Virtual Wards
Learning from Covid….
Improving Respiratory Care

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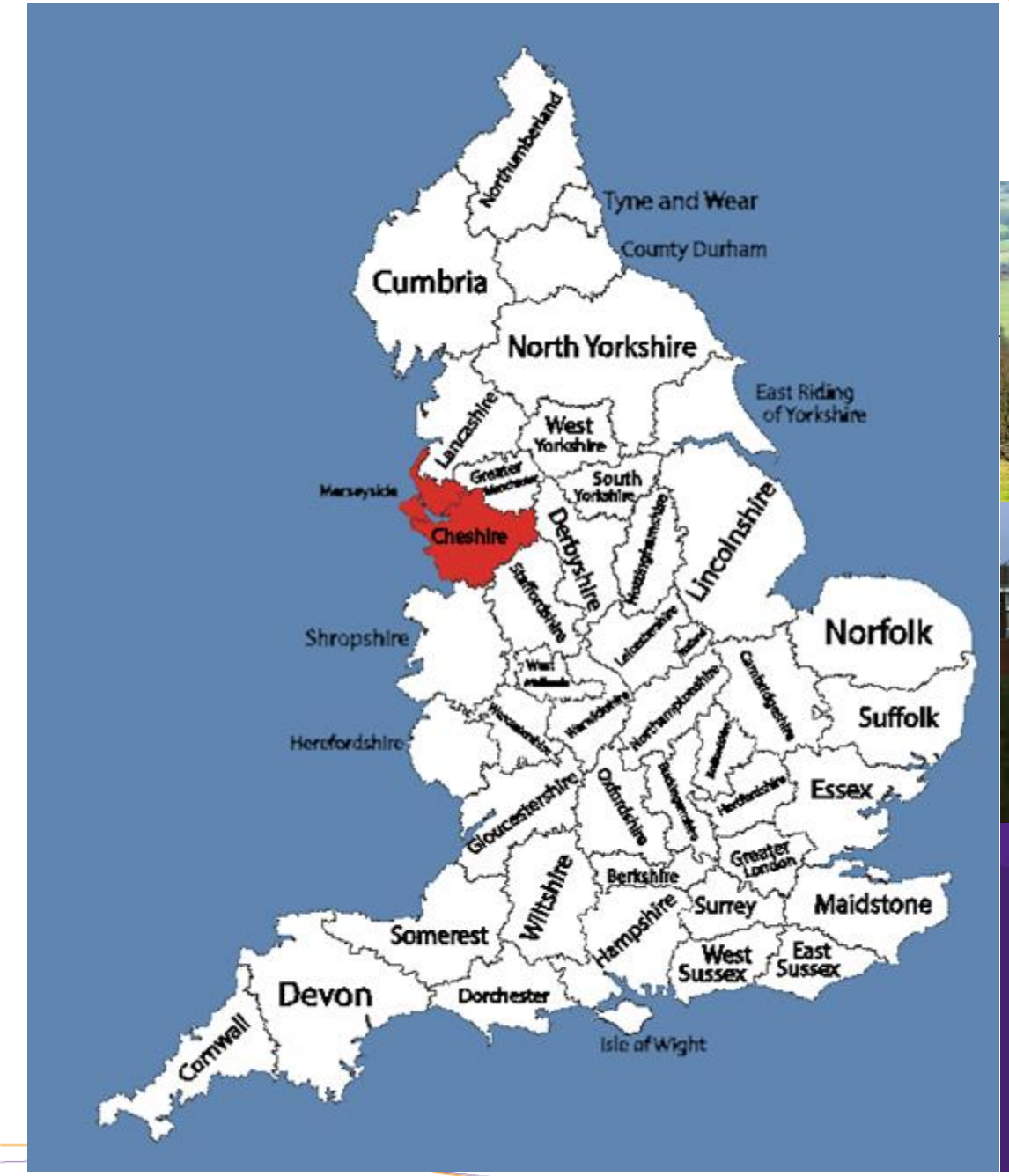


Cheshire & Merseyside
Population 2.5 million

Liverpool Heart and Chest Hospital NHS
NHS Foundation Trust

World class expertise
from the UK's largest
heart & chest hospital

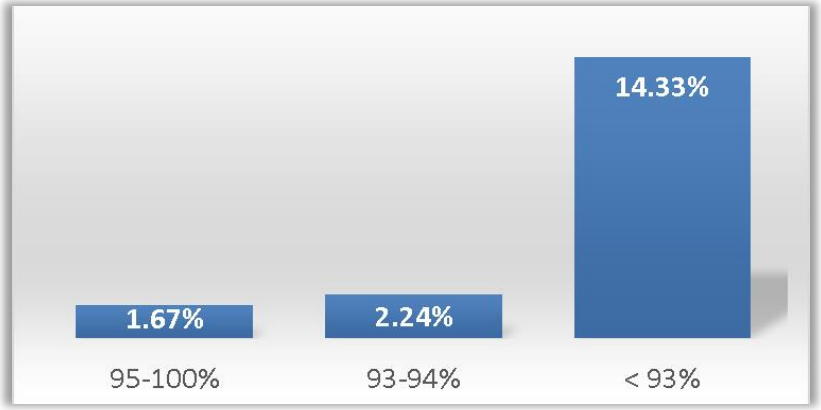
WHY?- the evidence

Rapid research to ascertain outcomes for symptomatic patients at home

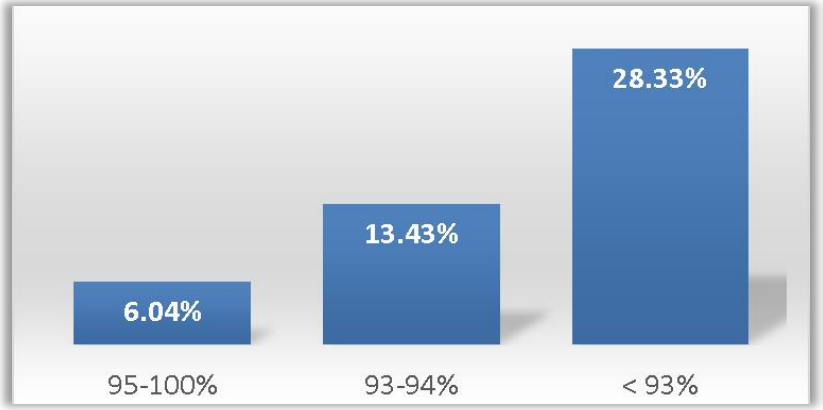
- Linked data from patients recording oxygen levels, age and outcomes.
- Monitoring the trends of symptoms & oxygen saturations predicts who of these are likely to do badly

