425.07
7	Australia	42.77	+3 ▲	9.2%	82.75	35.61
8	New Zealand	41.74	+10 ▲	9.2%	81.86	5.18
9	Thailand	41.4	+5 ▲	3.7%	76.93	0.86
10	Japan	40.21	-2 ▼	10.9%	84.21	18.3
11	Norway	38.79	+6 ▲	10.4%	82.76	65.3
12	China	38.02	+13 ▲	5.2%	76.7	3.22
55	United States	-4.89	–	17.1%	78.54	835.35

*Rank change refers to the difference in the output using original methodology versus including this year's special adjustments for Covid-19.

Source: BLOOMBERG (WITH INFORMATION FROM WORLD HEALTH ORGANISATION, JOHNS HOPKINS UNIVERSITY, WORLD BANK, UN POPULATION DIVISION, INTERNATIONAL MONETARY FUND, HONG KONG DEPARTMENT OF HEALTH, TAIWAN MINISTRIES OF THE INTERIOR, HEALTH AND WELFARE)
STRAITS TIMES GRAPHICS

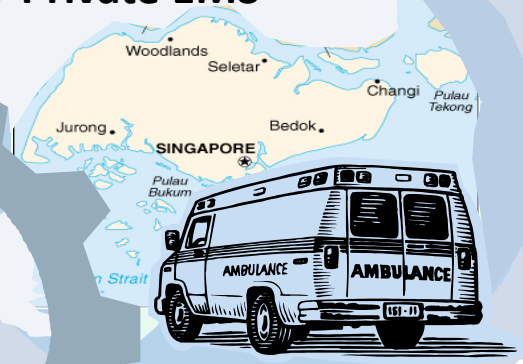
CURRENT PEC SYSTEM

EDs at Public Hospitals

- Varied degrees of capabilities of handling specific conditions of trauma, AMI, Stroke
- Manned by trained specialist

Ambulance

- Operates at Intermmediate life support
- Usually bring patients to the nearest hospital
- Emergency ambulance run by SCDF, the rest are private
- Private EMS

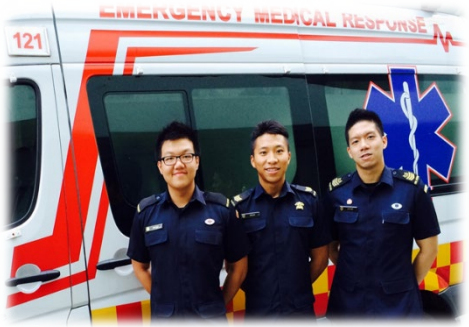


Community

- Primary care clinics and Polyclinics operating at certain times
- CPR training provided mostly by private organisations

Singapore Emergency Medical Services

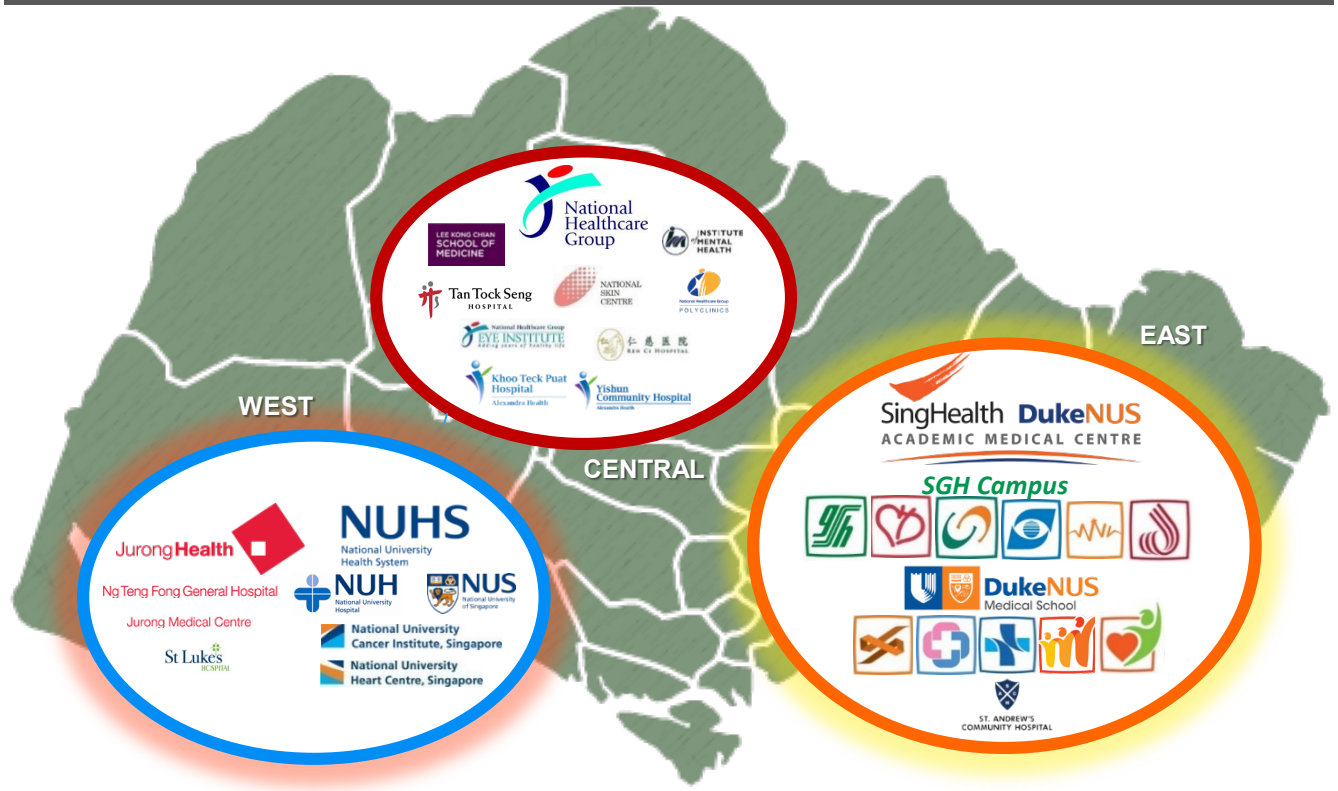
- **Area 719 km²**
- **Urban / Suburban**
- **Population 5.47 mil**
- **Multi-racial/cultural/religion**
- **Currently *60* Emergency Ambulances**
- ***191,468 EMS calls in 2019***
- **Total about *300* Active Paramedics**



UNIT FOR PRE-HOSPITAL EMERGENCY CARE
UPEC
SINGAPORE

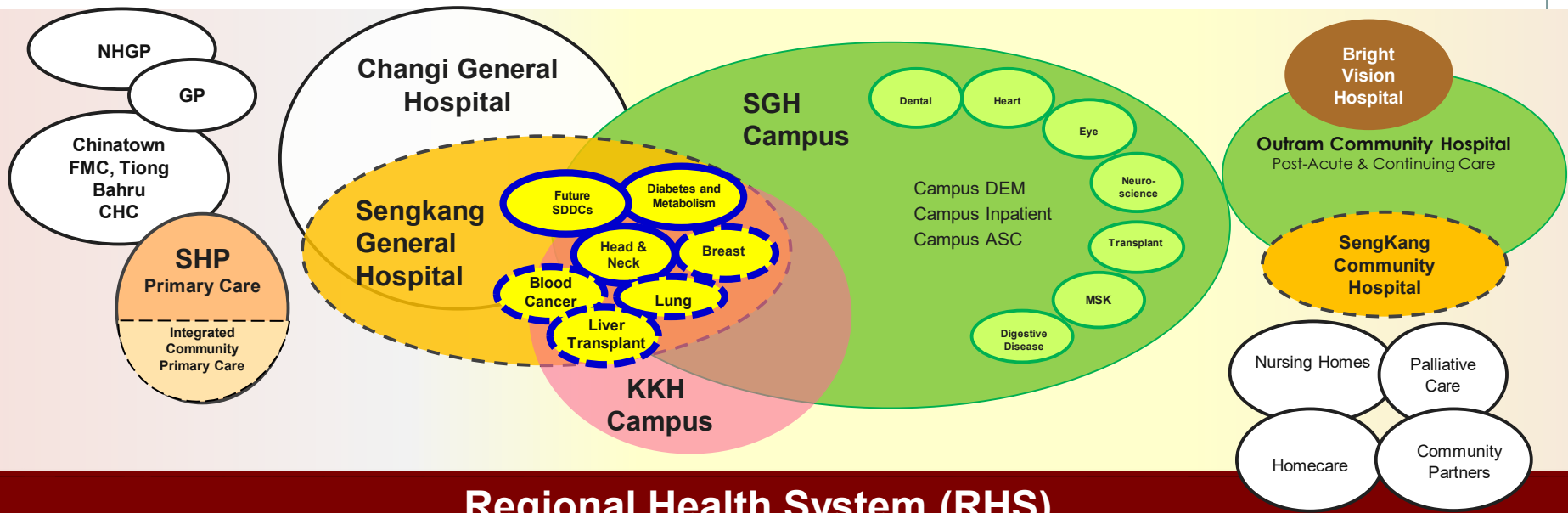
Public Healthcare Delivery Network

3 Regional Health Systems including 2 Tertiary Centres of Excellence



Patients Across the Care Continuum

Community / Primary | Acute / Secondary | Tertiary / Quaternary | Intermediate / Long Term



