



Introduction to **SENSE**

A discovery engine for AI-powered
clinical decision support in real time

SENSE aims to unlock a more proactive or 'anticipatory' model of care



Personalised AI-powered insights that help clinicians take preventative action earlier

Real-time decision support to prevent avoidable hospitalisation and acute deterioration



Predictive models to help managers to make better operational decisions

Spot problems or pinch-points in time to take action and to reallocate resources



Technologies designed with and for the NHS

AI designed working closely with NHS clinicians, targeted on front-line problems and supported by clinical evidence



Actionable and 'explainable' insights

Predictions that have impact, the basis of which are clearly and accurately explained



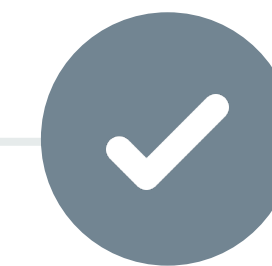
Insights drawn from analysis of large sets of deidentified real-world NHS data

Securely held in a Microsoft Azure cloud environment strictly according to the best standards of privacy and information governance



Challenges

- Underutilised data in disconnected silos
- Information overload hinders effective clinical decision-making
- Poor data access to enable AI development
- Inaccessible AI expertise
- Information governance, security & privacy concerns
- Clinicians' lack of trust in black-box algorithms