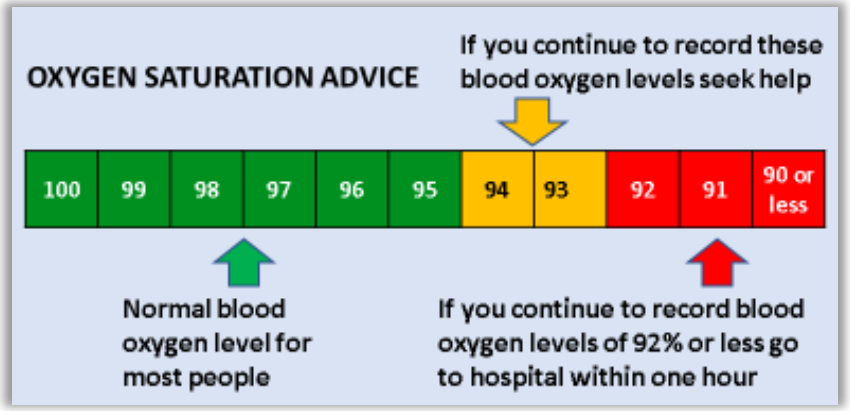
In England, community oxygen saturations of 92% or less is the cut off for when death or intensive care becomes much more likely (at all ages)

5 day mortality (N= 1,212)



30 day mortality (N= 1,212)





[Validation of home oxygen saturations as a marker of clinical deterioration in patients with suspected COVID-19]

Matthew Inada-Kim, Francis P Chmiel, Michael J Boniface, Helen Pocock, John J. M. Black, Charles D Deakin

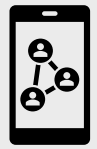
Leading to National policy change and mandate

[NHS England COVID Safety netting guidance]

617/1080 COVID admissions had Sats 95-100%

Patient Pathway

Patient reassurance & partnership is key



Patient at home

Deterioration

Hospital

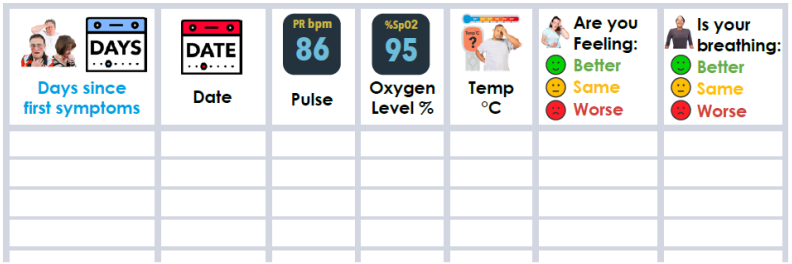
Blood Oxygen Level	What to do / When to seek help
95-100%	Stay at home and continue to check your blood oxygen level regularly
93-94%	Check your blood oxygen level again and within an hour 1. If it's still 93 or 94 % seek help 2. If concerning symptoms seek help • Shortness of breath • Chills/high fever • Severe aches/tiredness • Collapse/Confusion
92% or below	Check your blood oxygen level again straight away If its still 92% or below go to hospital immediately

Discharge

ADMISSION

Early supported Discharge

Home Patient Self monitoring with/without clinical supervision



VIRTUAL WARD

Home self monitoring with Telephone service +/- app Supporting early discharge to maintain hospital capacity

CLINICAL PATHWAY

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Patient at home → Deterioration → Hospital Clinical Assessment / Discharge guidance

93-94%	2. If concerning symptoms seek help • Shortness of breath • Chills/high fever • Severe aches/tiredness • Collapse/Confusion
92% or below	Check your blood oxygen level again straight away If its still 92% or below go to hospital immediately

MILD
Sats ≥ 95% and **< 3%**
desaturation on exertion*

MODERATE
Sats 93-94% with < 3%
desaturation on exertion*
OR ≥ 95% with ≥ 3% desaturation on exertion*

SEVERE
Sats 92% or less
OR 93-94% with ≥ 3% desaturation on exertion*

***40 step exertion test, Attach Sats probe, Walk 40 steps whilst monitoring or 1 minute Sit-to-Stand**

CXR, bloods
Additional risk factors,
clinical concern**
or NEWS2 ≥ 3

Concerning symptoms**
- SHORTNESS OF BREATH
- Chills/rigors

Yes

- Severe myalgia/fatigue
- Collapse/Confusion

NO

ADMISSION
Consider discharge if
Clinically stable
Within 24-48 hours

CONSIDER DISCHARGE

Lower acuity
Lower clinical concern

Home Patient Self monitoring
Covid Oximetry@Home

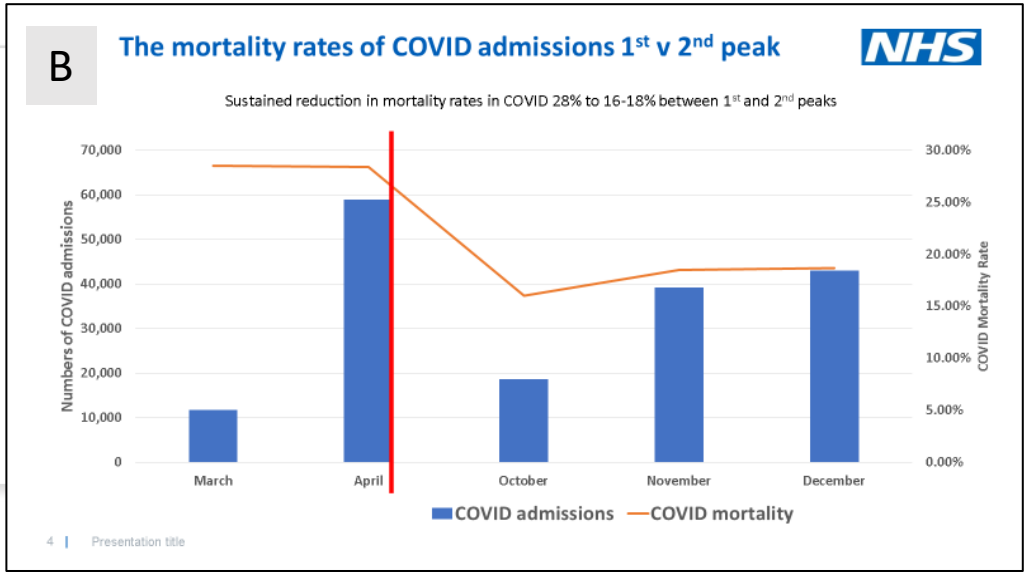
Higher acuity
Higher clinical concern

Clinician supervised VIRTUAL WARD
Telephone service +/- app
Supporting early discharge to maintain hospital capacity
If resources allow

IMPACT

A. Reduced length of stay in admissions
B. Reduced overall mortality rates
C. Safe model of care
D. Increased virtual care leads to reduced admissions