Regional Health System (RHS)

** Collaboration with Pearl's Hill Care Home*

Undergirding Enablers

Case Management | Operations | HR | Finance | IT | Education and Research Infrastructure

Singapore Healthcare Landscape

Key Challenges

1. Rapid Ageing of the Population
2. Increasing Burden of Chronic Diseases
3. Rising Cost of Healthcare
4. Limited Health Workforce and Competing Demands
5. Challenges from COVID-19

Stresses on Our Resources

People

Space

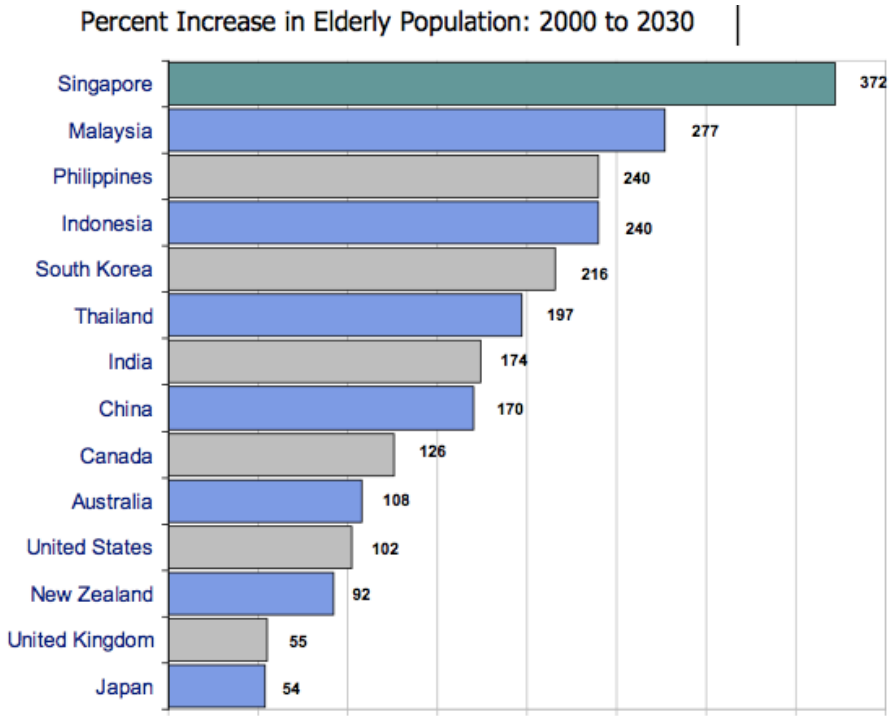
Money

Singapore: Overall Trends

	2000	2011	2020	2030
Population	4.0	5.3	6.0	6.9
Old Age Support Ratio	8.4	6.3	3.6	2.1
Ambulance Calls	66,958	131,806	196,550	325,268
Calls/100,000	1,521	2,487	3276	4714
A&E cases	537,342	934,485		
Cases/100,000	13,433	17,631		
Polyclinic	2,728,377	4,314,496	5,543,397	6,919,717
Cases/100,000	68,209	81,405	92,340	100,286

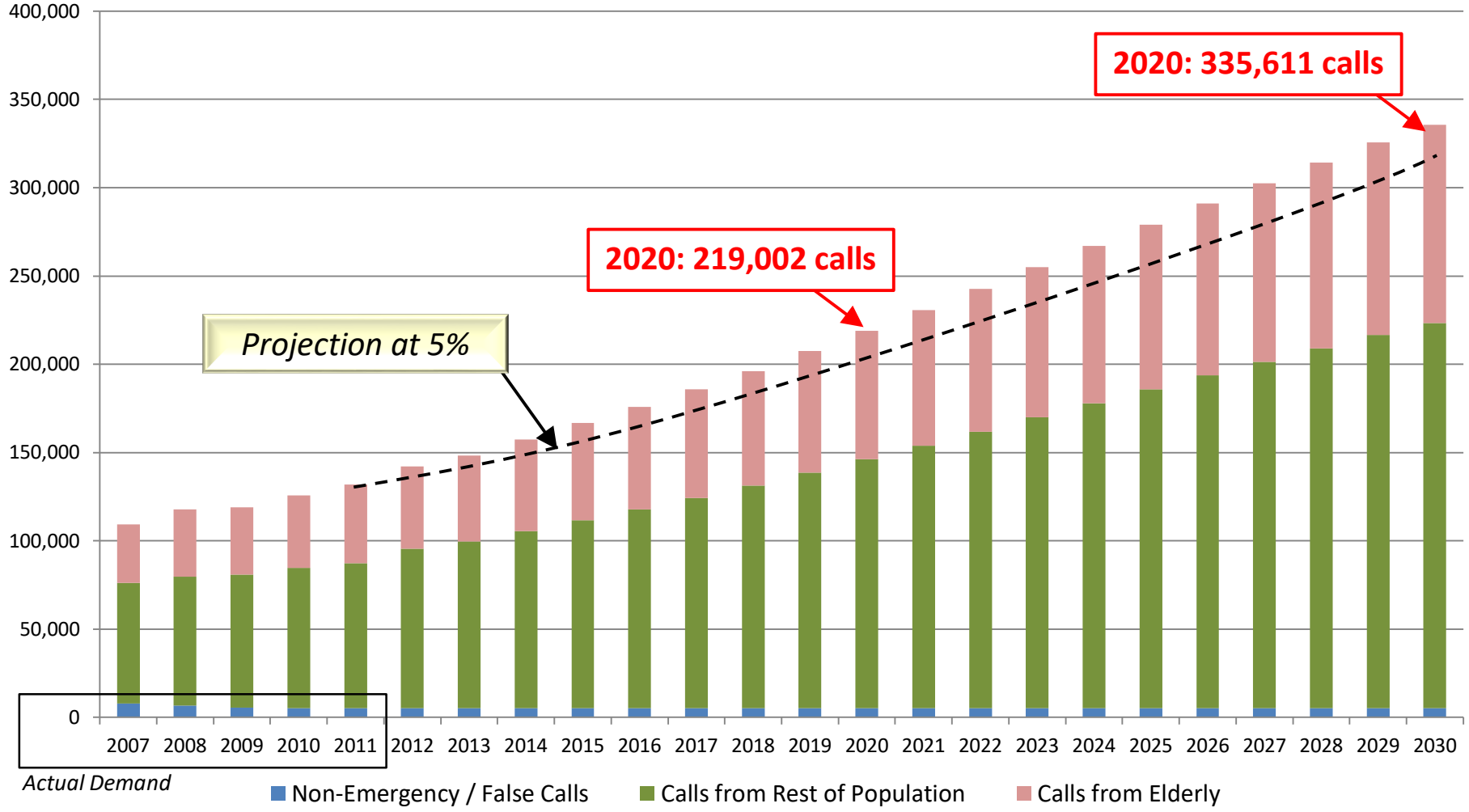
More elderly, more illnesses, poor coping

- Study of 2808 seniors (Ng Tze Pin NUS)
- 9 in 10 had 1 illness and 43% had 3 or more illnesses
- Elderly in Singapore experience increasing functional disability in contrast to the West
- Elderly projected to increase by **372%** by **2030**

