NHS Education for Scotland

SAFETY, SKILLS AND IMPROVEMENT

PATIENT SAFETY

Safety, Skills & Improvement

Patient Safety

Systems Thinking in the Quality Improvement Activity

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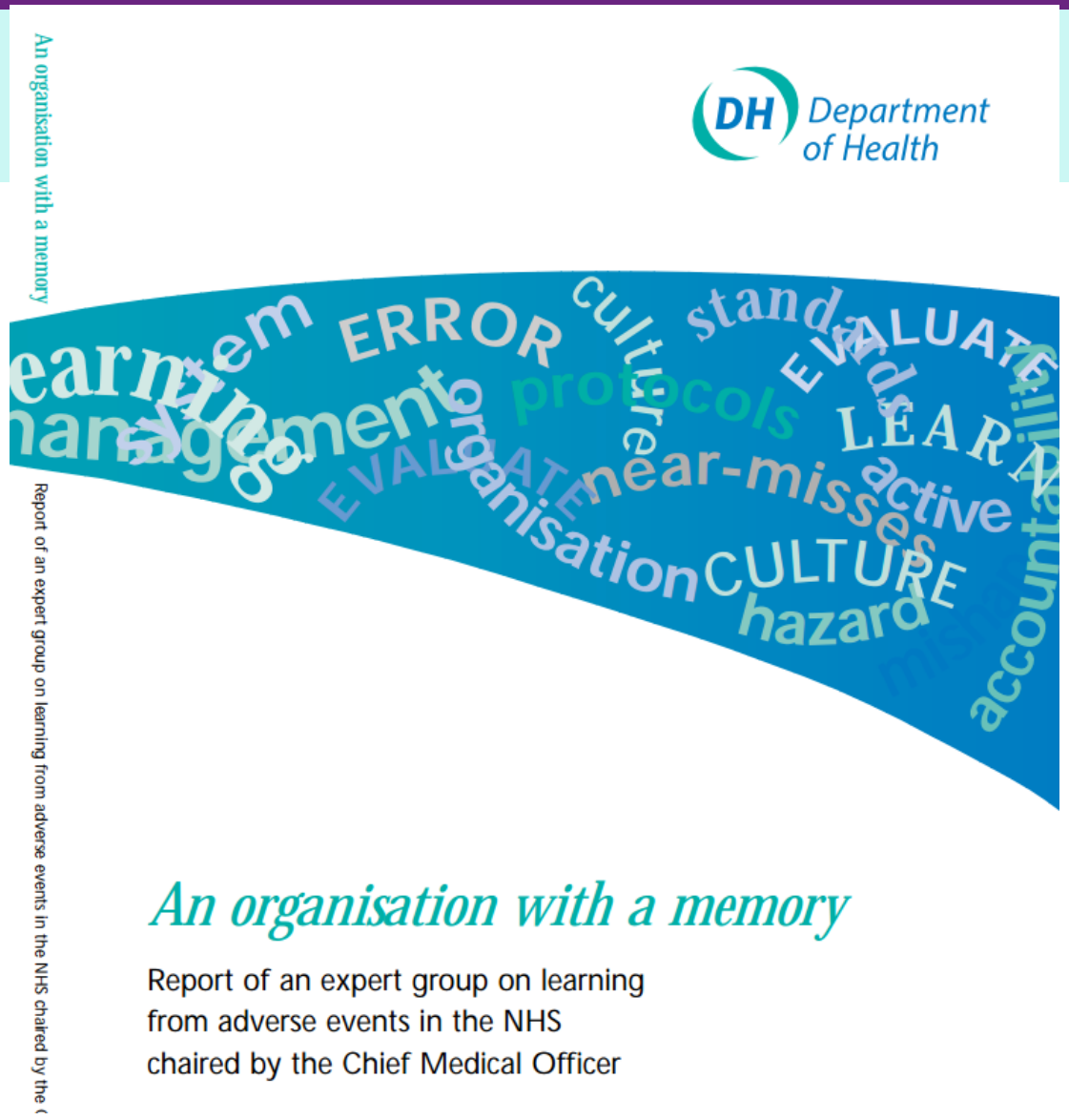


"We believe that, if the NHS is successfully to modernise its approach to learning from failure, there are four key areas that must be addressed. In summary, the NHS needs to develop:

- a much wider appreciation of the value of the **system approach** in preventing, analysing and learning from errors"

- “Participate actively in the improvement of systems of care.
- Acquire the skills to do so.”

Systems approach

- What does that mean?
- Individual actions – doing as you're told?
- Contributing to projects led by others
- Lead change and improvement

- Quality Improvement Activities (QIA)
- Feeding back on QIA – 5 questions

Five questions

1. What is the purpose of the system?
2. How do conditions of work affect decisions and actions?
3. How do interactions between components and flow of work affect overall system functioning?
4. What are the different perspectives on *work-as-done* and *work-as-imagined?*
5. Will changes maximise overall system function?

What is a systems approach?

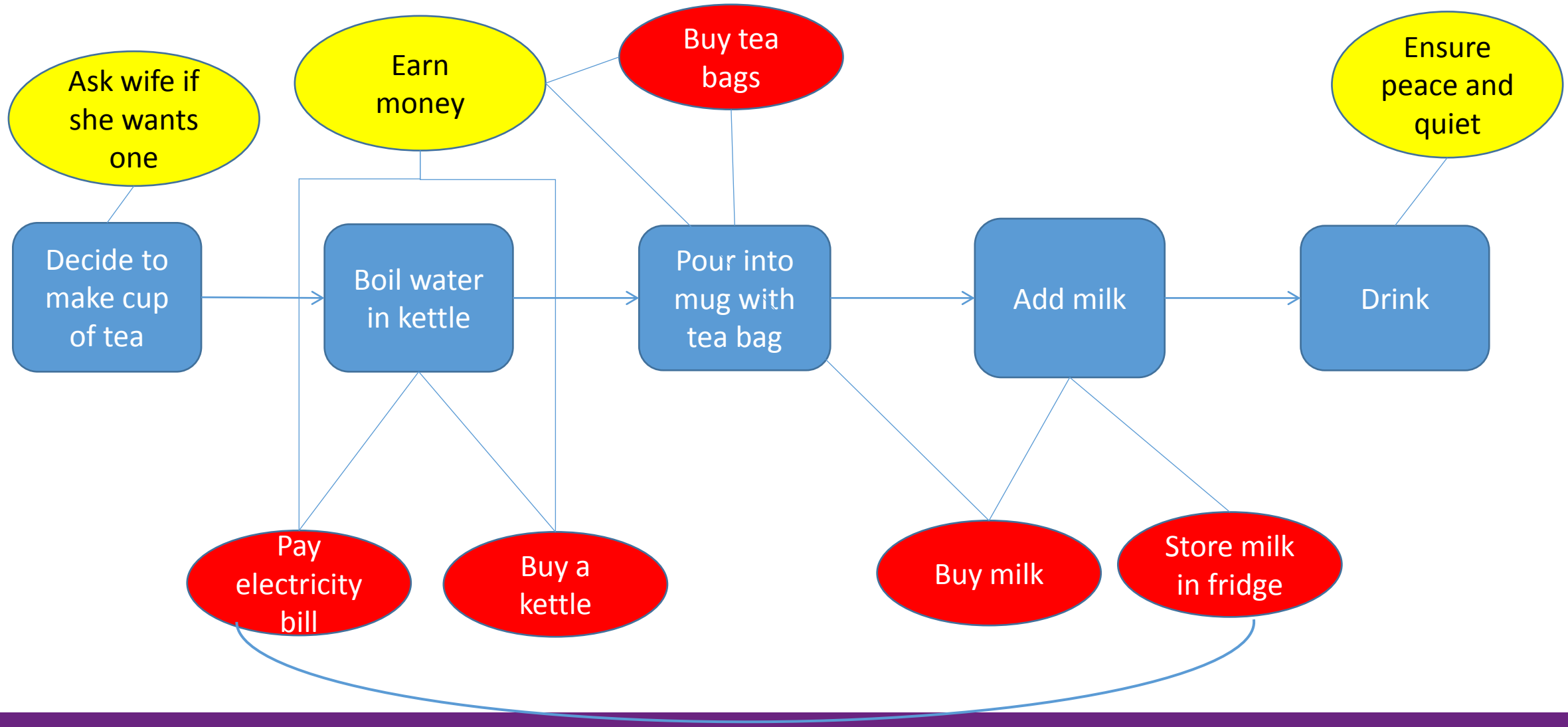
- First of all: What is a system?
- Components organised for a purpose – need purpose, boundary, components, interactions, between components and between systems
- What is a systems approach?
- Considering purpose, system as a whole, interactions and conditions

