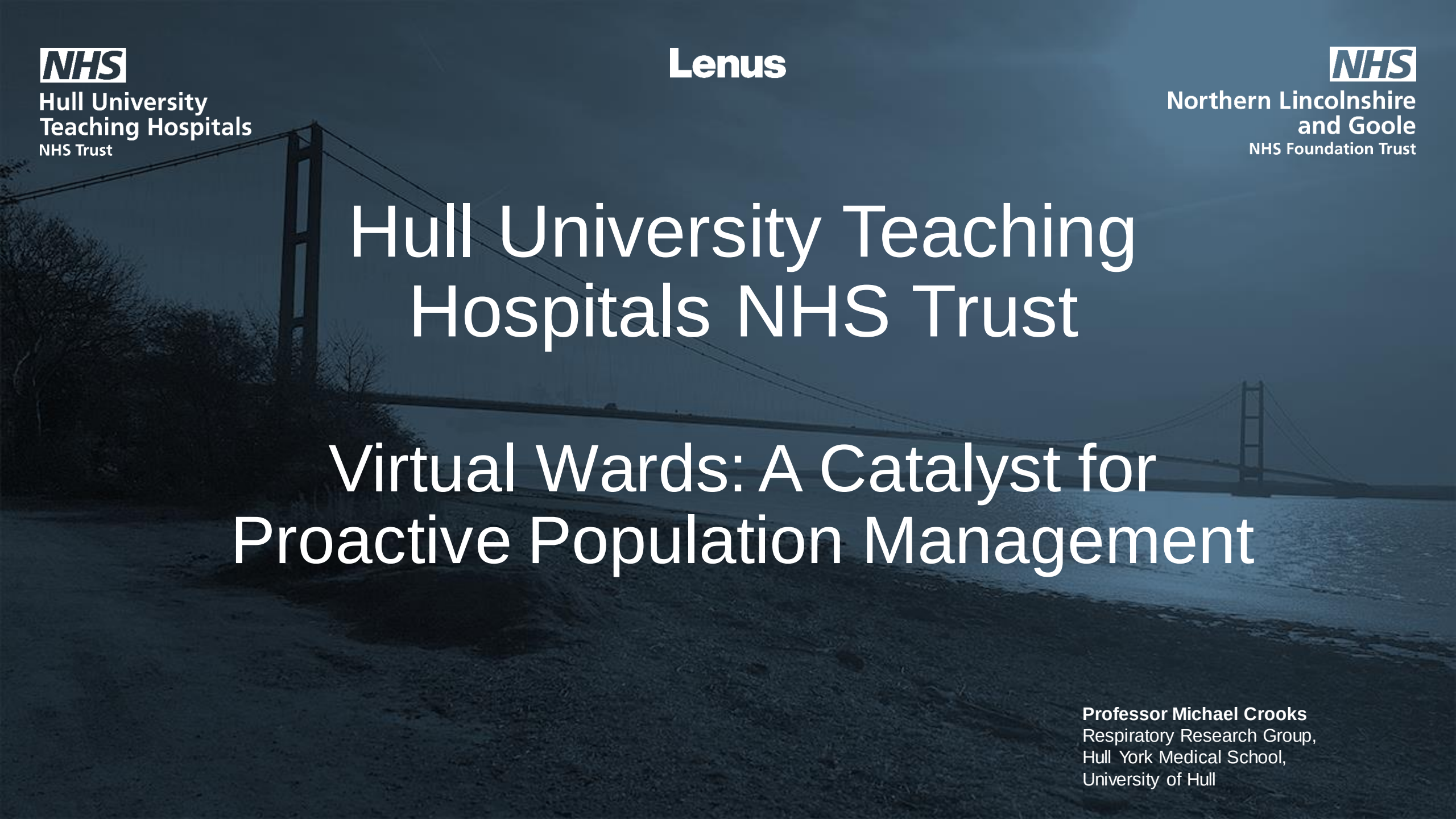

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Virtual Wards: A Catalyst for Proactive Population Management

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Hull York Medical School,
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Declaration of Interests

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

- I have received grants from the Academic Health Sciences Network (AHSN), National Institute for Health and Care Research (NIHR), AstraZeneca, Boehringer Ingelheim, Chiesi, Pfizer and Philips.

Content

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- 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?