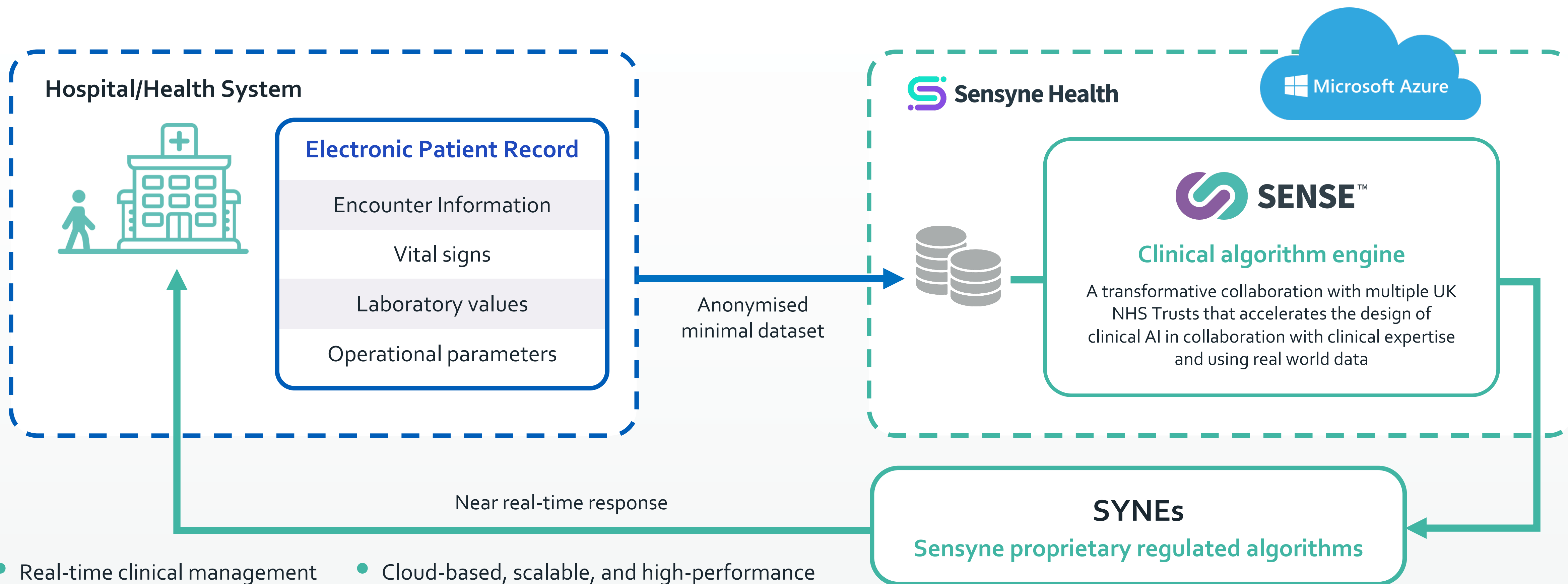


Ideal solution

- Proactive use of electronic patient record data
- AI-assisted early intervention on at-risk patients
- Data-driven, personalised clinical pathways
- Real time access to clinical AI insights
- Increased clinical and operational efficiency
- Plain English explanation of clinical AI outcomes

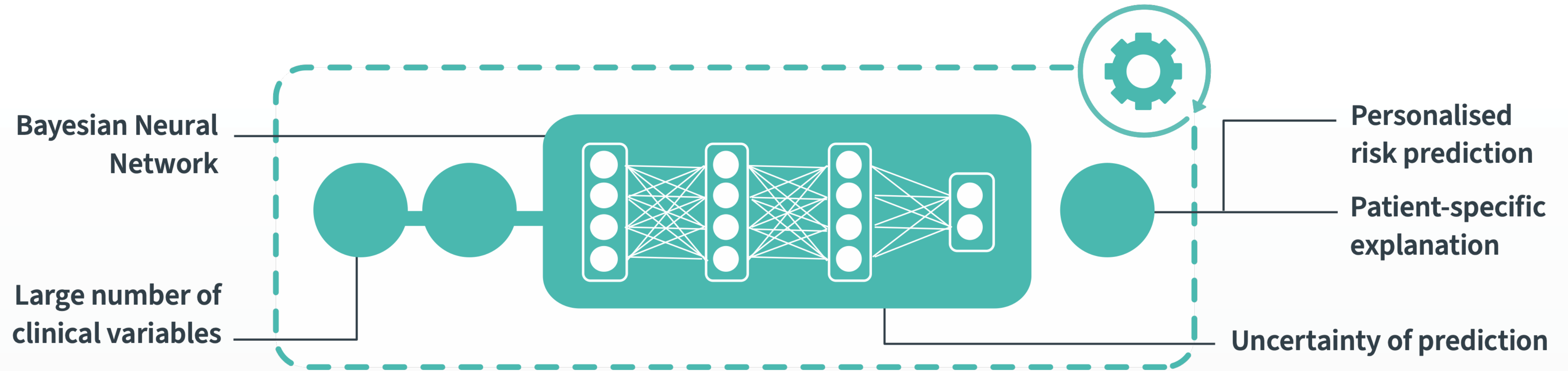
How SENSE works: real-time support for clinical & operational decision-makers

The clinical algorithm engine to provide real time clinical management support for clinicians across multiple conditions



- Real-time clinical management
- Based on clinical evidence
- Built on real world data
- Cloud-based, scalable, and high-performance
- Designed in collaboration with clinicians
- One AI platform, multiple conditions

Neural Network technology - explained clearly, with transparent certainty levels



In contrast to other risk prediction engines, SENSE uses advanced Neural Network technology to process large quantities of clinical variables simultaneously, providing personalised predictions with quantifiable certainty levels for each patient, explained to clinicians in plain English.



One AI platform, multiple conditions

Active development

SYNE-OPS-1

Predict ICU beds required for patients with active COVID-19 infection

SYNE-COV

Personalised COVID-19 risk predictor (risk of ICU admission, mechanical ventilation, mortality)

