

# Care Redesign Concepts and Strategies for Community-Anchored Pre-hospital Care



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# To better understand the PEC landscape, MOHT embarked on a series of environmental scans

	Study 1: Local Primary Study	Study 2: Systematic Review
<b>Research Title</b>	Exploring Pre-Emergency Care Challenges and Innovations in Singapore: A Qualitative Environmental Scan	Interventions and Strategies to Improve Pre-emergency Care And Reduce Ed Overcrowding: A Qualitative Meta-synthesis
<b>Aim</b>	To explore the perceptions of stakeholders on the challenges and inefficiencies of PEC driving high ED attendance, and to identify strategies for optimizing resource allocation and patient care pathways.	Explore stakeholder perceptions of PEC (Pre-emergency Care) innovations to decongest ED inflows
<b>Methodology</b>	<p><b>22 one-on-one interviews</b> conducted via Zoom, analyzed via Braun and Clarke (2006) thematic analysis</p> <ul style="list-style-type: none"> <li>• MOH, UPEC, SCDF, and MHA administrators</li> <li>• ED HODs and consultants from different clusters</li> <li>• SCDF paramedics</li> </ul>	<b>22 articles</b> from 15,776 records, from 6 databases (CINAHL, Embase, PsycInfo, Pubmed, Scopus, Web of Science)
<b>Outcome</b>	Findings can highlight challenges, and identify relevant strategies and innovation for PEC redesign	<p><b>Majority from UK, Sweden, Canada</b>            UK = 6, Sweden = 4, Canada = 3, Australia = 2, Czech Republic = 1, Denmark = 1, India = 1, Iran = 1, Ireland = 1, Rwanda = 1, USA = 1</p> <p><b>Majority of those interviewed were paramedics, nurses, managers/policy makers</b></p> <p>Paramedics = 13, nurses = 11, managers/policymakers = 9, physicians = 8            call handlers= 3, IT reps = 1, patients = 3</p> <p><b>Most published in 2020s</b>, ranging from 2004-2023</p>

# Background: Factors leading to ED congestion

**Legend:**

● ● ● Perceived pain points

○ ○ ○ Perceived drivers

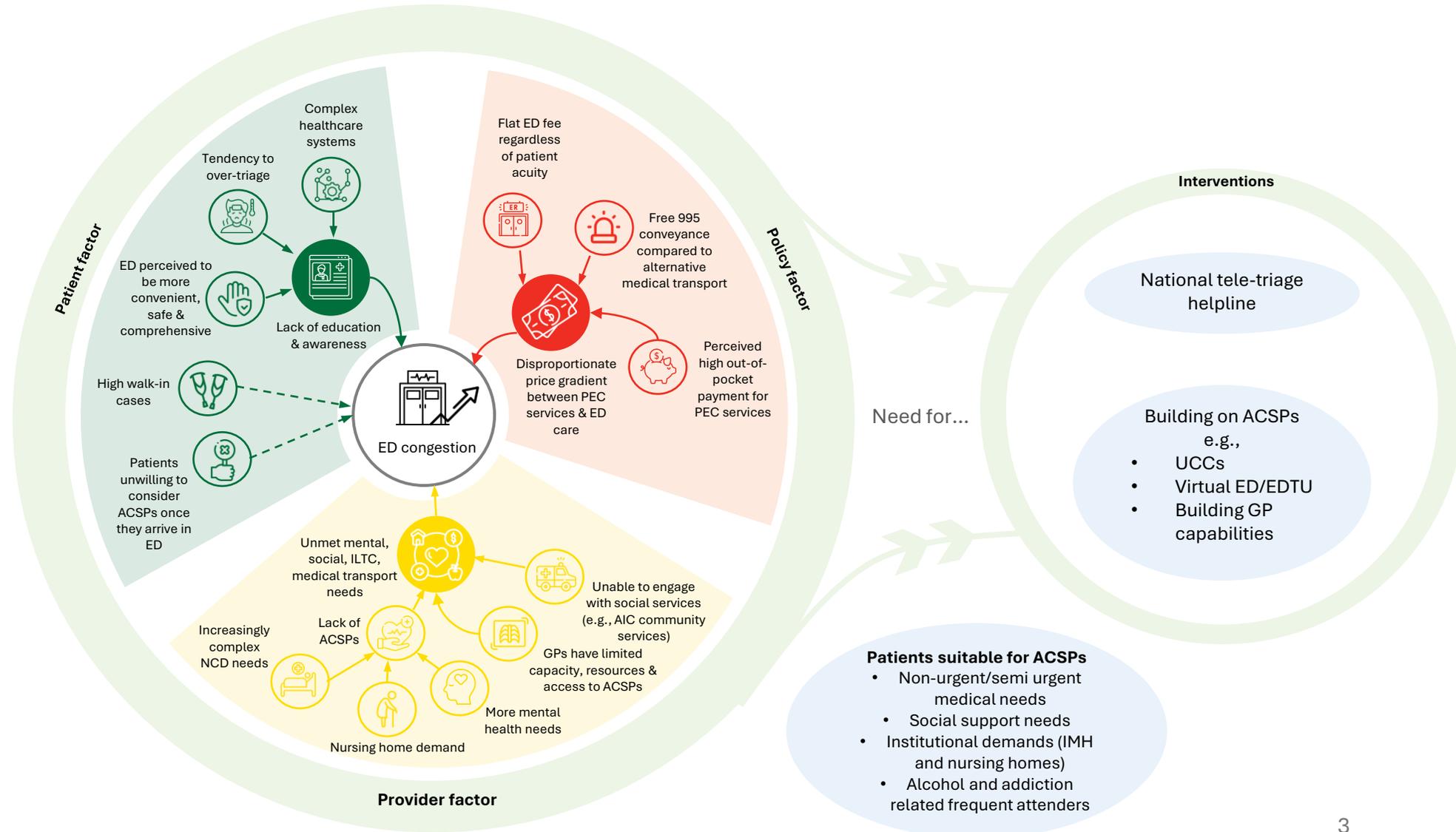
**Abbreviations:**

ACSP – Alternative Care Service Pathway  
 ILTC – Intermediate- & Long-Term Care  
 (encompassing palliative care, nursing home care, home personal care, rehabilitative care etc.)

NCD – Non-Communicable Diseases

AIC – Agency for Integrated Care

EMS – Emergency Medical Services



# Summary of perceived patient groups suitable for alternative care service pathways (ACSPs)

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## Common medical needs

- URTI such as cough, minor food poisoning ●
- Sprains, minor fractures, musculoskeletal pains ●
- Patients with comorbidities and acute or chronic conditions ●
- Palliative care patients



## Social support needs

- Social emergencies/issues related to loneliness, lack of familial support ●
- Patients requiring medical transport



## Institutional demand

- IMH
- Nursing homes



## Others

- Alcohol- and addiction-related issues ●

# Innovation opportunity #1: National tele-triage helpline

- Similarities with systematic review
- Differences with systematic review / not mentioned in primary study

*“if [helpline] cannot connect to the different GP or SOC appointment services...is a failure because we just become another helpline”*



**24/7, free for public, access to ACSPs**

**Schedule appointments to ACSPs**

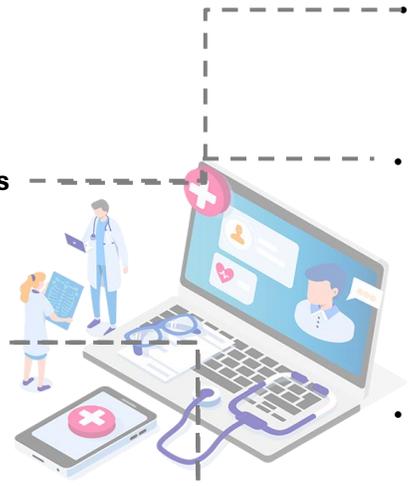
**No “wrong door” policy**  
Pt can access help regardless of initial contact point. Connects helpline with 995 to redirect them to appropriate services.