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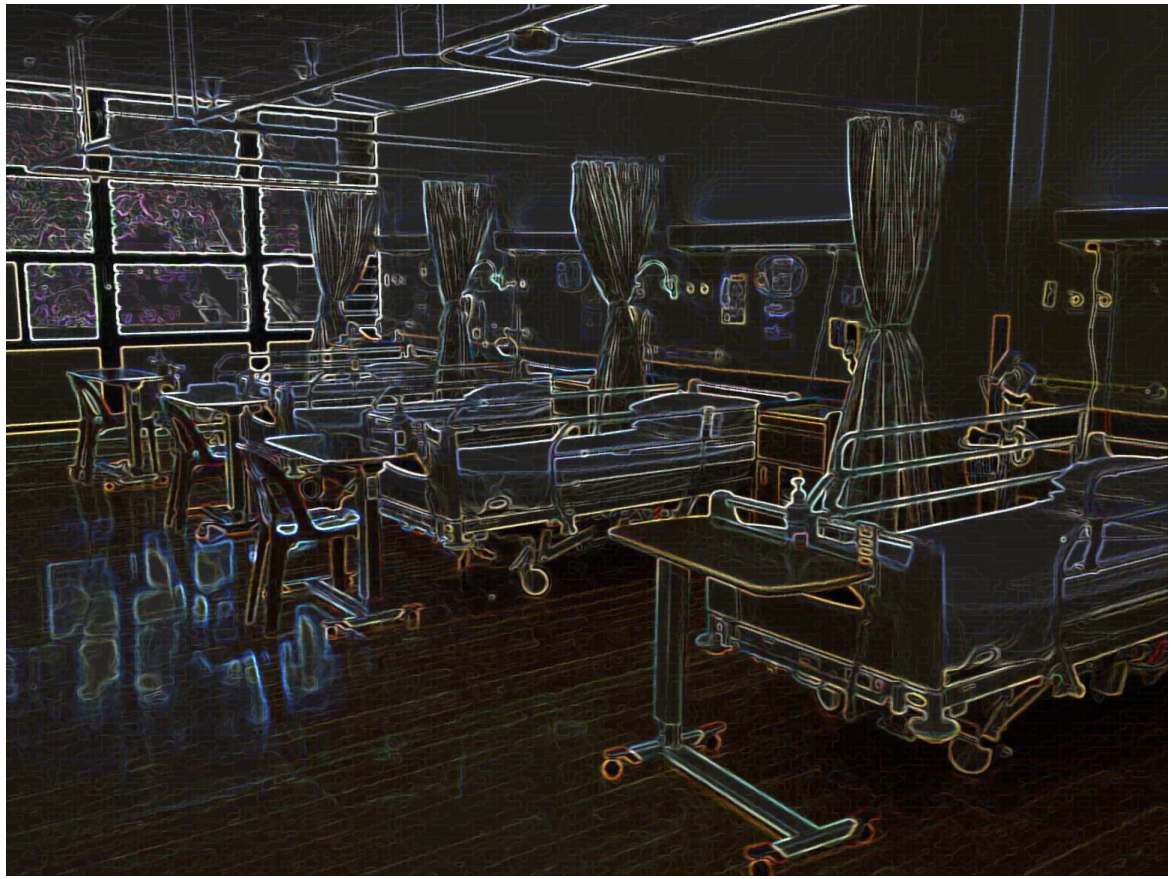
virtual ward

ˈvəːtʃʊ(ə)l wɔːd

*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

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virtual ward

ˈvəːtʃʊ(ə)l wɔːd

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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.

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Integrated Virtual Ward Model: Hull and East Riding

Respiratory Virtual Ward – Live from September 2022

Frailty Virtual Ward – Live from December 2022

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chcp

COPD is an important cause of morbidity and mortality

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~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

