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Virtual Wards: A Catalyst for Proactive Population Management

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Declaration of Interests

- I have received honoraria and/or non-financial support from AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Novartis and Pfizer
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Content

- What is a respiratory virtual ward?
- Hull: Respiratory Virtual Ward as a Catalyst for Healthcare Transformation
 - The Present
 - The Future

What is a virtual ward?

virtual ward

🔊 'və:tʃʊ(ə)l wɔ:d

A virtual ward is a safe and efficient **alternative to NHS bedded care** that is enabled by technology.

Virtual wards support patients who would **otherwise be in hospital** to receive the acute care, monitoring and treatment they need in their own home.

This includes either **preventing avoidable admissions** into hospital, or **supporting early discharge** out of hospital.



Virtual Wards: Tech Enablement

virtual ward

🔊 'və:tʃʊ(ə)l wɔ:d

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A virtual ward enabled by technology consists of (as a minimum):

1. The ability for patients to measure and input agreed health data for example vital signs into an app or website (this may also be done automatically for example with wearable/Bluetooth technology).
2. These data feed into a digital platform / dashboard which is reviewed remotely by a clinical team.
3. The clinical team are alerted when a patient moves outside of agreed parameters so they can take appropriate and timely action.

Integrated Virtual Ward Model: Hull and East Riding

Respiratory Virtual Ward – Live from September 2022

Frailty Virtual Ward – Live from December 2022

COPD is an important cause of morbidity and mortality



~392 million have COPD globally



Exacerbations can **irreversibly reduce lung function**

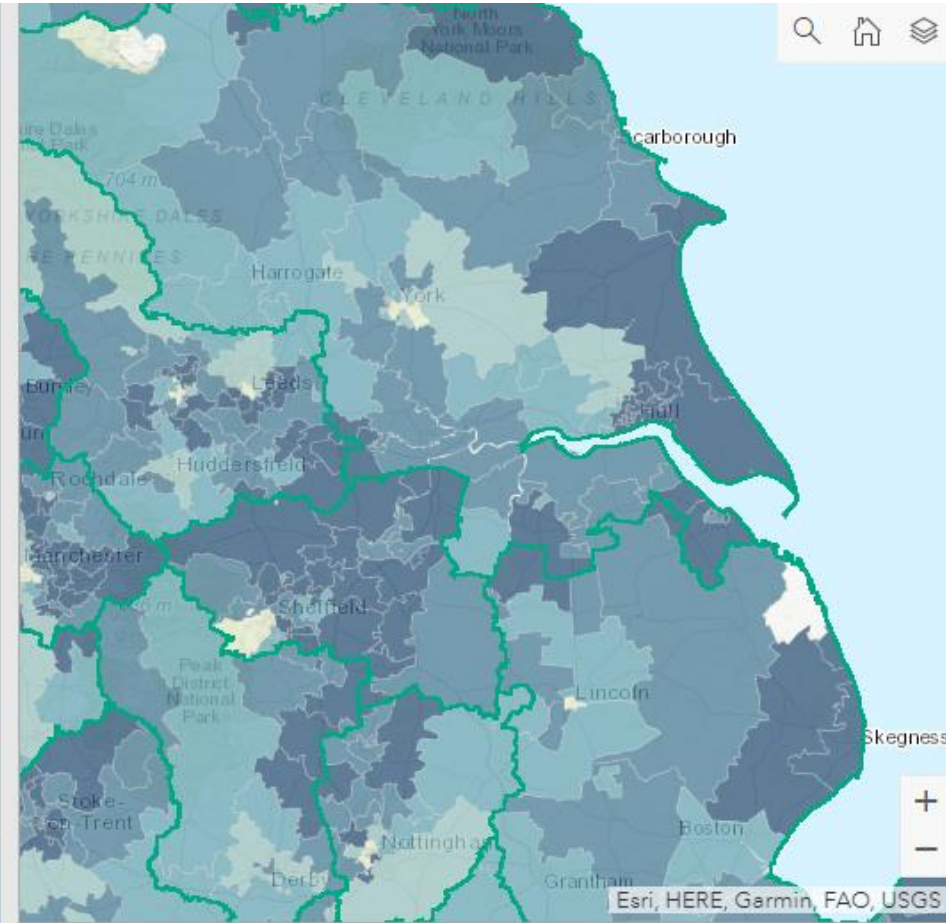
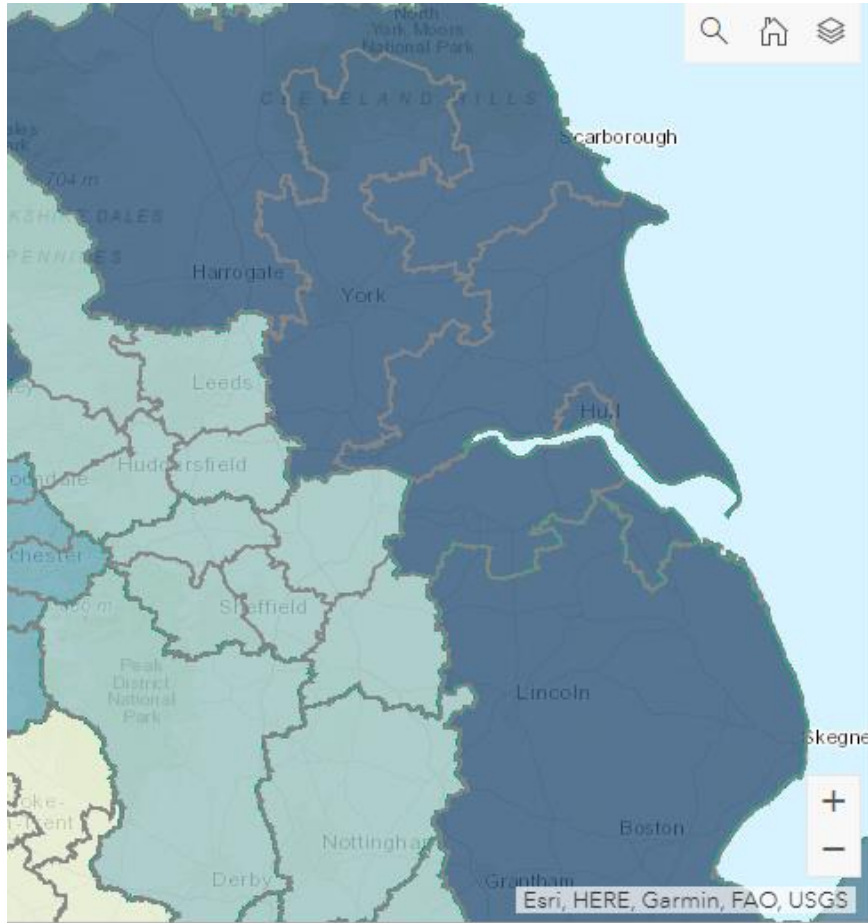


