

3. Multimorbidity Day, UniversitätsSpital Zürich, 22.11.2018

# Reduced General Condition: why<sup>5</sup>

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# Case 1

## «The old woman»



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# Case 1 – The old woman

- March 2018
- emergency admission of a 79-year-old woman from a nursing home due to reduced general condition, somnolence, dizziness and intermittent dyspnea
- hypertension, chronic kidney failure (G3a), diabetes mellitus type 2, hypothyroidism, obesity, depression.
- BP 105/54 mmHg, 68/min, Temp. 37.1°C, sO<sub>2</sub> 95% (3l/min O<sub>2</sub>), inconspicuous cardiopulmonary examination, mild peripheral edema, mild cyanosis, somnolent.

# Case 1 – the old woman

- acute on chronic kidney failure (Creatinin 121  $\mu\text{mol/l}$ , GFR 37ml/min, baseline 55 ml/min)
- CRP 35 mg/l, minimal leukocytosis 10.09 G/l, glucose 6.8 mmol/l, hypernatremia, hypokalemia
- fractional excretion of urea 20% → acute kidney failure
- CT thorax: new right heart failure/strain
- CT brain: no intracranial pathology
- Sonography (abdominal): no obstruction
- pulmonary embolism, acute kidney failure, multifactorial dizziness
- oral anticoagulation, rehydration -> discharge

**All done?  
No need for further analysis?**

# Case 1 – The old woman

- two further hospitalisations in March/April 2018
- clinical appearance: reduced general condition, somnolence
- recurrent acute prerenal kidney failure
  - 27.03.: admission creatinine 289  $\mu\text{mol/l}$ , demissio: 30.03.: creatinin 108  $\mu\text{mol/l}$
  - 06.04.: admission creatinine 382  $\mu\text{mol/l}$ , demissio: 10.04.: creatinin 122  $\mu\text{mol/l}$
  - hypernatremia ( $\sim 157 \text{ mmol/l}$ ), hypokalemia ( $\sim 3.0 \text{ mmol/l}$ )
  - no pulmonary symptoms anymore
  - nursing home doctor: evaluation enteral/parenteral nutrition?

# background / actual situation

Why did the patient present recurrent kidney failure?  
Any connection to the pulmonary embolism?

- Root Cause Analytics (RCA): method of problem solving
  - originally developed in psychology and system engineering to identify the "basic and causal factor(s) that underlie variation in performance"
  - 3 questions:
    - What happened?
    - Why did it happen?
    - What can be done to prevent it from happening again?