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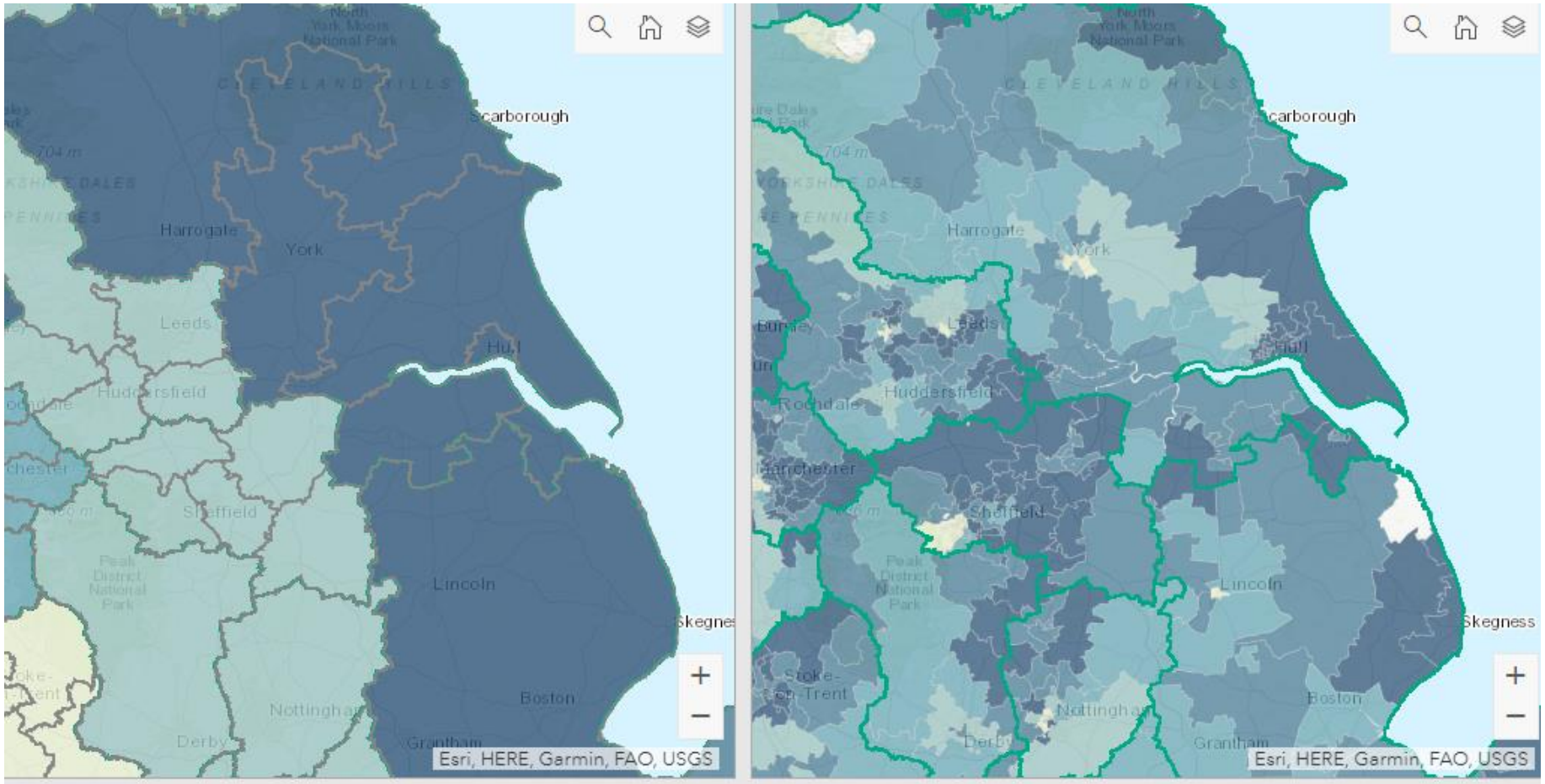
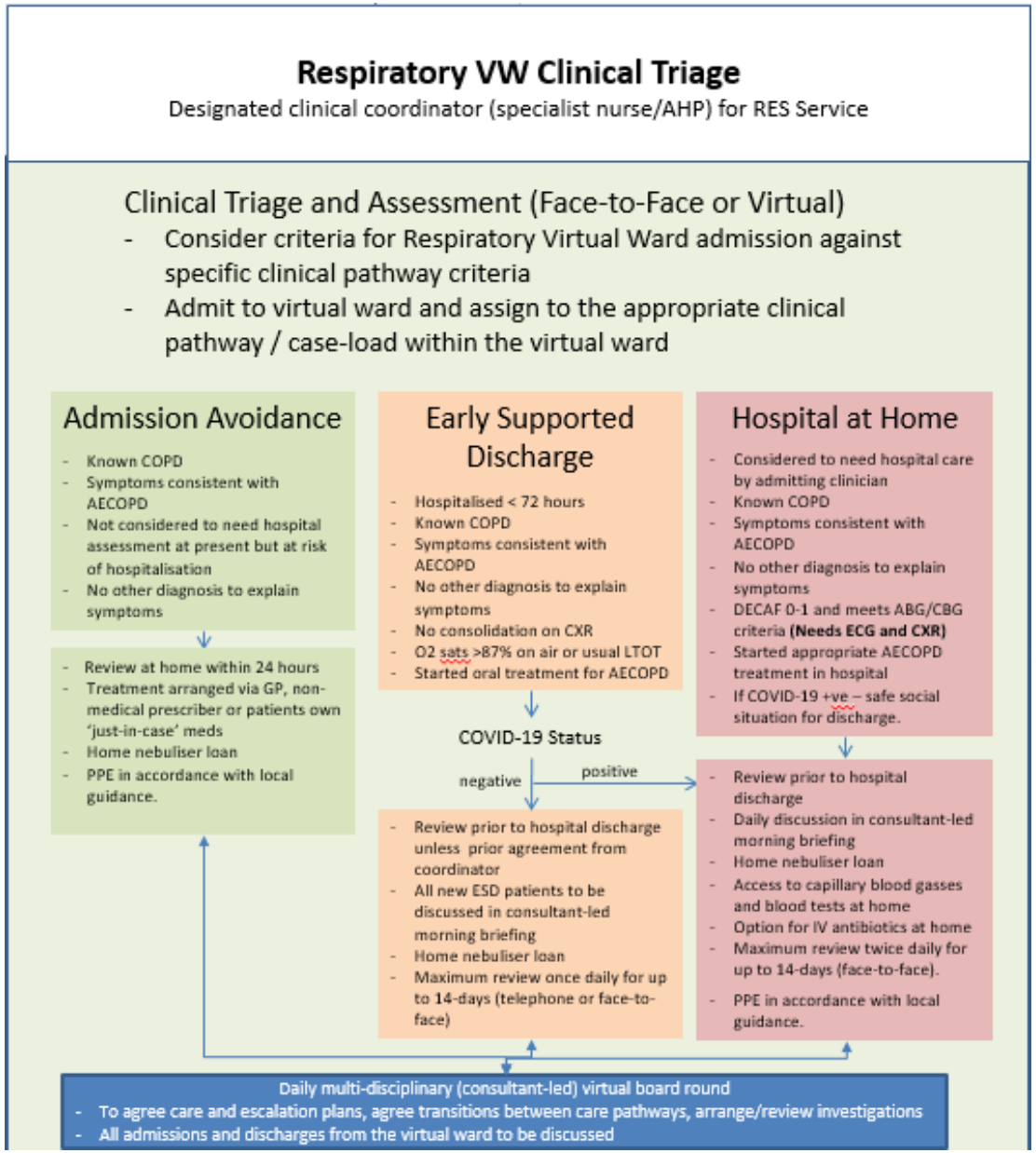