COPD exacerbations are the **2nd commonest cause** of **emergency admissions** in the UK



~1 in 5 patients die within **1 year** of their first severe exacerbation

COPD in Hull and ERY



Respiratory Clinical Assessment Service

Respiratory Virtual Ward

Respiratory VW Clinical Triage

Designated clinical coordinator (specialist nurse/AHP) for RES Service

Clinical Triage and Assessment (Face-to-Face or Virtual)

- Consider criteria for Respiratory Virtual Ward admission against specific clinical pathway criteria
- Admit to virtual ward and assign to the appropriate clinical pathway / case-load within the virtual ward

Admission Avoidance

- Known COPD
- Symptoms consistent with AECOPD
- Not considered to need hospital assessment at present but at risk of hospitalisation
- No other diagnosis to explain symptoms

- Review at home within 24 hours
- Treatment arranged via GP, non-medical prescriber or patients own 'just-in-case' meds
- Home nebuliser loan
- PPE in accordance with local guidance.

Early Supported Discharge

- Hospitalised < 72 hours
- Known COPD
- Symptoms consistent with AECOPD
- No other diagnosis to explain symptoms
- No consolidation on CXR
- O2 sats >87% on air or usual LTOT
- Started oral treatment for AECOPD

COVID-19 Status

negative | positive

- Review prior to hospital discharge unless prior agreement from coordinator
- All new ESD patients to be discussed in consultant-led morning briefing
- Home nebuliser loan
- Maximum review once daily for up to 14-days (telephone or face-to-face)

Hospital at Home

- Considered to need hospital care by admitting clinician
- Known COPD
- Symptoms consistent with AECOPD
- No other diagnosis to explain symptoms
- DECAF 0-1 and meets ABG/CBG criteria (**Needs ECG and CXR**)
- Started appropriate AECOPD treatment in hospital
- If COVID-19 +ve – safe social situation for discharge.

- Review prior to hospital discharge
- Daily discussion in consultant-led morning briefing
- Home nebuliser loan
- Access to capillary blood gasses and blood tests at home
- Option for IV antibiotics at home
- Maximum review twice daily for up to 14-days (face-to-face).
- PPE in accordance with local guidance.

Daily multi-disciplinary (consultant-led) virtual board round

- To agree care and escalation plans, agree transitions between care pathways, arrange/review investigations
- All admissions and discharges from the virtual ward to be discussed

Digital Support: Lenus Health

Lenus About Technology Services News Licensing Careers Enquire now

Joe Example
NHS SCOTLAND COPD

How are you feeling today?