Future opportunities

Congestive Heart Failure

Stroke

COPD

Myocardial infarction

Beds allocation

Length of stay

Diabetes

Venous Thromboembolism

Resource prediction

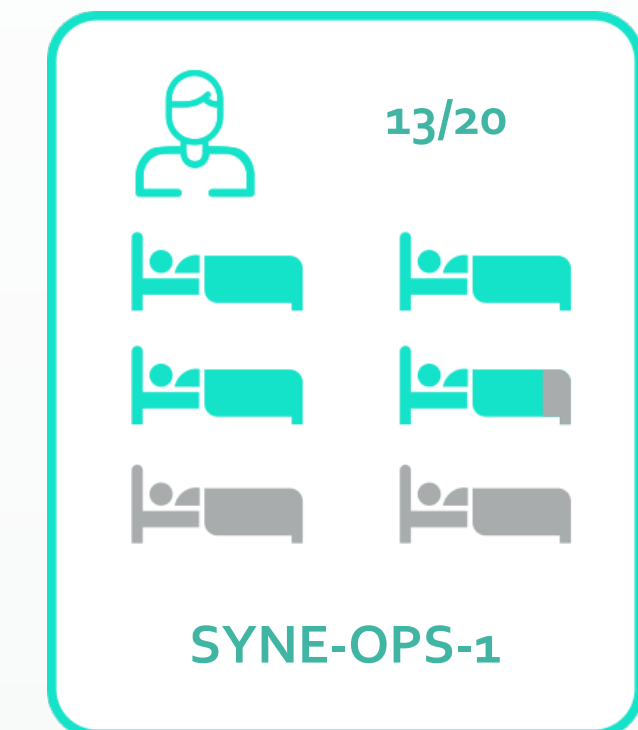
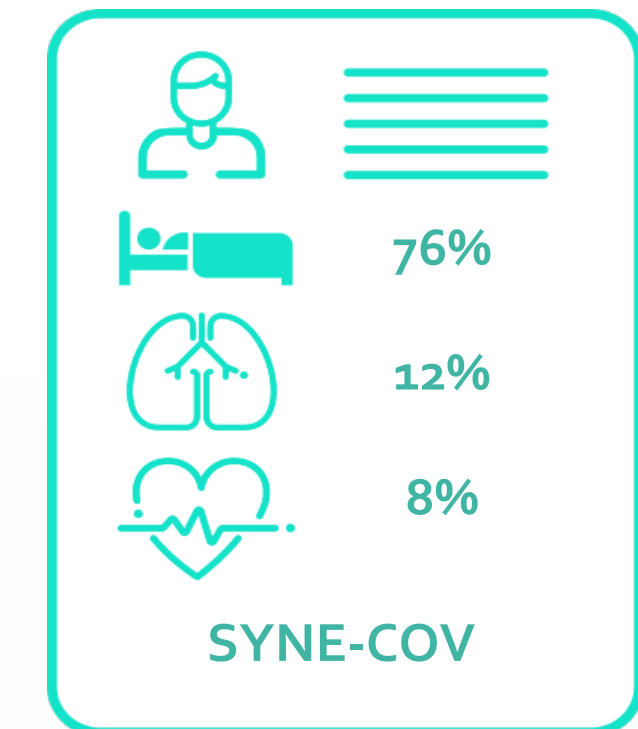
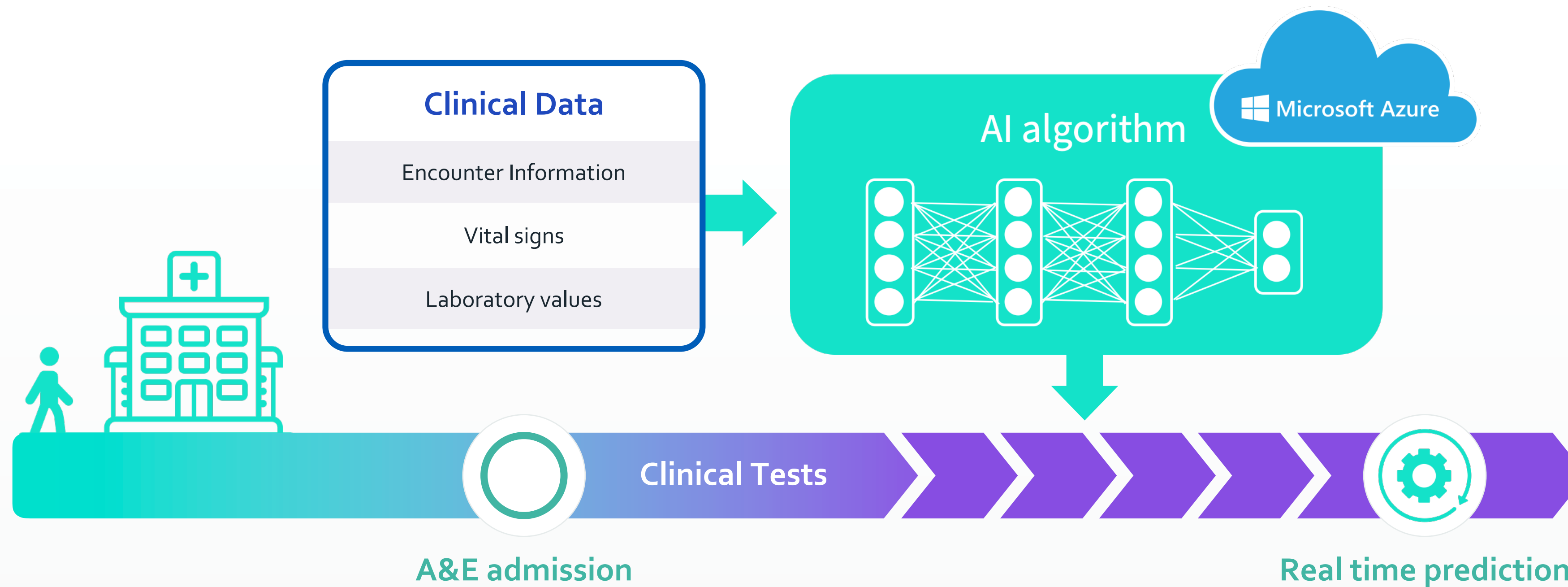
Medication management