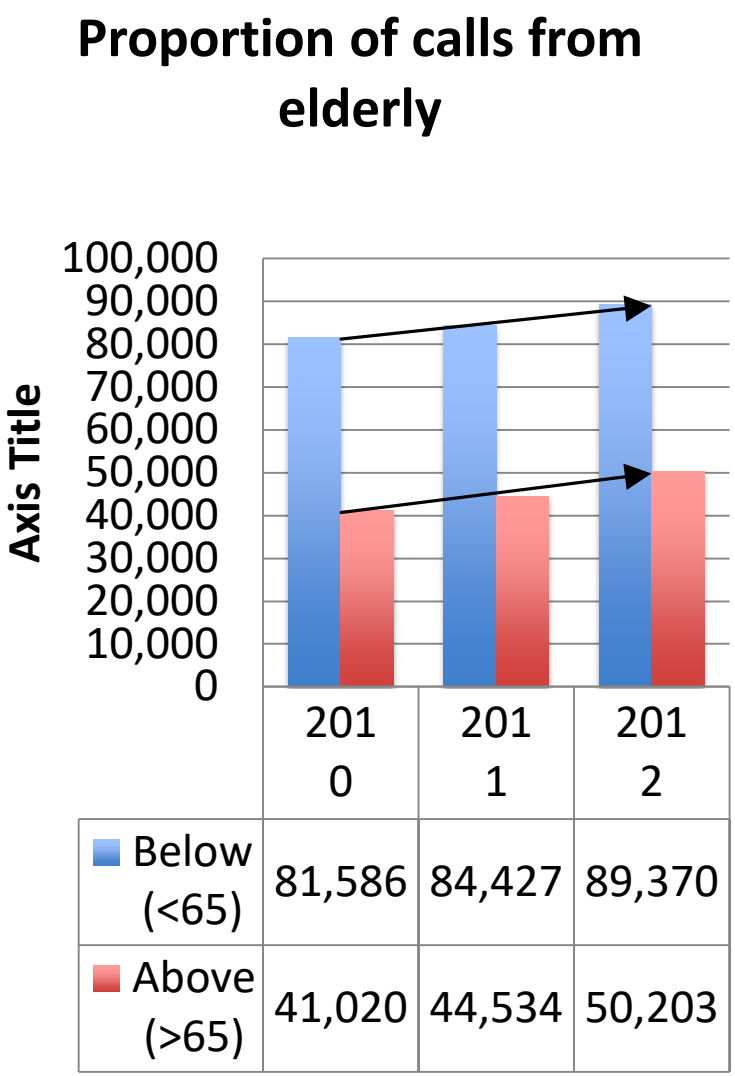


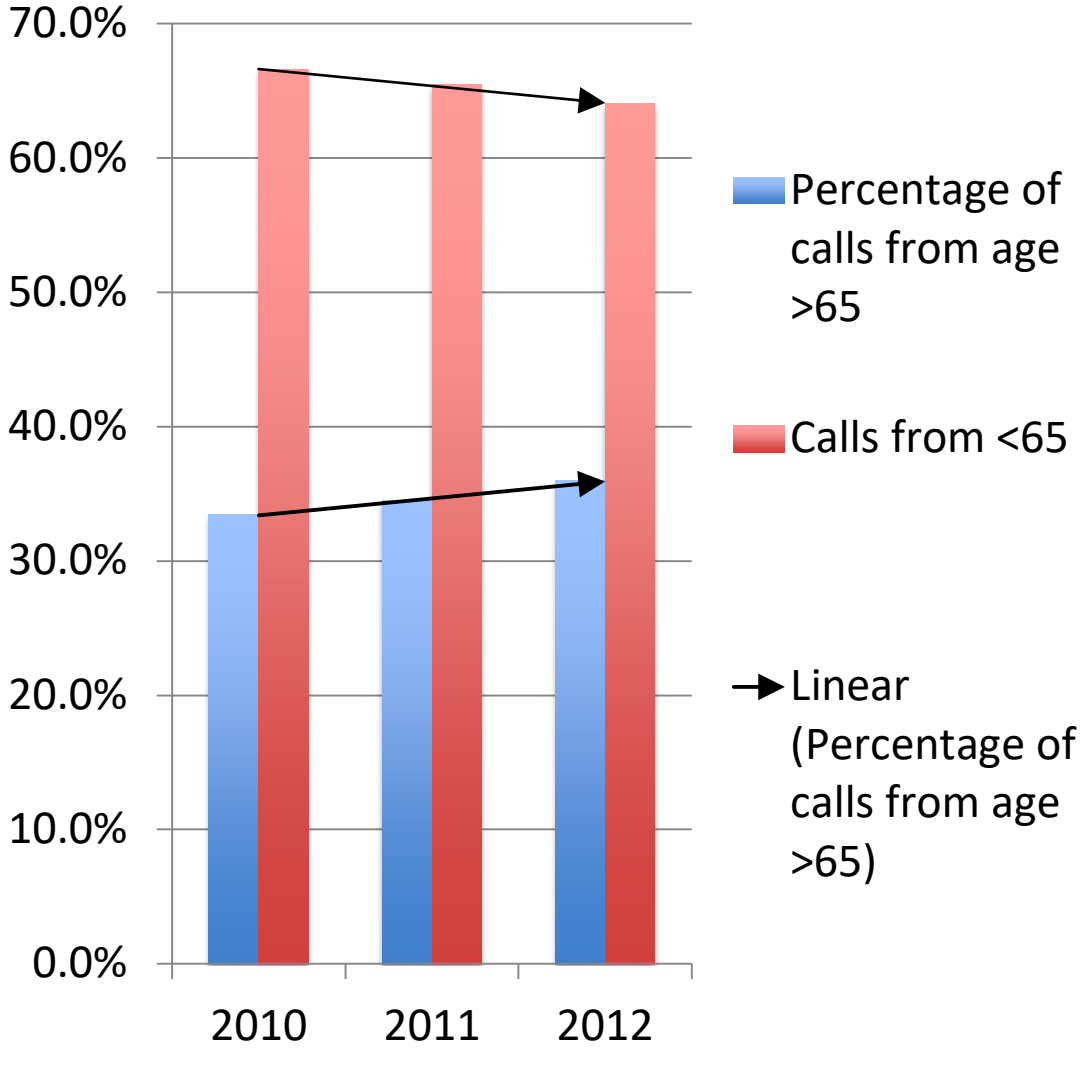
http://medicine.nus.edu.sg/pcm/Chronic%20Disease%20Functional%20Status%20and%20QOL%20Elderly%20%20in%20Singapore.pdf