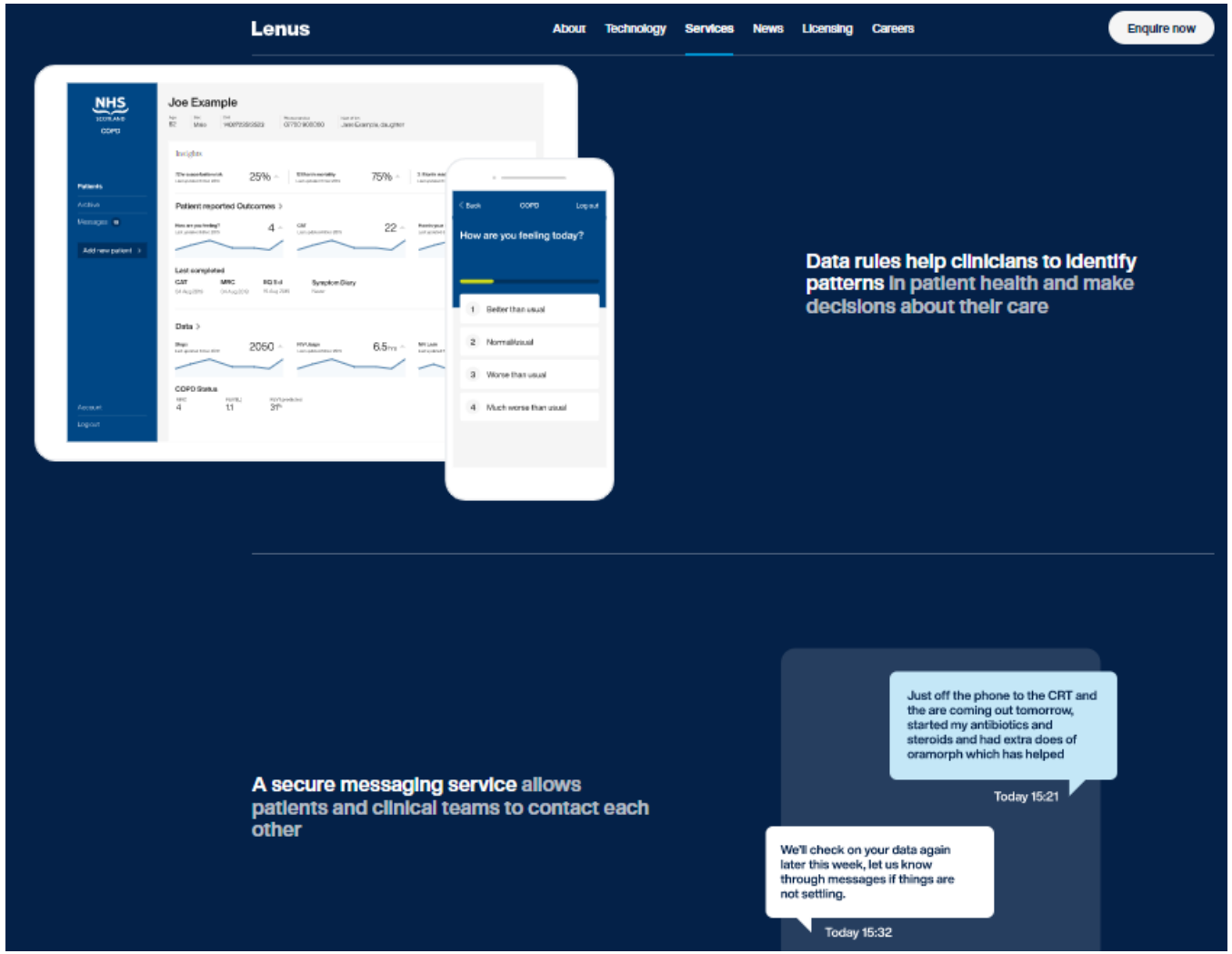
Remarkable people.
Extraordinary place.

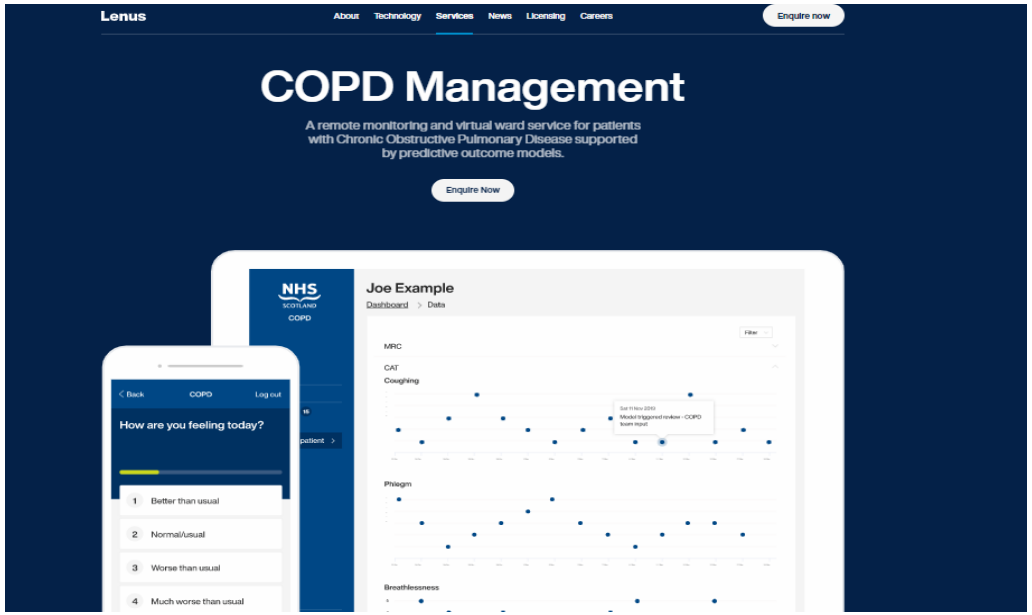
Respiratory Clinical Assessment Service

Respiratory Virtual Ward



Digital Support: Lenus Health





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

Respiratory Virtual Ward: Digital Enablement

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Supporting clinical workflows