1. Better than usual
2. Normal/usual
3. Worse than usual
4. Much worse than usual

Data rules help clinicians to identify patterns in patient health and make decisions about their care

A secure messaging service allows patients and clinical teams to contact each other

Today 15:21
Today 15:32

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COPD Management

A remote monitoring and virtual ward service for patients with Chronic Obstructive Pulmonary Disease supported by predictive outcome models.

Enquire Now

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The Lenus Service has improved the management of COPD by demonstrating a reduction in hospital admissions, sustained usage at 2 years follow-up and equality in access to care.

2x

Improved 12-month survival rate

54%

Reduction in hospital admissions

4.53

Fewer annual bed days per patient

£3.38m

Projected annual cost savings with 500 users

Remarkable people.
Extraordinary place.

Respiratory Virtual Ward: Digital Enablement

Supporting clinical workflows

- Clinical dashboards
- Data flows from patient for monitoring, no alerting
- Communicate directly with the patient via app

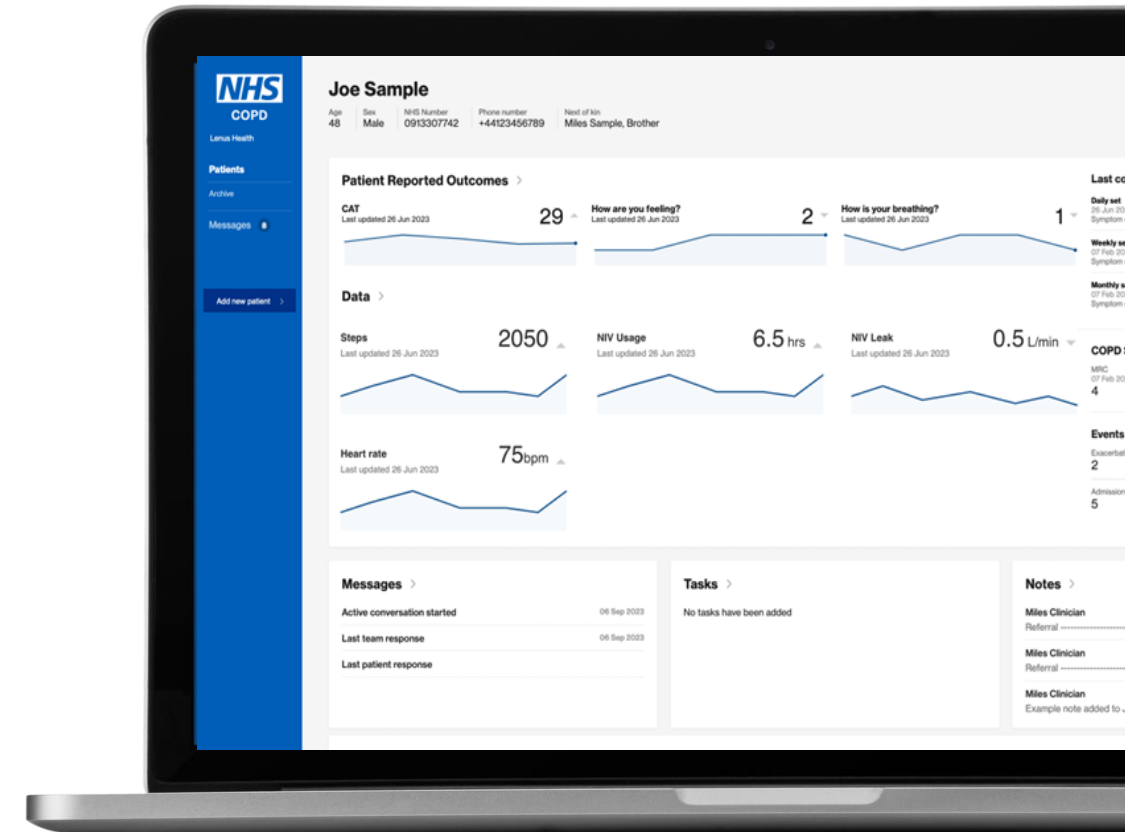
COPD Digital Support Service components

Supported self-management

- Data flows from patient for monitoring
- Communicate directly with the patient via app
- Empowering patients – connecting + resources
- Integrated with Virtual Ward processes