Projected EMS Demand

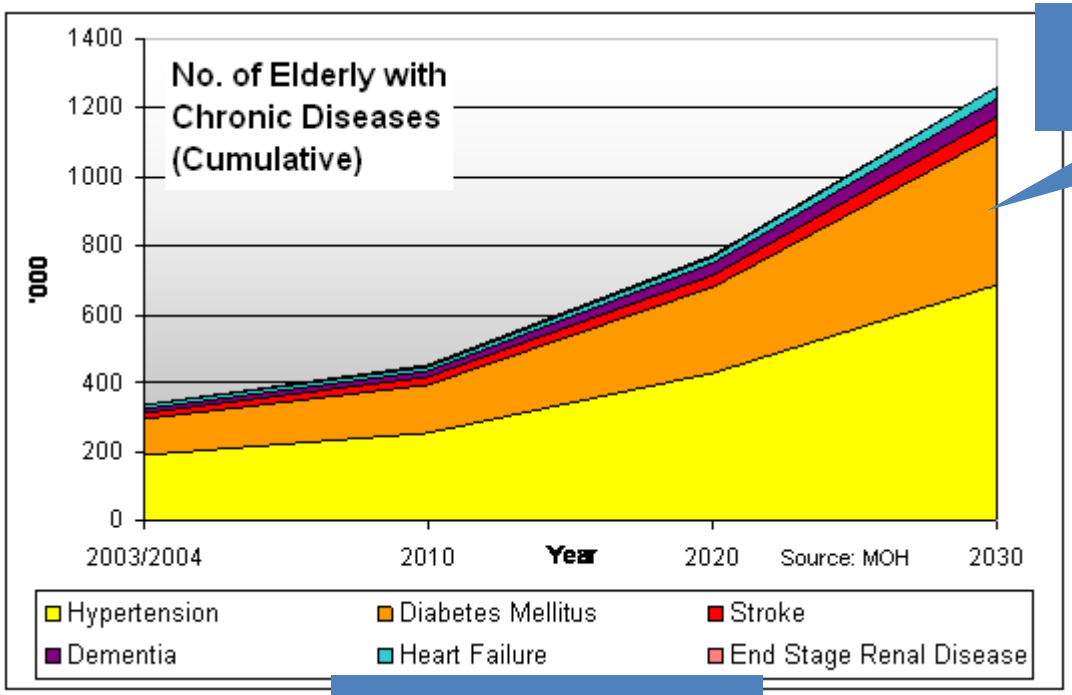


Calls from Elderly

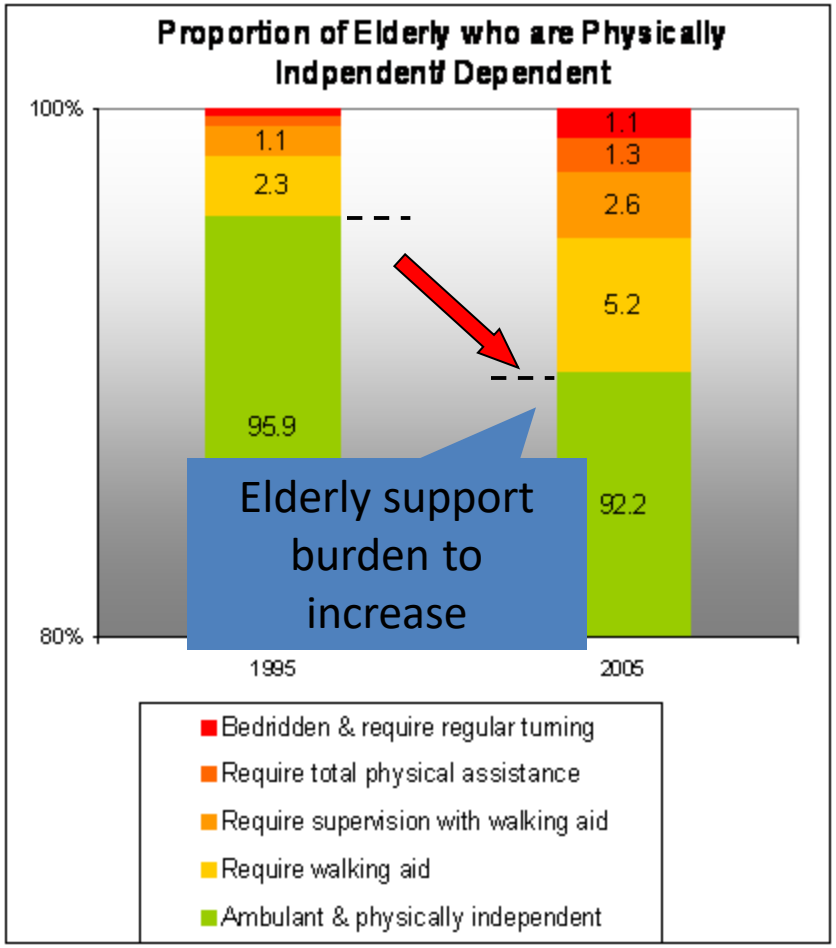




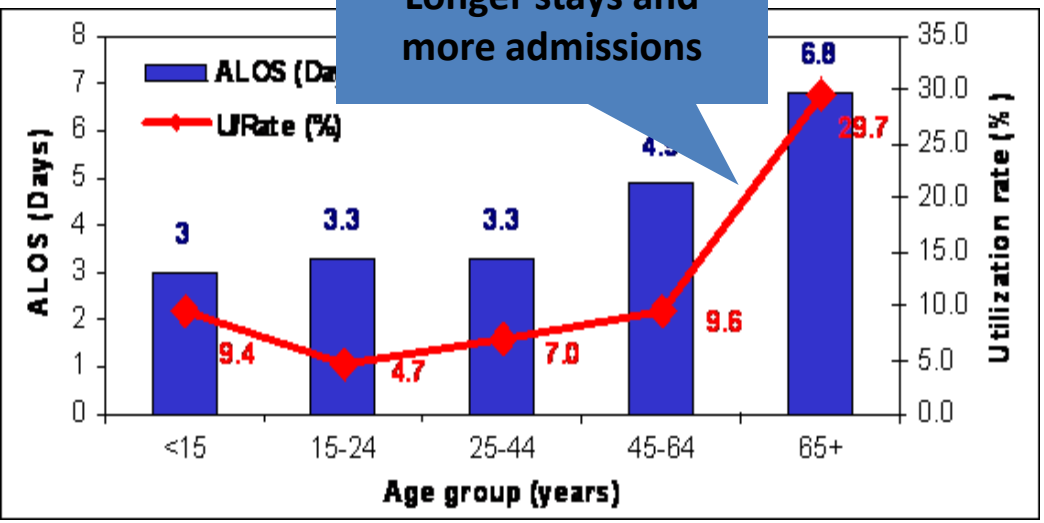
Longer stays and more admissions



Chronic disease burden increasing



Elderly support burden to increase



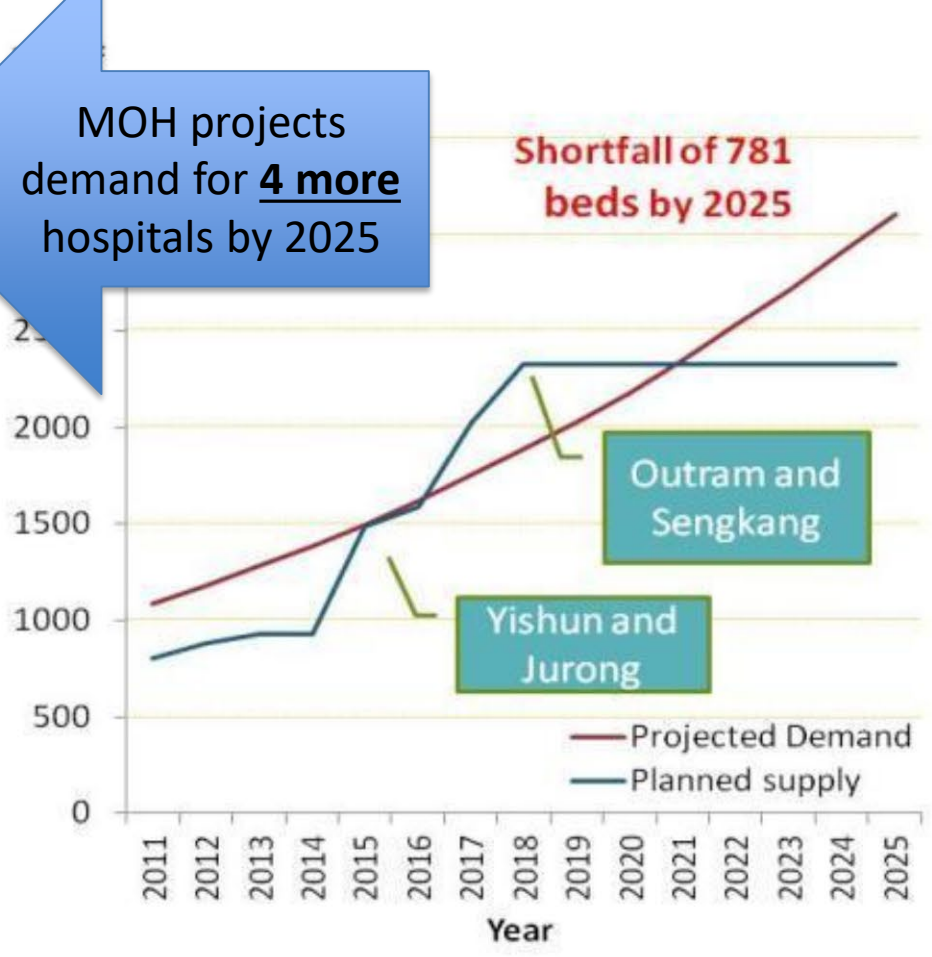
Longer stays and more admissions

In the medium and long term, we will need to build more acute and community beds

Projected Public Acute Bed Demand (overall)

MOH projects demand for **4 more** hospitals by 2025

Projected CH Bed Demand (overall)



Notes:: 1. Based on NPTD population projections (up to 2025)
2. Assumes 80% Bed Occupancy Rates

Ambulance Ratios

- Pegging ambulance ratios to population growth
  - US 5 per 100,000
  - HK 4.2 per 100,000
  - Taipei 2.9 per 100,000
  - Japan 2 per 100,000
  - Singapore 0.8 per 100,000
- Proposal to peg to 2 ambulances/100,000
  - **60 ambulances 2020**
  - **138 ambulances by 2030**
- Improves EAS ability to plan for growth of services
- Ratio can be adjusted according to ability to meet KPIs

Frame of Survival

for improving OHCA outcomes in developing EMS systems

Political commitment — Healtcare expenditure — Legislative environment — Basic state of preventive health — Traffic congestion solutions

Culture of excellence — Relationship w/ government, police, fire, hospitals — Quality improvement — Emergency care network