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

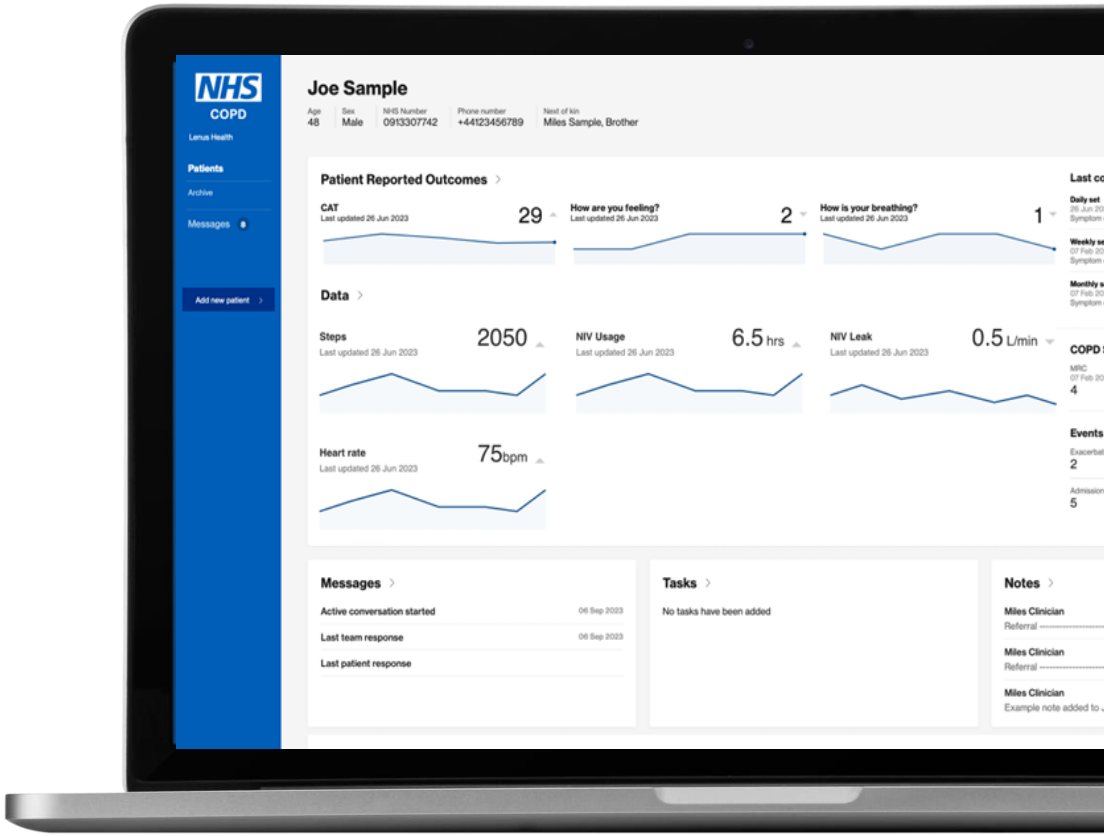
COPD Digital Support Service components

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



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Respiratory Virtual Ward: Outcomes

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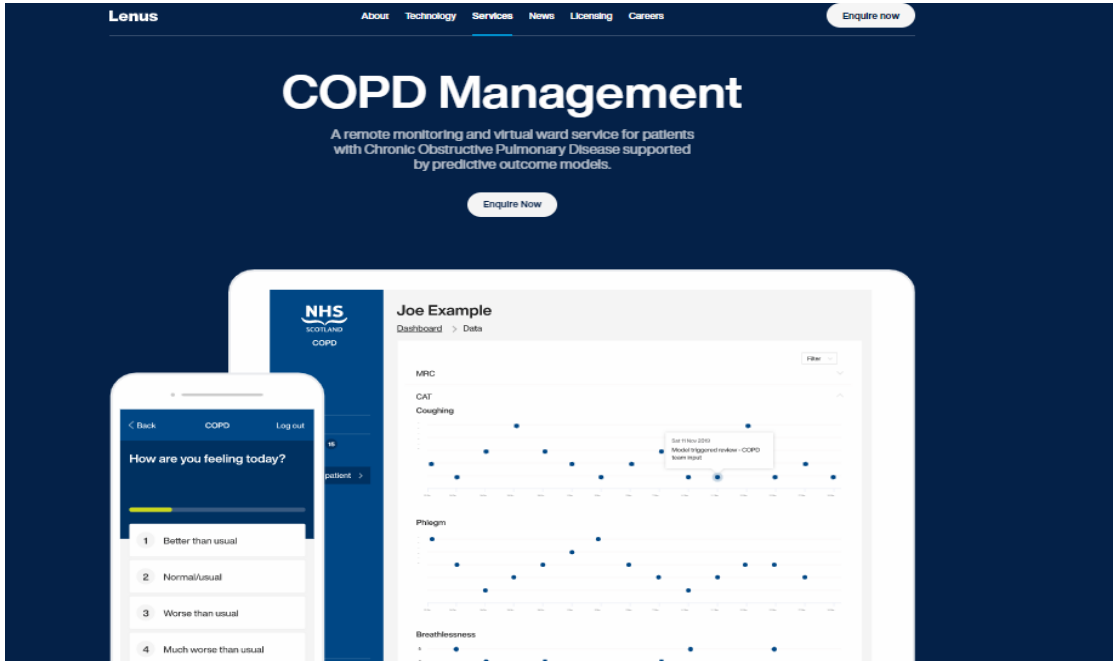
In the first year since launch