Sepsis

Inpatient Hypoglycaemia



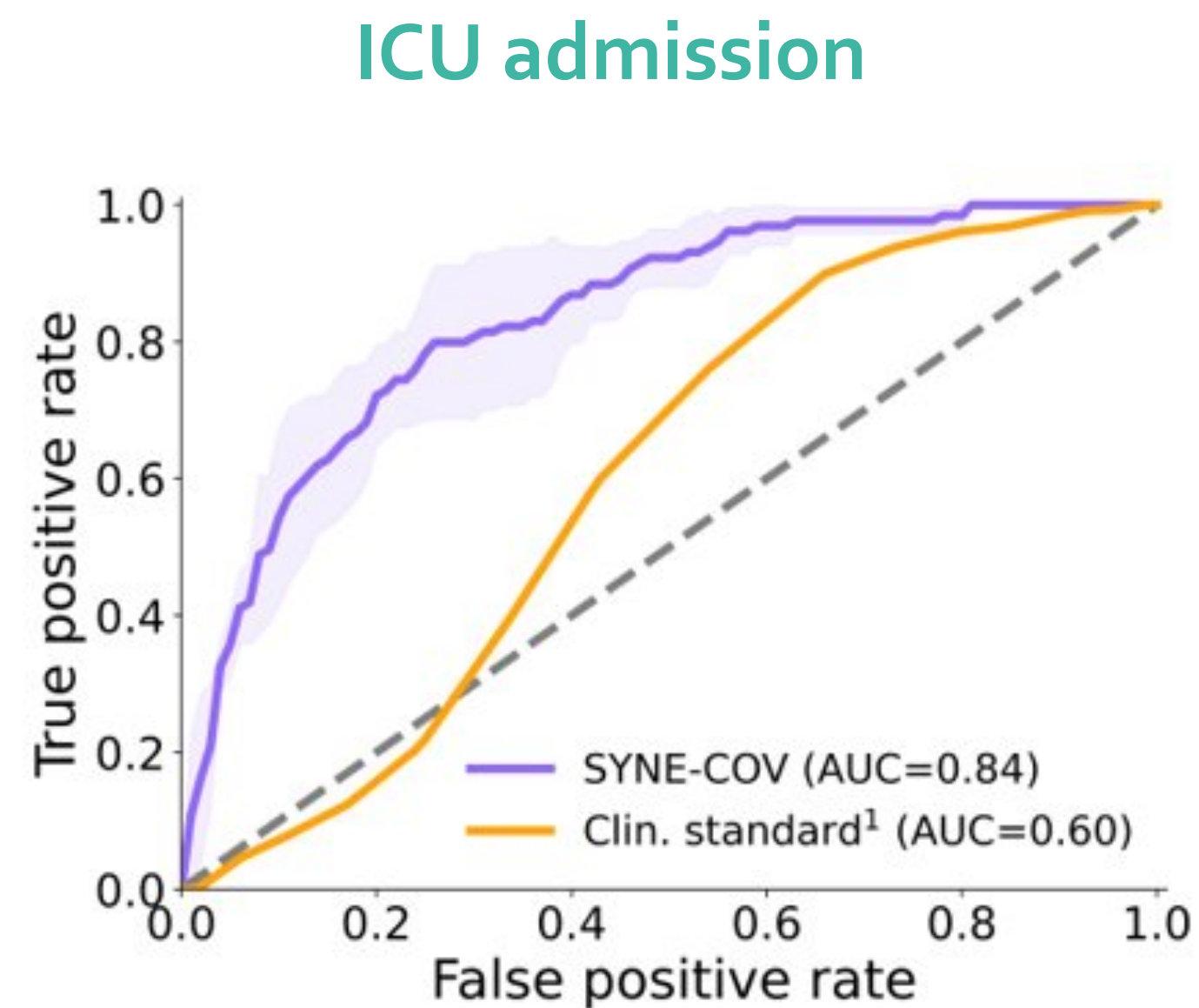
Case study: real-time decision support for COVID-19