Strong EMS leadership

Cost-efficient smart technologies

Good Samaritan laws

EMS specialty development

Field to facility communication

Motivation of staff

Ambulance/ population ratio

Research projects

Chain of Survival

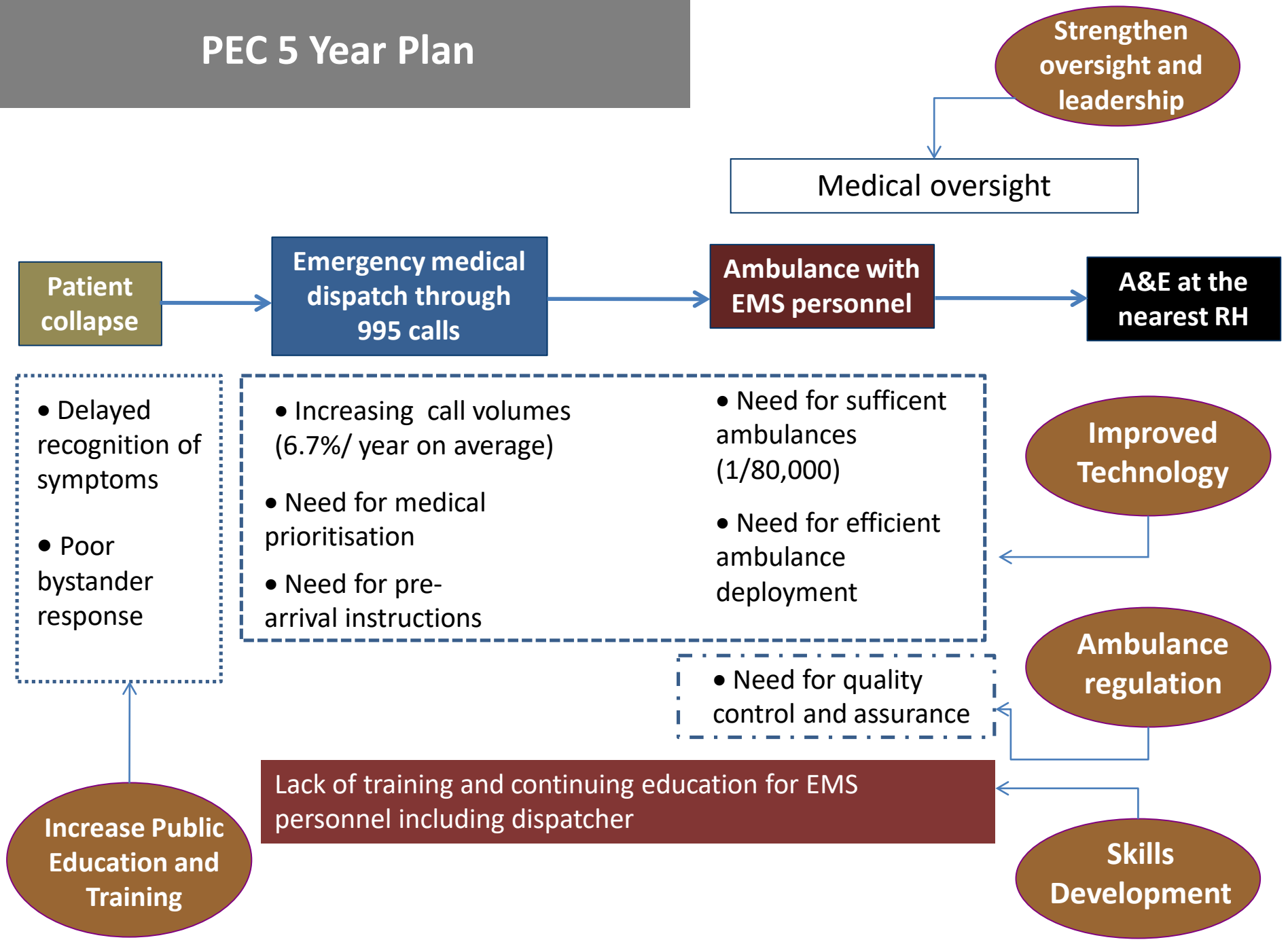
Health seeking behavior
Appropriate use of EMS

Willing and competent
Pool of bystanders CPR/AED

Practice of giving way to ambulance

Cultural views of death and resuscitation — Cultural willingness to help strangers — Research environment — Road conditions — Reliable telecommunications

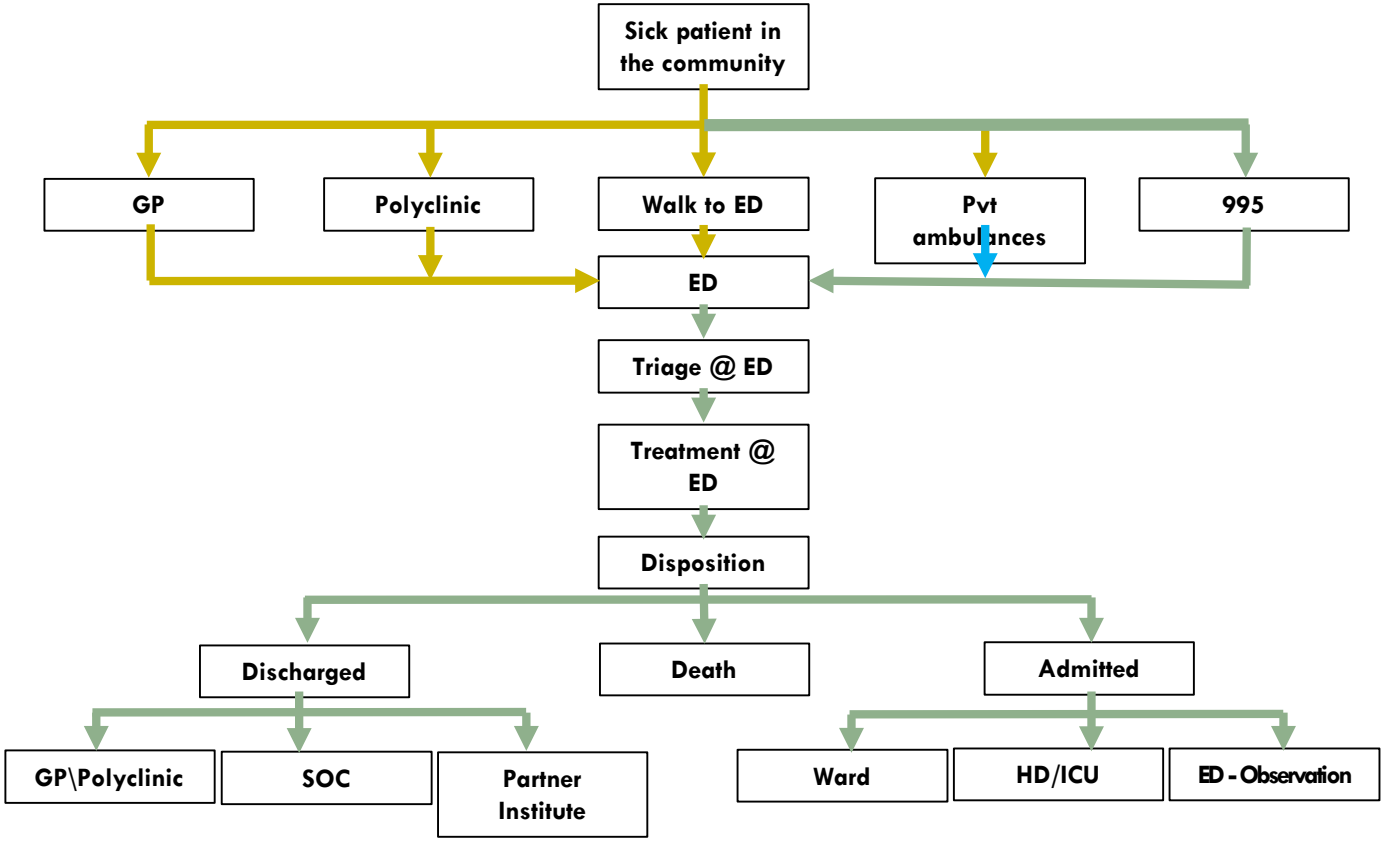
PEC 5 Year Plan



EMS system now

- Current model is linear
  - Nearly all 995 get conveyed to hospital
  - A proportion of calls could be better managed in the community
  - Inefficient
    - Use of resources (eg: stable chronic, mild COVID19 pt)
  - Overcrowding
    - Suboptimal care
    - Low satisfaction