- 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

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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 - Male	 64 (58) 47 (42)	 93 (64) 52 (36)

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

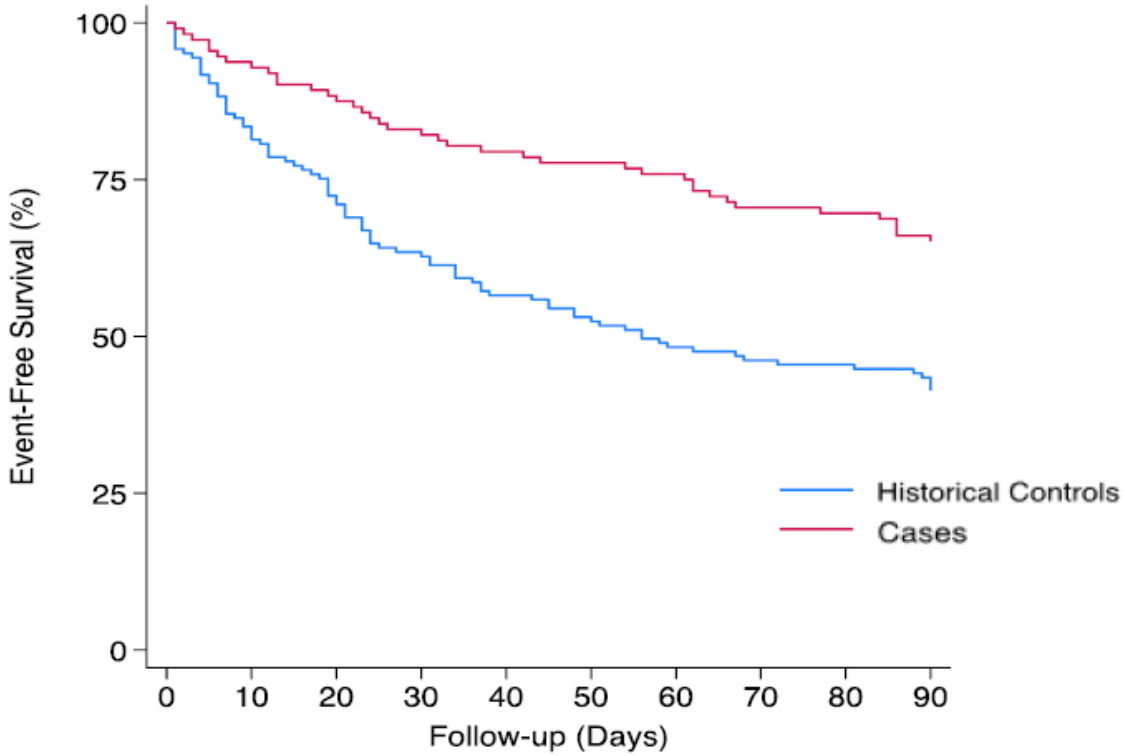

Figure 1. Kaplan-Meier survival plot demonstrating event-free survival for the cases (red line) and the historical controls (blue line) in the 3-month post-index date window. The first event is taken to be whichever occurred first: an emergency department attendance, a hospital admission or death.