**Protocols to prevent abuse**  
Prevent use of helpline as a faster way to get referrals  
Monitoring & feedback system to track outcomes (Mohammadi et al., 2022)

**Direct patients who are unsure if their condition requires emergency care**  
Also useful for patients who are unknown to the healthcare clusters

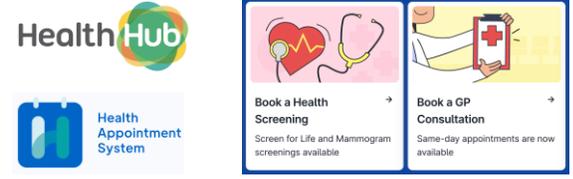
- Access to different ACSPs

*“availability for this alternative pathway...if they don't know...then we can arrange for something for them to get alternative care”*



## Enablers

- Booking of appointments using software / online platforms (e.g. Health Appointment System [HAS] and HealthHub)
- Lack of follow through on referrals could lead to a disinclination for users to use the service again (Brydges et al., 2015)
- Supported by alternative medical transport services



- Mapping out available cluster ACSPs and refining internal referral protocols
- Access to patient data through NEHR → more well-informed triaging and seamless transfer of patient care and information ●
- Establish governance framework of personal health information to enable data sharing
- Potential use of AI / chatbot / data analytics to support helpline call-takers by providing possible care options

# Innovation opportunity #2: Pathfinders to community services and resources

- Similarities with systematic review
- Differences with systematic review / not mentioned in primary study



**Cluster coordinators serving as pathfinders**

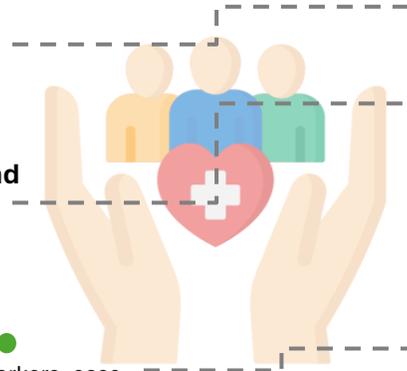


**Referrals to community and social support services**



**Multi-disciplinary approach ●**

Collaboration between AIC, social workers, case managers



## Enablers

- Mapping out available cluster ACSPs and refining internal referral protocols
- Able to receive referrals from national tele-triage helpline, with help from pathfinders to social services such as
  - Active Aging centers/Elderly daycares/active, social services to expand after-work hours, addiction and alcohol services, suicide services, financial services, befriender services, social worker
- Integrating case managers into helpline and virtual ED teams can address social issues
- Multilingual support for diverse patient populations

*"...[national tele-triaging helpline] need...a pathfinder of sorts. So if the patient has social issues, they need to be able to refer to social services...a befriender, or...they need some financial help.."*

*"If they can map out exactly what are all the services available. I would say that's a good start. So at least within your region...I can call and this person would know who to refer to in their cluster...then it's a lot easier to do it nationwide"*

## Stakeholders' perception

- A safety net assures patients that non-life-threatening conditions will be addressed later, offering peace of mind
- Reducing hospital admissions through community-based support

## Suitable patient profile

- Social and support needs, such as social emergencies, loneliness, without family support, needing medical transportation, frequent ED attendance (e.g., Alcohol dependencies)



# Innovation opportunity #3: Virtual ED

- Similarities with systematic review
- Differences with systematic review / not mentioned in primary study



### Utilise remote access tools

Simplify the process of virtual ED consultations for elderly users/ those who are unsure if they should seek ED care

A dedicated patient administrative assistant manages appointments and referrals, as well as help patients navigate technological difficulties (Shuldiner et al., 2022)



### Schedule physical ED appointments

Schedule further testing & assessments



### Access to hospital data of known patients

Can better manage known patients by linking them back to their regular care provider



### Schedule appointments to ACSPs

To social and medical services like tele-helpline could

"What can a virtual ED do, that the virtual GP cannot... they would be able to better handle their own patients... the family is not sure, or the patient is not sure... you can arrange a virtual consult. I can check your NEHR, look at the hospital plan... And more importantly, I can link the patient back to their regular care provider"

### Stakeholders' perceptions

- Virtual ED should be run by highly experienced and specially trained ED physicians
- Concerns about liability and regulation, require close support from MOH

### Enablers

- Leveraging technology: E.g., virtual ED sends an SMS with a link that directs the user's device to the teleconsultation platform and activates their camera

### Respondents' perceptions on roles of proposed tele-services:

	Tele-helpline	Virtual ED	Tele-medicine
Manned by...	Nurses	Skilled emergency physicians	GPs
Core capabilities	<ul style="list-style-type: none"> <li>• Triage and refer (primarily to direct patients)</li> <li>• Schedule appointments to ACSPs</li> </ul>	<ul style="list-style-type: none"> <li>• Triage, diagnose, treat, refer</li> <li>• Schedule appointments to ACSPs and EDs</li> </ul>	<ul style="list-style-type: none"> <li>• Diagnose and treat</li> <li>• Issuance of medical certificates and medication</li> </ul>
Workflow	Primarily an <b>afferent</b> pathway	Both an <b>afferent</b> (direct call) and <b>efferent</b> (referred from tele-helpline) pathway	<b>Efferent</b> pathway
Financial model	<b>Free</b> service	<b>Paid</b> service, teleconsultation fee	<b>Paid</b> service, teleconsultation fee

### Suitable patient profile

- Virtual ED suggested to be most useful for known, long-term patients with chronic conditions to access their hospital directly (e.g. IV therapeutics, cancer patients, palliative, IMH or nursing home residents)



# Innovation opportunity #4: Virtual EDTU



### Monitoring and imaging devices

For patient tracking & observation



### Emergency response system

E.g., deploying an ambulance / community nursing team



### Followed up with a primary care appointment

Ensure care continuity



"...[HaH] is admitted patient...doctor or the nurse is visiting at some level of frequency. This [virtual EDTU] patient actually may not need any visit."

## Enablers

- Leveraging on wearable technology and imaging devices
- Establishing ways to mitigate patient privacy concerns
- Forming partnerships with community resources and services

## Possible distinction between virtual EDTU & Hospital at Home

	Virtual EDTU	Hospital at Home
Core capabilities	• Patient monitoring	• Care by multi-disciplinary team
Duration of care	• Shorter stay (e.g., ~1 day)	• Longer stay
Suitable patient profile	Patients who mainly require short-term observation for acute medical episode	Patients with complex needs and with clear diagnoses



## Stakeholders' perceptions

- Patient segmentation for Virtual EDTU and Hospital at Home must be clear, if not, it would be an overlap of hospital at home

"...blood pressure was 200 and you're having a bit of headache...someone monitor you very closely...check on you later. Why don't you go to your own...home?...You can do that for many, many patients."