Current Linear Pathway



Remodelling EMS

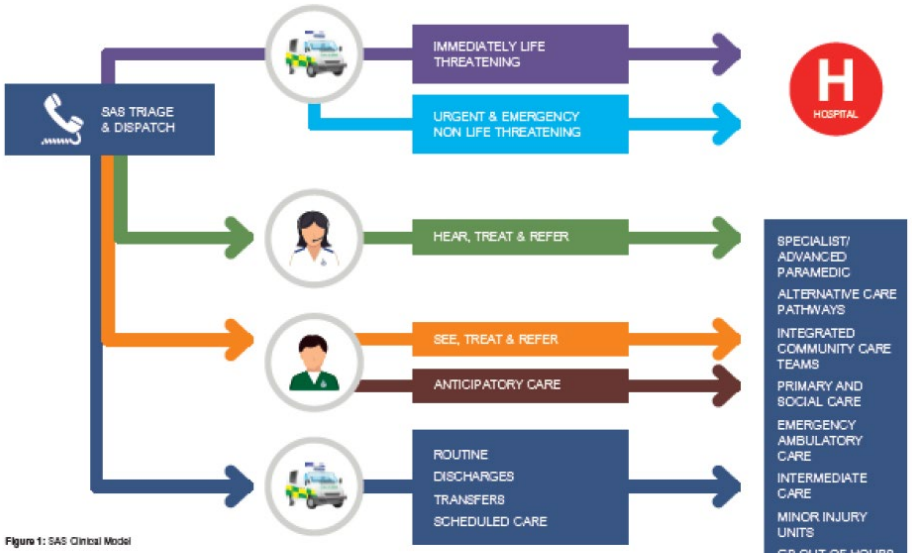
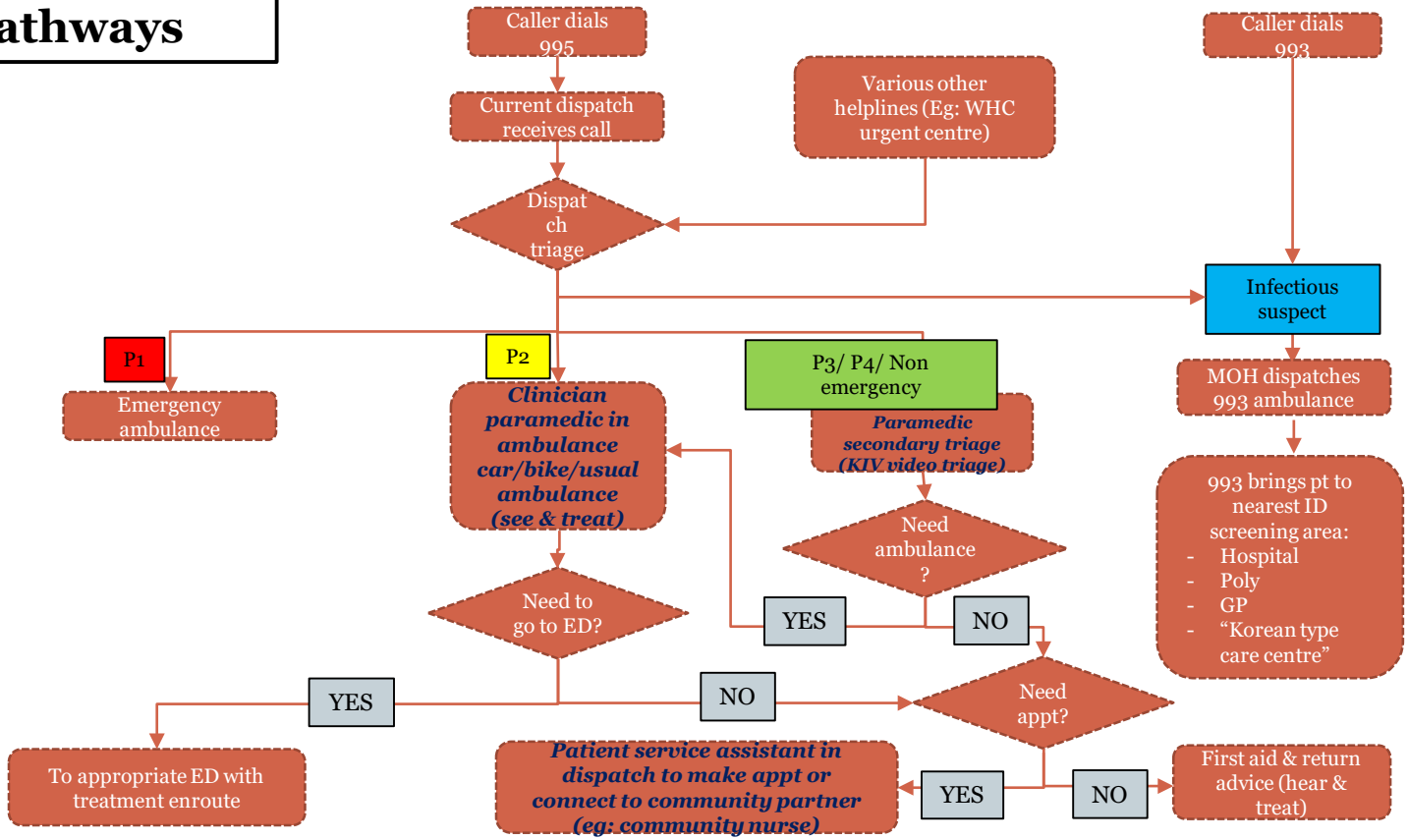
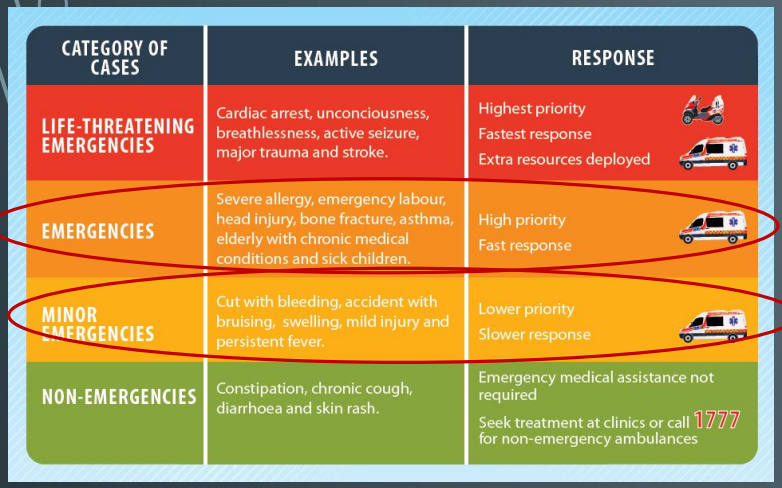


Figure 1: SAS Clinical Model

Figure 1 illustrates the key components of the new clinical and offers some examples within each of the identified patient flow groups.

Alternate Care Pathways





CATEGORY OF CASES	EXAMPLES	RESPONSE
LIFE-THREATENING EMERGENCIES	Cardiac arrest, unconciousness, breathlessness, active seizure, major trauma and stroke.	Highest priority Fastest response Extra resources deployed
EMERGENCIES	Severe allergy, emergency labour, head injury, bone fracture, asthma, elderly with chronic medical conditions and sick children.	High priority Fast response
MINOR EMERGENCIES	Cut with bleeding, accident with bruising, swelling, mild injury and persistent fever.	Lower priority Slower response
NON-EMERGENCIES	Constipation, chronic cough, diarrhoea and skin rash.	Emergency medical assistance not required Seek treatment at clinics or call 1777 for non-emergency ambulances

Target Populations

- Population with chronic medical conditions including the elderly
- Population with minor injuries/ailments
- Population with psychological and social issues

Resources

Primary Care

Polyclinics SingHealth

National Healthcare Group POLYCLINICS

National University Polyclinics

+ GPs

Intermediate Care

SingHealth Community Hospitals
Bright Vision • Outram • Sengkang

Yishun Community Hospital
National Healthcare Group

Jurong Community Hospital

Other resources

aic agency for integrated care

home-based care, centre-based care, befriending services for seniors

NCSS National Council of Social Service

Social service agencies – mental health/social issues, community nurses, person-centred primary healthcare practice

INSTITUTE of MENTAL HEALTH
National Healthcare Group

Acute/severe mental health

RESTRICTED

MOH STANDARDS FOR EMERGENCY AMBULANCE SERVICE (2014)

These standards are for the reference of agencies operating or intending to operate an emergency ambulance service.

The standards spell out the minimum requirements which the agency must comply with when operating an emergency ambulance service.

Contents:

PARAMEDIC TRAINING & EDUCATION

The Singapore Armed Forces (SAF) works closely with the Singapore Civil Defence Force (SCDF) and the Ministry of Health (MOH) to equip both SAF and SCDF medical personnel with professional skills and knowledge relevant for peacetime training and operations. The National Paramedic Training and Education Roadmap, leverages the four thrusts of SkillsFuture[1] initiative and provides career paramedics with many pathways to success, regardless of their educational background.

Who are Paramedics?

- Allied Health Professionals
- First responders to the injured and sick
- Operate with a crew comprising a medic and a transporter, and in pre-hospital setting, often with limited resources

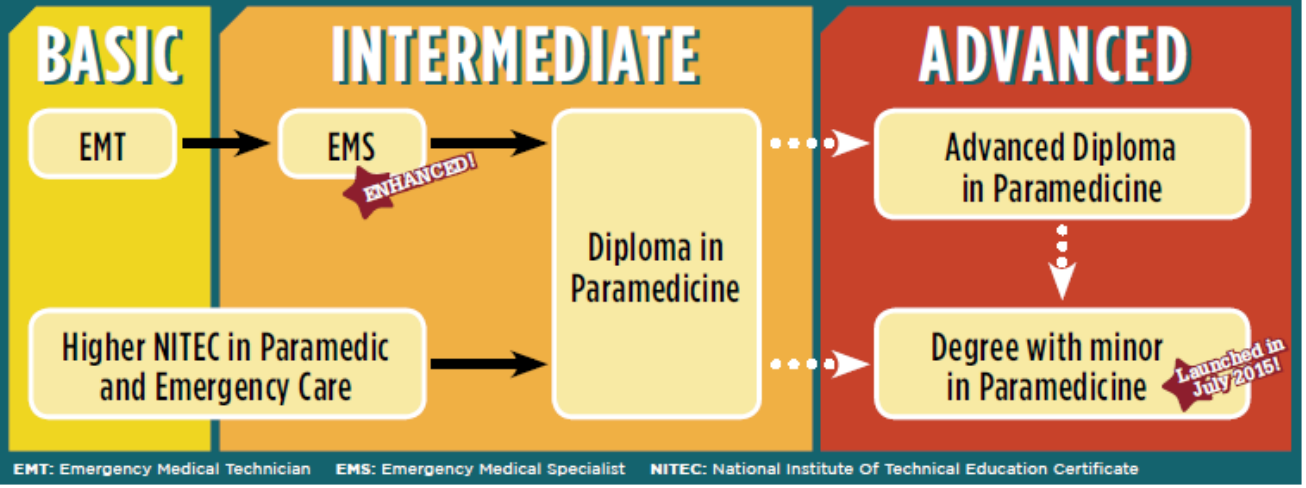
Paramedic Professional Standards Committee

Industry stakeholders	SAF and SCDF
Regulatory bodies	Unit for Prehospital Emergency Care (UPEC), Ministry of Education (MOE) and Workforce Developmental Agency (WDA)
Training educational providers	Institute of Technical Education (ITE), Nanyang Polytechnic (NYP) and SIM University

Looks at defining training competencies for Prehospital Emergency Care providers

THE NATIONAL PARAMEDIC TRAINING AND EDUCATION ROADMAP

The multi-agency Paramedic Professional Standards Committee, together with various paramedic training stakeholders, established this roadmap that allows paramedics to make well-informed choices about opportunities for career development.