AI ready

- Providing proactive care capabilities
- Class IIb CE marking submitted



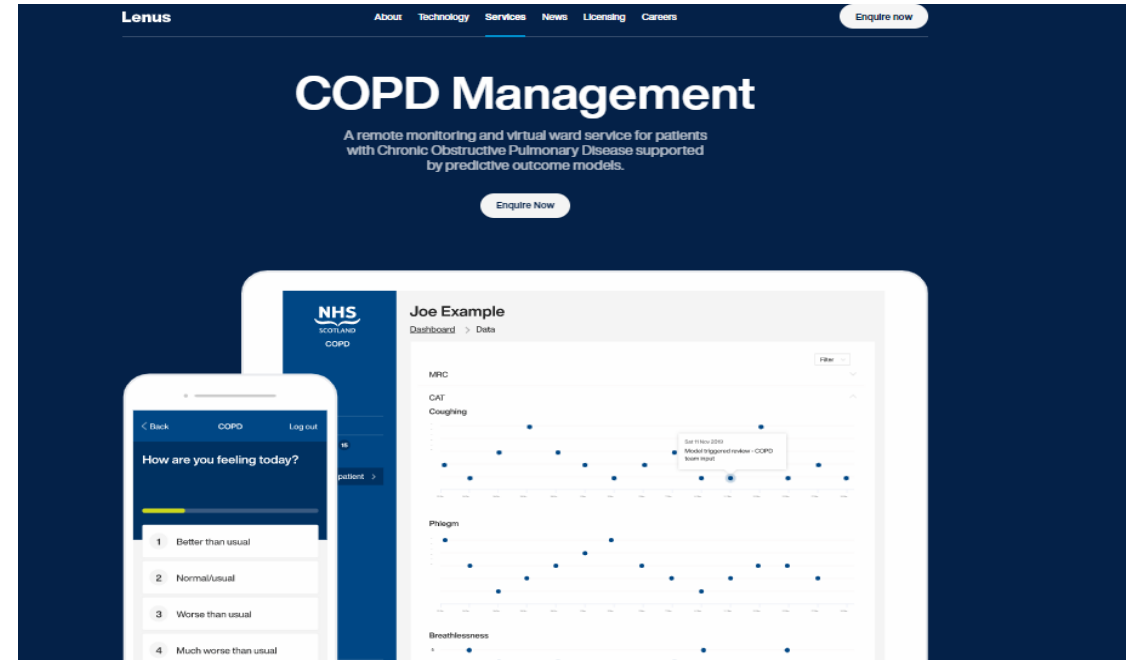
Respiratory Virtual Ward: Outcomes

In the first year since launch

- 1,195 patients have been on the virtual ward
 - ~ 60% admission avoidance
 - ~40% early supported discharge

Since the launch of the technology enabled virtual ward

- Estimated bed-day savings of 4,183 Bed Days
- Equates to 11.4 beds per day



Continued Supported Self-Management

Preliminary Analysis of those receiving continued, digitally enabled supported self-management following Virtual Ward Discharge

Characteristic	Cases	Historical Control
Number (n)	111	145
Age – mean [SD]	68.1 [9.7]	71.8 [9.8]
Gender – n (%)		
- Female	64 (58)	93 (64)
- Male	47 (42)	52 (36)

Findings inline with an ~50% reduction in ED attendances and Hospital Admissions among those enrolled in digitally enabled supported self-management