B



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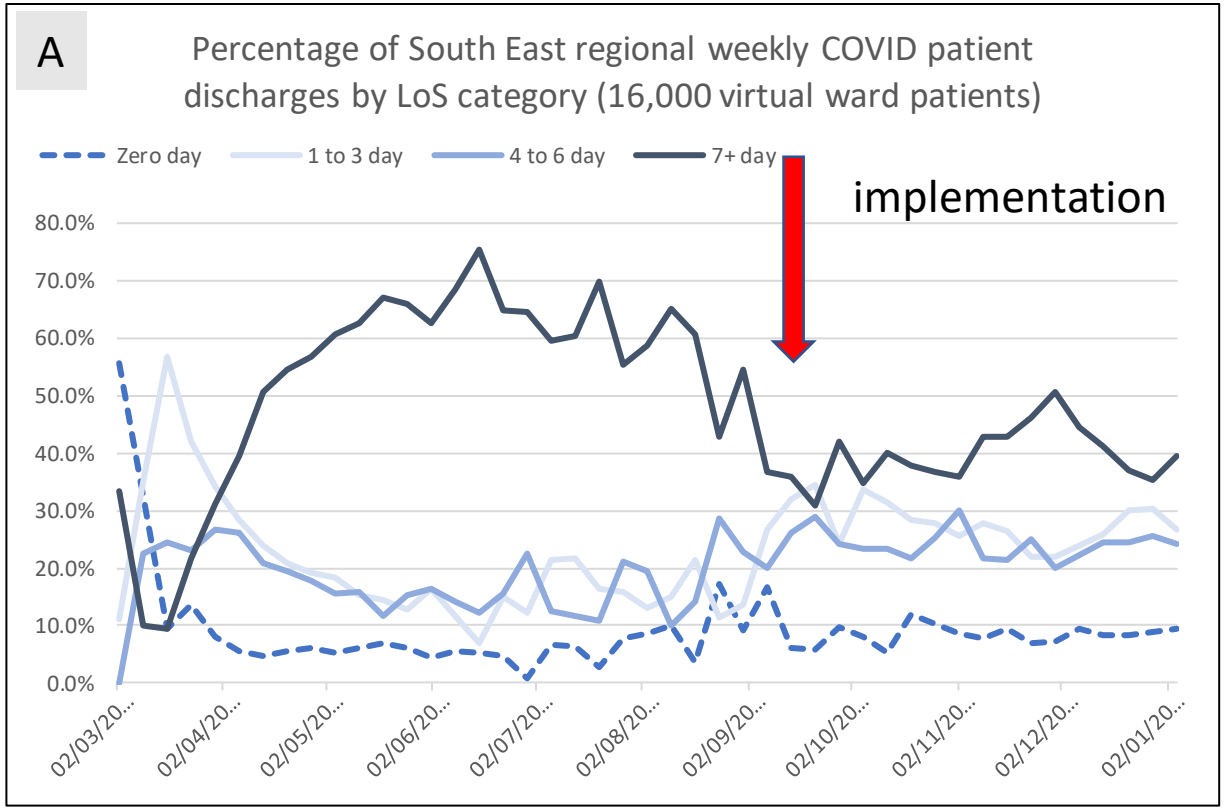

https://www.medrxiv.org/content/10.1101/2020.10.07.20208587v2

C

Throughput and outcome	Pre-hospital Model		Early discharge from the hospital Model	
	No. of patients	% of monitored patients	No. of patients	% of monitored patients
Patients triaged	1861	107.1	354	102.1
Patients remotely monitored	1737	100.0	347	100.0
Patients deteriorated and escalated	174	10.0	42	12.2
Deaths	20	1.1	3	0.9
Discharged alive from remote monitoring service	1639	94.4	320	92.2

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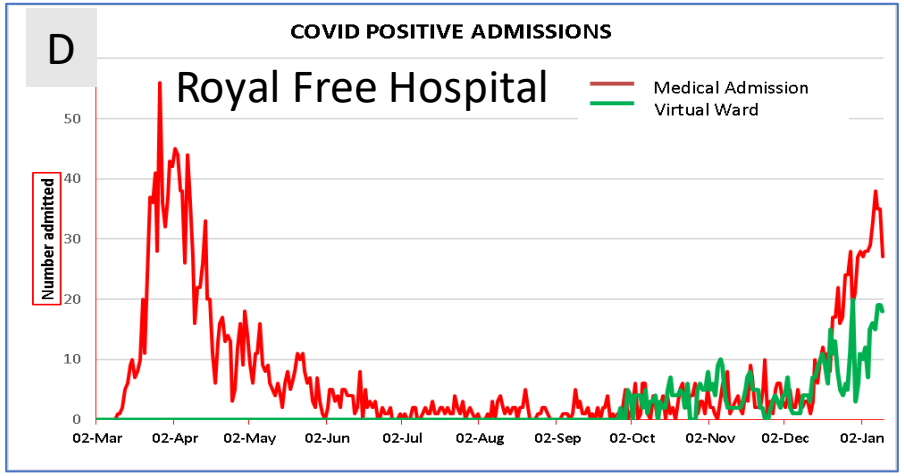


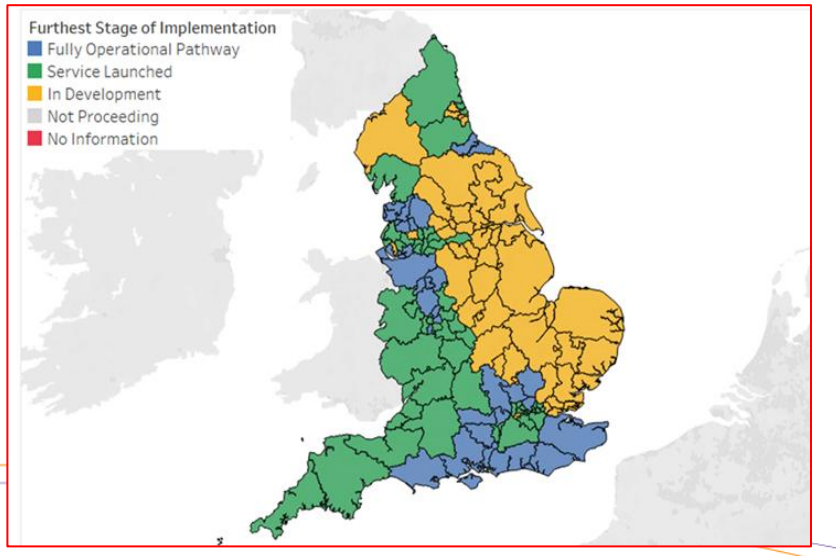
	COVID Oximetry @home	COVID virtual ward
WHERE	Primary care supervised	Hospital supervised
WHO	Lower acuity/complexity	Higher acuity/complexity
WHEN	Community diagnosed patients	Emergency hospital patients
AIMS	**Safe admission avoidance and self escalation**	**Early supported hospital discharge safe admission avoidance**
HOW	Patient self monitoring/escalation **Earlier deterioration presentation**	Monitored service Reliable deterioration recognition
WHAT	Supportive treatments	+/- Dexamethasone, LMWH, O2

