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Key Learning Outcomes for CPT Education in Europe: A Modified Delphi Study

Education Working Group
EACPT

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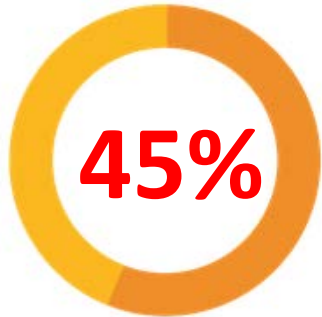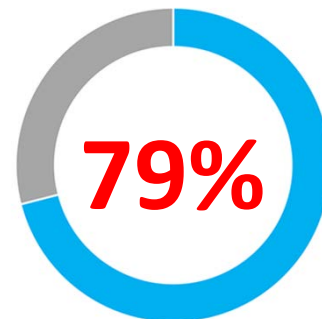What **should** all EU medical students know about clinical pharmacology and therapeutics?

Background

(1) Dornan et al., 2009
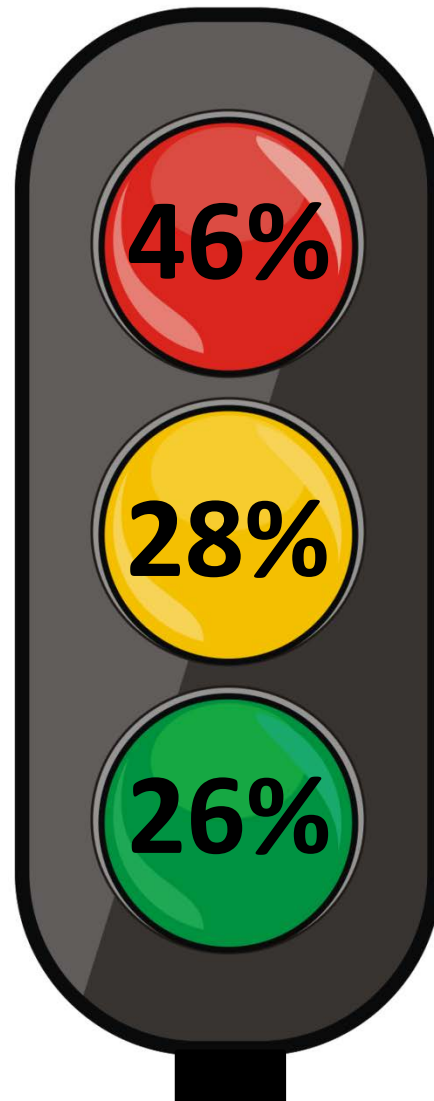
Final-year students (n= 895)

45% '**Never** have written a prescription during their medical study'