## Suitable patient profile

- Patients requiring short-term observations for acute medical episodes (e.g. hypertensive crises, monitoring of medication reactions)

# Innovation opportunity #5: Enhancing role of primary and urgent care



**Accessible to more patients**  
Divert patients from hospitals



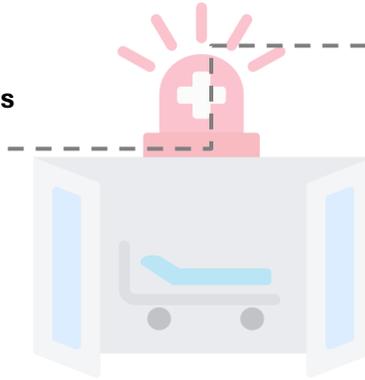
**Community diagnostic services**  
Increased community POCTs and diagnostic/ imaging capabilities



**Extended monitoring service**  
For patients requiring additional observation



**Expanding service scope**  
Acquisition of capabilities for expansion of services



## Enablers

### UCC

#### Majority agreed UCCs should be in the community

- Pooling GPs → offer incentives to run UCCs in rotation
- Form partnerships with polyclinics and/or private healthcare institutions to increase access to ancillary services and multi-disciplinary care

#### Majority agreed UCCs should be led by primary care physicians

- More well-suited and trained to handle low-acuity patients
- Still supported by ED physicians and specialists

#### Other approaches: Polyclinic+ / UCC@polyclinic

- Locating UCCs in polyclinics
- Cost effective approach by utilising existing polyclinic infrastructure, resources & staff

### Primary care

- Leveraging primary care networks for ancillary services such as nurse counsellors, wound dressings and management

#### Strengthening GPFirst and Healthier SG

- Strengthen Healthier SG and GPFirst by ensuring that such programmes reaches vulnerable patient groups with poorer health and social outcomes
- Implement follow-up measures to ensure that sign-ups translate into better health decisions

### Suitable patient profile

- Patients with mild to moderate symptom but require treatments, procedures or services not typically available at GP clinics (e.g. cases with mild fractures, URTI, cough, minor food poisoning, sprains, minor fractures, musculoskeletal pains)

## Stakeholders' perceptions

### UCC

- Current piloted UCC model perceived to take manpower away from EDs
- Perceived mismatch in skillset for ED physicians to run UCCs
- Price differential between ED and UCC care is not steep enough to incentivize patients

### Primary care

- Primary care resources not sufficient to meet increasingly complex healthcare needs → **high referral rates back to ED**

*"...you want to take away manpower from the ED to put in the UCC...the emergency physician is a...highly specialized person...asking them...not very...cost effective or efficient"*

*"...the tolerance level of [GPs] referring to [EDs] is low...GPs do not have readily available resources."*

# Innovation opportunity #6: Upskilling and retaining pool of paramedics through community paramedicine

- Similarities with systematic review
- Differences with systematic review / not mentioned in primary study



**Refer to more suitable ACSPs**  
On top of see-and-treat at scene to better meet patient needs



**Community paramedicine programmes**



**Increased OMC support**  
Expanding on protocol & types of cases where paramedics can call OMC

● Paramedics are supported by paramedic specialists, who are more familiar with clinical practice guidelines, compared to emergency physicians (Armour et al., 2021)



*"paramedics' training, skill sets...needs to be improved...with nationwide initiatives or collaboration with...stakeholders...to be able to refer P3, P4 patient in a more seamless and a timely manner."*

## Enablers

- Paramedics require more medical knowledge and skills in assessing low-acuity patients → increased confidence for treat-and-discharge ●
- Increased MOH oversight of EMS for paramedics to be better integrated into PEC and more recognized as healthcare professionals
- Defining role of community paramedics in Singapore:

Mixed views	Possible role
Should fulfil similar roles as a community nurse	Enhance community nursing as a resource and ACSP
Should complement the roles of a community nurse	Community paramedics act as a stand in to treat / stabilise patients until a community nurse can arrive at patients' home (i.e. the next day)
Pathway to transition experienced senior paramedics	For paramedics above a certain age and years of experience. Allowing them to continue practising and contribute to the community.

## Suitable patient profile

- Patients requiring indwelling catheter changes, nasogastric tube insertions, simple bandages and wound dressings etc

## Stakeholders' perceptions

- Low success of non-conveyance protocols:
  - Patient insistence on conveyance
  - Treat-and-discharge does not fully address patient needs (e.g., patients are not referred & conveyed to ACSPs)
- Non-conveyance also perceived to be inefficient as EMS resources have already been deployed for a non-emergency case



# Policy enablers

- Similarities with systematic review
- Differences with systematic review / not mentioned in primary study

"we need to be able to **accord protection to our people**, or at least have some government support to say that this is safe for patients and **also safe for our healthcare professionals**... if you practice within this scope...we will protect you...that will be the only way they are willing to do this."

## Financial models to subsidies patients seeking ACSPs

- Government subsidies
- MediSave & insurance coverage
- + Incentivize healthcare providers to manage patients in the community

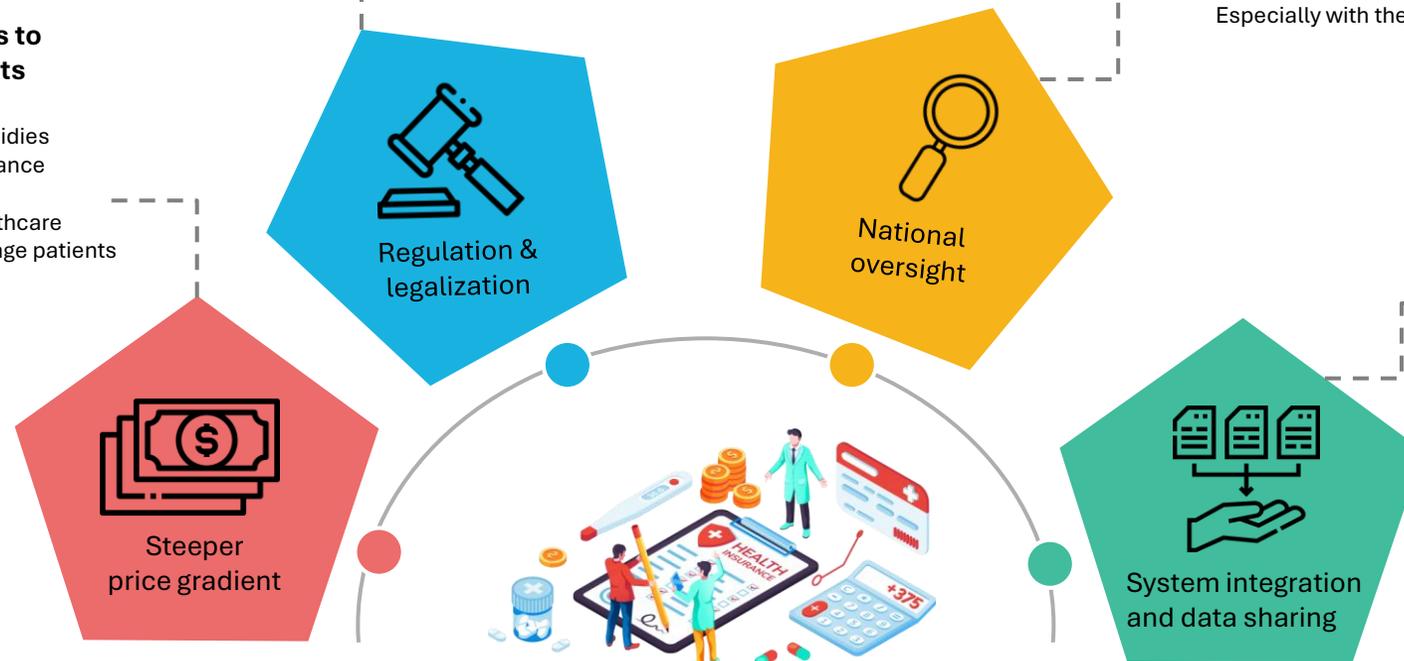
"our demographics have changed, but our healthcare financing has **not**...because inpatient can claim MediSave, insurance... **But outpatient - pay out of pocket**. There's little incentive for people to stay at home and get treated... even if you send them to GPFIRST etc, these may not be covered by insurance."