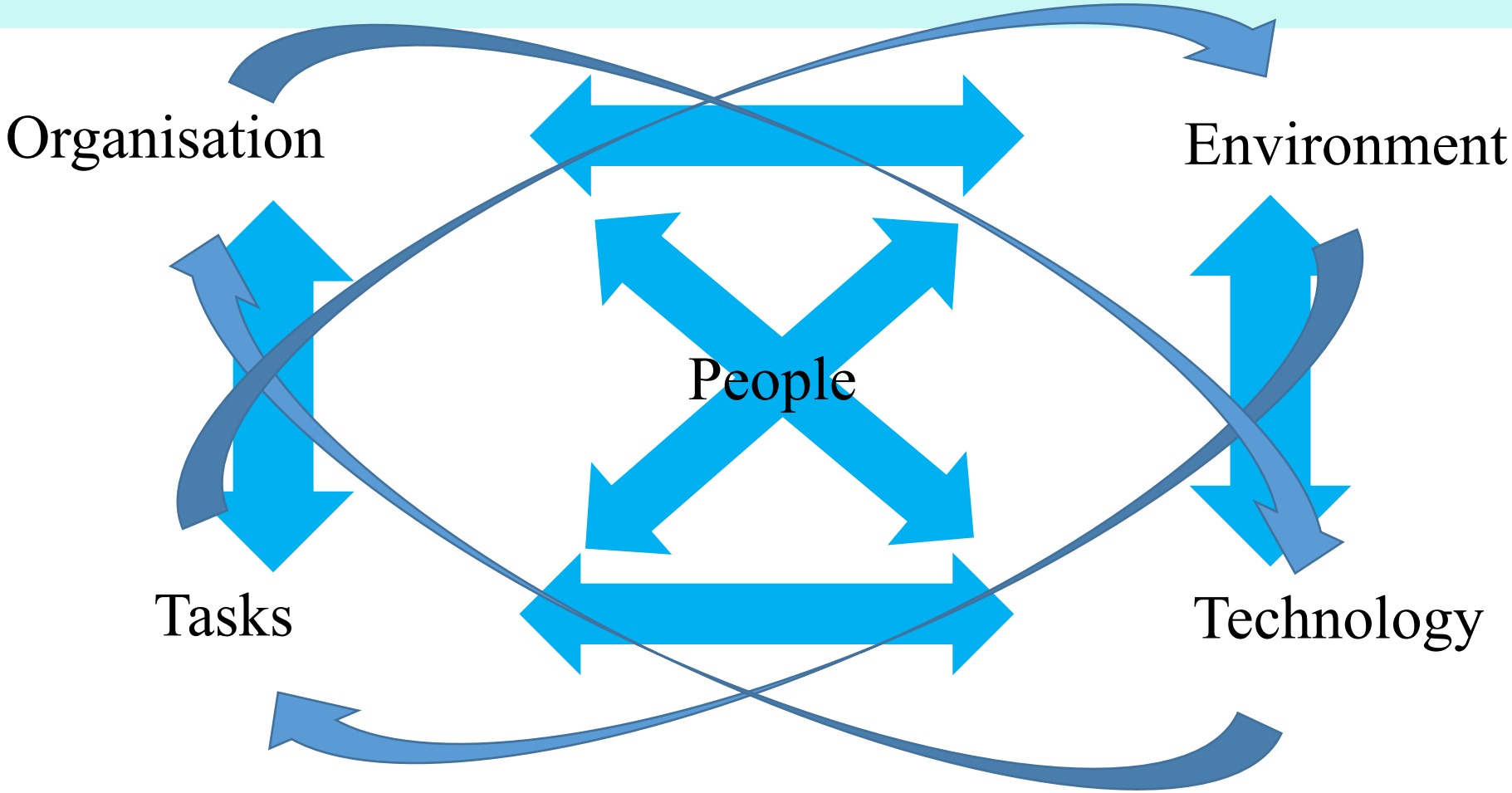
Systems

- Linear

- Complicated

- Complex


Ask wife if she wants one
Earn money
Buy tea bags
Ensure peace and quiet
Decide to make cup of tea
Boil water in kettle
Pour into mug with tea bag
Add milk
Drink
Pay electricity bill
Buy a kettle
Buy milk
Store milk in fridge


Organisation
Environment
People
Tasks
Technology

Linear?

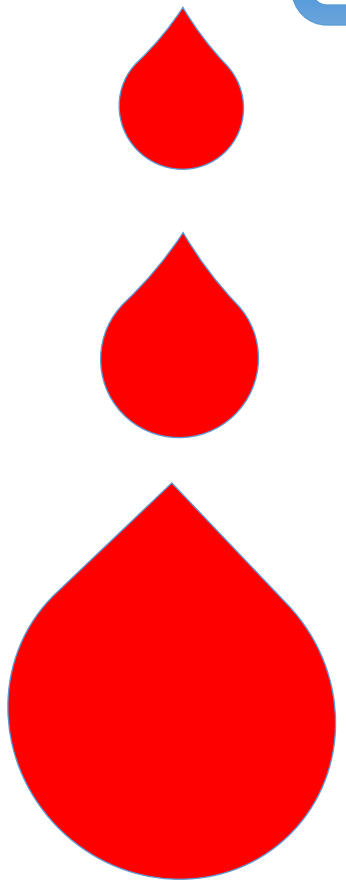
Decide to take blood

Assemble equipment

Take blood

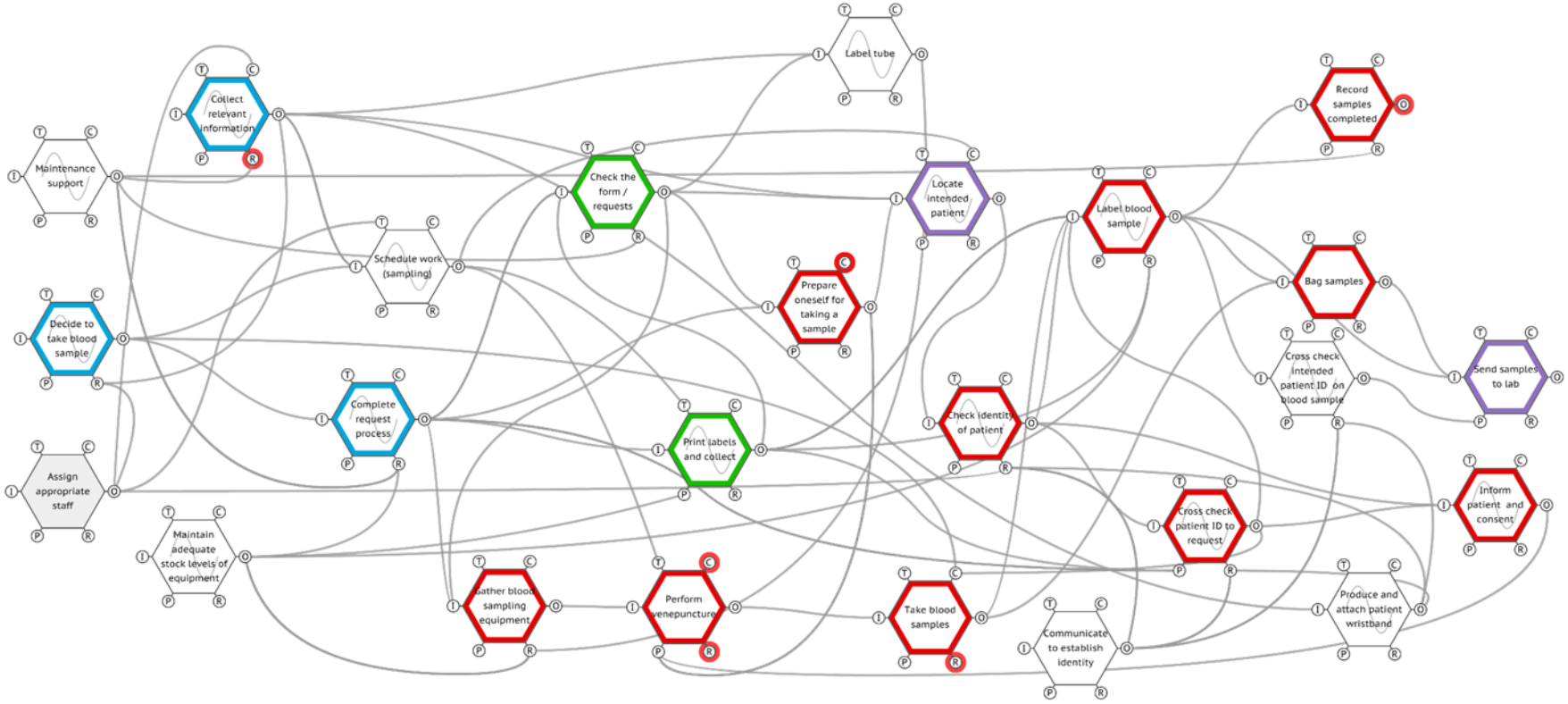
Label blood and complete form

Send to lab



Taking blood

Complex systems



Pickup *et al.* Blood sampling - Two sides to the story. Applied Ergonomics. Vol 59. 2017, Pages 234–242