EMT: Emergency Medical Technician **EMS:** Emergency Medical Specialist **NITEC:** National Institute Of Technical Education Certificate

Milestones of Paramedic training in Singapore

1996
The Defence and Home Affairs Ministries collaborated with the Justice Institute of British Columbia (JIBC) to launch the Paramedic Training Programme in Singapore. SAF became the national institution responsible for all Paramedic training

1996
SAF and SCDF sent 7 officers and combat medics to JIBC for training

1998
The first local Paramedic Matriculation course was conducted at the School of Military Medicine (SAF) to a group of SAF and SCDF medics

1998-2009
SAF and SCDF continued to send operational paramedics to JIBC for enhanced training

2008
ITE starts the Higher NITEC in Paramedic and Emergency Care Programme

2009
SAF Paramedic course gains JIBC accreditation for medic and paramedic training

2011
NYP starts the Advanced Diploma in Paramedicine course

2012
SAF and JIBC co-develop the Diploma in Health Sciences (Emergency Medical Services) and Primary Care Paramedic Programme

[1] *The four key thrusts of SkillsFuture are: (i) help individuals make well-informed choices in education, training and careers, (ii) develop an integrated high-quality system of education and training that responds to constantly evolving needs, (iii) promote employer recognition and career development based on skills and mastery and (iv) foster a culture that supports and celebrates lifelong learning.*

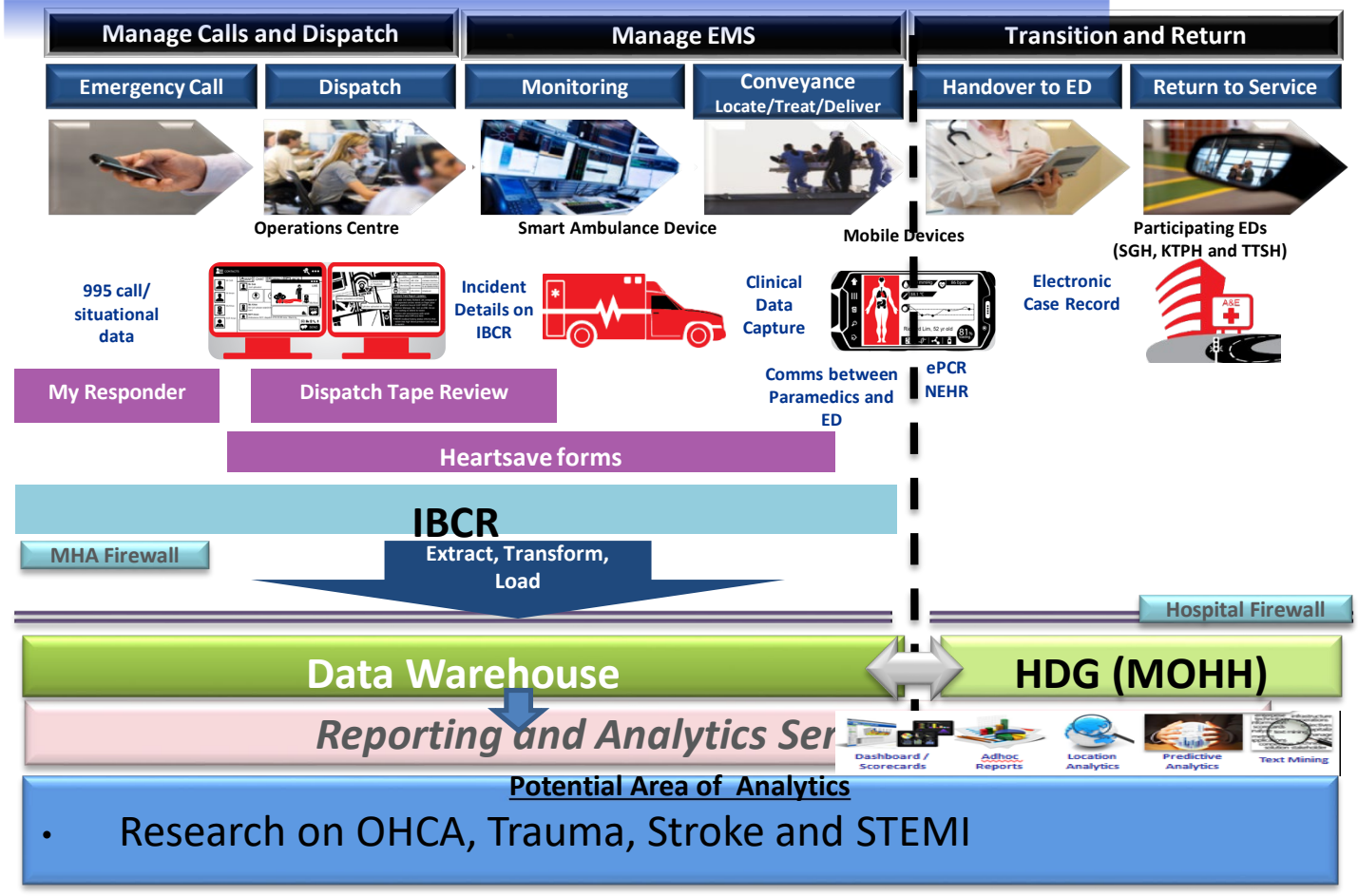
National Minimum Standards (Competencies)

	Competency levels	Level 2	Level 3	Level 4
28.	Perform suction of oral cavity	√	√	√
29.	Place patients into the recovery position	√	√	√
30.	Perform airway obstruction removal techniques, e.g. Heimlich	√	√	√
31.	Insert oropharyngeal airway	√	√	√
32.	Administer oxygen therapy via Non-rebreather mask (NRM)	√	√	√
33.	**Perform manual/assisted ventilation via bag valve mask (BVM) or resuscitators**	√	√	√
34.	Administer oxygen therapy via intranasal cannula		√	√
35.	Insert supraglottic airway device		√	√
36.	Manage airway of paediatric patients		√	√
37.	Perform Endotracheal (ETT) Intubation			√
38.	Perform needle thoracostomy			√
39.	Perform tracheobronchial suctioning of already intubated patient			√
40.	Administer oxygen therapy via Venturi Mask			√
				√
C.	**Manage Circulation**			
42.	Apply automated external defibrillator on adult	√	√	√
43.	Preform CPR compressions for adult, child & infant	√	√	√
44.	Perform peripheral intravenous cannulation		√	√
45.	Perform Intraosseous infusion (IO).		√	√
46.	Apply automated external defibrillator on child		√	√
47.	Apply mechanical assisted CPR device			√
48.	Perform manual cardioversion			√
49.	Perform transcutaneous pacing			√

Competency Categories
(6 pages)

- Patient Assessment
- Manage Airway
- Manage Breathing
- Manage Circulation
- Manage Injuries
- Administer Meds
- Special Situations
- General

PEC IT Blueprint and Analytics



Technology and Dispatch

Culture of Excellence

http://www.resuscitationacademy.org/tool/welcome/dashb

Marcus Ong Eng Hock (SHHQ ... | Resuscitation Academy Ass...

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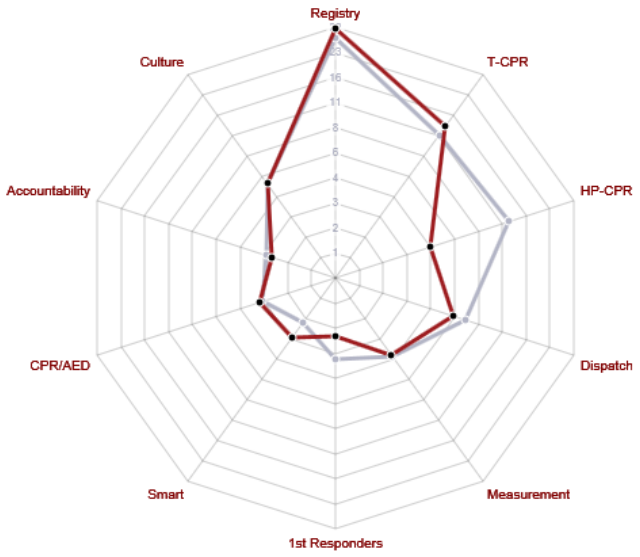
RESUSCITATION ACADEMY