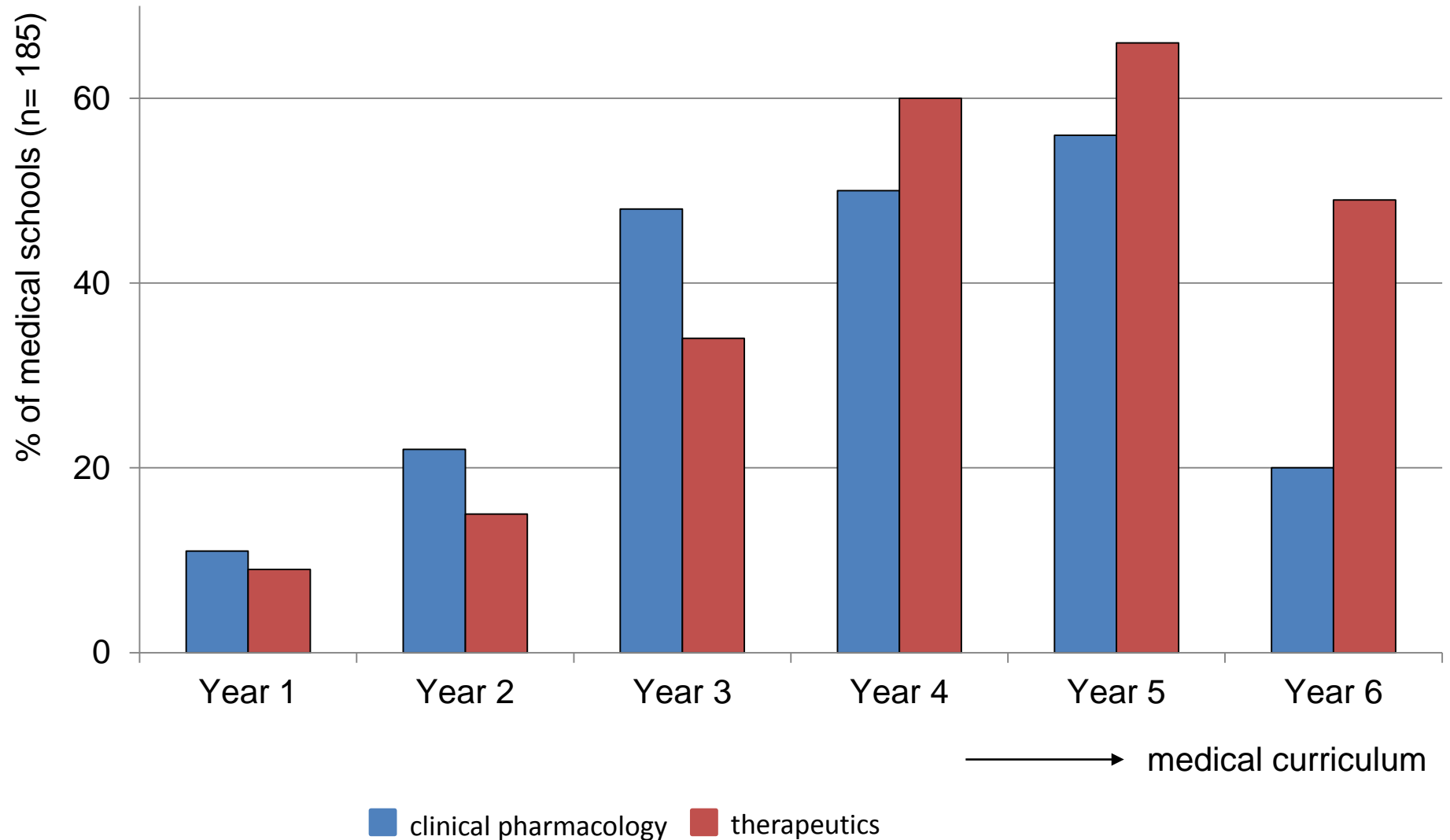**79%** 'Do **not** feel sufficiently prepared for prescribing'

(2) Brinkman et al., 2016

Drug prescriptions (n= 4.195)

46% — **incorrect**

28% — **suboptimal**

26% — **correct**

Which study years?