Everyday work

- As systems complex - cannot specify work precisely
  - Conditions vary
  - Competing goals
  - Demand-capacity mismatch
- People constantly have to vary how they work to match conditions

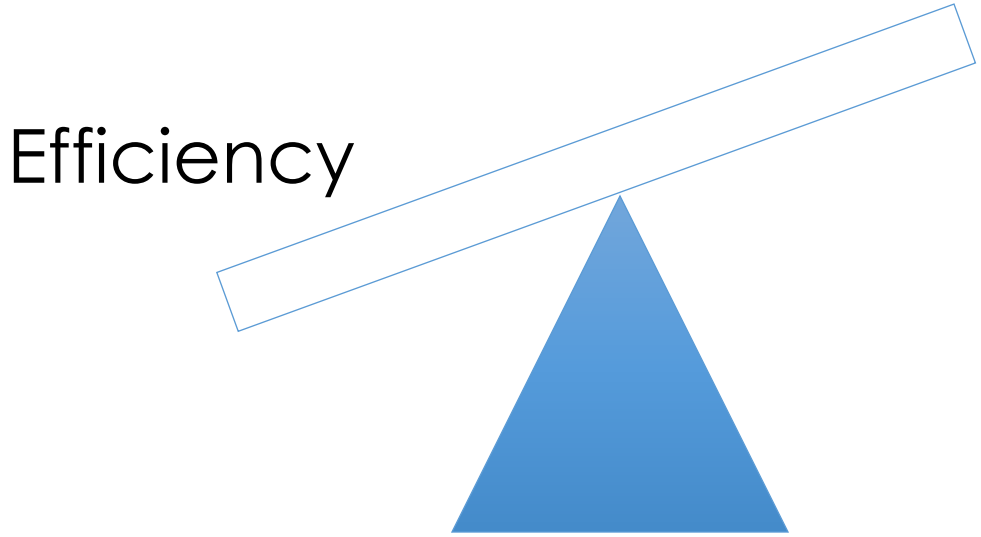
Performance adjustments

Workarounds

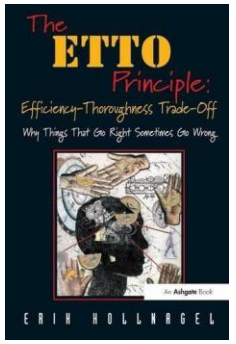
Performance adjustments

Efficiency thoroughness trade-off (ETTO)

Thoroughness



Efficiency



Hollnagel E. The ETTO Principle: Efficiency-thoroughness Trade-off: Why Things that Go Right Sometimes Go Wrong. Ashgate 2009, London

Performance adjustments

- We are used to constraining or blaming adjustments (or variability) – as in hindsight it often looks like that is what made it go wrong.

Performance adjustments

- Performance adjustments are essential to make systems function

- Performance variability (by humans) is what makes things usually go right.

work-as-imagined

VS

work-as-done

work-as-imagined

Enshrined in protocols, guidelines, SOP

VS

work-as-done

How staff vary processes in different conditions in order to achieve success

Group discussion

- Can you think of a time when you did not follow protocols (work as imagined) to achieve a successful result?

Safety-I [Hollnagel]

Normal functioning (compliance) → Acceptable outcomes (success)

↓

Unwanted transition

↓

Malfunctioning (noncompliance) → Unacceptable outcomes (failure)

Safety-I [Hollnagel]

Protocols, guidelines, IT 'solutions', barriers, regulations

Normal functioning (compliance) → Acceptable outcomes (success)

Performance indicators, standardisation, compliance

Unwanted transition

Malfunctioning (noncompliance) → Unacceptable outcomes (failure)

Safety-I [Hollnagel]

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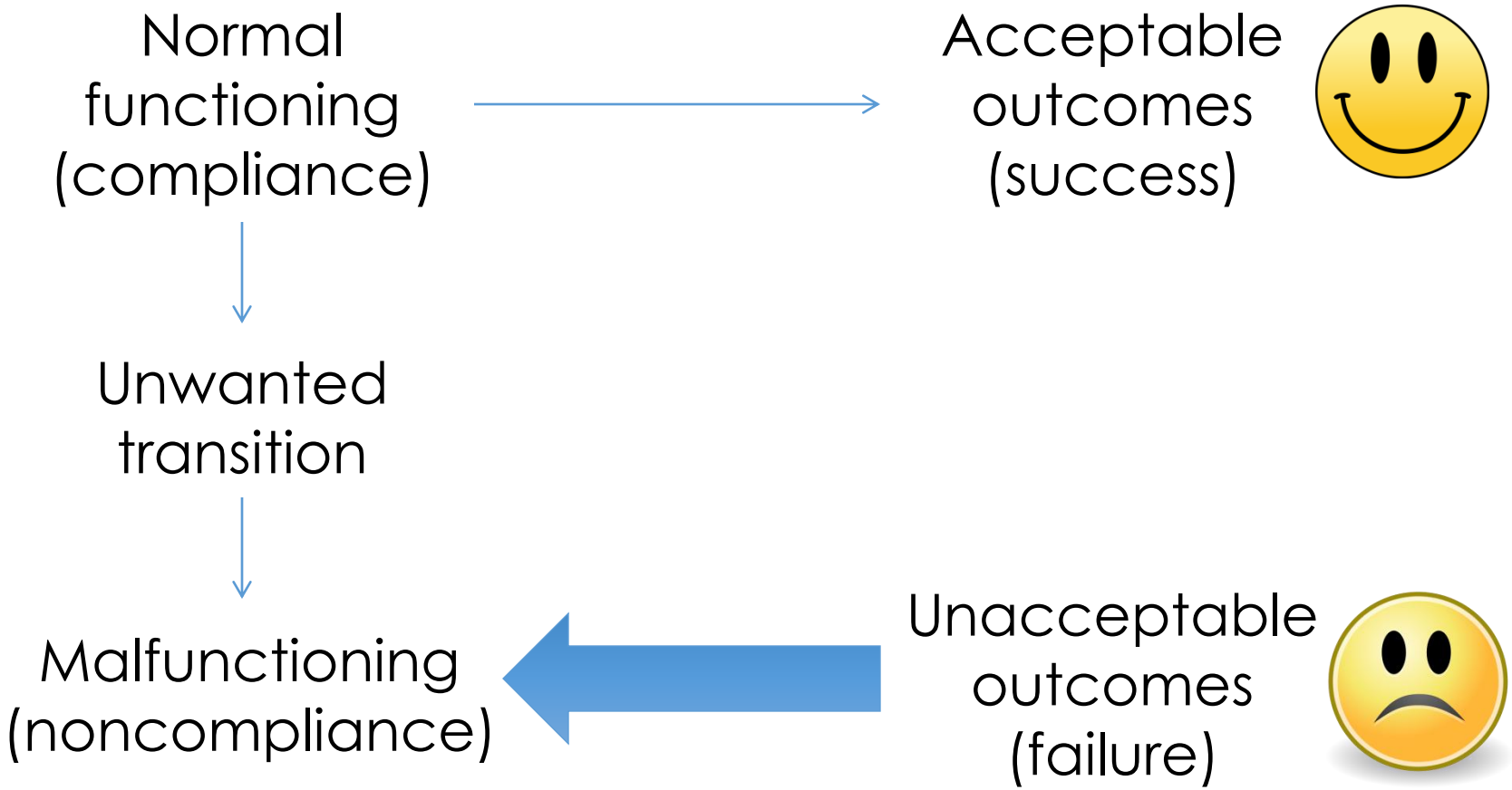

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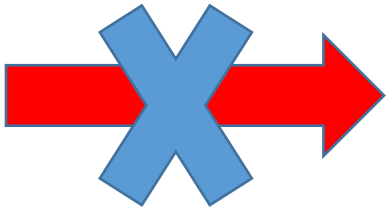
Acceptable outcomes (success)