COVID Oximetry Implementation across England

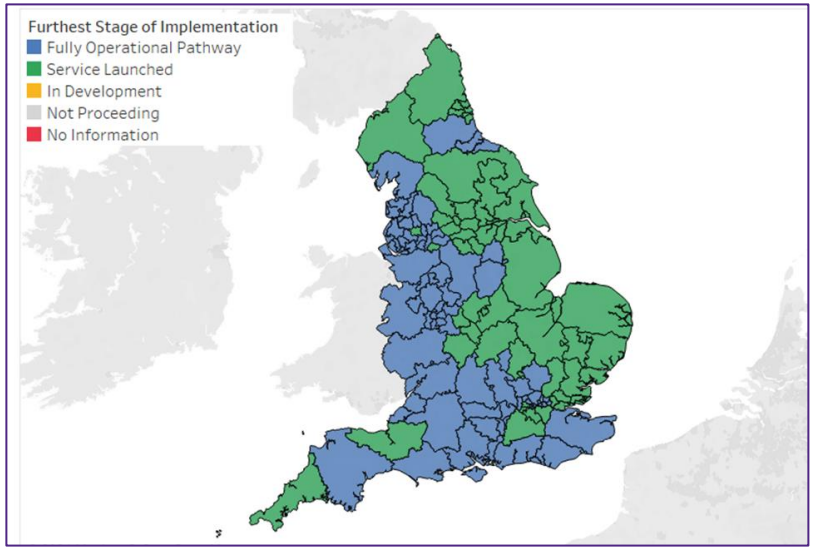
Training COVID-19 patients to self monitor/escalate

- Early identification of deterioration
- Admission avoidance
- Early safe discharge

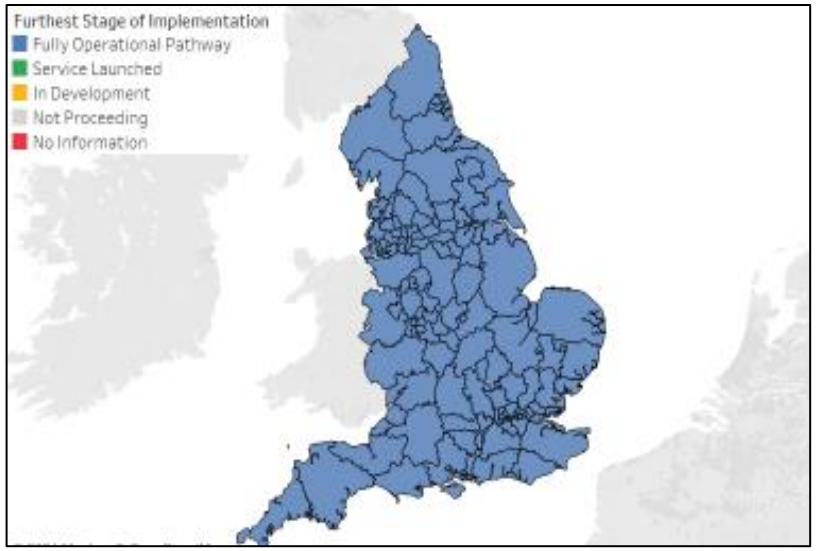
Dec 2020
35%



Jan 2021
60%



Feb 2021
100%



IMPROVEMENT STRATEGY
across 5-10 million population regions

EARLY SUPPORTED HOSPITAL DISCHARGE for ADULTS WITH COVID

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SEVERE

O_2 92% or lower

*Or if O2 sats >4% less

Mod/severe Shortness of breath
Severe fatigue/muscle aches
Confusion

SEVERE - UNSUITABLE FOR COVID VIRTUAL WARD OR OXIMETRY @HOME

MODERATE

O_2 93 - 94%

*Or if O2 sats 3-4% less than usual

Mild Shortness of breath

MILD

O_2 95% or higher

*Or if O2 sats are 1-2% less than usual

must be able to undertake activities of daily living

CONSIDER EARLY SUPPORTED HOSPITAL DISCHARGE

Exertion test (40 step walk or 1 min sit-to-stand tests)
AND SENIOR REVIEW if ≥ 3% reduction.

DEXAMETHASONE, ANTICOAGUATION +/- Oxygen
PULSE OXIMETER & training
SAFETY NETTING
DIARISING AND MONITORING VIA COVID VIRTUAL WARD (MODERATE) OR COVID OXIMETRY @HOME (MILD)

Early supported discharge guidance for adults with confirmed or suspected COVID

Liverpool Heart and Chest Hospital NHS
NHS Foundation Trust

1. Nurse led identification of patients potentially suitable for early supported ward DISCHARGE

- Improving clinical trajectory (symptoms, function, oxygen saturations)
- No fever for 48h consecutively without medication to reduce fever
- If NEWS Score stable (0-4) :
  - Oxygen saturations (sats) 95% or higher (nurse initiated discharge)
  - Oxygen saturations (sats) < 95% or higher (clinician led discharge)

2. Clinician review to authorize discharge

- As above + Blood tests improving, consider follow up in the COVID virtual ward on discharge*
- Discharge may be considered in stable patients when Oxygen sats <93% if baseline / expected baseline sats are below this range or NEWS 0-4 but stable > 48 hr
- Discharge can be considered in stable patients with mild exercise desaturation who have been fully investigated
- Any patient being considered for oxygen therapy on discharge must be discussed with the home oxygen team

3. Ward discharge check list

Check:

- Patient contact details
- Patient given advice to isolate at home until recovered i.e. at least 14 days from their first positive SARS-CoV-2 PCR test

Patient given:

- Copy of Discharge summary
- Follow up information
- Patient information leaflet
- Advice to contact their COVID Virtual ward monitoring service (8am- 8 pm) or NHS 111/999 if they deteriorate

Ensure discharge summary contains:

- Date of symptom onset
- Current SARS-CoV-2 PCR test status
- Whether patient desaturates on exertion
- RR, HR and oxygen saturations at rest
- Remote monitoring plan
  monitoring frequency, readmission criteria
- Remote treatment plan
  e.g. Oxygen, dexamethasone, anticoagulation
- Patient escalation criteria
- CXR follow-up plans
- AHP, social care & rehabilitation plans
- Treatment escalation/ readmission plan

4.*Consider COVID virtual ward if:

- Clinical Concern
- 65 years of age or older
- 65 years of age with moderate to severe comorbidity
- Lives alone
- Oxygen saturations not back to baseline 93-95%
- Immunosuppression
- Severe Long term condition
- Very overweight (BMI >35)
- BAME
- Learning disabilities incl. Downs, autism
- Diabetes

Adapted with thanks to NHS London

Covid Virtual Ward – Whiston Hospital

Hospital team educated about pathway → Patient identified as suitable for VW → Patient reviewed by Specialist nurse → Discharged from Hospital & onboarded to Virtual Ward → Daily calls from the team & Consultant Ward Round → Discharged / Community Review / Readmission

Covid Virtual Ward
Whiston Hospital
The first 7 weeks……..