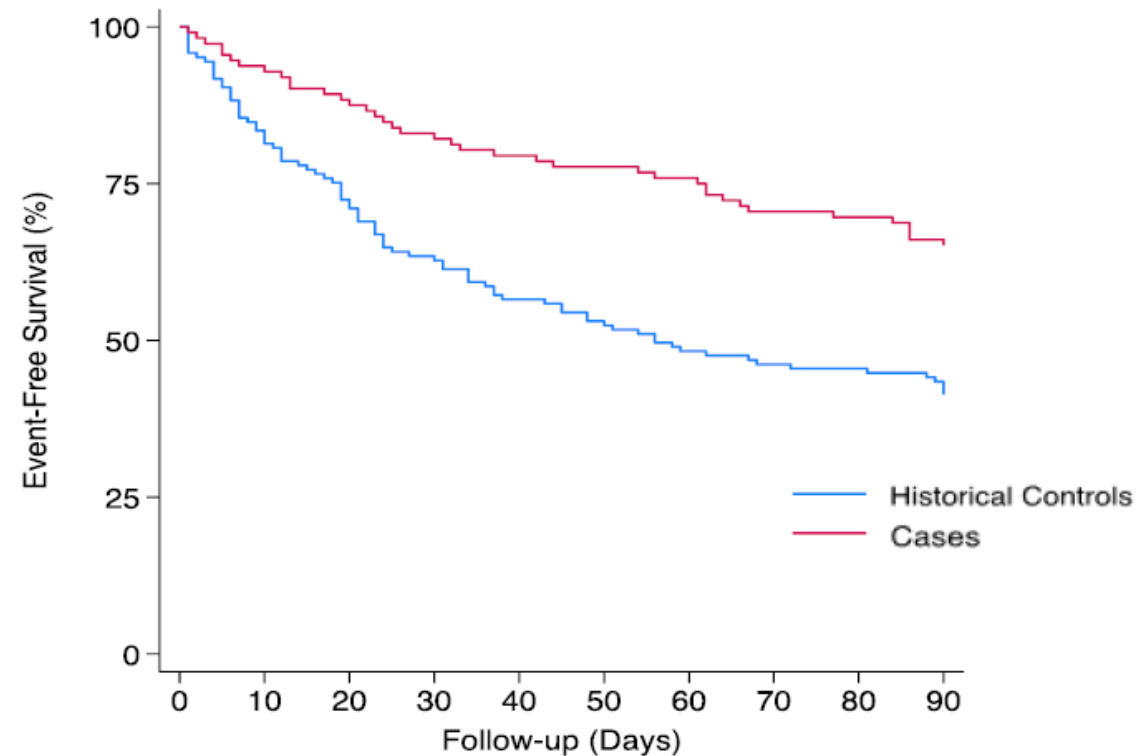
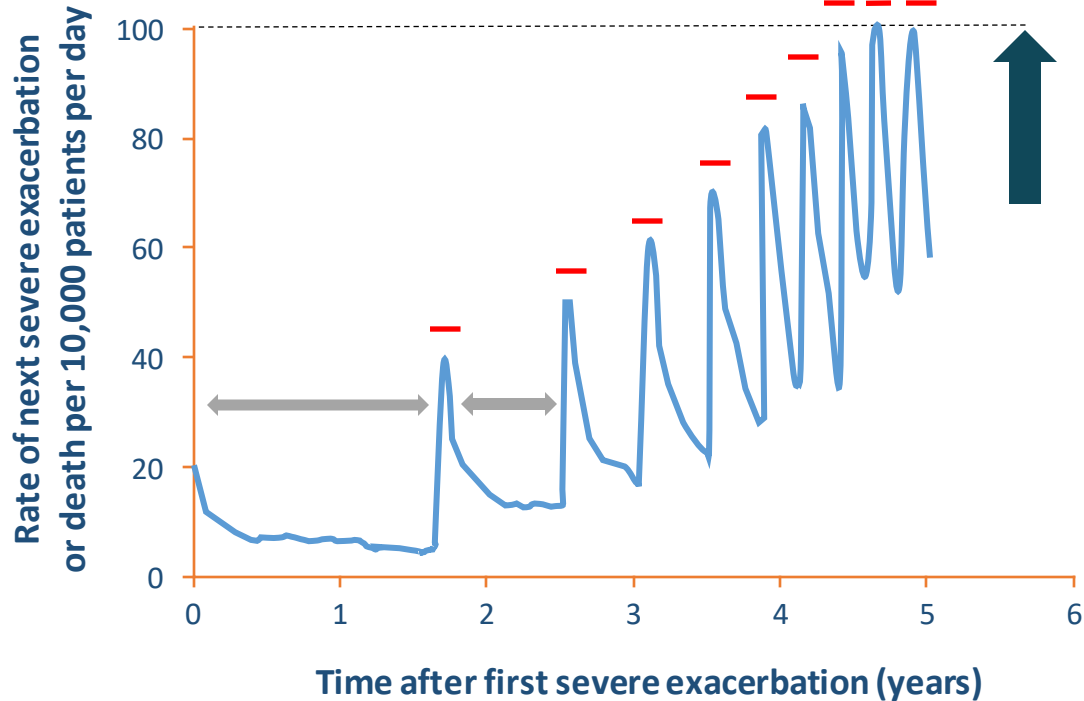


Figure 1. Kaplan-Meier survival plot demonstrating event-free survival for the cases (red line) and the historical controls (blue line) in the 3-month post-index date window. The first event is taken to be whichever occurred first: an emergency department attendance, a hospital admission or death.

Respiratory Virtual Ward: the future

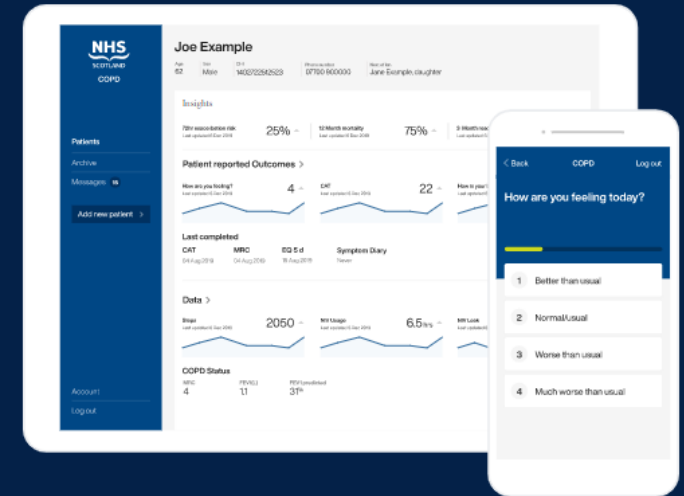
An opportunity to prevent the next exacerbation

Population Health Management



Early discharge and AI risk-stratified management of COPD patients

[Find out more >](#)



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Extraordinary place.