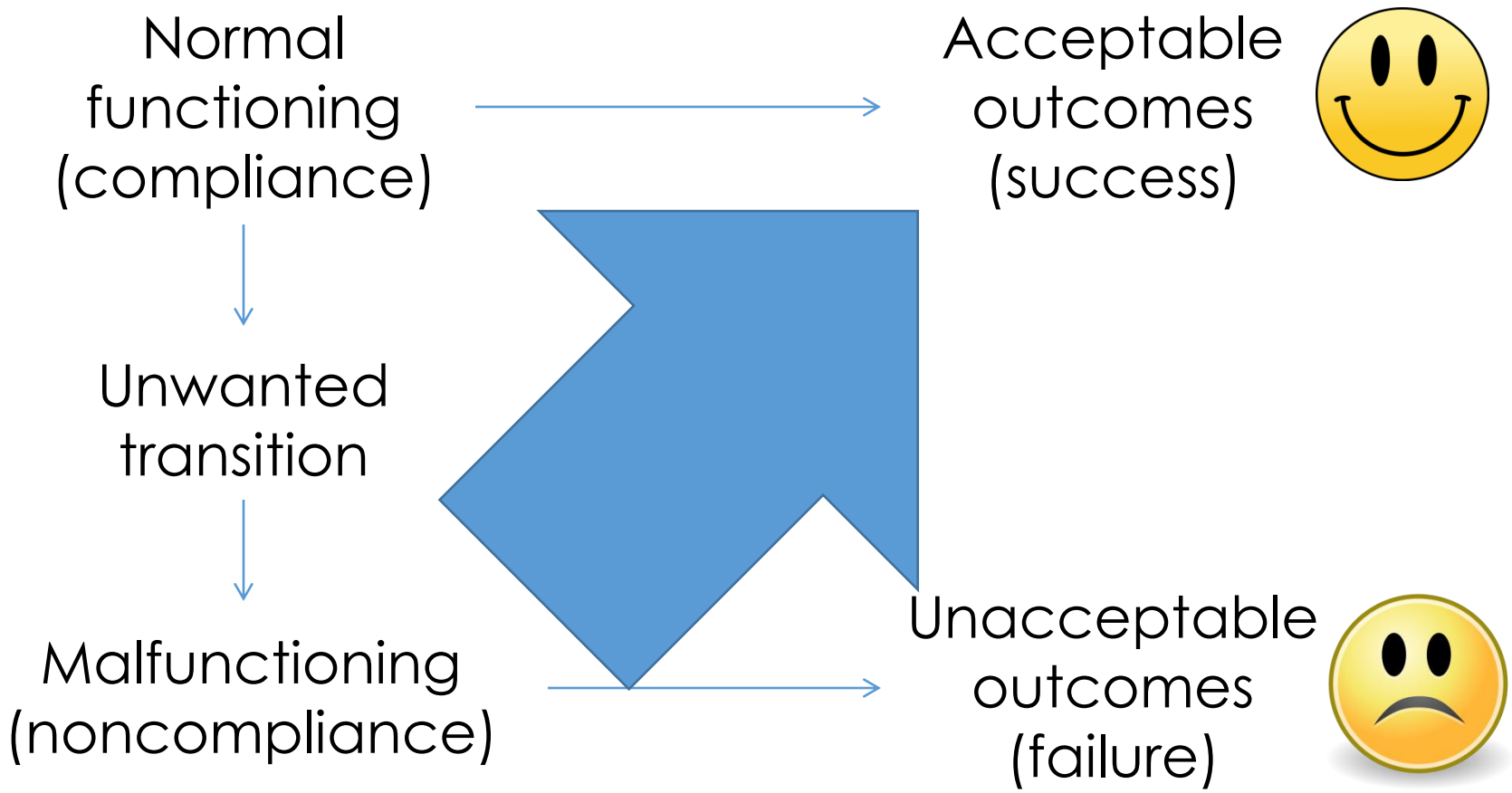
Unwanted transition

Malfunctioning (noncompliance)



Unacceptable outcomes (failure)

Safety-I [Hollnagel]



Normal accident

Normal functioning (compliance)

Unwanted transition

Malfunctioning (noncompliance)

Acceptable outcomes (success)

Unacceptable outcomes (failure)

Safety-I [Hollnagel]

Normal functioning (compliance) → Acceptable outcomes (success)

↓

Unwanted transition

↓

Malfunctioning (noncompliance) → Unacceptable outcomes (failure)

Safety-II [Hollnagel]

Normal functioning (compliance)

Everyday work - performance adjustments

Malfunctioning (noncompliance)

Acceptable outcomes (success)

Unacceptable outcomes (failure)

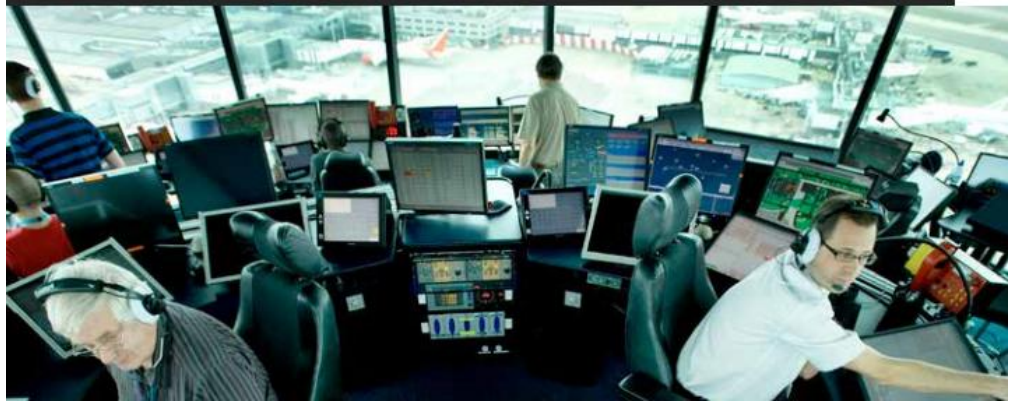
Network Manager
nominated by
the European Commission

EUROCONTROL

Systems Thinking for Safety: Ten Principles
A White Paper

Moving towards Safety-II

DNM Safety



Foundation Concept

- Most Problems and Solutions Belong to the System. To understand safety, we need to consider the overall system, not isolated parts, events or outcomes.

Principle 1 – Seek Multiple Perspectives.

- People are local experts in the work they do and how the system works will appear differently to those with different perspectives.

Principle 2 – Understand Why Decisions Make Sense at the Time

- People do what makes sense to them at the time based on their work and personal goals, the knowledge and information they possess and the system conditions they face in order to achieve a successful outcome.
- Exploring these factors at the time decisions were made can help understand how the system functions, how safety can be improved and promote a ‘Just Culture’.

Principle 3 – Consider Work Conditions

- Consider how varying work conditions affect outcomes.
- Demand, capacity, resource availability and constraints are ‘system levers’ and may be able to be altered to improve overall system functioning and staff wellbeing.

Principle 4 – Analyse Interactions and Flow

- Identify functions needed to achieve the goal of the system and consider how interactions influence the flow of work and affect performance and wellbeing.
- Changes to isolated parts of a system should take account of the impact on overall functioning.

Principle 5 – Consider Performance Adjustments

- Consider how performance adjustments such as trade-offs and workarounds contribute mainly to successful (but occasionally unsuccessful) outcomes. Explore and understand the difference between *work-as-done* and *work-as-imagined.*

Principle 6 – Explore Everyday Work

- Appreciate that desired and undesired outcomes emerge from the same source: everyday work. Decisions that usually lead to success may occasionally lead to unwanted outcomes.
- Explore *work-as-done* with staff before implementing change to understand where variation in performance is essential for success and where it needs to be reduced.

Adapted principles

Five questions

- What is the purpose of the system?
- How do conditions of work affect decisions and actions?
  - Demand, capacity, resources and constraints
- How do interactions between components and flow of work affect overall system functioning?
- What are the different perspectives on *work-as-done* and *work-as-imagined?*
  - Consider how system conditions, interactions and flow influence how people create success.
  - Consider where variation in performance is essential and where it needs to be reduced.
- Will changes maximise overall system function?
  - In terms of performance and the well-being of people (staff/ patients/ visitors)