	Average	Score	
Cardiac Arrest Registry	27.71	31.25	Retake
Telephone-CPR	11.48	13.25	Retake
High-performance CPR	12.39	4.00	Retake
Rapid Dispatch	6.65	5.50	Retake
Measurement of Resuscitation using Defibrillation Recording	3.84	3.75	Retake
AED Program for First Responders	3.10	2.25	Retake
Smart Technologies for Public CPR and AED	2.13	2.75	Retake
Mandatory CPR and/or AED training	2.88	3.00	Retake
Accountability	2.72	2.50	Retake
Culture of Excellence	5.00	5.00	Retake

For further program information supporting the Assessment Tool, please download Improving Survival from Out-of-Hospital Cardiac Arrest

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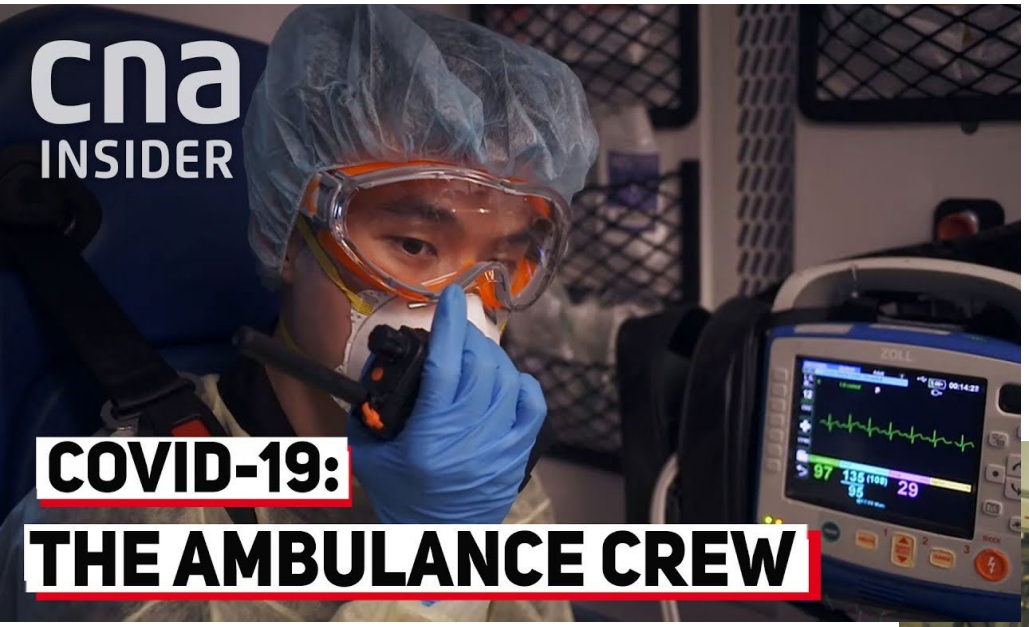
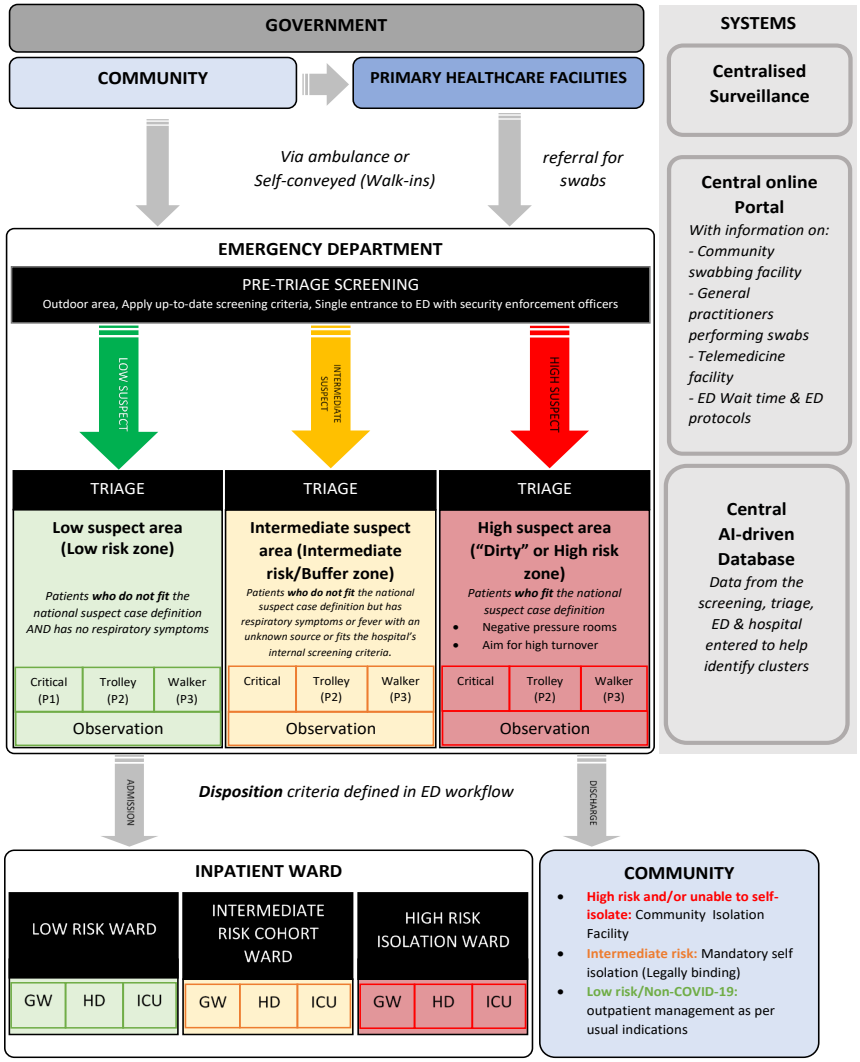


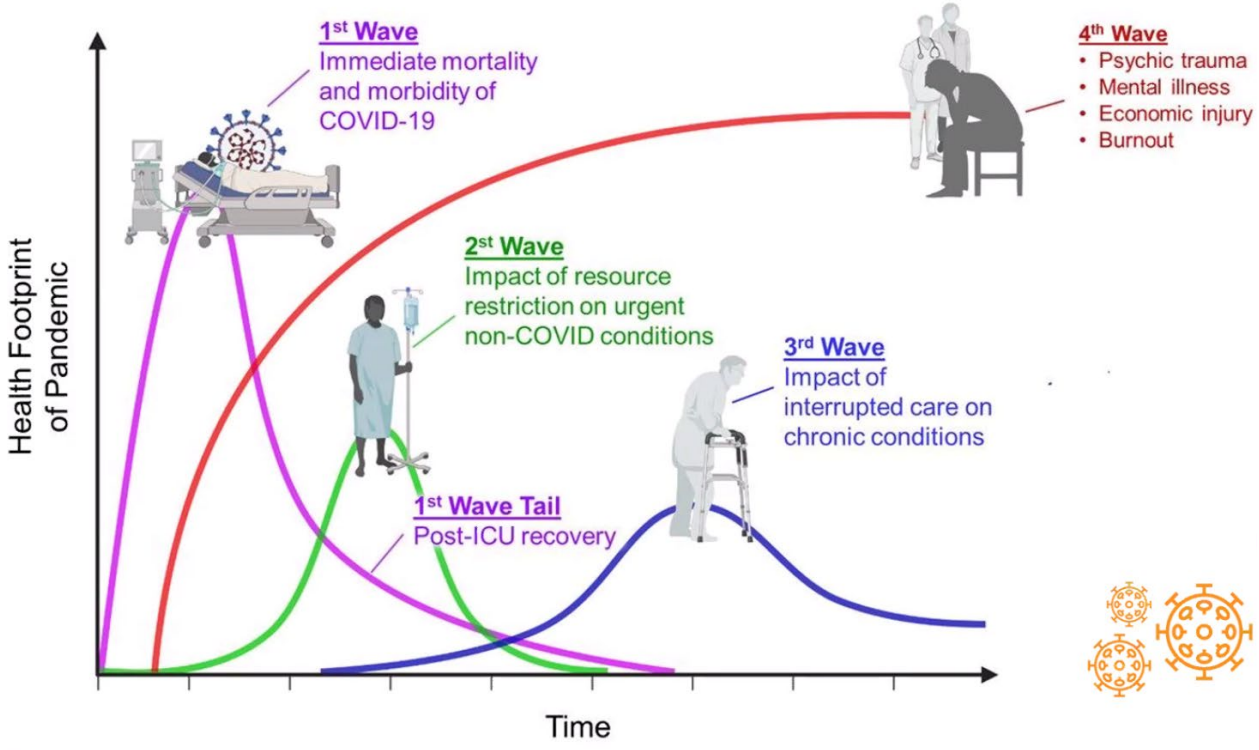
EMS and COVID-19

Redesign of SGH Emergency Department Workflow



SingHealth DukeNUS ACADEMIC MEDICAL CENTRE

Next impacts in the aftermath of COVID-19



Let’s save lives together!

TODAY • MONDAY 12 JUNE 2017

2 hotnews

Card allows users to see if the chest compressions they are giving are deep, fast enough

New device could help save more cardiac arrest victims

NEO CHAI CHIN

ONLY 17, BUT JC STUDENT HAS SAVED MANY LIVES