Respiratory Virtual Ward: the future

An opportunity to prevent the next exacerbation

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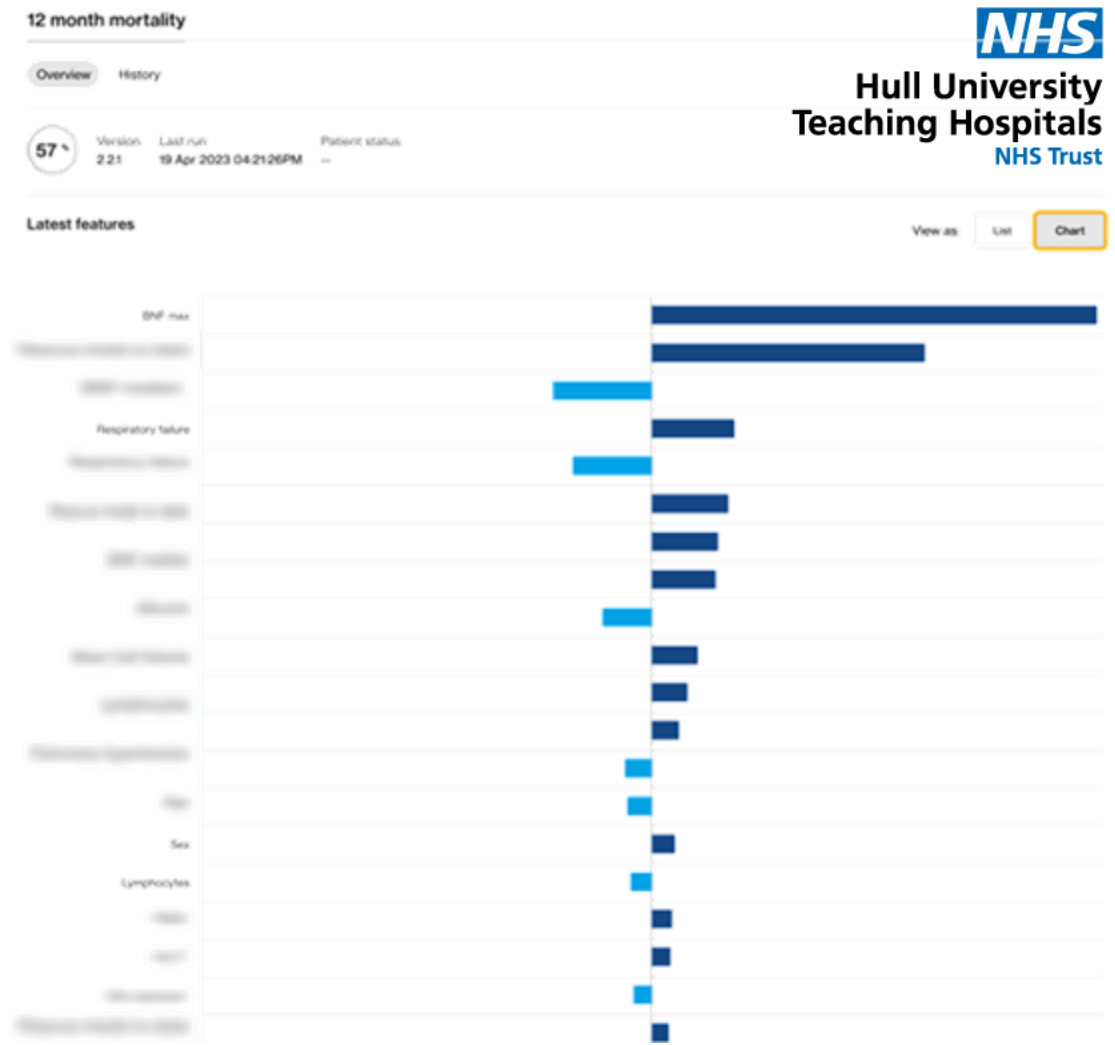
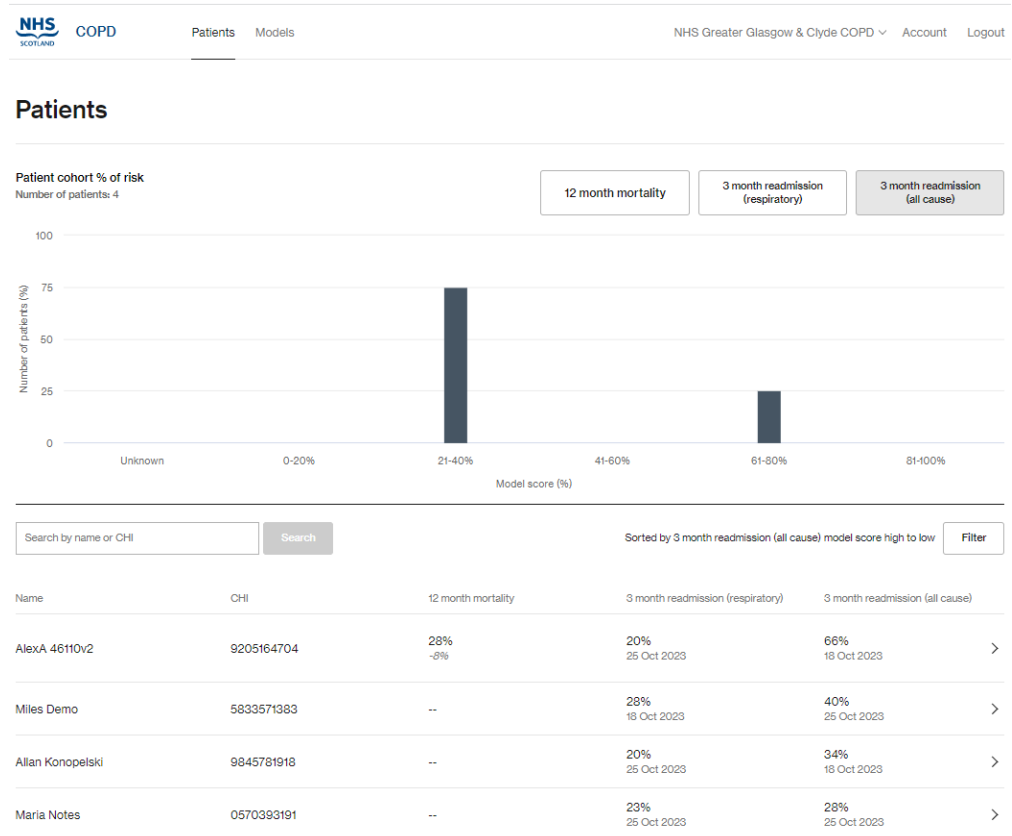
CARE 2023
Using AI to improve outcomes for COPD patients