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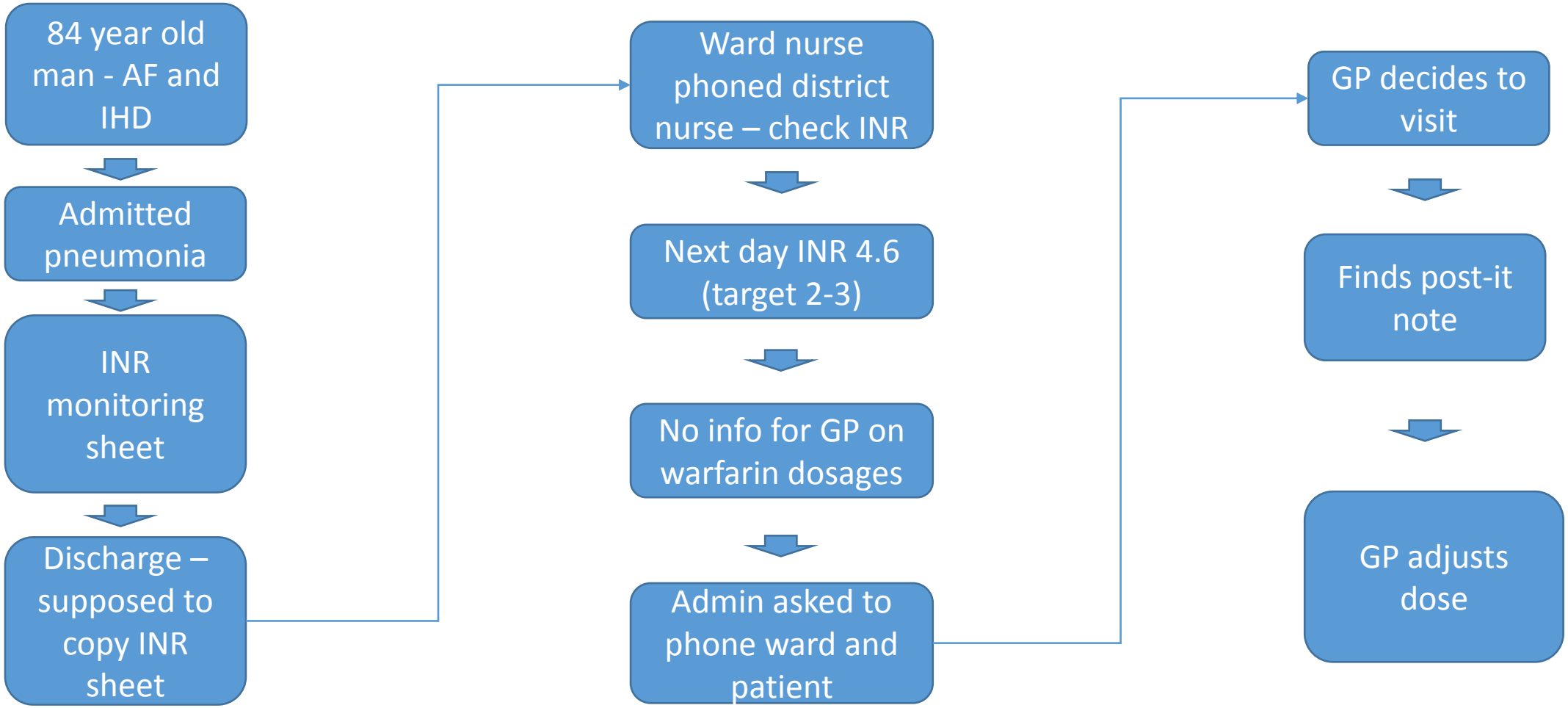
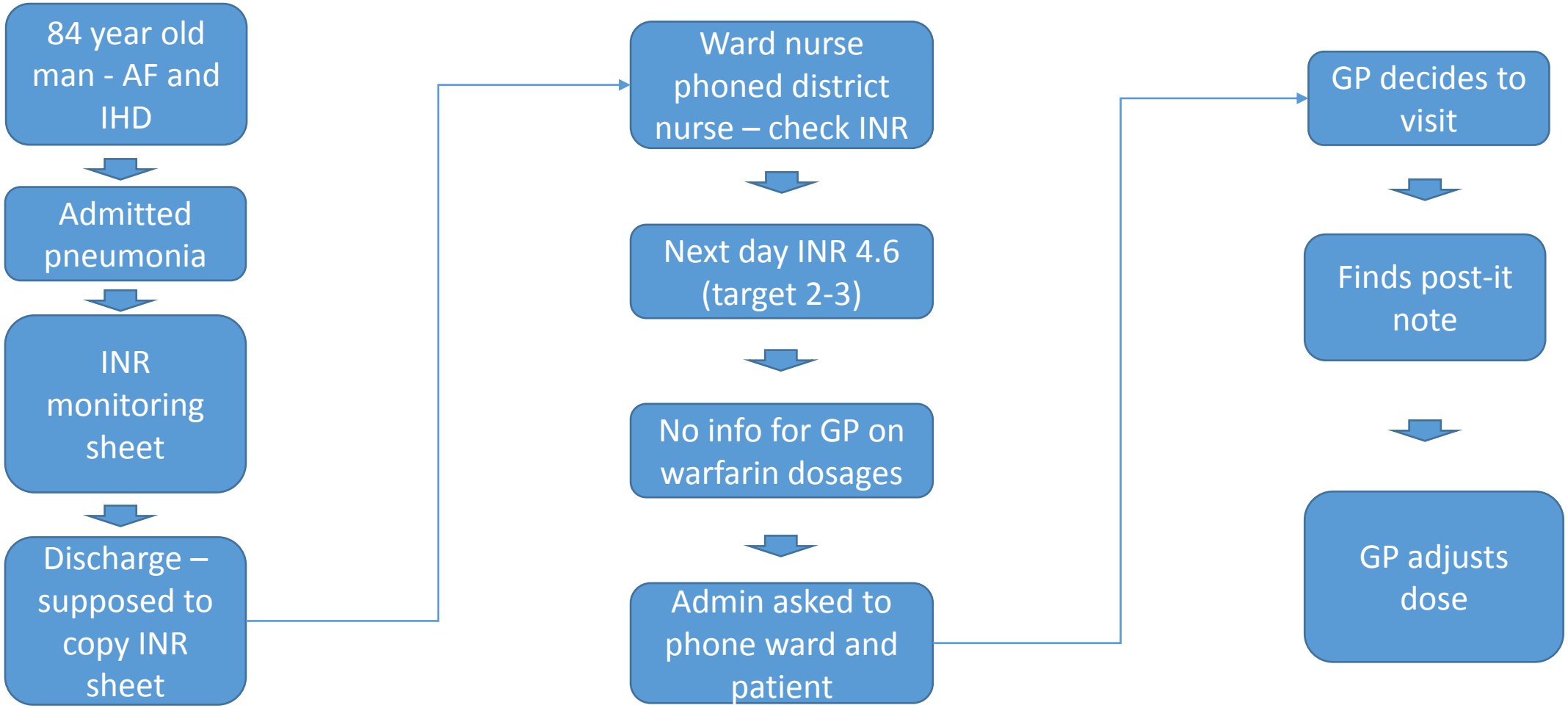
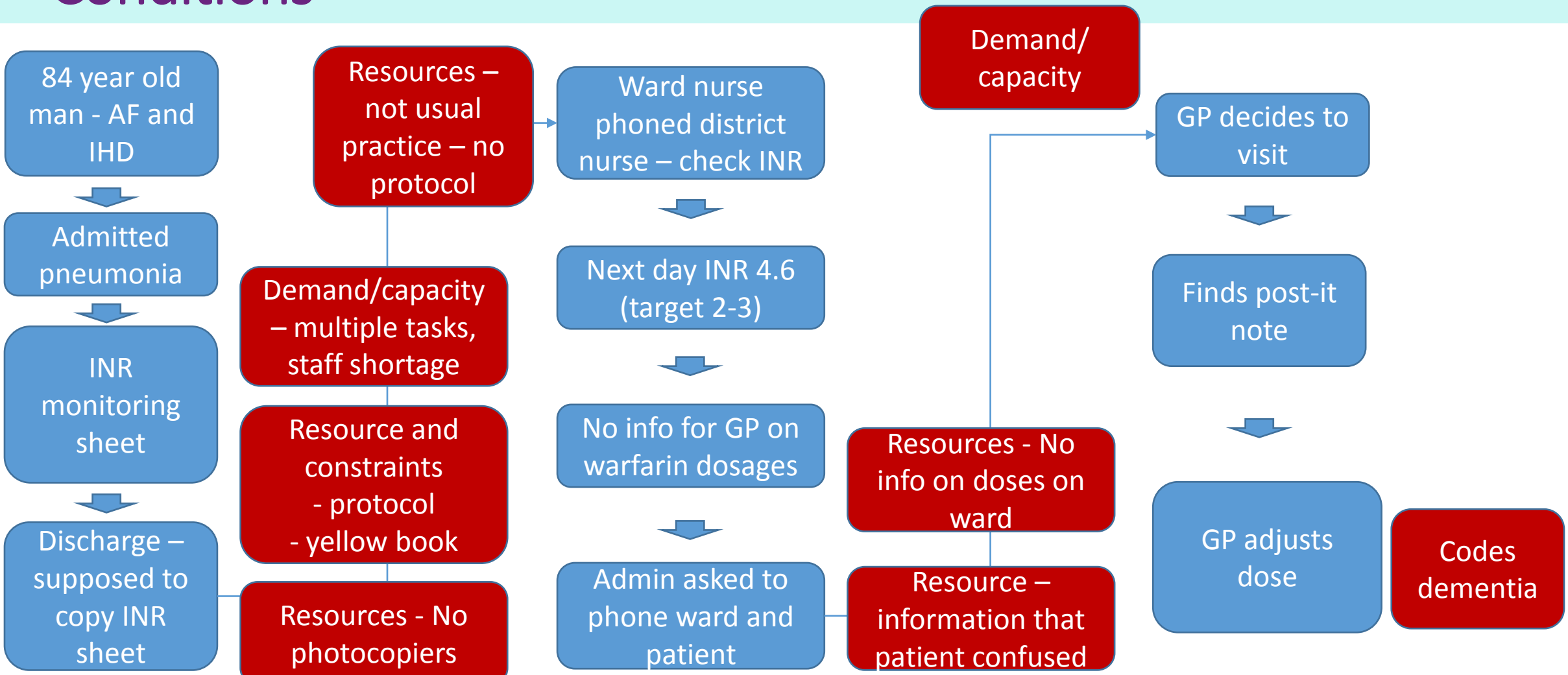
Worked Example – INR communication