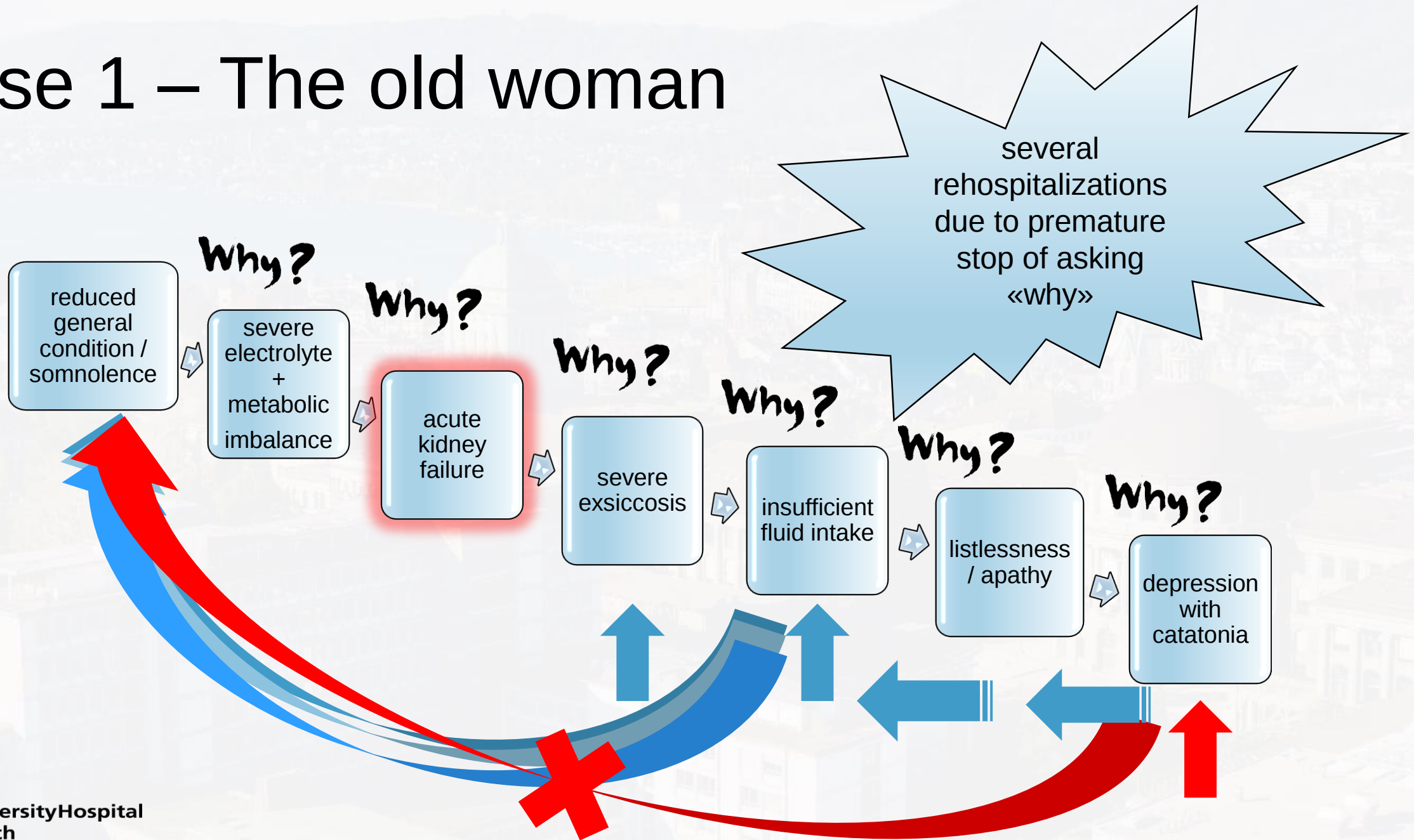


# background / actual situation

- RCA routinely used in healthcare service since mid-1990s to identify root causes of serious events
- little or no information about usability in differential diagnosis
- 5-why-technique
  - start with a symptom or situation and ask yourself **WHY** it occurred
  - then repeat asking **WHY** after the answer and so on
  - simple, iterative interrogative process to clarify potential causes
  - helps to determine the cause-effect-relationship in a problem/failure

