Cyclops Healthcare Network

EPSRC Network Plus

www.healthcaretechnologies.ac.uk/cyclops

Aim of the network

Treatment that is optimised and personalised to the individual patient to improve outcomes across a range of medical conditions.
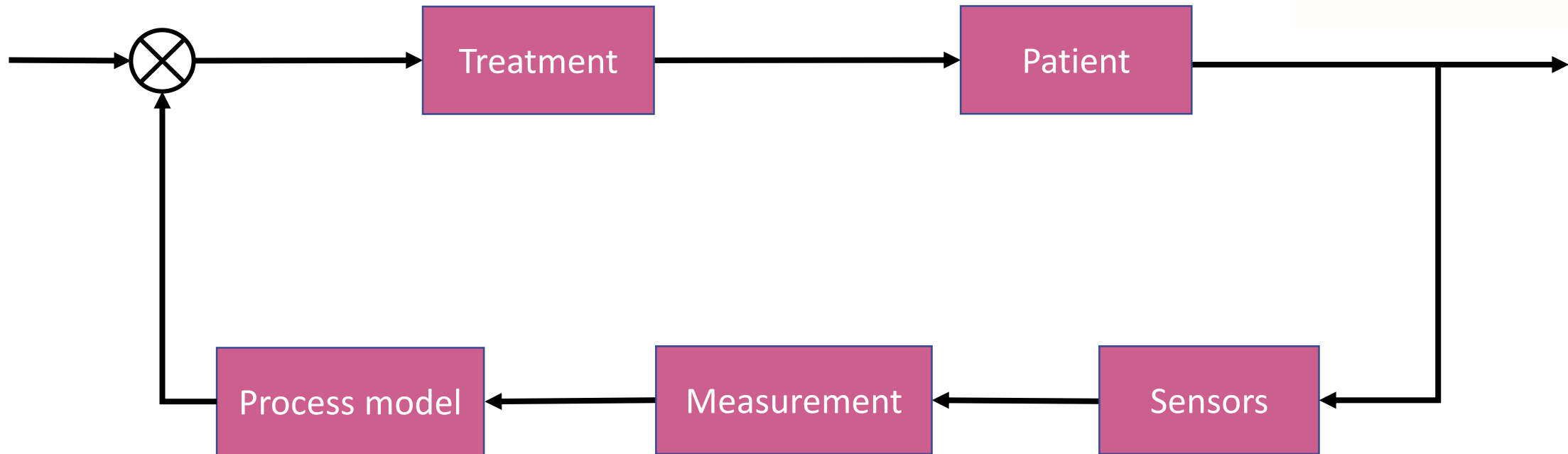
The closed-loop control approach involves continuously monitoring key clinical parameters and, informed by mathematical models, adapting treatment.

(aligned with EPSRC Grand Challenge in Optimising Treatment)
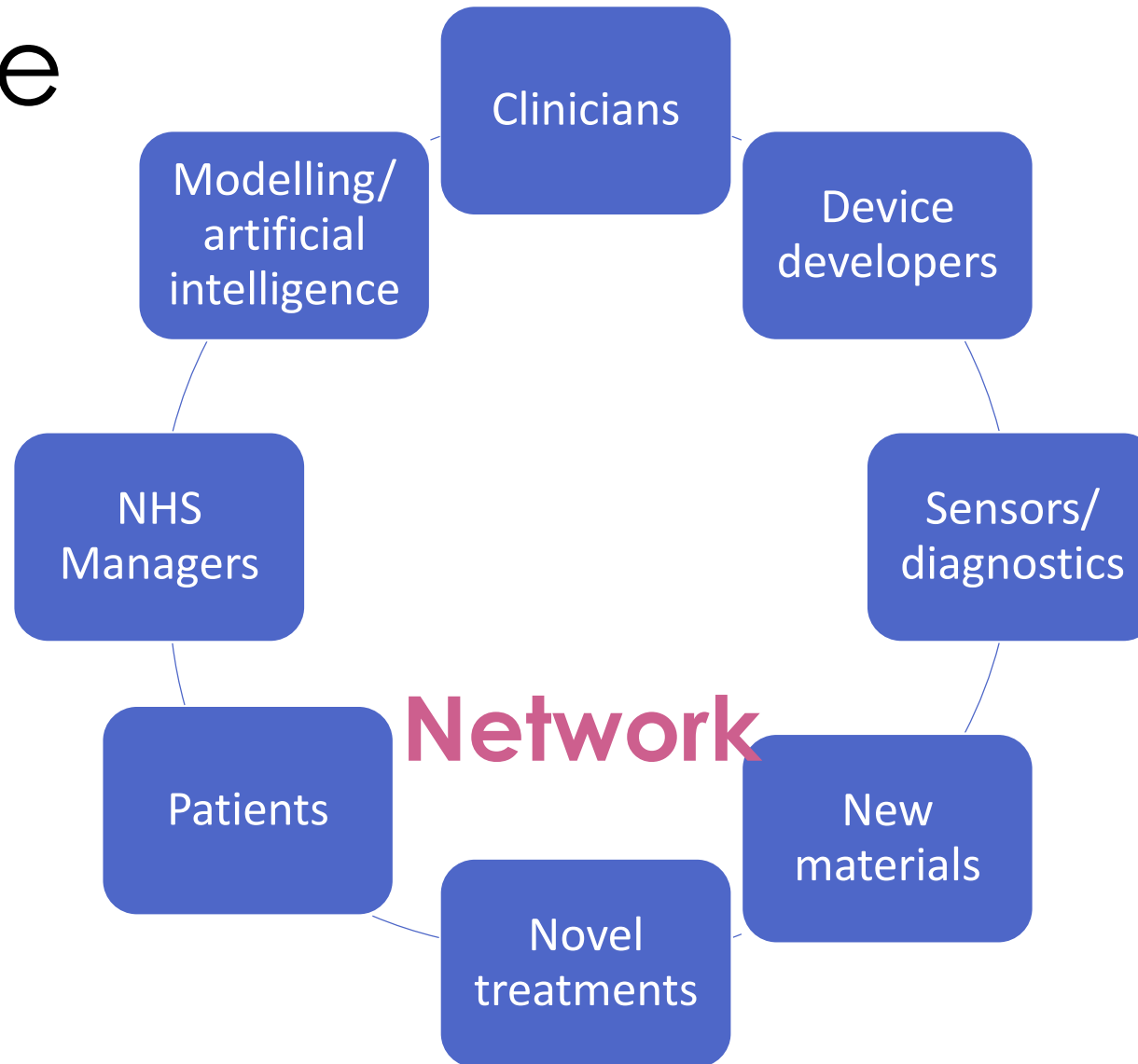
Investigators