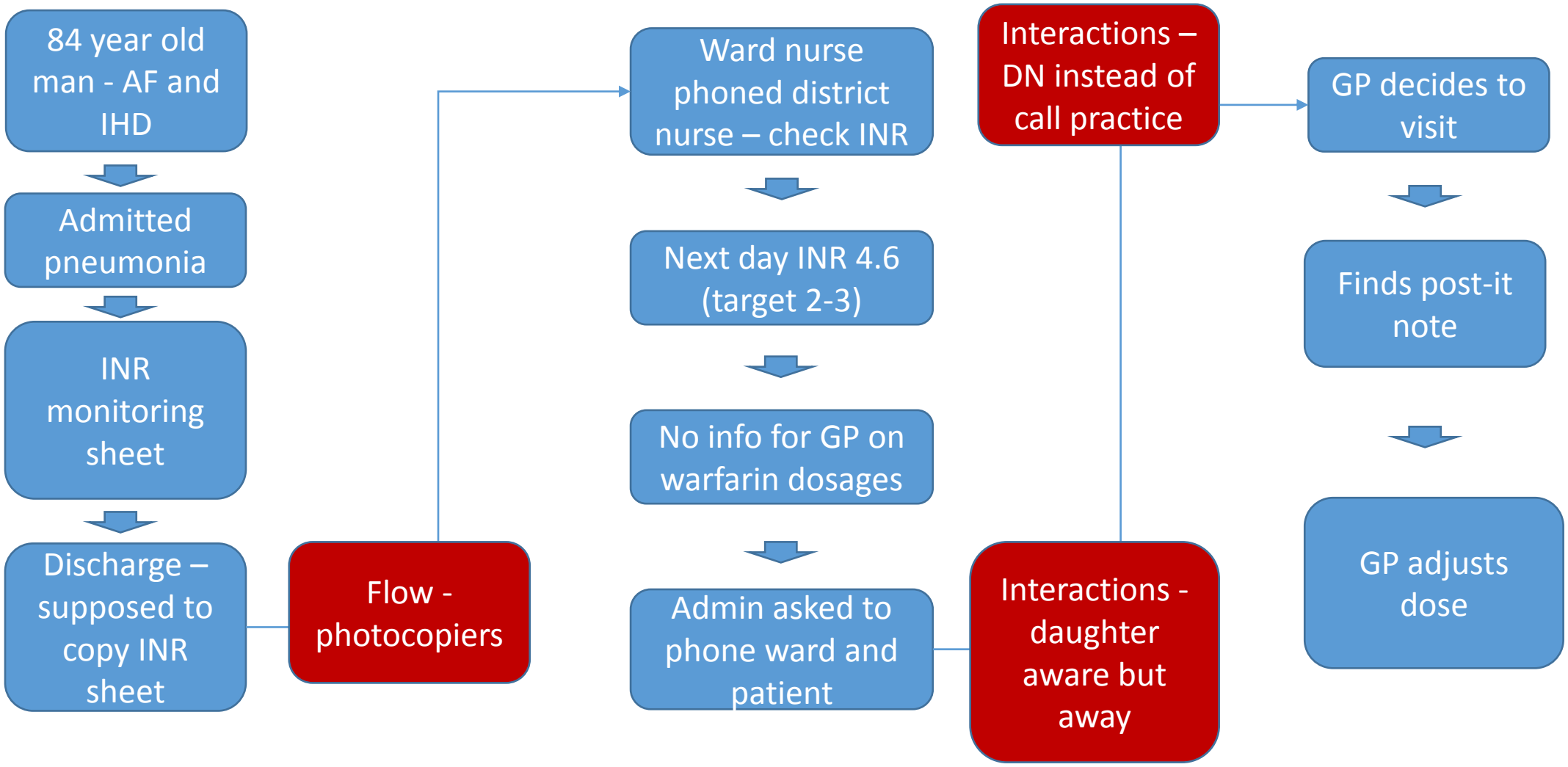
INR communication – purpose of system?



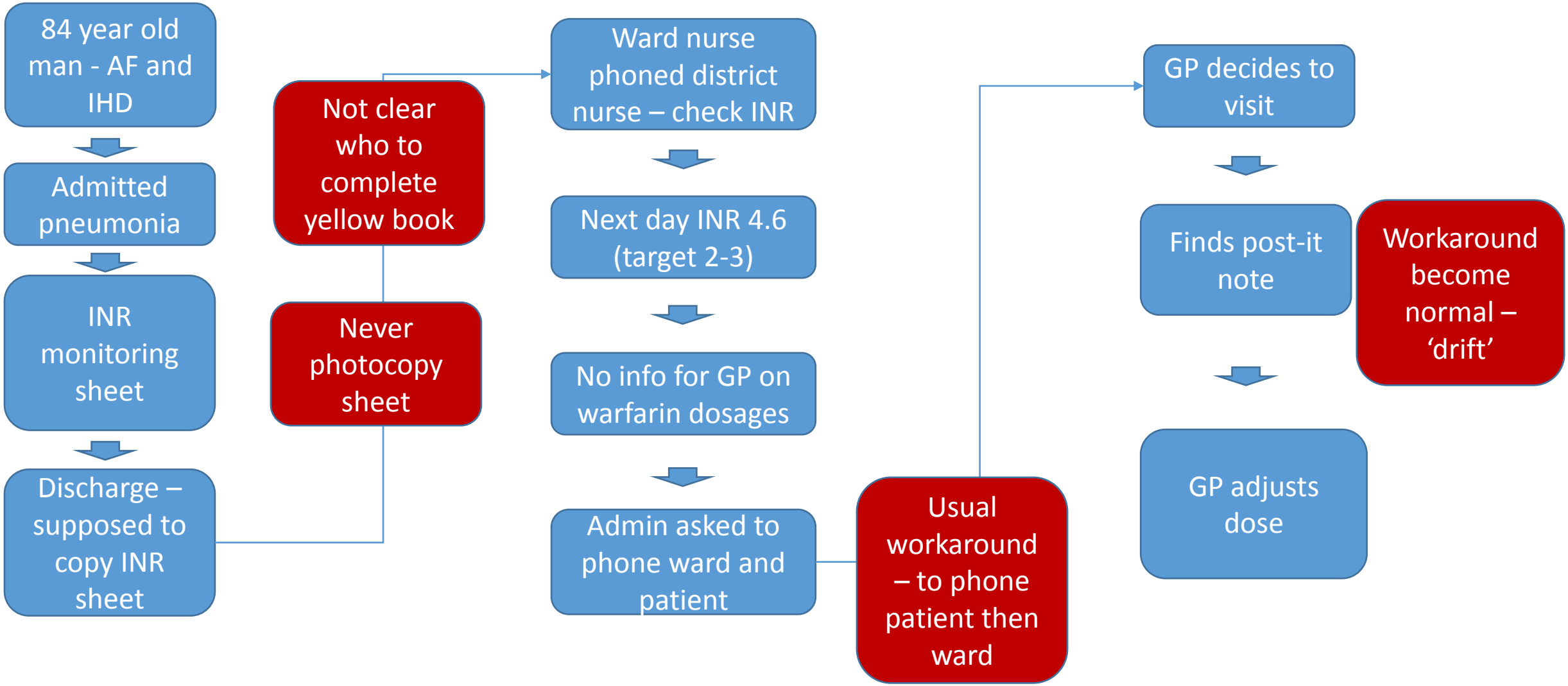
Conditions


84 year old man - AF and IHD
Admitted pneumonia
INR monitoring sheet
Discharge – supposed to copy INR sheet
Resources – not usual practice – no protocol
Demand/capacity – multiple tasks, staff shortage
Resource and constraints - protocol - yellow book
Resources - No photocopiers
Ward nurse phoned district nurse – check INR
Next day INR 4.6 (target 2-3)
No info for GP on warfarin dosages
Admin asked to phone ward and patient
Demand/ capacity
Resources - No info on doses on ward
Resource – information that patient confused
GP decides to visit
Finds post-it note
GP adjusts dose
Codes dementia

Interactions and flow?