5th June 2023

Lenus model suite - Summary

Model	Identifies patients based on	Patient Prioritization within Pathway
Model PLAN	<ul style="list-style-type: none">high risk of mortality in 12 months	<ul style="list-style-type: none">Initiate patient review and anticipatory care planning.Case finding tool for advanced therapies.
Model ACT	<ul style="list-style-type: none">high risk of hospital readmission in 1-3 months for COPD / all cause admission	<ul style="list-style-type: none">Identify patients for therapy review to prevent downstream admissionCase find for advanced therapies.
Model ALERT	<ul style="list-style-type: none">high risk of having an exacerbation event in next 3-5 days	<ul style="list-style-type: none">Contact immediately to initiate rescue medication and care
Model CLASS	<ul style="list-style-type: none">three common clusters in a population	<ul style="list-style-type: none">determine if patients are receiving guideline directed therapy based on their risk profileprioritise those in need of review

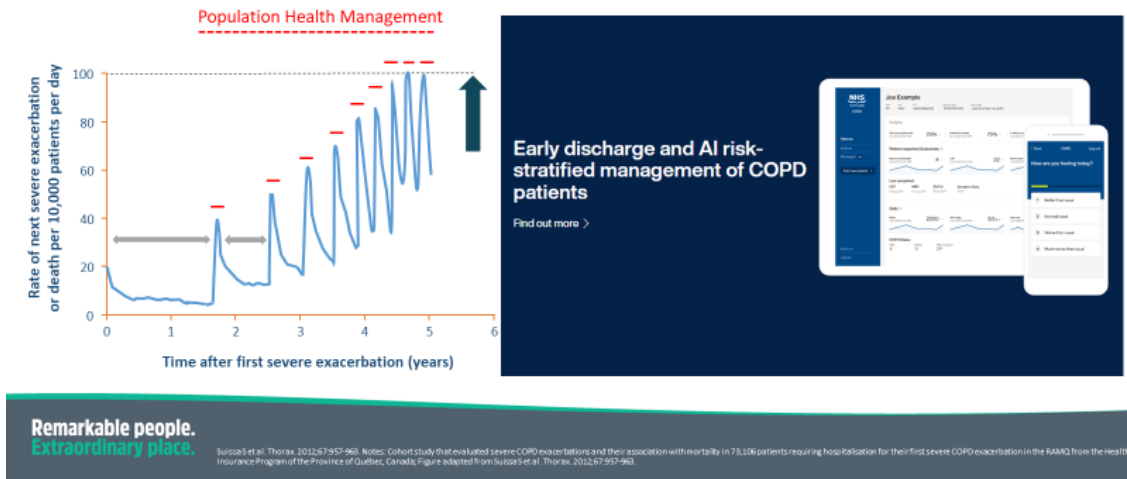