135 Patients

67 patients	51 patients	9 patients	8 patients
No oxygen or Dexamethasone	**Dexamethasone**	**Oxygen**	**Oxygen & Dexamethasone**
Minimum 67 bed days	220 treatment days	205 treatment days	124 treatment days

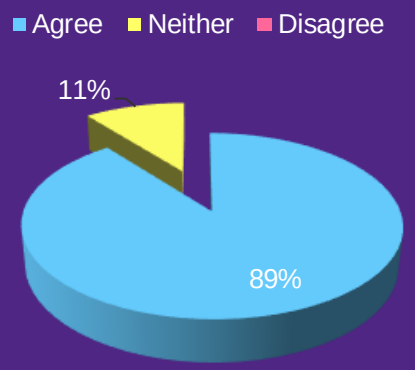
616 bed days

Covid Virtual Ward Patient Feedback

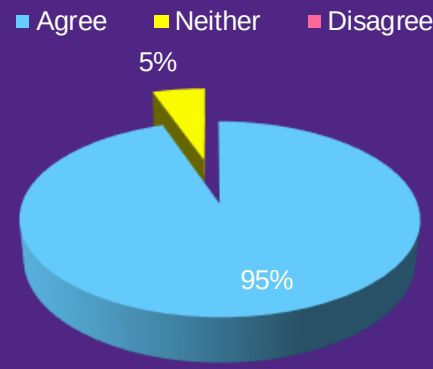
Liverpool Heart and Chest Hospital NHS
NHS Foundation Trust

100% of patients who responded said they understood why they were asked to monitor their oxygen saturations

"You felt you were fully supported by the Team"

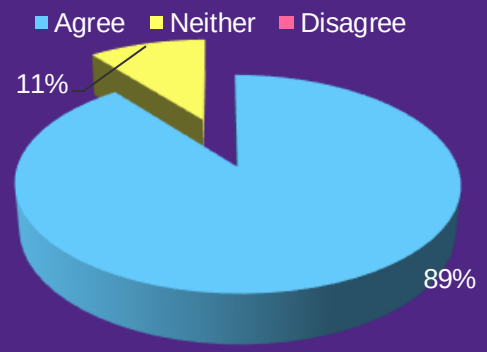


You Were Happy to have been Discharged on to the Covid Virtual Ward Round instead of Remaining in Hospital?



90% of patients felt they benefitted from being discharged with the support of CVW

Would You Recommend this Service?



"All NHS are amazing, they saved my life and after care is brilliant"

"There's no place like home to recover"

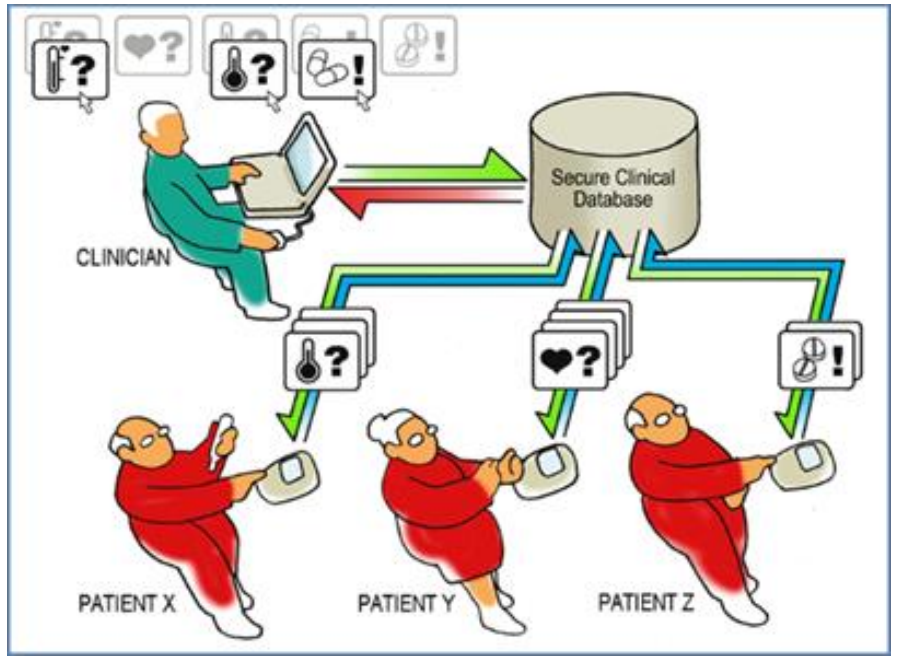
"It reassured me there was someone to talk to and ask questions if something went wrong"

"Hospitals are the crown jewels of the NHS"

"Felt better being at home with the back up"

*CVW questionnaire based on sample size of 19 returned questionnaires as of 22/3/21

Covid Virtual Ward
Merseycare Telehealth



3,312 patients supported with CO@H & CVW across C&M with MCFT providing care for 1,722 patients supported on both CO@H & CVW

640 patients alerted amber resulting in 26 contacts with the GP. Ambulances were called 48 times for patients.

6,783 “alerts” due to clinical reasons; **67% were amber alerts** and **23% were red alerts** resulting in 3,177 calls to patients.

Use of centralised telehealth clinical hub enabled rapid implementation of pathways and scalability

The majority of patients being monitored by telehealth clinical hub did not need onward referral to either primary and secondary care

What did we learn about Virtual Wards?

Safe and effective
Patient selection is key to success
Reduces length of stay
Value added to a traditional ‘Early Supported Discharge’ model with Consultant oversight
Most patients have an uncomplicated recovery
Complications require specialist expertise/decision making
Can be delivered at scale using Telehealth
Wide ranging applications

