How to make mistakes

Julius Juurmaa, radiologist

EAST TALLINN
CENTRAL HOSPITAL

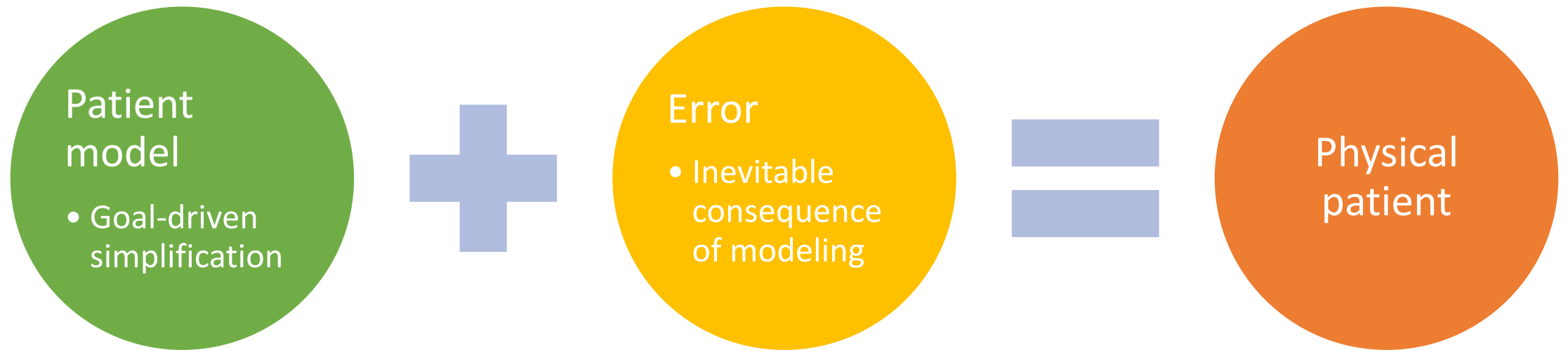# How things go wrong

Classical view

- Systems are <u>trustworthy</u>

- <u>Human error is the reason</u> why accidents happen in an otherwise functioning system

- To understand why an accident happened we have to find out who to blame and remove

New view

- Systems are <u>broken</u>

- <u>Humans create safety</u> by balancing the conflicting interests of system components

- Human error is a symptom pointing to a system failure

- To understand why an accident happened we have to figure out the <u>context that made rational people behave irrationally</u>

All models are wrong

Patient model
• Goal-driven simplification

+

Error
• Inevitable consequence of modeling

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Physical patient
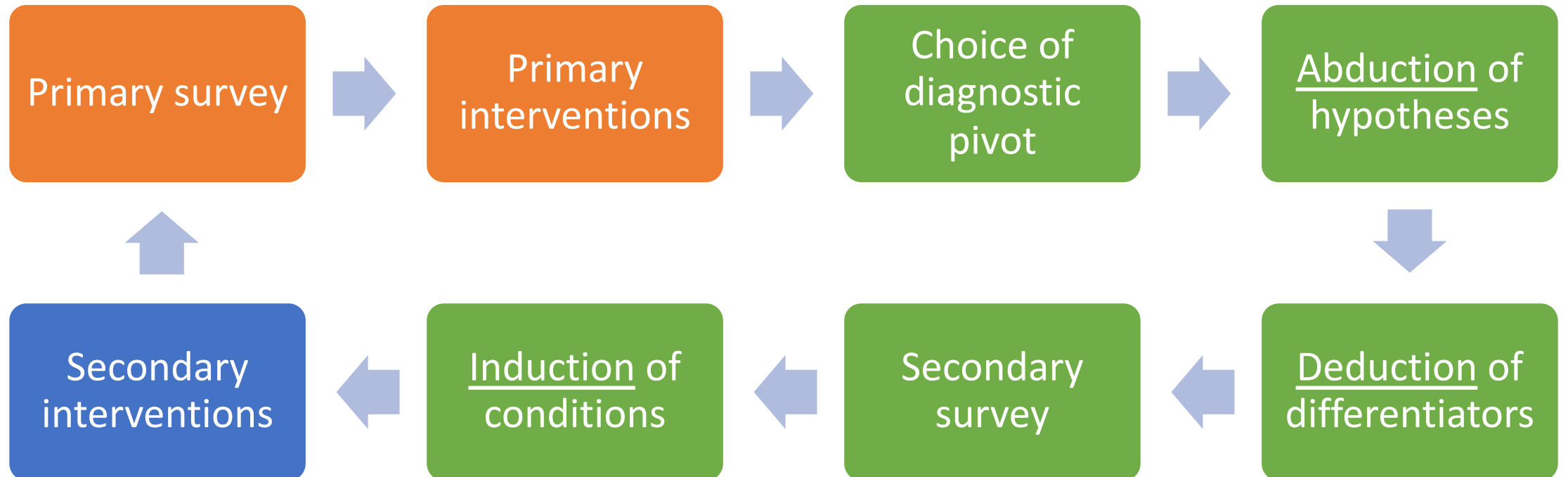
Patient model can be explicitly defined

Observed features (and patterns)