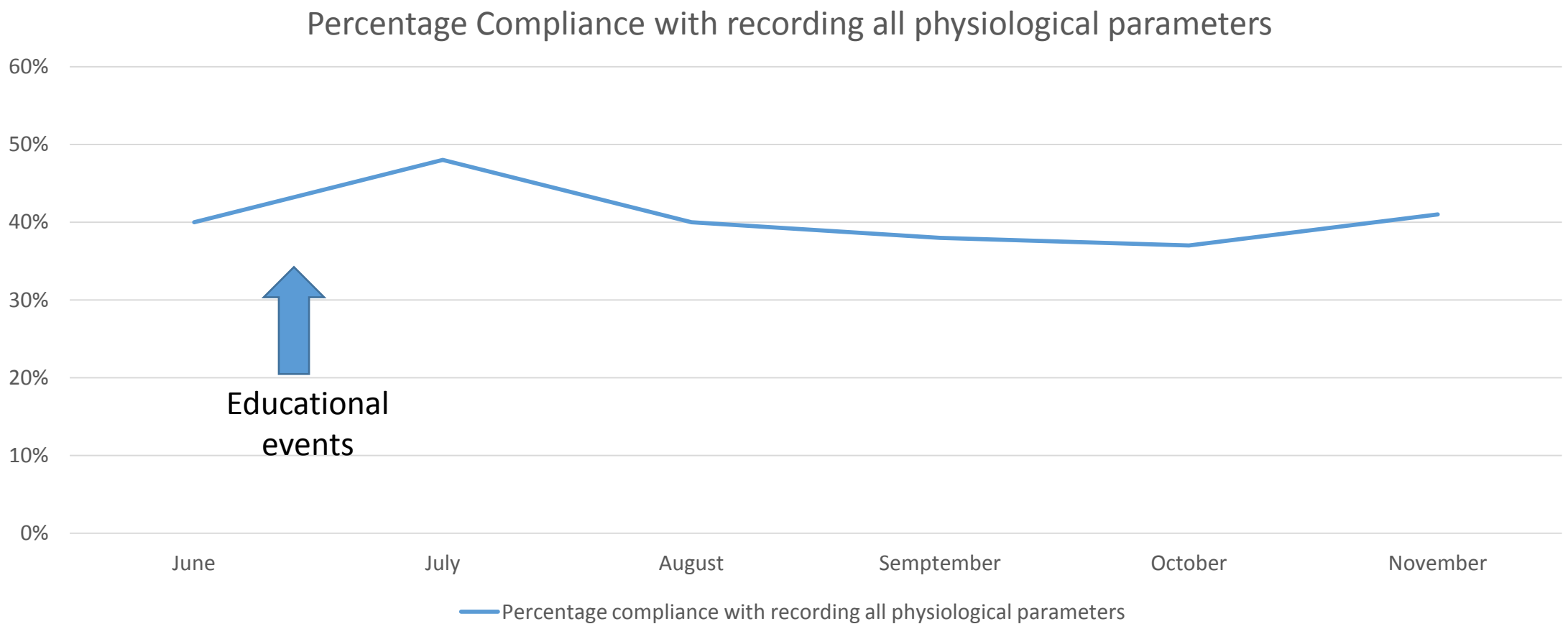


Work-as-done vs work-as-imagined?



Sepsis identification and management

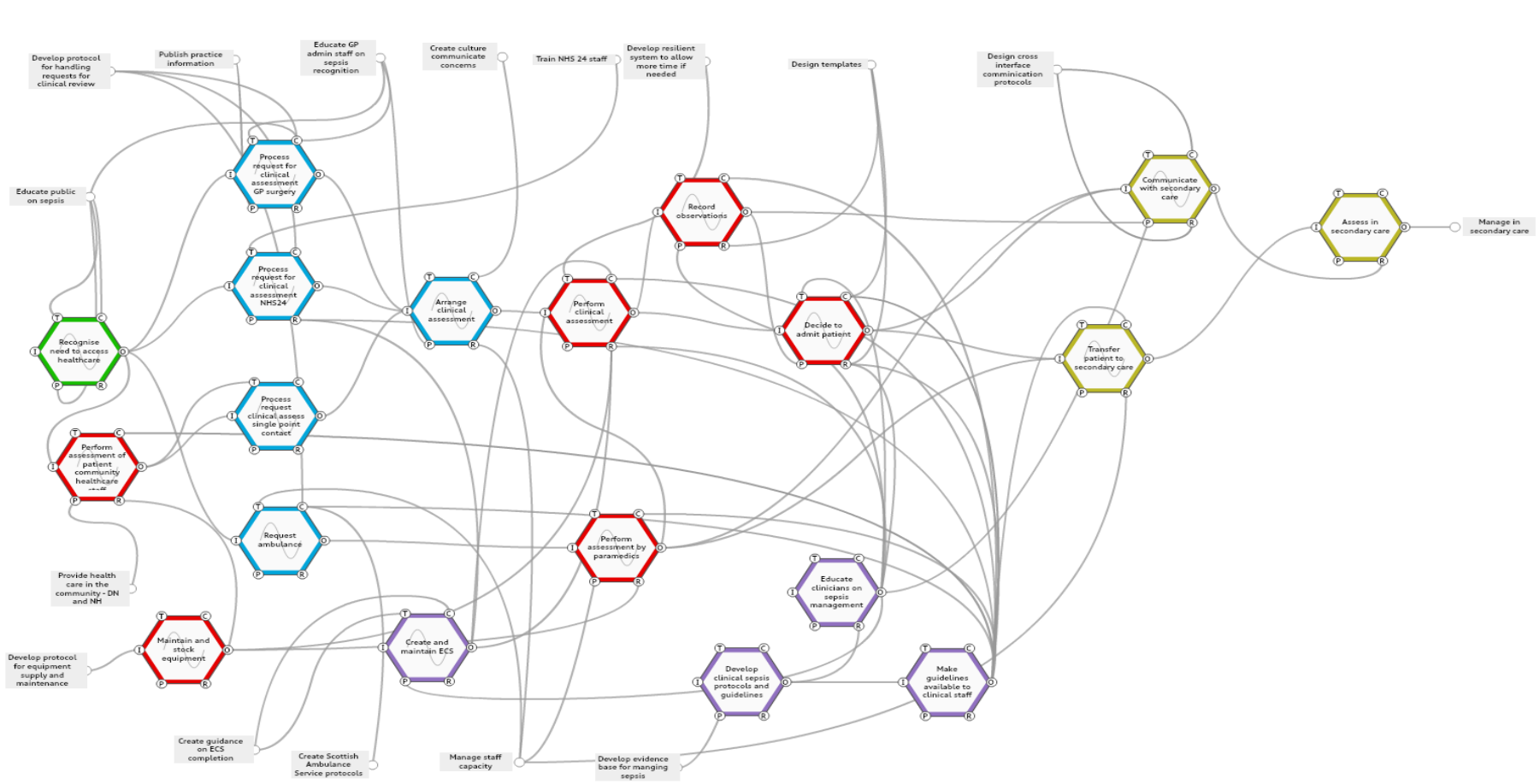
- Previous incident investigations identified
  - Incorrect diagnosis as ‘root cause’.
  - Lack of recording of physiological parameters
- Educational events and protocol
  - Recording of physiological parameters in an electronic template
    - Temperature
    - Pulse
    - Blood pressure
    - Saturation
    - Respiration rate
    - Consciousness level


Percentage Compliance with recording all physiological parameters
60%
50%
40%
30%
20%
10%
0%
Educational events
June
July
August
Semptember
October
November
Percentage compliance with recording all physiological parameters

Sepsis – system approach

- Data collected
  - Review of random 50 adult admission in May 2016 due to infective condition from out-of-hours.
  - Review of 76 adult in-hours admissions from 8 GP practices
- Interview of staff:
  - GP, GPST, GP receptionist, NHS24, District nurse, Combined Assessment Unit (CAU), A and E, Out of hours