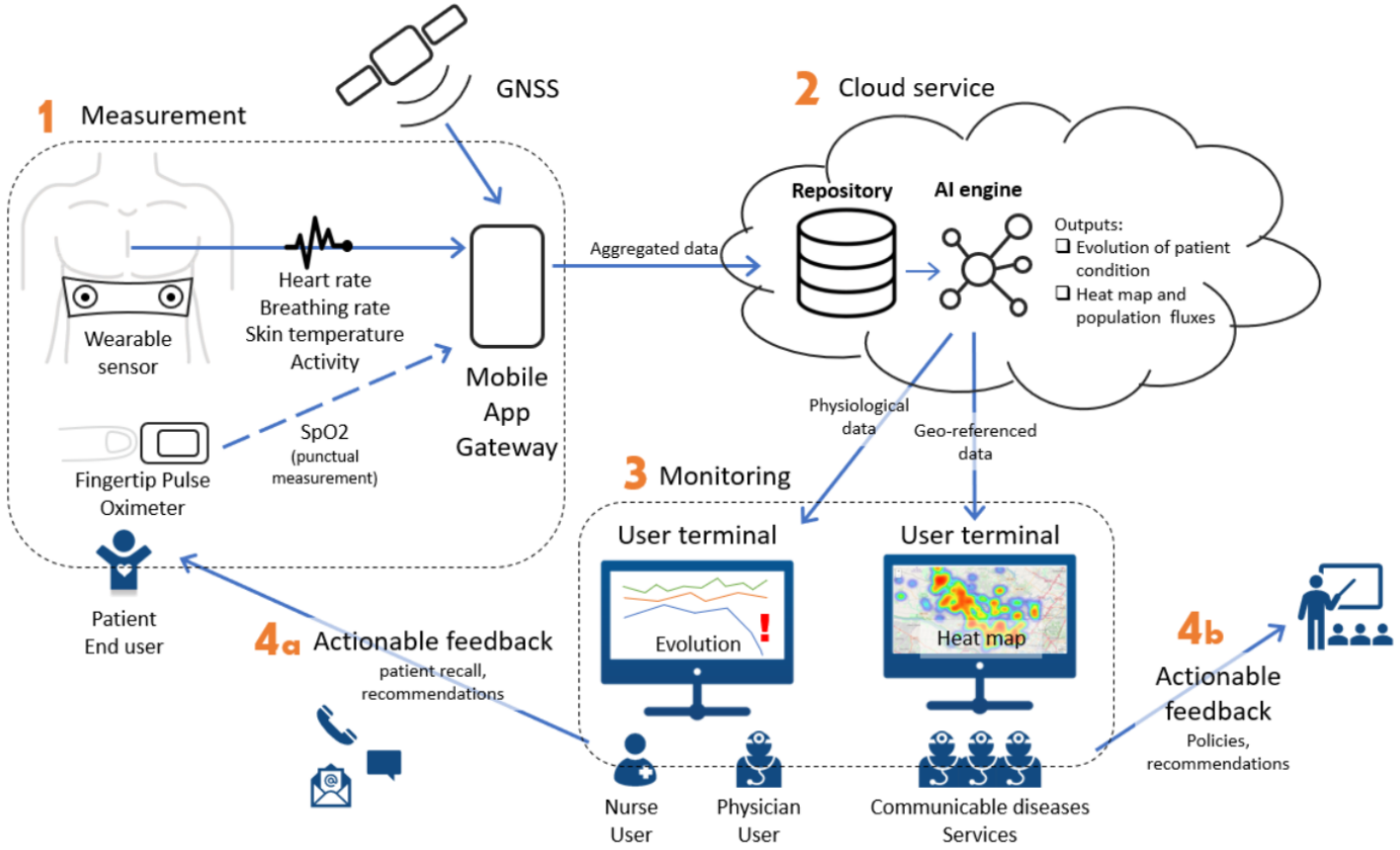
Covidom

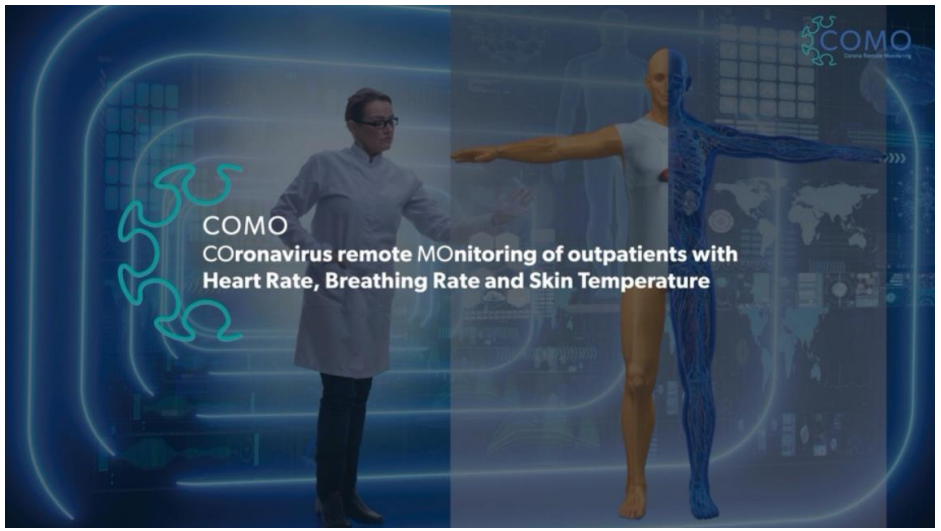

covi
dom
Bienvenue sur votre application de suivi patient
Clément Begoy
3 suivis


Tableau de bord
covi
dom
AUJOURD'HUI
À VENIR
Consulter un document
Conduite à tenir
Remplir mon questionnaire
Surveillance coronavirus