## Legal and policy backing for healthcare providers

Greater liability protection → greater risk tolerance

## MOH should have oversight

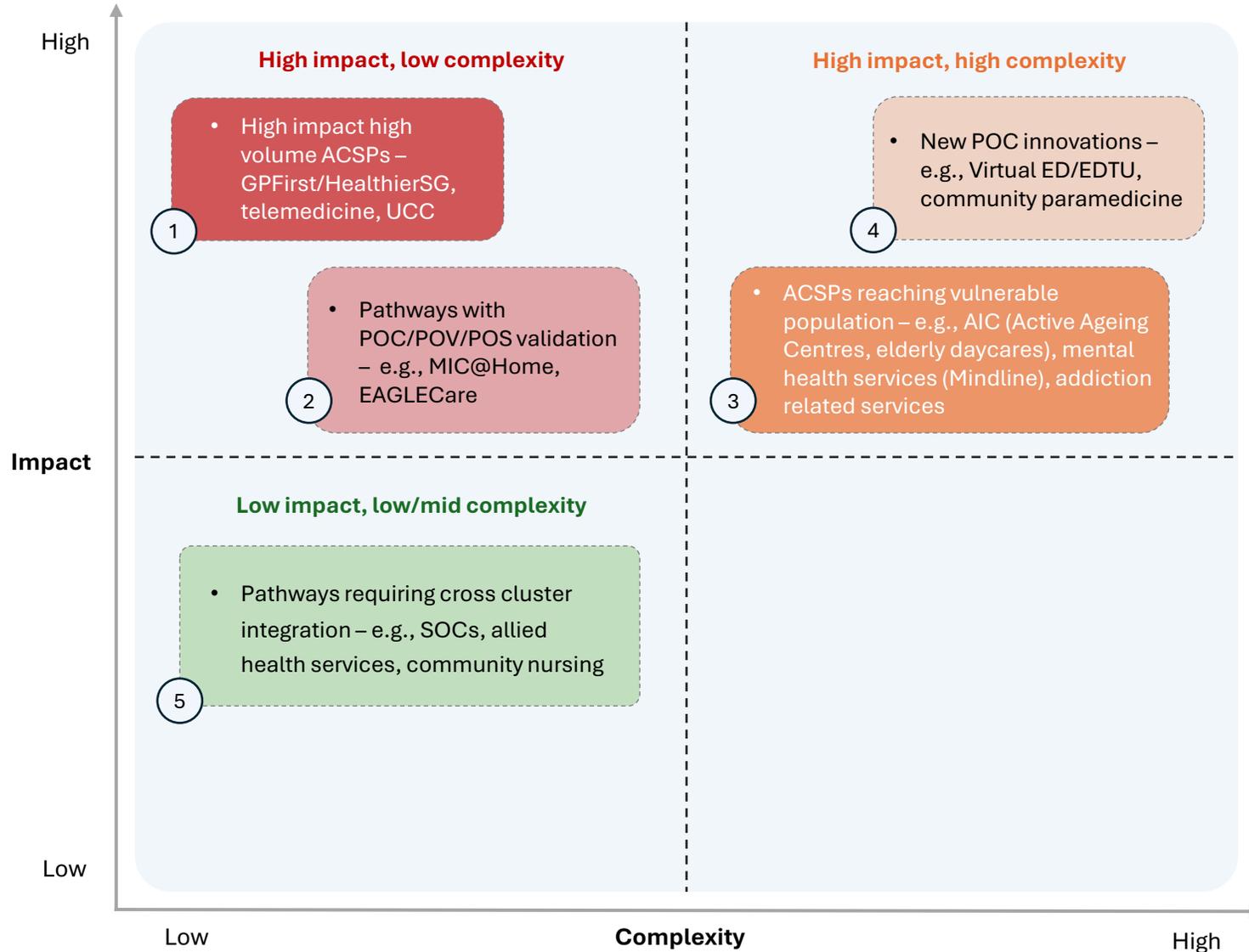
Especially with the national triage services



## Need for integration

- Allowing hospital administrators to access pre-hospital data, and NEHR data from paramedics → tele-helpline → ACSPs
- Ensure seamless patient and information handovers across clusters to accommodate patient preferences and needs