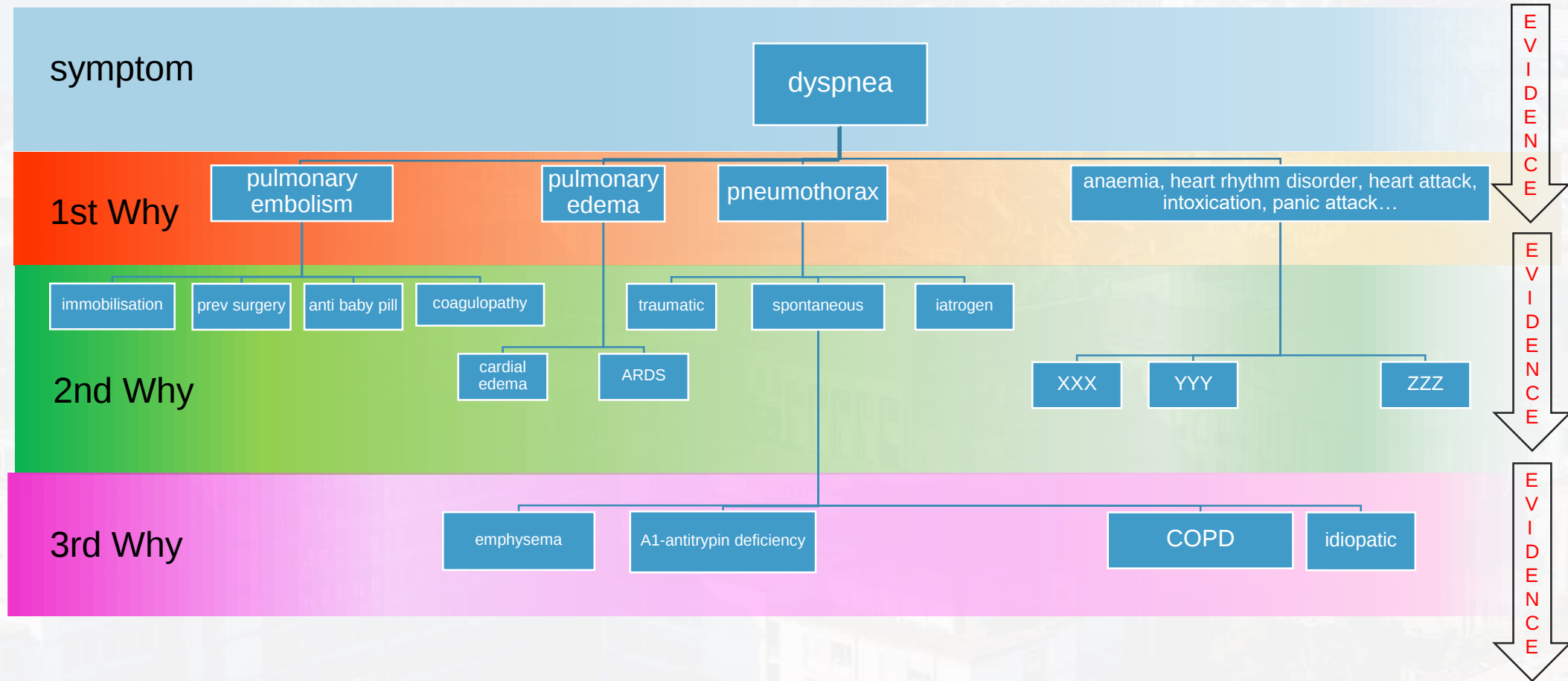


# Case 1 – The old woman



# RCA decision tree

- How to construct a “root tree”



## Case 2

### «The loving wife»



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# Case 2 – The loving wife

Mai 2018

- emergency admission of a 67-year-old woman due to reduced level of consciousness after progressive dyspnea during the last week
- coronary heart disease (2x DES), ischemic heart failure, EF 36% (04/2018), hypertension.
- pre-existing medication: Lisinopril, Amlodipin, Torasemid, Bisoprolol, Aldactone, Lorazepam



# Case 2 – The loving wife

GCS 10, BP 176/76 mmHg, 123 bpm, sO<sub>2</sub> 86% with 10 l/min O<sub>2</sub>, 35.8°C

cyanosis of the lips, heart sounds regularly, 3/6 systolic murmur, bilateral lower legs edema, general moist rales on both lungs.