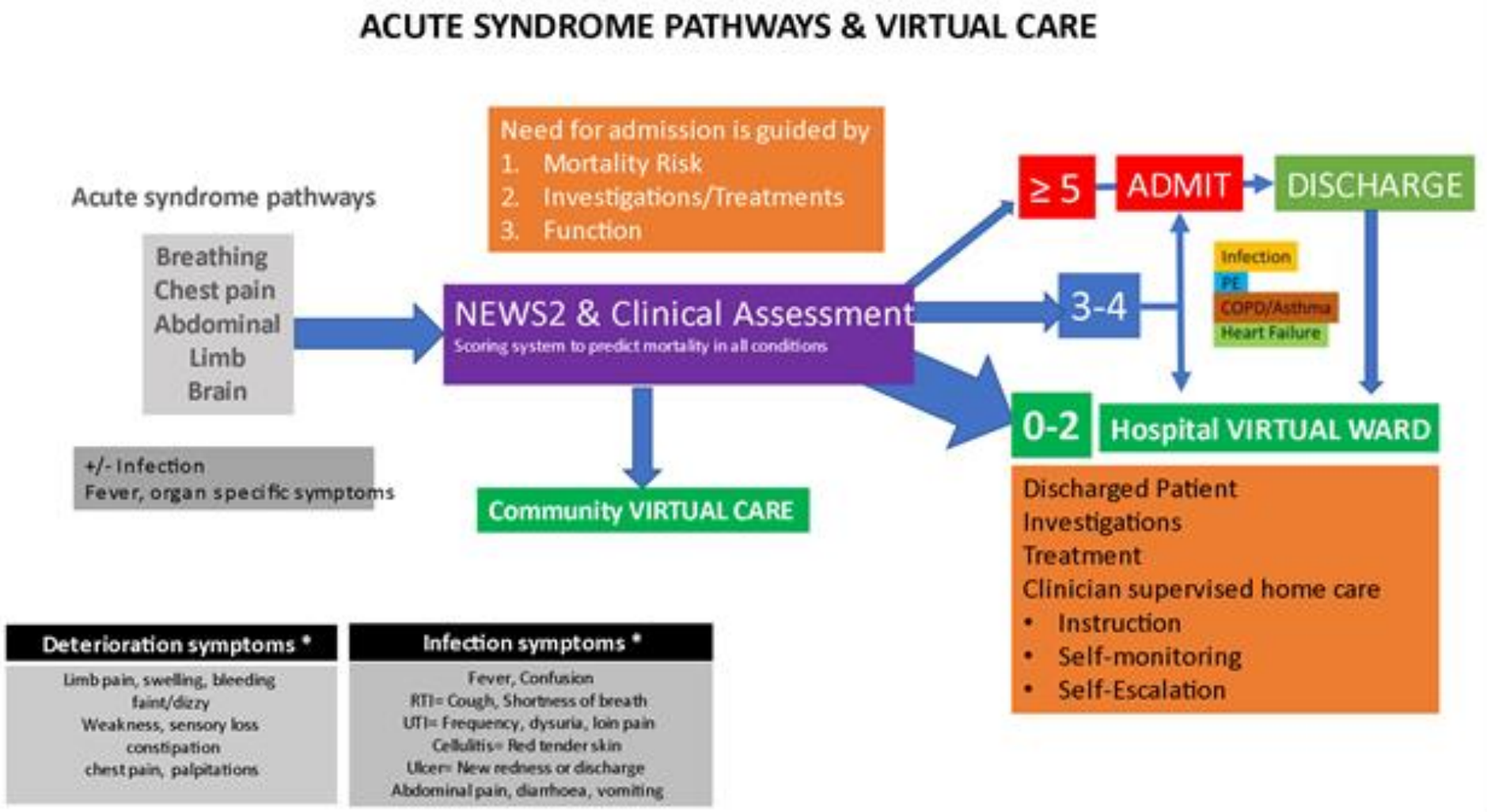

Questionnaire
Prenez votre température (en °C)
Pour bien prendre votre température, rendez-vous dans votre espace documentaire ou bien cliquez sur le lien ci-dessous.
Aide
Ma température est inférieure à 35,5°C
Ma température est comprise entre 35,5 et 38°C
Ma température est comprise entre 38,1 et 40°C
Ma température est supérieure à 40°C
Précédent
Suivant

COMO

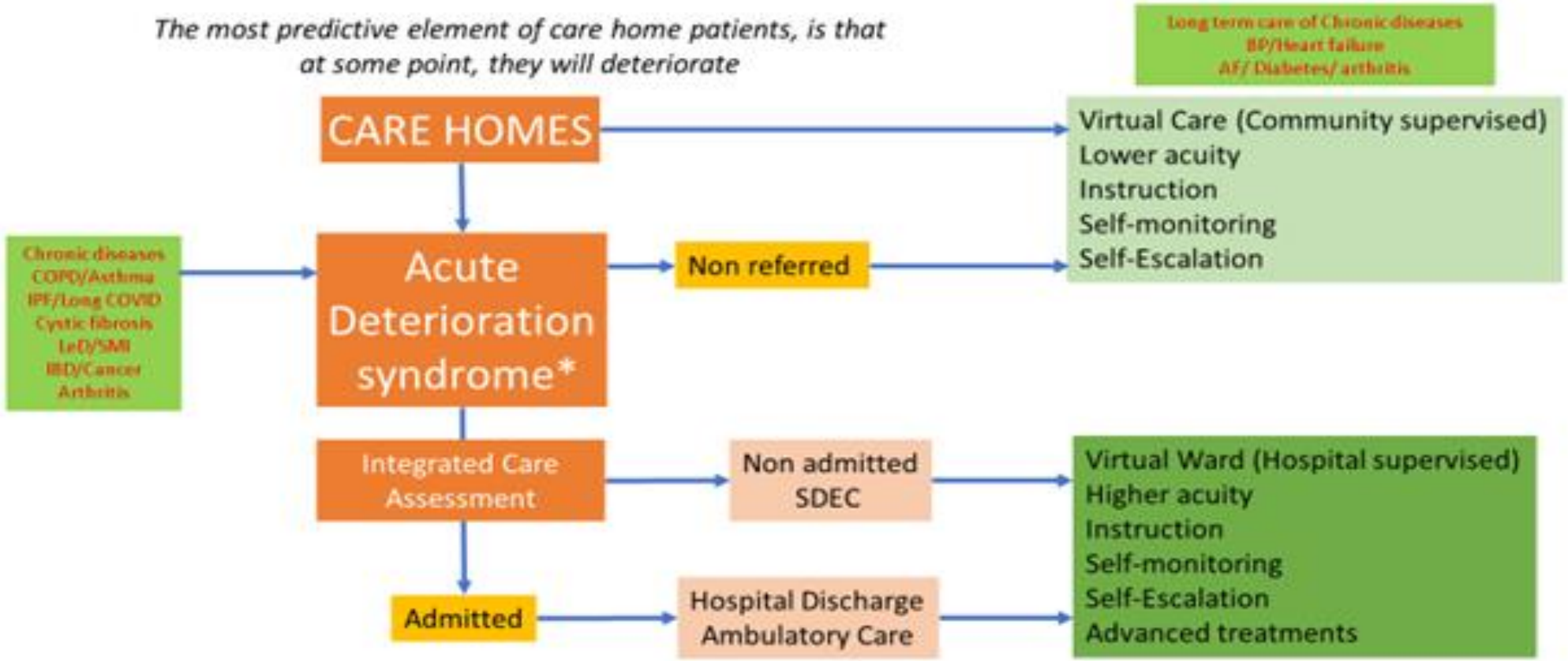

1 Measurement
GNSS
Wearable sensor
Heart rate
Breathing rate
Skin temperature
Activity
Mobile App Gateway
SpO2 (punctual measurement)
Fingertip Pulse Oximeter
Patient End user
2 Cloud service
Repository
AI engine
Outputs:
Evolution of patient condition
Heat map and population fluxes
Aggregated data
Physiological data
Geo-referenced data
3 Monitoring
User terminal
Evolution
User terminal
Heat map
Nurse User
Physician User
Communicable diseases Services
4a Actionable feedback
patient recall, recommendations
4b
Actionable feedback
Policies, recommendations


COMO
COronavirus remote MOnitoring of outpatients with
Heart Rate, Breathing Rate and Skin Temperature