# Prioritization Model through Impact vs Complexity Matrix



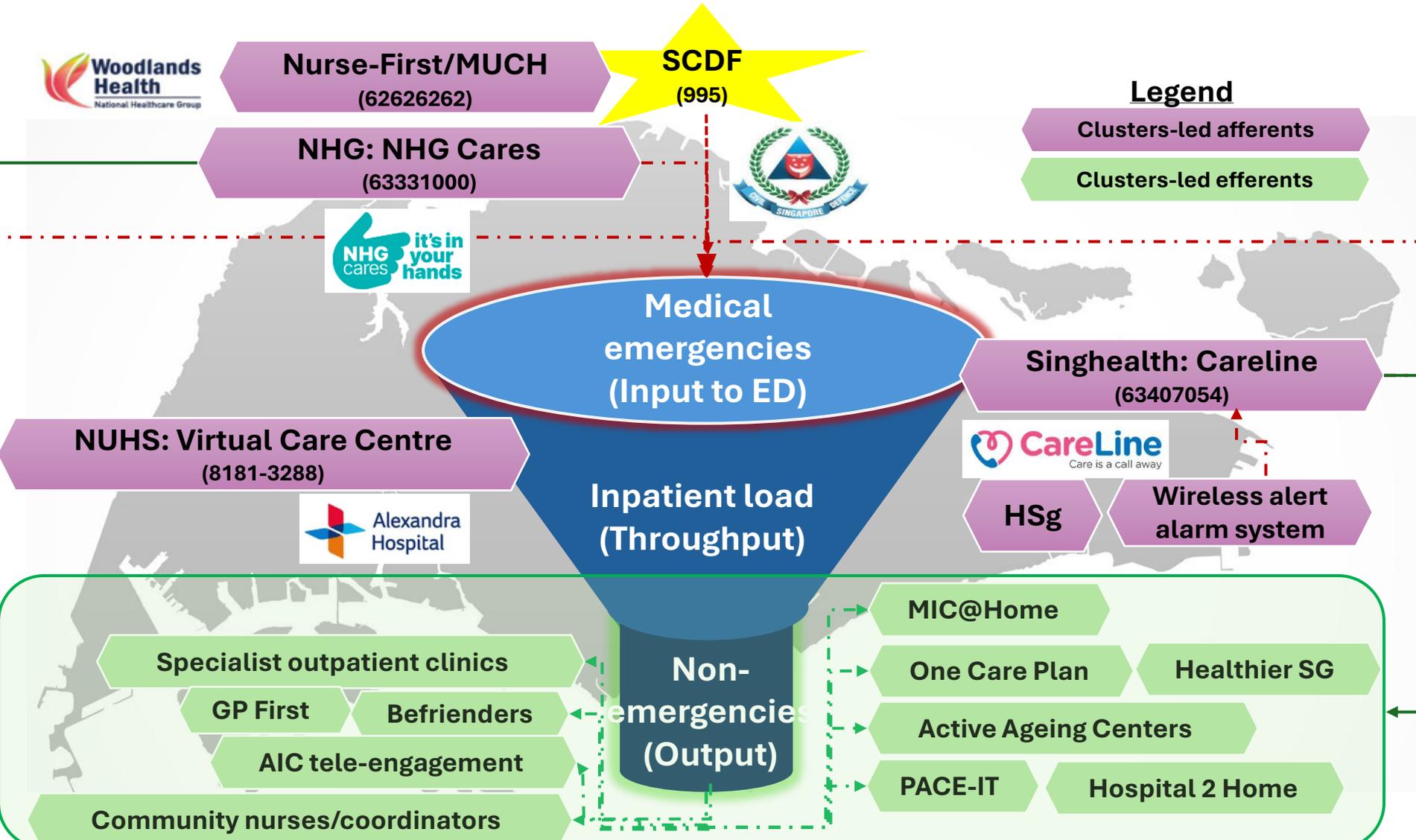
**Legend**

- Impact (Y-axis): Measures the potential for reducing ED/EMS workload
- Complexity (X-axis): Assesses the ease of implementation

- High impact, high volume ACSPs – first priority
- High impact, high volume ACSPs – second priority
- High impact, high complexity ACSPs – third priority
- High impact, high complexity ACSPs – fourth priority
- Low impact, low/mid complexity ACSPs – fifth priority

# Care Redesign Approach

**Current management of medical urgent care remain fragmented and challenges around alternate care and services pathways impede efficient patient flow for non-emergency cases. Coordinated national efforts to improve input/output factors will allow hospitals to focus on throughput and right-siting efficiency.**



**1 Upstream**

- X Fragmented cluster efforts with multiple numbers to recall
- X Variances in triaging capabilities and ED referral thresholds

X Patients often not right-sited from emergency-care to non-emergency care without going ED as cluster-ACSPs are not visible to triage command centre

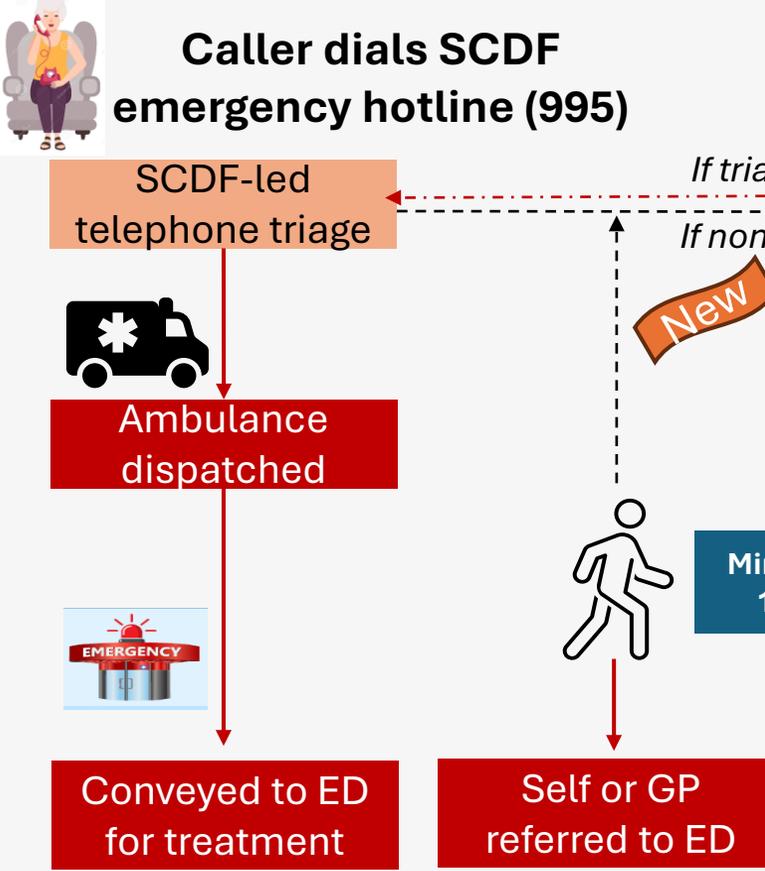
**2 Downstream**

- X Inconsistent alternate care pathways across clusters and often restricted to within-cluster use
- X Poor data sharing for evaluation of success measures

# Upstream priority positions NurseFirst as a national, public-facing tele-triaging platform that complements 995/SCDF emergency hotline, and serves medically urgent care needs with the aim of diverting avoidable/inappropriate ED visits for non-emergency cases.

## 1 Differentiation of medical emergencies from medical urgent care

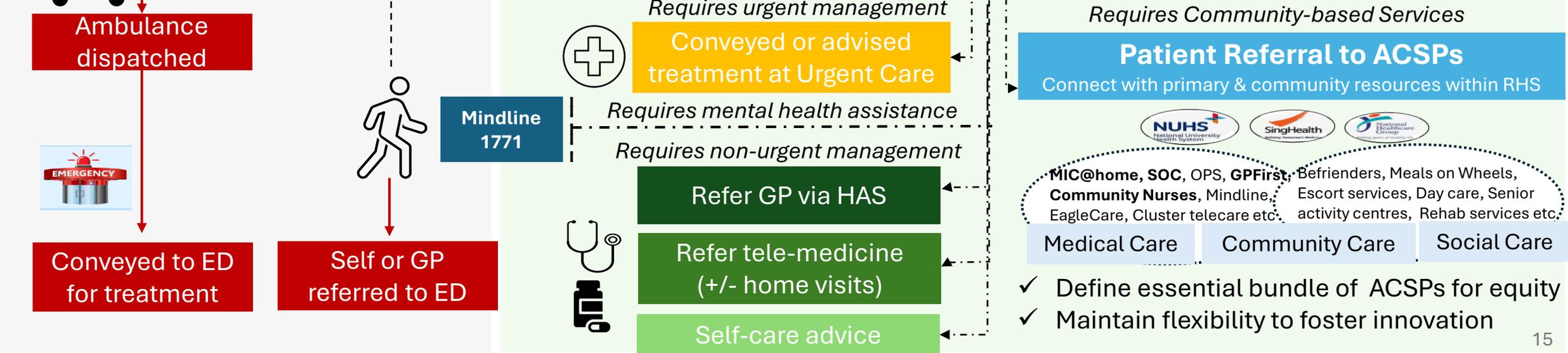
### Traditional linear pathway "995"