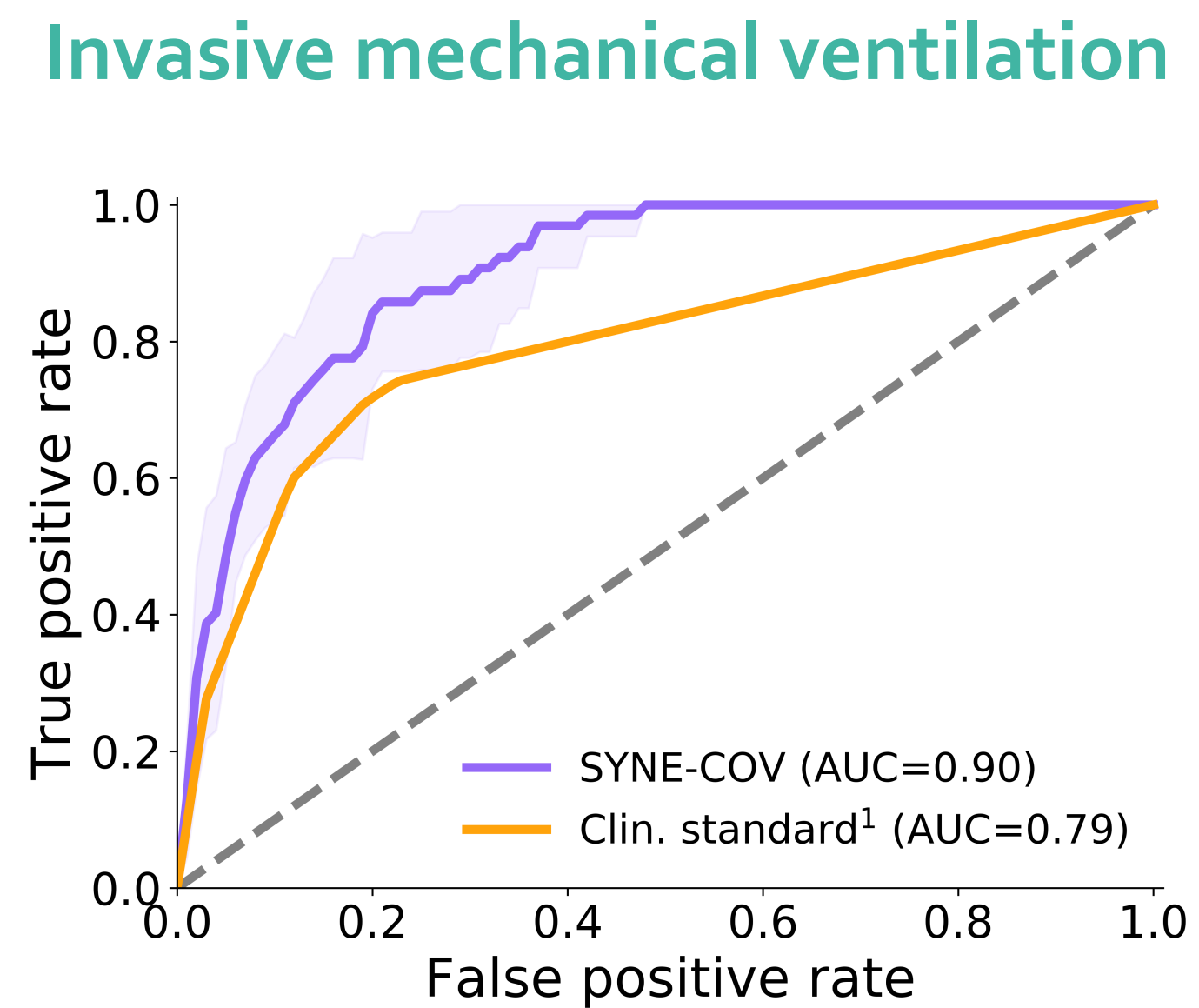
Potential benefits

- Personalised clinical care and early intervention for at-risk patients
- Faster recovery; less time spend in ICU, on ventilators and in hospital
- Improved operational planning (# of ventilators and ICU beds needed)