The closed loop approach

With development of new sensors and artificial intelligence approaches can we optimise treatment based on multiple measurements and tailored treatment that is continuously optimised?

Expertise

Clinical areas
i) critical care;
ii) chronic wound care;
iii) cancer treatment.

1st workshop held March 2017

Objectives

- Create an effective, multidisciplinary and multi-stakeholder network that will develop closed loop control (CLC) approaches for optimisation of treatment;

- Develop a general framework and roadmap for the application of CLC using three exemplar clinical areas

- Address gaps in technology and knowledge via eight feasibility studies or secondments (£50k-£60k per project)

- Develop funding applications that address major healthcare challenges

- Raise awareness of potential for using closed loop control to deliver personalised medicine

Critical Care

- Highly sensorised environment,
- multiple inputs (propofol, antibiotics, ventilator)
- Multiple outputs (EEG, blood pressure, SpO2 ..)
- Some examples exist e.g. depth of anaesthesia using propofol, EEG

Cancer Treatment

- Less well explored
- Slower timescales
- Potential for better chemotherapy using infusion pumps?
- Better radiotherapy based on measurement?

Wound Care

- Less well explored
- Slow timescales for chronic wounds
- Biomarkers identified as a major challenge
- What's the potential for closed loop control?
- Smart wound dressings (measurement & treatment)?
- Vacuum assisted therapy?

Pathways to Impact

- Hosted by Clinical Engineering at Nottingham University Hospitals NHS Trust
- Remit is to help the Med Tech Industry and Academia to develop innovative products that:
  - Will ultimately benefit both patients and the healthcare system
  - Are truly fit for purpose
  - Have the right evidence within their Value Proposition for more easy adoption by the NHS

Pathways to Impact

Bespoke package of services across the product development lifecycle

- Supporting product development
  - Identification of clinical opportunities
  - Focus Groups (Advisory Board) and KOL interactions
  - Engineering review
- Clinical trials and evaluation studies
- Regulatory strategy/review and CE marking readiness
- Health economic modelling
- Value proposition / health technology assessment
- Advice and support on submission to NICE for inclusion into Guidelines

Funded projects

'Closed loop drug monitoring and delivery in intensive care,'
Dr Andy Norris, Nottingham University Hospitals Trust

'SPI-CLOPS (Surface Polymer Imprinted Closed Loop Optical Patient Sensors) for Dose Detection and Prevention of Cancer Resistance'
Prof Cameron Alexander, University of Nottingham

'Investigation of closed-loop ventilation strategies for neonatal ICU patients using computational simulation',
Prof Declan Bates, University of Warwick

Cyclops - MDVSN

Can we develop a closed loop feasibility study from the MDVSN network?

Is chronic wound care just too difficult? (too many unknowns at present?)

Should we extend the remit to wound prevention? (e.g. pressure off-loading devices)

Next funding call likely November

Summary

Treatment that is optimised and personalised to the individual patient to improve outcomes across a range of medical conditions.

The closed-loop control approach involves continuously monitoring key clinical parameters and, informed by mathematical models, adapting treatment.

- To join, contact Dr Jasmine Harvey, info@healthcaretechnologies.ac.uk