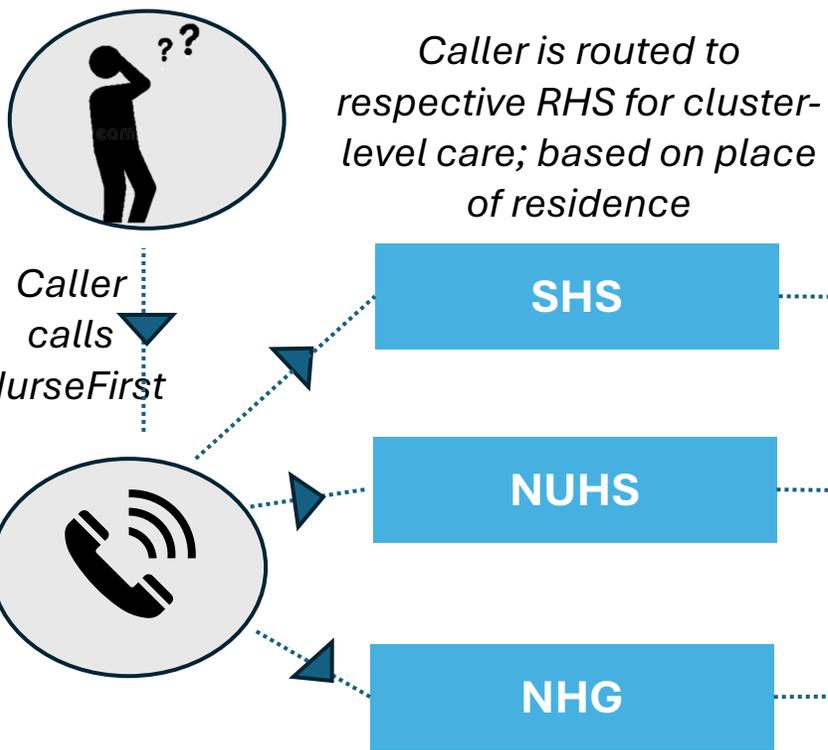
### New Establish "NurseFirst" as a national "medical urgent care" helpline as a digital front door



## 2 Acute medical cases are directed to appropriate disposition options while cases requiring extended support are referred to RHS



**Downstream, Clusters serving as “regional health managers” in the population health landscape can benefit from eventual integration with upstream triaging to (1) right-site care, and (2) enable seamless and efficient patient flow management across all levels of care.**



**Clusters can refer to existing initiatives**

**Example 1: Referrals to primary care networks for care coordination**  
 Mr X, 65yo, recently discharged for an infected toe, experiences high blood sugar levels. Cluster directs him to a primary care provide (PCP) within a primary care network for medication adjustment, as well as ancillary services such as foot screening and tele-monitoring by nurse counsellors.



**Example 2: Referrals to MIC@Home**  
 Ms Y, seen by her PCP and diagnosed with right LL cellulitis requiring IV antibiotics. Instead of going to ED, her PCP referred her to MUCH which connected her to a cluster hotline to facilitate direct admission to a nearby hospital’s MIC@Home team.



**Example 3: Referrals to home care teams**  
 Mr Z with b/g severe Parkinson’s is immobile and has a blocked catheter. Instead of going to ED, cluster can refer community nursing services where a nurse will come to his home to change the catheter and provide support for home management.



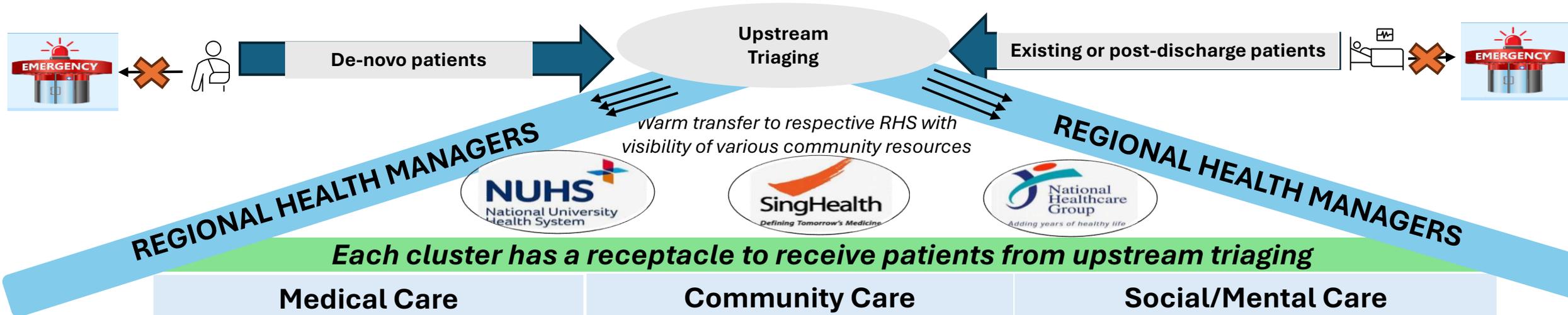
**Example 4: Referrals to social services**  
 Mr A had a fall and requires admission. He lives with his only son with Down’s. Cluster can refer to Meals on Wheels and befriending services to ensure his son is safe and supported at home.



**Benefits to clusters**

- ✓ Enhance population health management
- ✓ Enhance care coordination
- ✓ Enhance community trust
- ✓ Enable sharing of best practices

**A centralised point of contact by clusters can direct patients to services and resources under their oversight. This fosters a longitudinal care approach for residents who will benefit beyond traditional episodic care approach.**