Suggested models of future Virtual Ward care



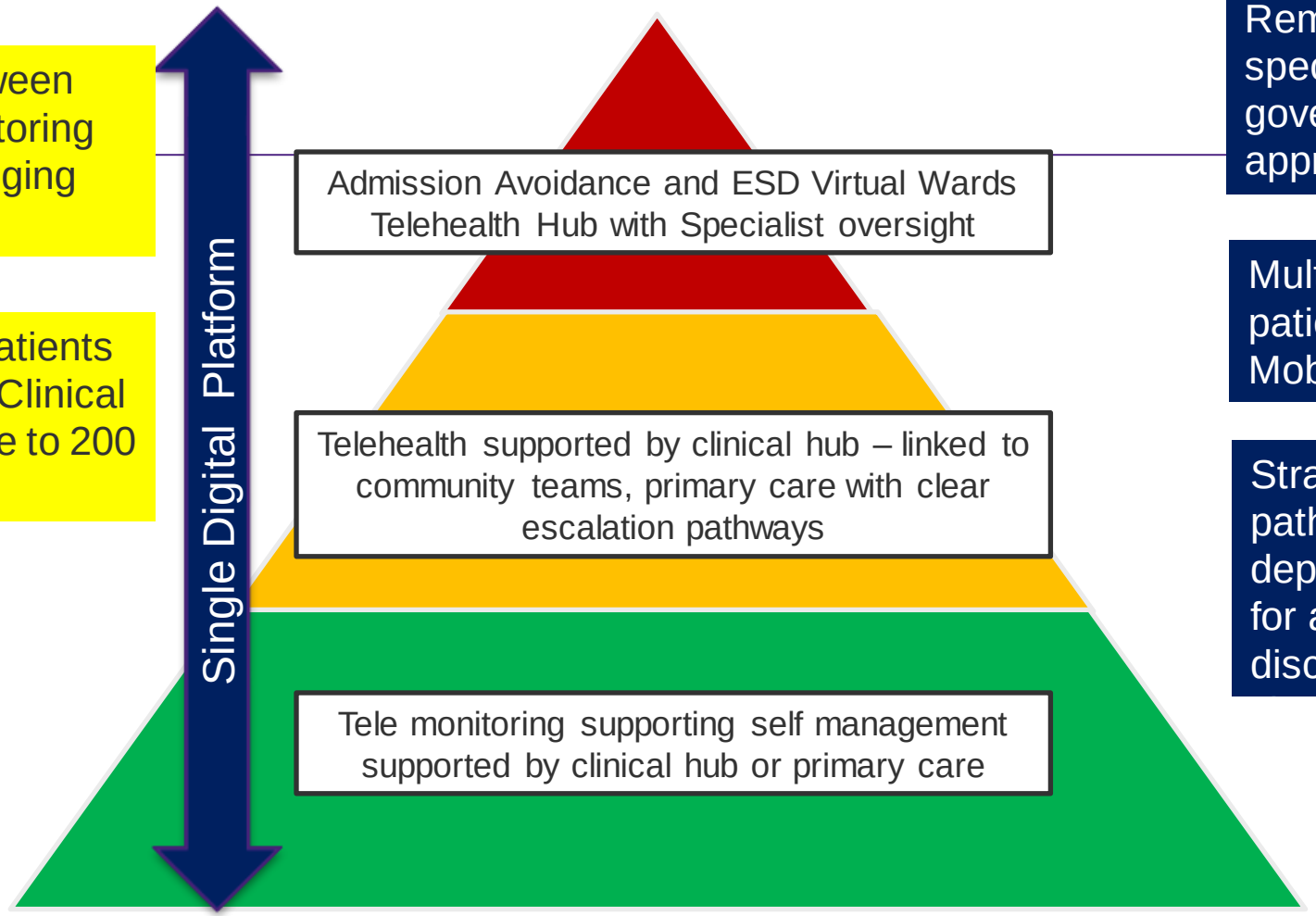
Suggested models of future Virtual Ward care



Cheshire and Merseyside Telehealth Vision

Mobility between tiers of monitoring without changing platform

Majority of patients managed in Clinical Hub : 1 nurse to 200 patients



Remote monitoring at scale requires specialist skills and training within a specific governance framework to support appropriate decision making and escalation

Multiple levels of monitoring dependent on patient need, with a variety of access point Mobility through tiers with single platform

Stratified service offer with a variety of pathways, monitoring capabilities and deployed across multiple providers allows for admission avoidance and expedited discharge to be added to the impact of the

The level of patient need defines the level of monitoring with clear clinical pathways and escalation

Covid and Respiratory Virtual Ward care

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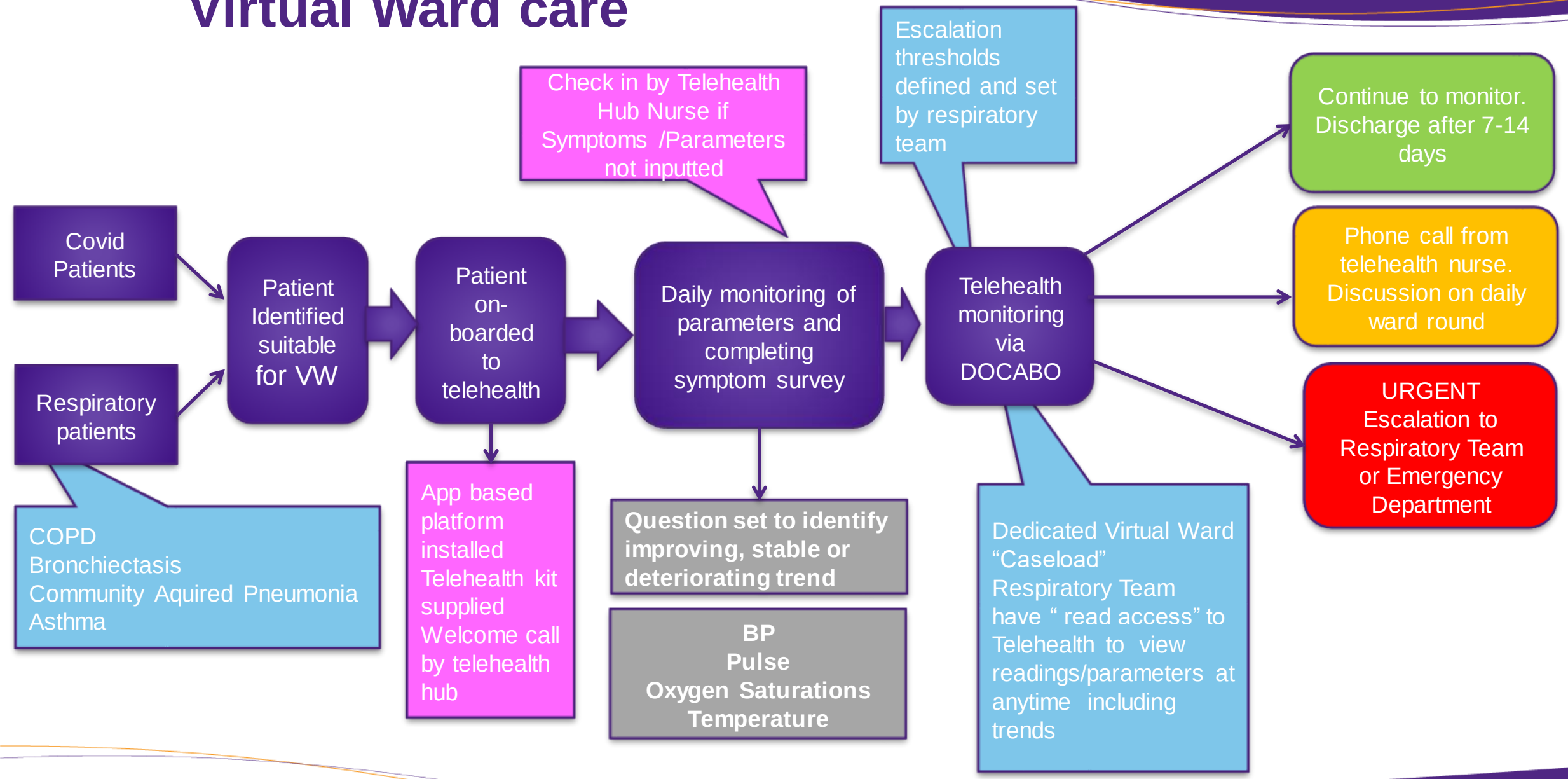

'If you always do what you've always done, You'll always get what you've always got'

Henry Ford

Thanks to Matt Inada Kim for sharing many of his slides :0)