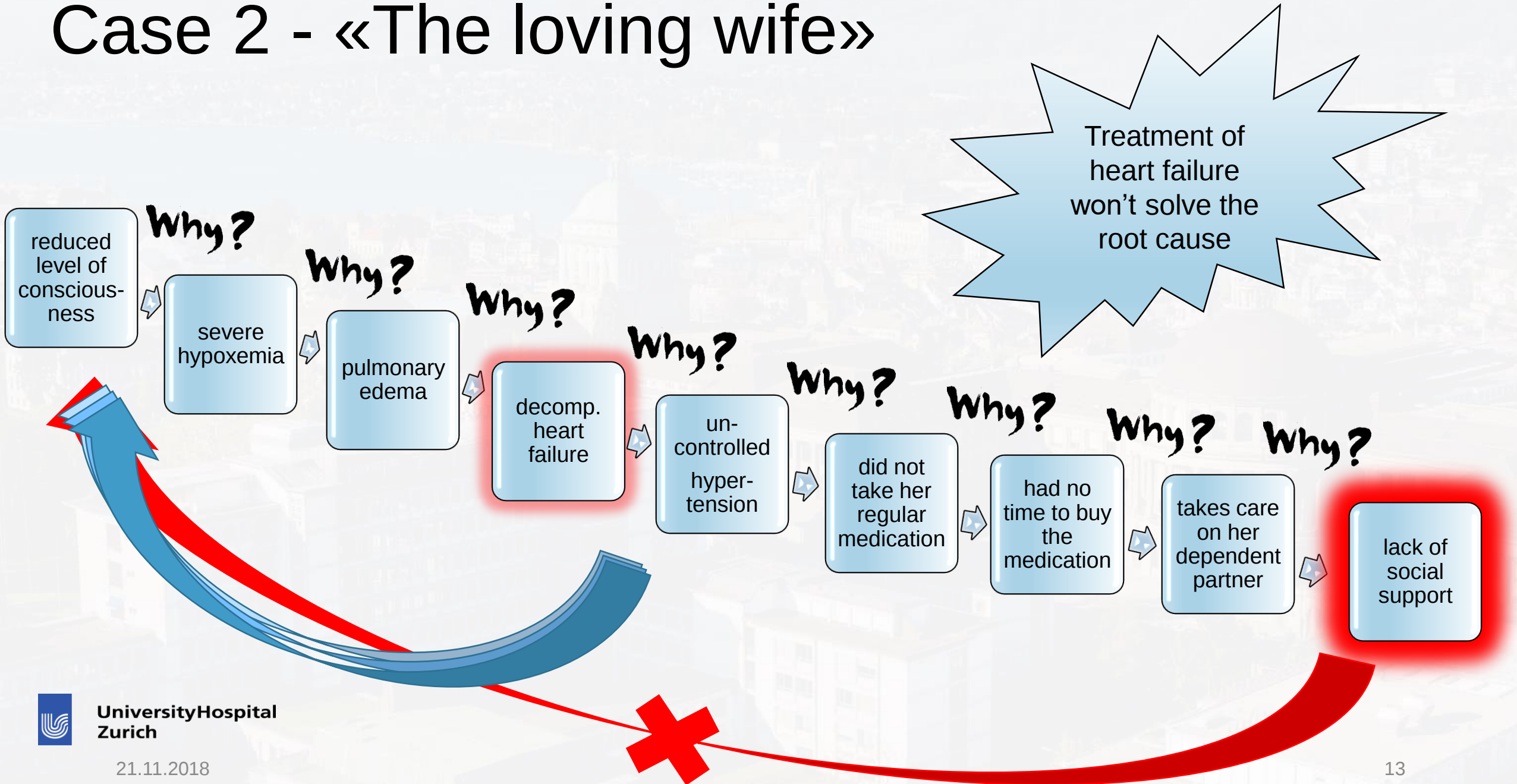
CRP 4 mg/l, leukocytes 11.6 G/l, creatinin 88 µmol/l, Troponin 7 ng/l (Ref. < 14 ng/l) without dynamics in follow up testing, NT-proBNP 76'000 ng/l