Sepsis identification and management



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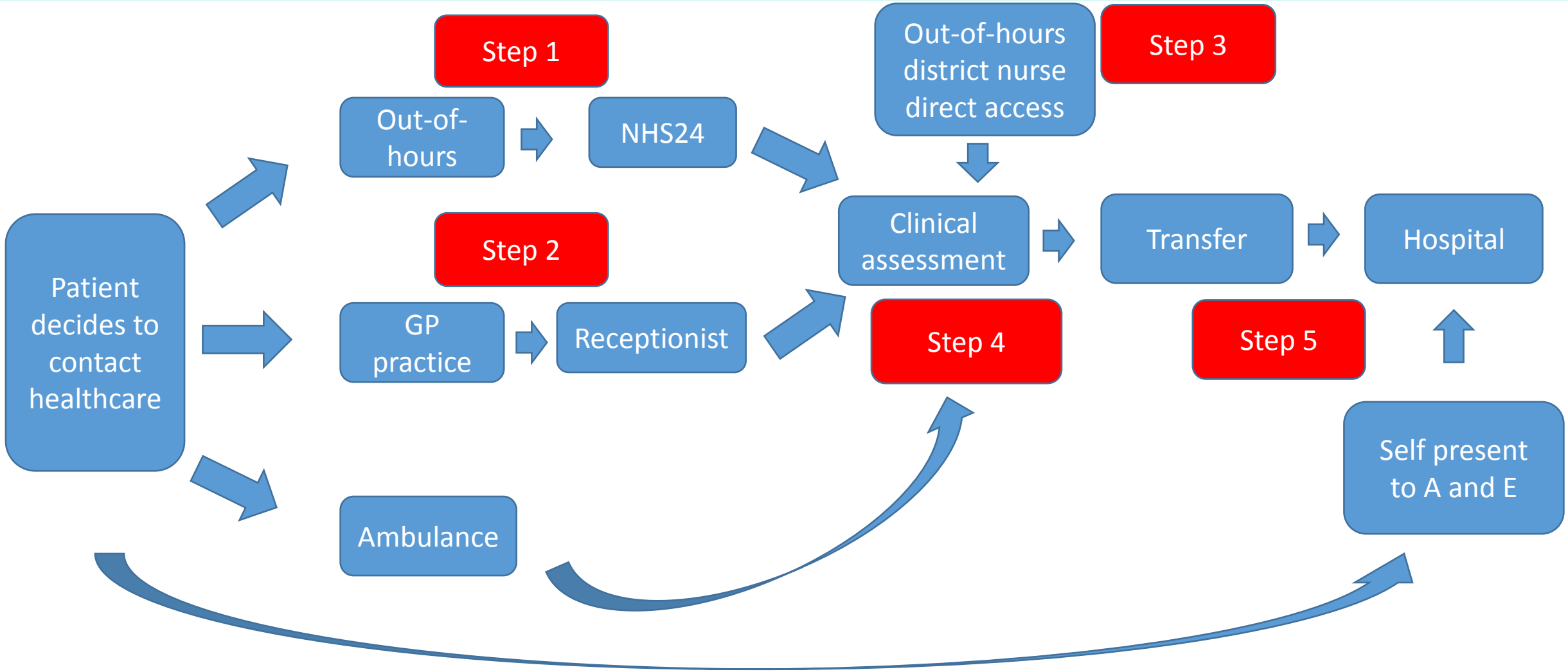

Definitions

- **Demand** includes patients' demand for information, appointments and treatment and also the demand to complete work in a certain time or in a specified way.
- **Capacity** is the ability to address demand.
- **Resources** include everything that is required to perform a function.
- **Constraints** are factors, such as lack of resources or limited capacity that restrict decisions and actions. Guidelines and protocols can also act as constraints as they constrain actions. Constraints can have a positive or negative effect

Sepsis – systems approach

- Read data for each step

- Use the 5 questions to consider how to design:

  - More effective change
  - More system focussed QI project

System principles and questions

- Would you use any of these or similar questions already?

- Are these questions useful in appraisal?

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Complex systems

- Interactions between humans, technology, organisations
- Open - External agents and the boundaries of influence are hard to define
- Changing conditions - Demand /capacity mismatch
- Non-linear - Cause and effect
- Evolve - Systems evolve and adapt
- Emergence - Safety emerges from interactions

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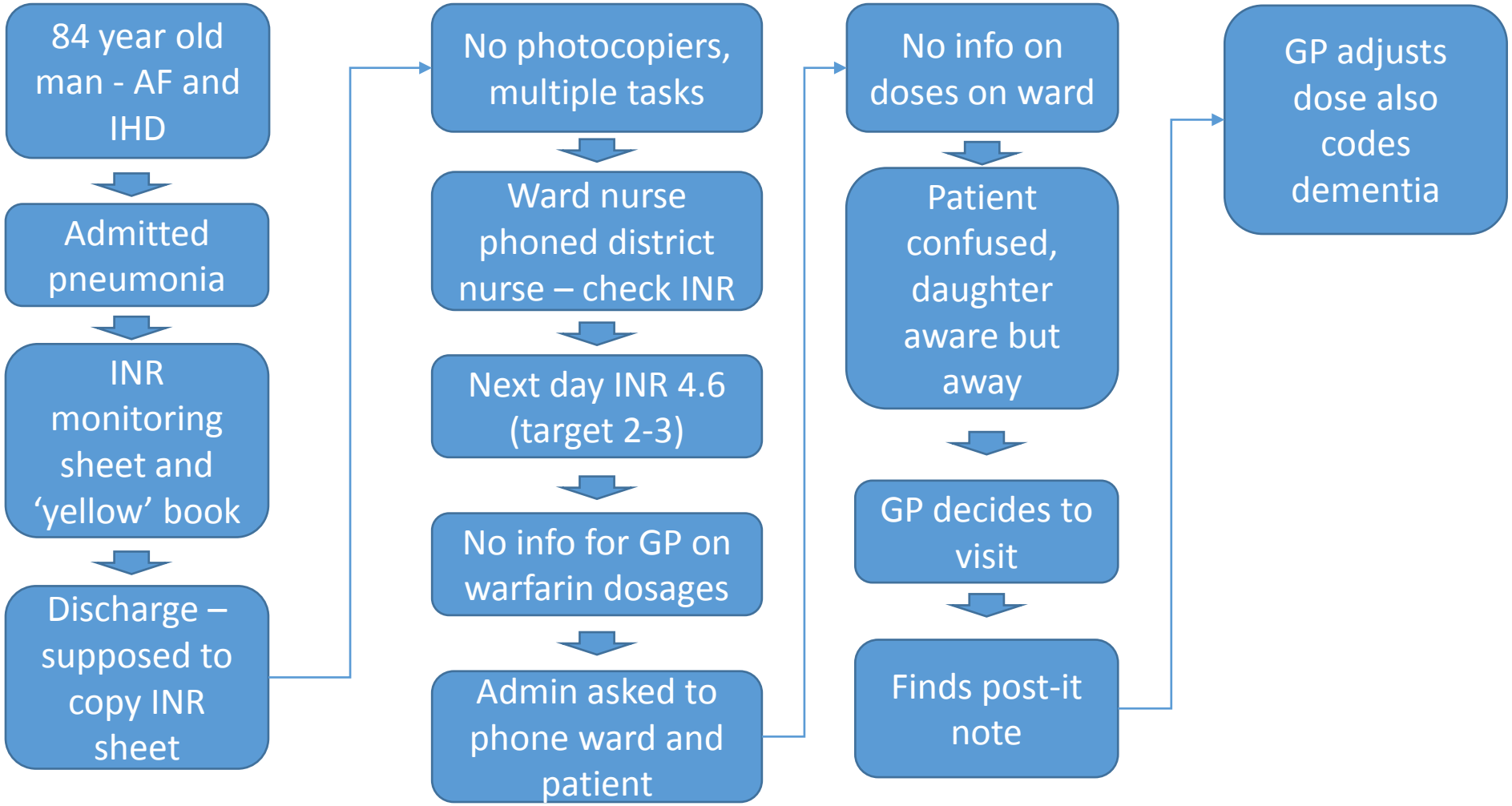

Five questions

- What is the purpose of the system?
  - To communicate INR and warfarin dosage between primary, secondary care and patient
  - To reduce the risk of stroke
- How do conditions of work effect decisions and actions?
  - Demand/ capacity – discharge process, GP on-call workload
  - Resources – photocopiers, info GP had
  - Constraints – protocol for discharge, yellow book
- How do interactions between components and flow of work effect overall system functioning?
  - Daughter away, patient dementia (not coded), no transfer of info, flow – copy sheet
- What are the different perspectives on *work-as-done* and *work-as-imagined* within the system?
  - Nurse – ETTO – not copying warfarin sheet/ post-it note
  - GP – phone patient and see if they know
  - Hospital doctors – presume GP gets all info
  - District nurse – usually do not take INR – did as requested
  - Patient/carer – carer presume passed on correct information
- Will changes maximise overall system function?
  - Not about blaming one component/ person
  - Coding dementia and recording plans for warfarin management
  - District nurses understanding of INR system

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