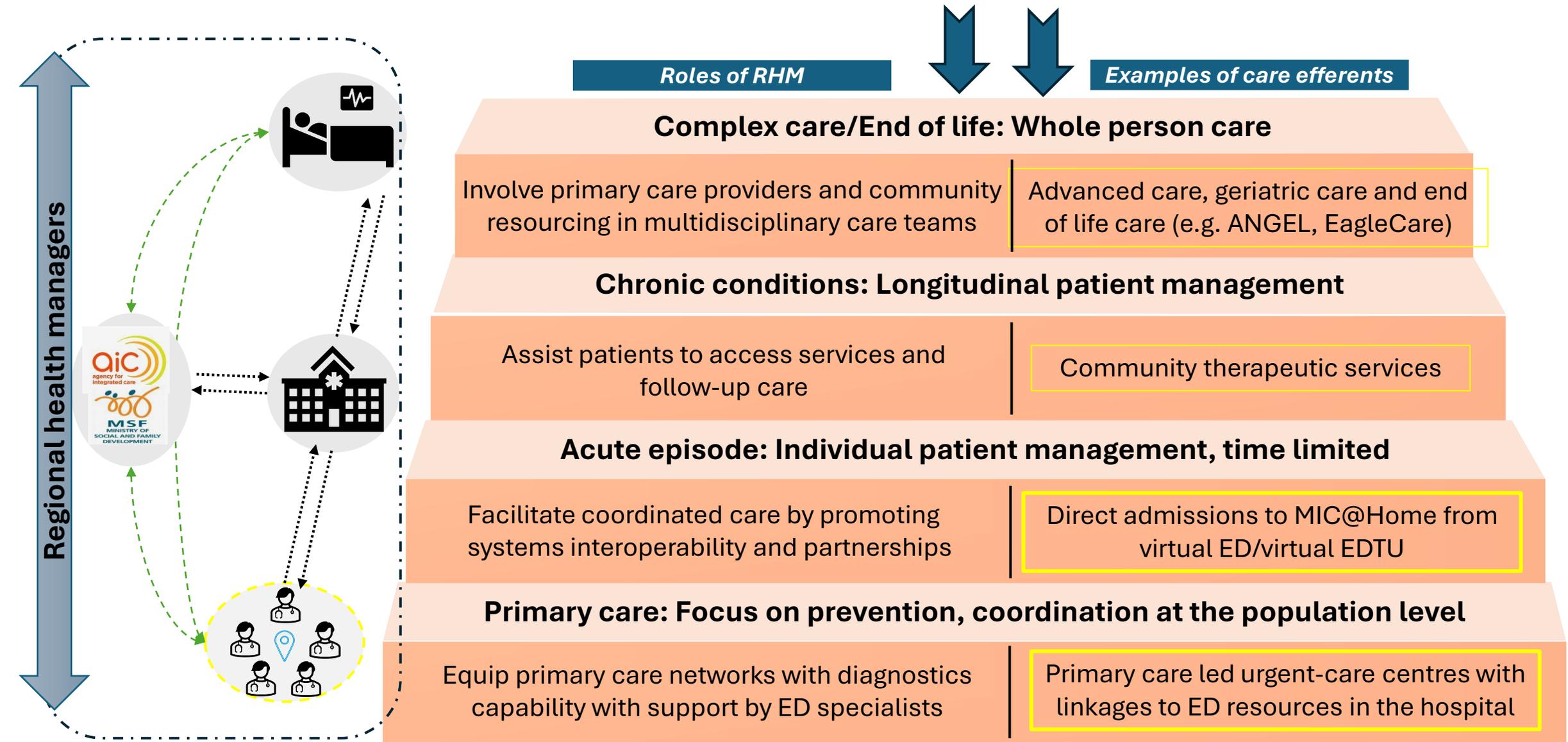
**Each cluster has a receptacle to receive patients from upstream triaging**

*Examples of roles of regional health managers*

*Examples of performance metrics*

	Medical Care	Community Care	Social/Mental Care
<i>Examples of roles of regional health managers</i>	<p><b>Accessibility to services:</b> Leverage primary care networks to manage cases that would require ED visits by providing resources and capabilities; facilitates referrals to specialists if needed</p> <p><b>Preventive care:</b> Schedule follow-ups, screenings and vaccinations</p>	<p><b>Collaboration with multi-disciplinary teams:</b> Connect patients with community nurses, social workers, allied health, pharmacists etc</p> <p><b>Partnerships with AIC and SGO:</b> Connect patients with appropriate rehab or daycare services within RHS</p>	<p><b>Identify individuals at risk:</b> Identify individuals requiring continued support and ensure access to appropriate resources</p> <p><b>Partnerships with AIC and SGO:</b> Connect patients with appropriate social befriending or support services within RHS</p>
<i>Examples of performance metrics</i>	E.g. Service utilisation rates, chronic disease outcomes	E.g. Percent referrals to services, cost vs health outcomes	E.g. Service utilisation, symptom improvement, crisis incidents

**Traditionally, healthcare delivery has been hospital-centric. Regional health managers can facilitate direct access to primary care and community resources, fostering a more **agile and patient-centred, longitudinal, community-based integrated care** delivery.**



# Beyond specific right-siting opportunities, there can be system-level benefits to reap by embracing premise-neutral care principles and developing a more comprehensive suite of policy/tech-enabled care solutions in the community

## 1. Right-site suitable patients receiving care in the community

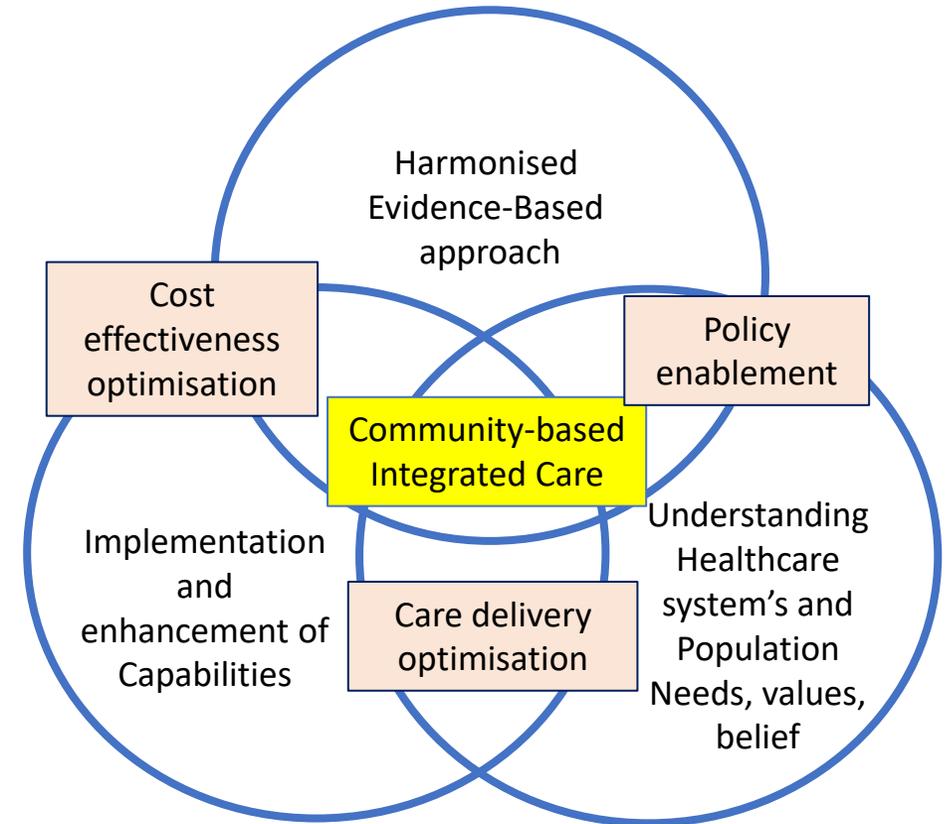
- Increase hospital capacity/load-balancing clinics
- ED avoidance/reduction in ED wait times
- Continuous identification of appropriate patient segments and in-community service expansion
- Allow utilisation of physical capacity for patients with more complex medical needs