Respiratory Virtual Ward: the future

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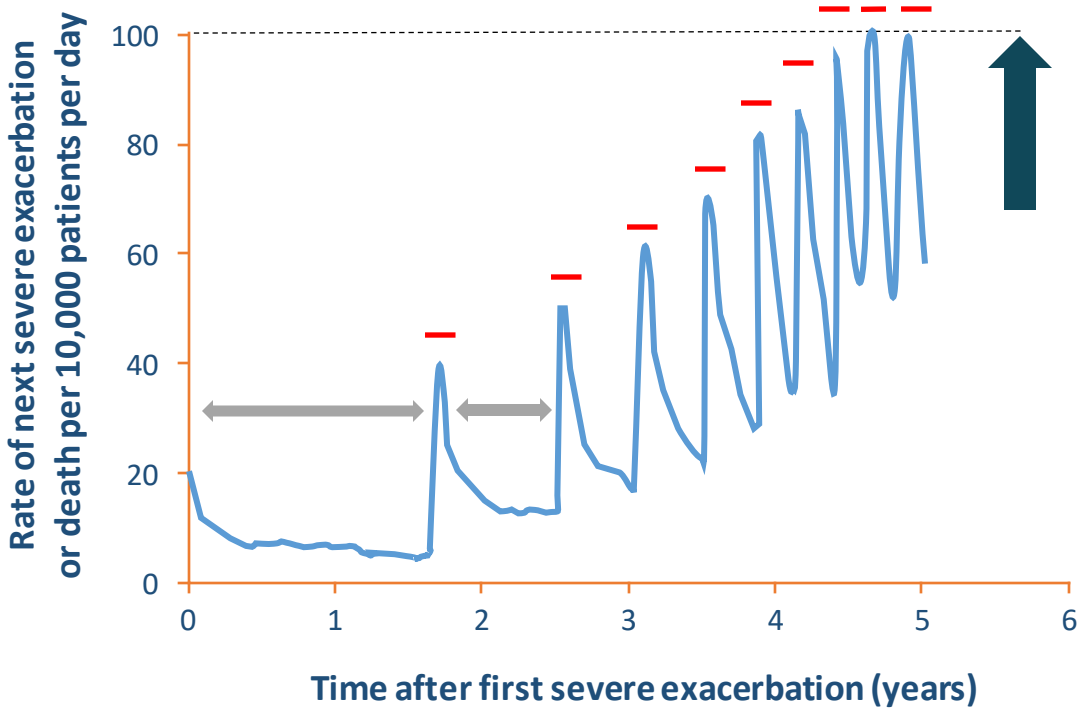
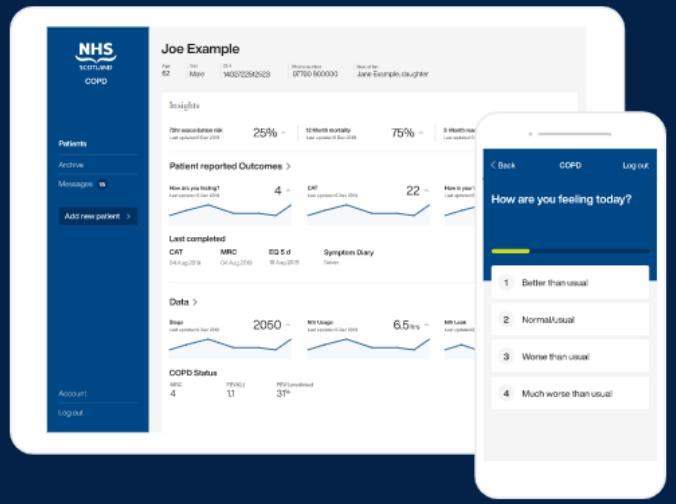
An opportunity to prevent the next exacerbation

Population Health Management



Early discharge and AI risk-stratified management of COPD patients

Find out more >



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Suissa S et al. Thorax. 2012;67:957-963. Notes: Cohort study that evaluated severe COPD exacerbations and their association with mortality in 73,106 patients requiring hospitalisation for their first severe COPD exacerbation in the RAMQ from the Health Insurance Program of the Province of Québec, Canada; Figure adapted from Suissa S et al. Thorax. 2012;67:957-963.

Respiratory Virtual Ward: the future

Hull University Teaching Hospitals NHS Trust

An opportunity to prevent the next exacerbation

Lenus

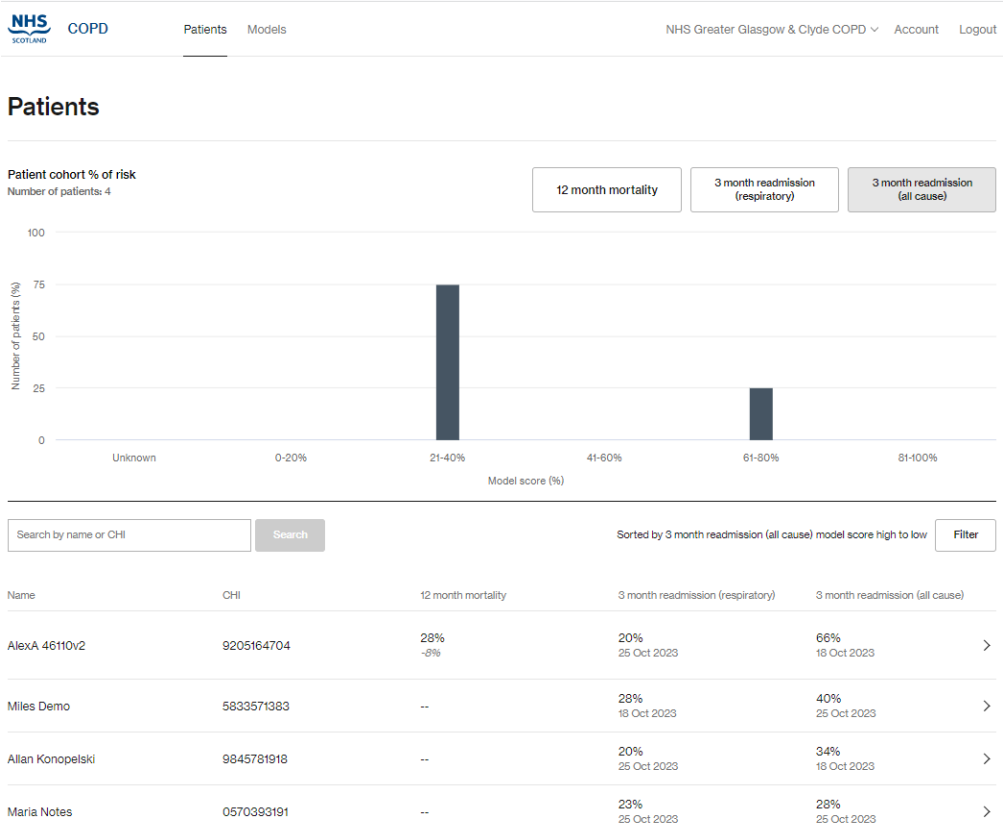
CARE 2023
Using AI to improve outcomes for COPD patients