Absent features

Active interventions

Presumed conditions

Process can be explicitly defined

What if we gave people the tools to think

Abduction

- Premises
  - patient has chest pain
  - myocardial infarction, pneumonia and rib fracture are associated with chest pain
- Conclusion
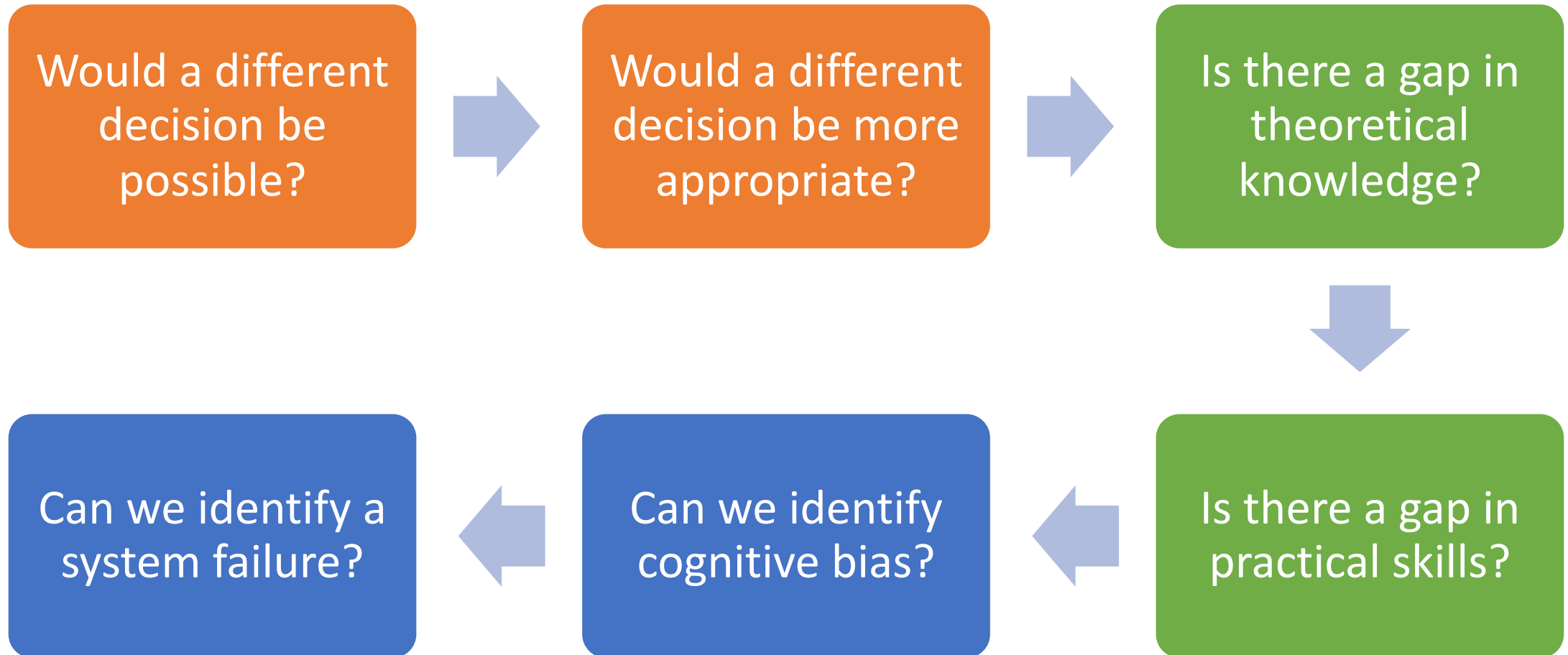 - patient <u>may have</u> myocardial infarction, pneumonia or a fractured rib

Deduction

- Premises
  - pneumonia comes with elevated CRP and consolidation on CXR
  - patient has pneumonia
- Conclusion
  - patient <u>has</u> elevated CRP and consolidation on CXR

Induction

- Premises
  - pneumonia comes with elevated CRP and consolidation on CXR
  - patient has elevated CRP and consolidation on CXR
- Conclusion
  - patient <u>may have</u> pneumonia

What if our model is off

Would a different decision be possible? → Would a different decision be more appropriate? → Is there a gap in theoretical knowledge? ↓ Is there a gap in practical skills? ← Can we identify cognitive bias? ← Can we identify a system failure?

Dual process theory of cognition

System 1

- Every time we receive new information, our brain automagically retrieves earlier examples that form a strong association with current context

- The association is stronger if
  - there are lots of examples
  - examples have recently been stored or retrieved
  - examples are emotionally charged

System 2

- Processing of abstract information decoupled from current context

- Simulation of outcomes from possible actions

The zoo of cognitive biases

- Representativeness restraint
  - tendency to assume that conditions look typical
- Availability bias, significant case bias
  - tendency to judge the likelihood of a condition by the ease with which relevant examples come to mind
- Affective error, outcome bias
  - tendency to convince yourself that what you want to be true is true, instead of less appealing alternatives
- Fundamental attribution error
  - tendency to overweigh an individual's personality as the cause of their problems—applies to consults as well

The zoo of cognitive biases

- Framing
  - tendency to excessively frame decisions with initial context
- Search satisfaction
  - tendency to stop searching once one has found something
- Anchoring, diagnosis momentum
  - tendency to prematurely settle on a condition based on few important features of the initial presentation, failing to adjust as new features arrive
- Confirmation bias
  - tendency to only consider features that support your hypothesis and ignore contrary evidence

The zoo of system failures

- Fatigue
- Inadequate training
  - either theoretical or practical
- Frequent interruptions
- Inadequate documentation
  - or just inaccessible
- No instrumental diagnostics
  - or just inaccessible
- No available hospital beds

- No consultants
  - or afraid to call them
- Unprofessional behavior
- Communication breakdown
- Organization culture
- Social hierarchies
  - „I'm not going to take suggestions from nursing staff"
- Economic simuli

Non-academic teaching hospital