## 2. Reduce overall cost of implementing mobile/virtual care

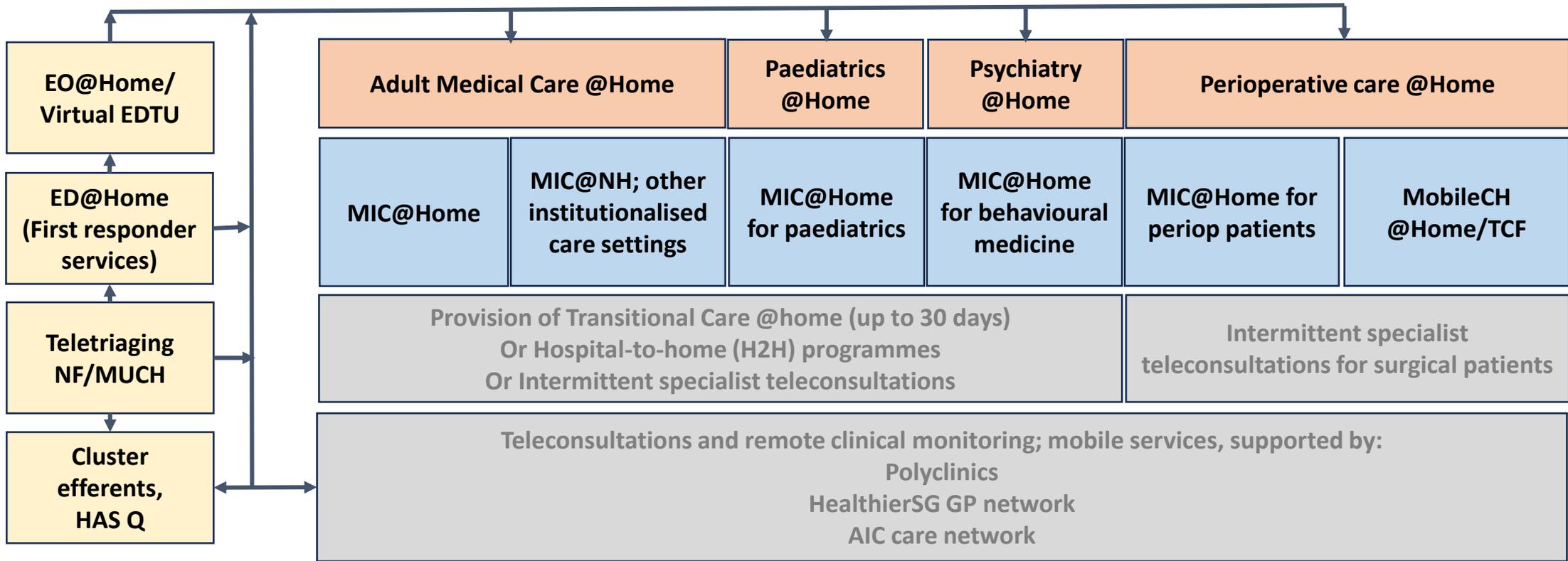
- Care and operational model optimisation as programmes scale
- Enhance mobile capabilities for required resources and infrastructure for care model

## 3. Enable shared/integrated care

- Embracing premise-neutral care
- Policy enablement backed by evidence
- Stakeholder engagement



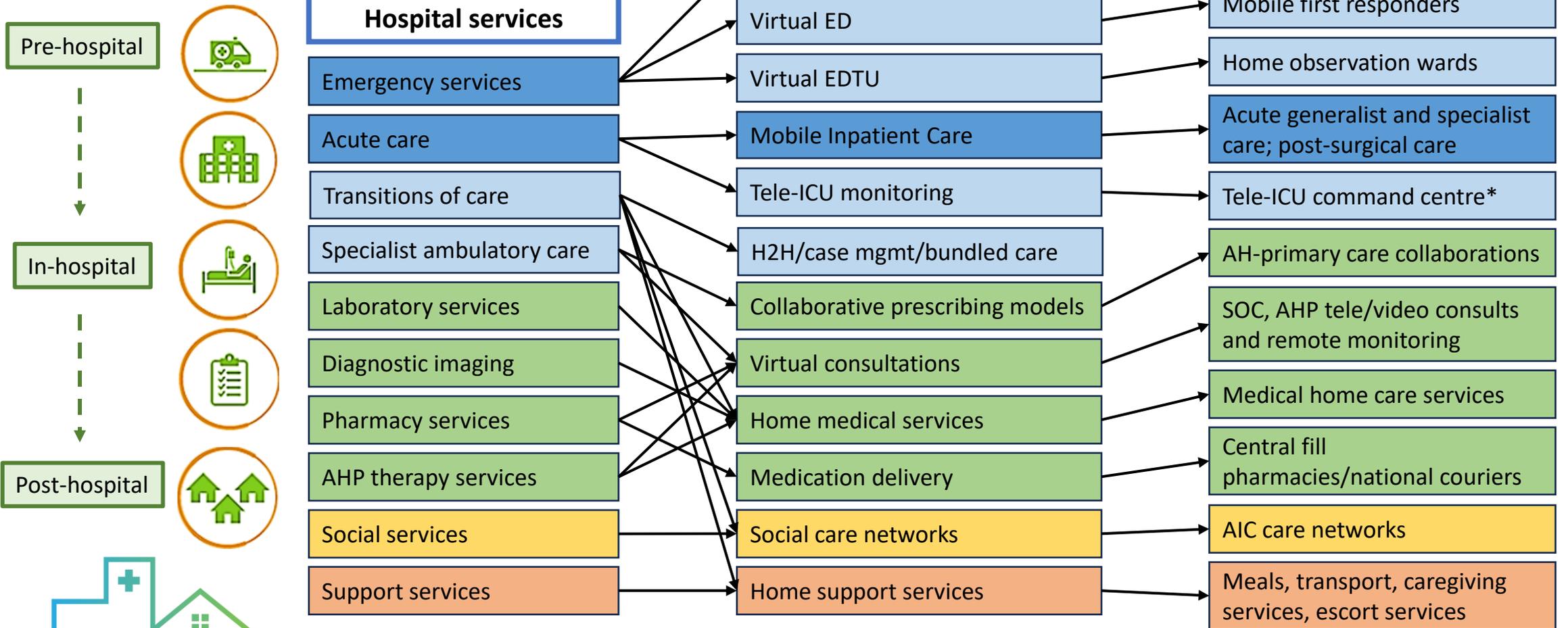
# Aspirational Structuring of Community-based Integrated Care Network



Seamless care transitions, supported by medical, nursing, pharmacy, allied health (therapists), laboratory, radiology, social work, other community-based services, and transport

\*Grey areas are to be further clarified after FY26; focus will be on HaH first. Downstream hospital-owned ACSPs will also be developed under PEC

# In-Community “Healthcare at home”/Hospital Care Redesign – Aspirational Innovation Agenda



An envisioned state of being able to decentralise all services available in a physical hospital into **community-anchored care** operating in an **integrated, shared care model**<sup>#</sup>, with **equivalent outcomes**



Legend:

- Care settings (Blue)
- Medical services (Green)
- Social services (Yellow)
- Ancillary services (Orange)

\*Patients will still be warded in physical ICUs, but manpower consolidated to oversee multiple ICUs; some physical manpower still required in physical ICUs  
<sup>#</sup>Enables necessary in-community service provision at all levels of care (e.g., provision of caregiving services for MIC@Home)