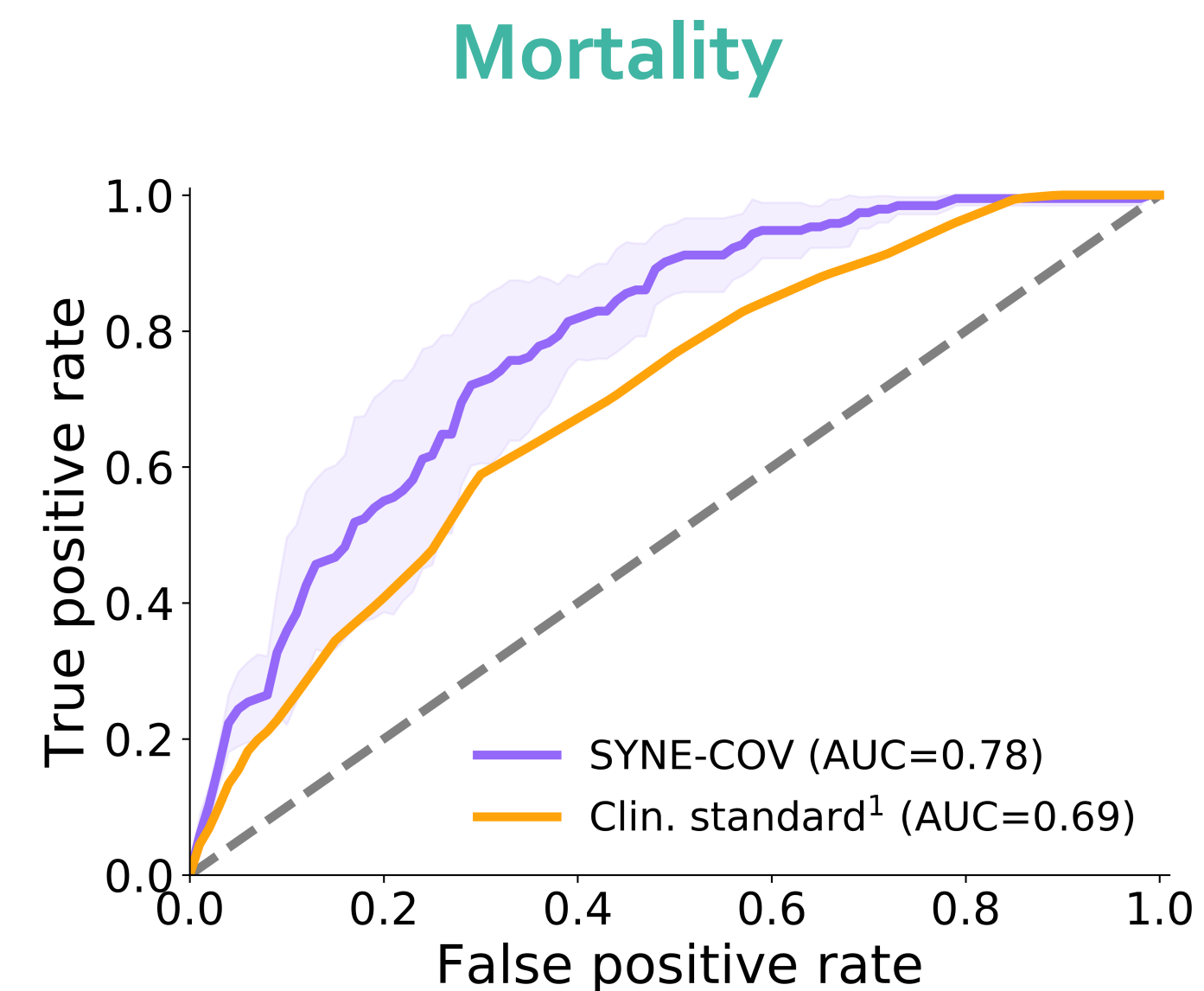
SYNE-COV outperforms traditional risk indicators



Clinical standard
NEWS₂



Clinical standard
respiratory component of SOFA



Clinical standard
Apache II

Better performance compared to clinical standard
(NEWS₂, APACHE II, SOFA)

Potential benefits of adopting SENSE



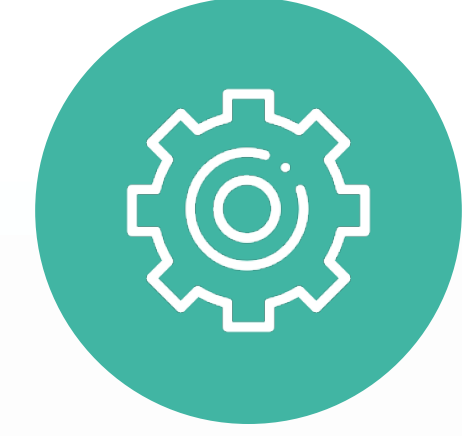
Improved patient outcomes



Regulated algorithms



Increase capacity through clinical efficiency



Interoperable with existing systems



Rapid, better informed clinical decisions



Enhanced security & privacy



Improve operational efficiency



Increased data accuracy



Sensyne Health

Designed by clinicians, focused on patients, powered by AI

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Clinically led and scientifically validated

Developed in partnership with Chelsea & Westminster NHS Trust

Heldt et al., medRxiv, 2020

Abu-Jamous et al., medRxiv, 2020

Velardo et al., JMIR (pre-print) 2020

Fletcher et al., medRxiv, 2020

Andreotti et al., Arxiv 2020