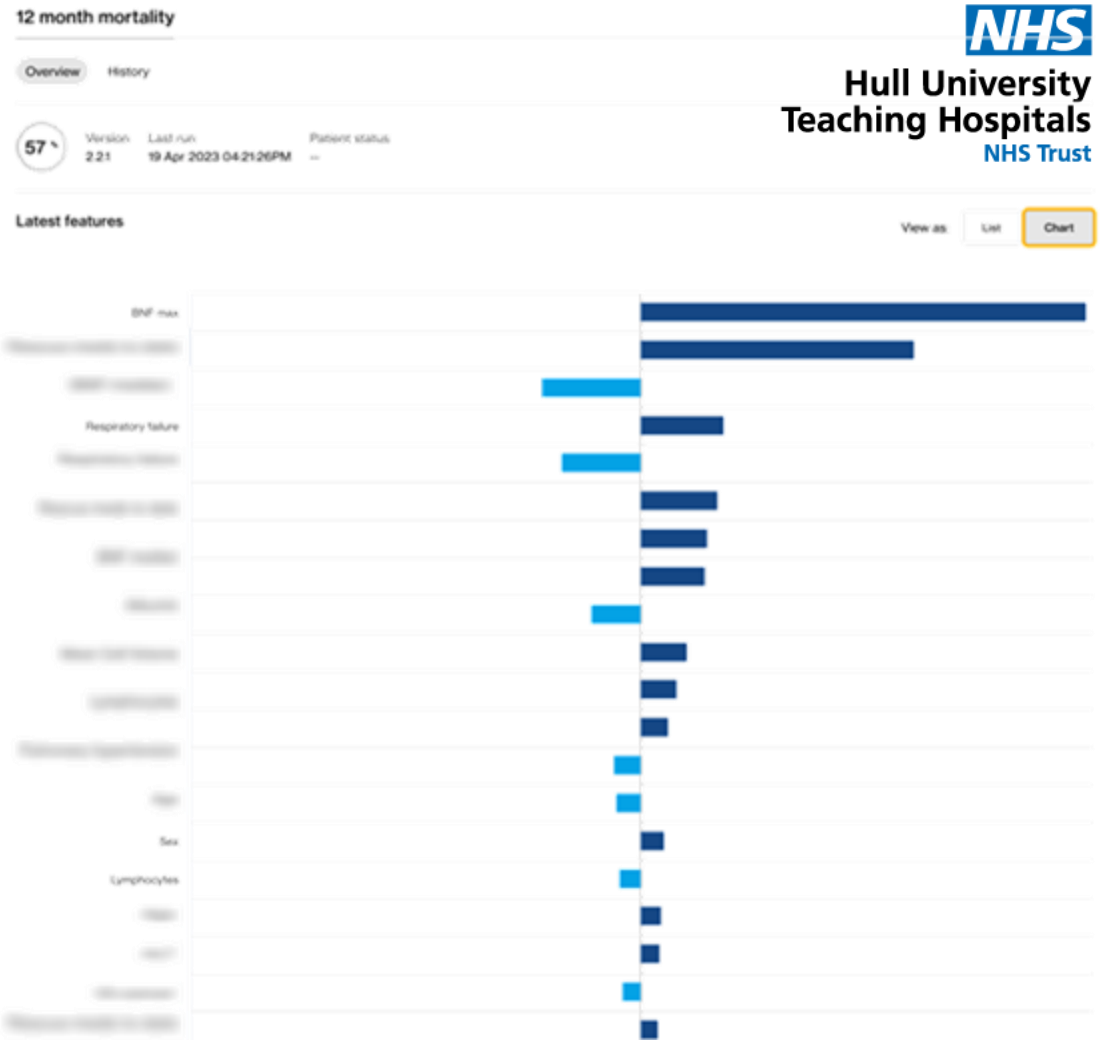
5th June 2023

Lenus model suite - Summary

Model	Identifies patients based on	Patient Prioritization within Pathway
Model PLAN	▪ high risk of mortality in 12 months	▪ Initiate patient review and anticipatory care planning. ▪ Case finding tool for advanced therapies.
Model ACT	▪ high risk of hospital readmission in 1-3 months for COPD / all cause admission	▪ Identify patients for therapy review to prevent downstream admission ▪ Case find for advanced therapies.
Model ALERT	▪ high risk of having an exacerbation event in next 3-5 days	▪ Contact immediately to initiate rescue medication and care
Model CLASS	▪ three common clusters in a population	▪ determine if patients are receiving guideline directed therapy based on their risk profile ▪ prioritise those in need of review

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





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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

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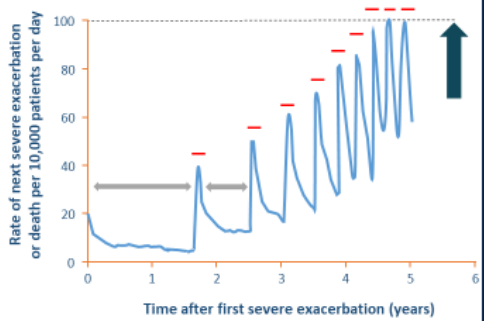
Population Health Management



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Virtual Ward

Low Risk

Primary Care Managed

High Risk

Specialist COPD Services Managed

COPD MDT/Specialist Review

- Optimisation of pharmacotherapy
- Specialist stop smoking support
- Pulmonary rehabilitation
- O2 assessment
- Advanced care planning
- etc

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Extraordinary place.

Conclusions

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- 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.