ECG: sinus tachycardia, no signs of myocardial ischaemia

chest x-ray: peri-bronchiales cuffing, bilateral pleural effusion, kerley lines



# Case 2 - «The loving wife»



## Case 3

### «The young man»



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# Case 3 – The young man

March 2018

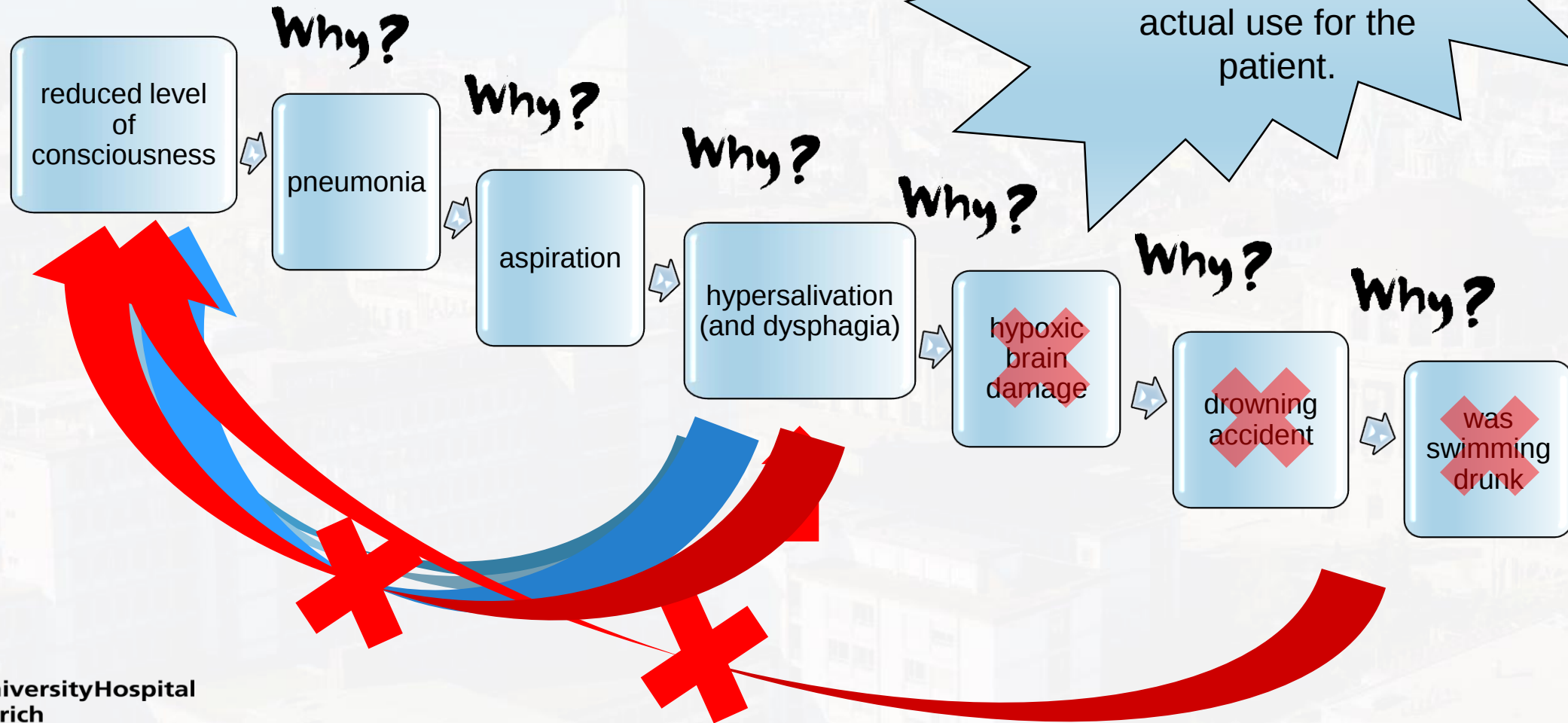
- admission of a 37-year-old man due to reduced general condition, level of consciousness and fever.
- severe hypoxic brain damage due to a swimming accident in 2013 with consecutive tetraplegia
- enteral nutrition via PEG-tube, tracheotomized.
- further diagnosis: obesity, hypertension, ethylic cirrhosis (former alcoholic).
- recurrent hospitalizations due to aspiration pneumonia