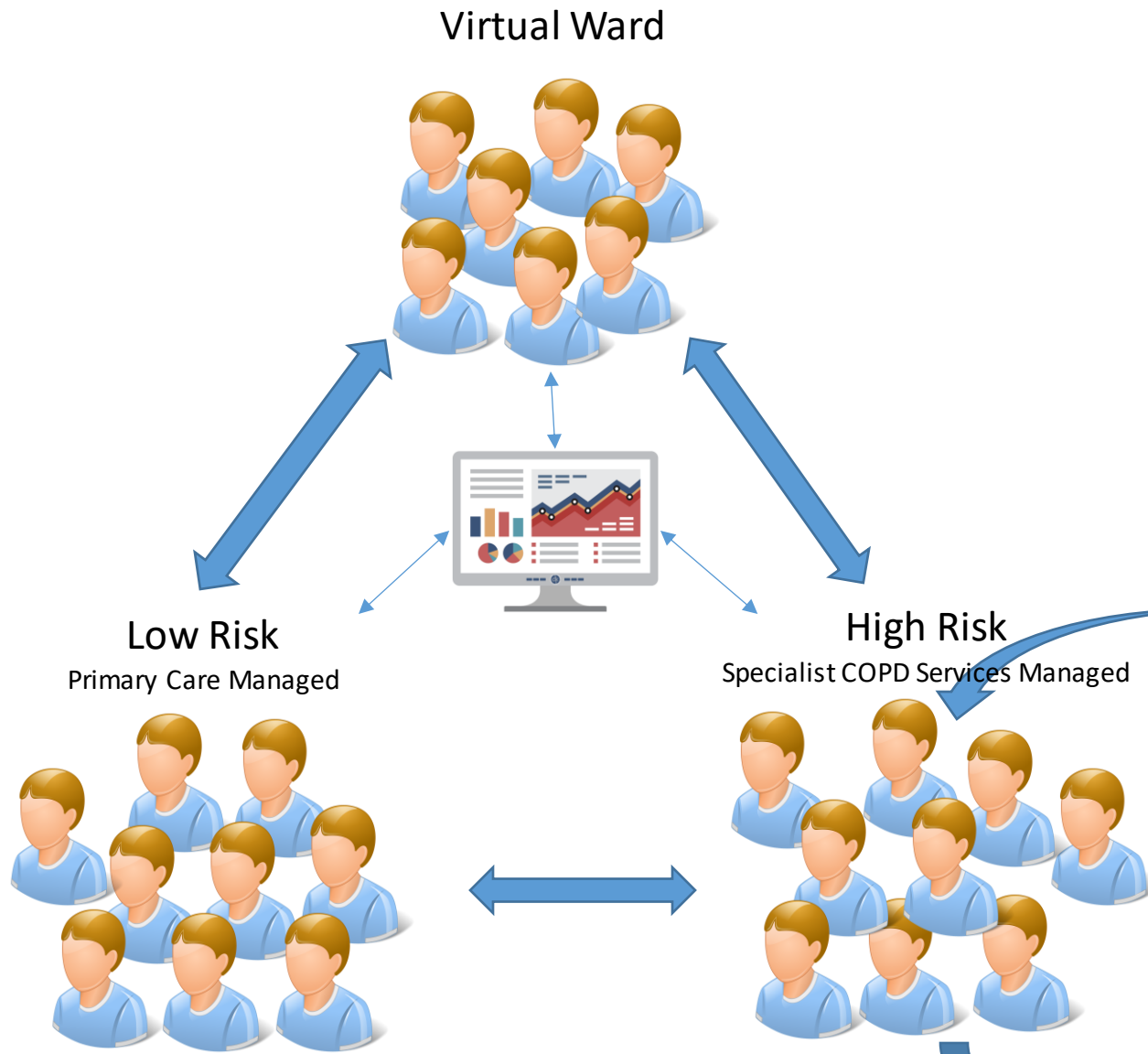
Lenus Stratify[®] provides a population view of the risk profile across the models



For each patient, a personalised risk score for each model is shown alongside the features that are influencing the risk.

Respiratory Virtual Ward: the future

An opportunity to prevent the next exacerbation



Early discharge and AI risk-stratified management of COPD patients

Find out more >

- COPD MDT/Specialist Review**
- Optimisation of pharmacotherapy
 - Specialist stop smoking support
 - Pulmonary rehabilitation
 - O2 assessment
 - Advanced care planning
 - etc

Conclusions

- Virtual wards represent an opportunity to improve care
 - Exacerbation care
 - Treatment optimisation to prevent the next exacerbation
- ‘Technology Enablement’ can support service delivery
 - Operational efficiency
 - Systems integrations, providing relevant data to clinicians in a useful format
- Integrating virtual wards with population health management
 - Future opportunities for AI based risk prediction to rebalance proactive and reactive care delivery.