# Case 3 – The young man

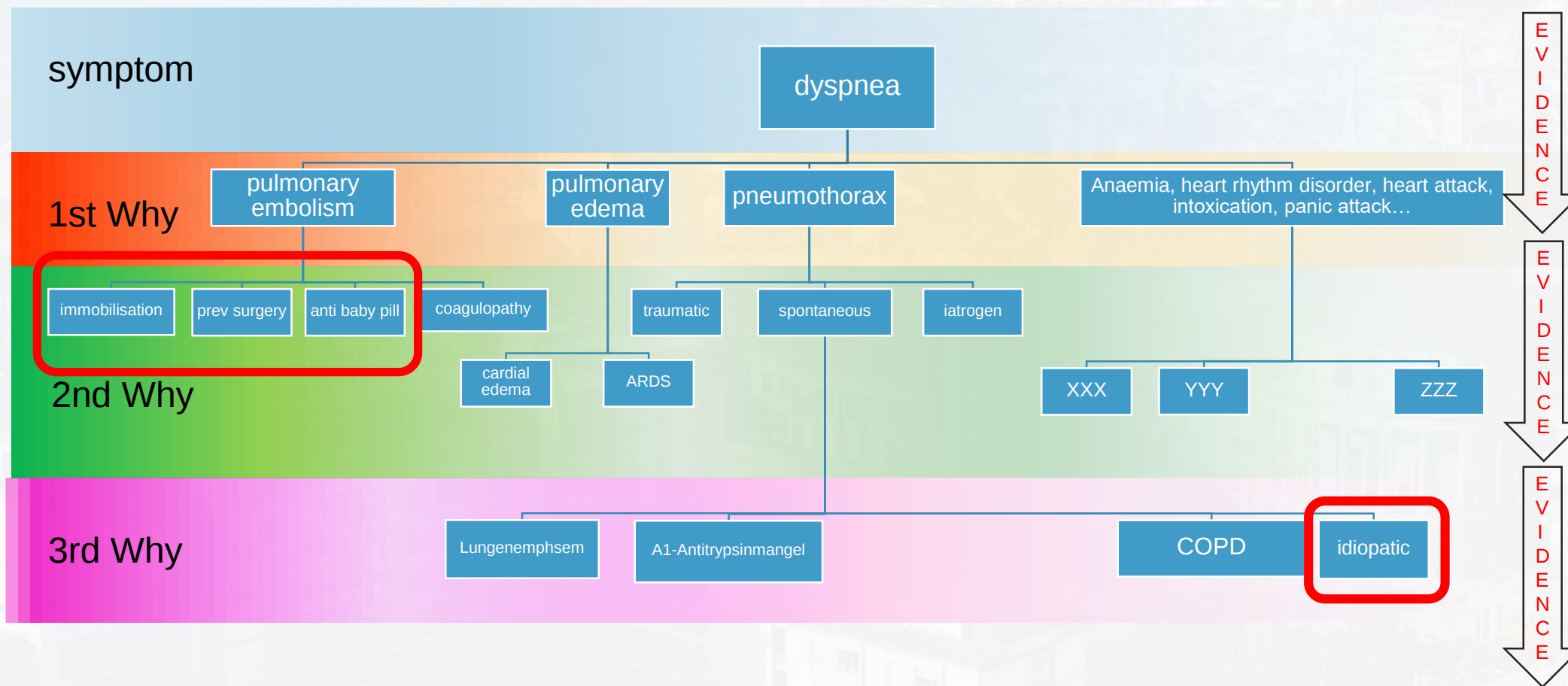
- BP 143/84 mmHg, 104 bpm, sO<sub>2</sub> 98% with 4 l/min oxygen, respiratory rate 32/min, temp. 36.5°C
- reduced level of consciousness (GCS 6 points), normal cardiac examination, bilateral rales in pulmonary auscultation. no verbal or non-verbal communication possible.
- CRP 93 mg/l (Ref < 5 mg/l), leukocytes 14.57 G/l (ref. 3.0 – 9.6 G/l), electrolytes und kidney function within normal range.
- chest x-ray: bilateral infiltrates, pleural effusion on the left side
- Dx: sepsis due to pneumonia (qSOFA 2/3), respiratory partial insufficiency

# Case 3 – The young man



# RCA decision tree

- Limitations



## Conclusion

- RCA, e.g. the 5-Why technique, may be a good approach to examine, solve and structure thoughts in recurring problems / symptoms
- Easy to learn and apply
- Easy way for possible identification of underlying, i.e., root causes, of very different origin (social, financial, medical etc.): In particular, in recurrent hospitalisations, the application of RCA analysis appears to be useful (increased pretest probability for an underlying cause)
- Complex disease with multifactorial symptoms can be a limitation

Thanks for your attention



hope 2 c u  
soon

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