Associated with better knowledge & skills

Problem-based learning

Traditional learning

Unknown

(3) Brinkman et al., 2017

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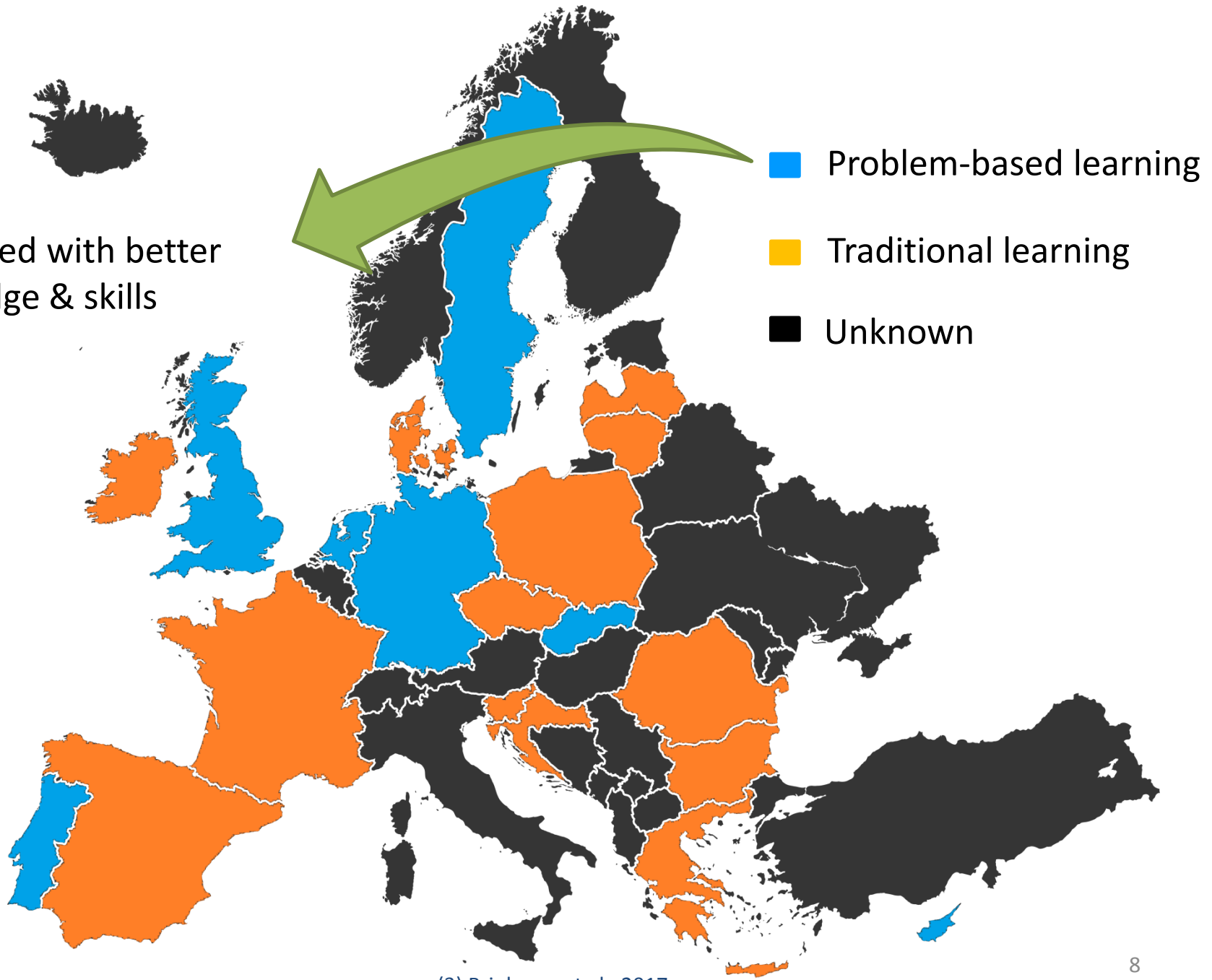
Improvement over last 30 years?

	1988 (n= 164)[3]	2016 (n= 185)[4]
Clinical pharmacology department available	97%	98%
Identifible CPT programme	77%	90%
Average amount of contact hours	35 h	95 h

(3) Orme et al., 1990 (4) Brinkman et al., 2017

How can we **improve** and **harmonize** the CPT education in Europe?

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Aim

- To reach **consensus** on key learning outcomes for teaching and assessing CPT during the undergraduate medical training in Europe

Methods

Modified Delphi Study

Systematic literature review

23 original articles (e.g. Walley & Webb 1997, Orme 2002, Maxwell & Walley 2003, Ross & Maxwell 2012)

307 learning outcomes (233 knowledge, 65 skills, 9 attitudes)

Knowledge

'Describe first-pass metabolism and its importance'

Skills

'Communicate treatment plan and instructions (e.g. when to take, how to take, what duration) to a patient, at a suitable level of information'

Attitudes

'Recognize that patient's values and preferences are important in order to make a risk-benefit analysis at an individual level'

EU expert group

129 CPT teachers from 27 European countries

(Young) Clinical pharmacologists and pharmacists

Network of Teachers in Pharmacotherapy

Questionnaire rounds

Round 1

- **Importance** of each outcome scored (1 to 5)
- Consensus: ≥80% experts give score 4 or 5
- Change outcomes of add new ones

Round 2

- Outcomes **without** consensus were scored again based on group score
- Add arguments in open text box
- Additional and adapted outcomes from Round 1 were scored

Panel meeting

- EACPT congress 2017 (Prague)
- **Discussing** and re-voting outcomes with 75-80% agreement

Round 3

- All experts scored the adapted outcomes from panel meeting

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Results
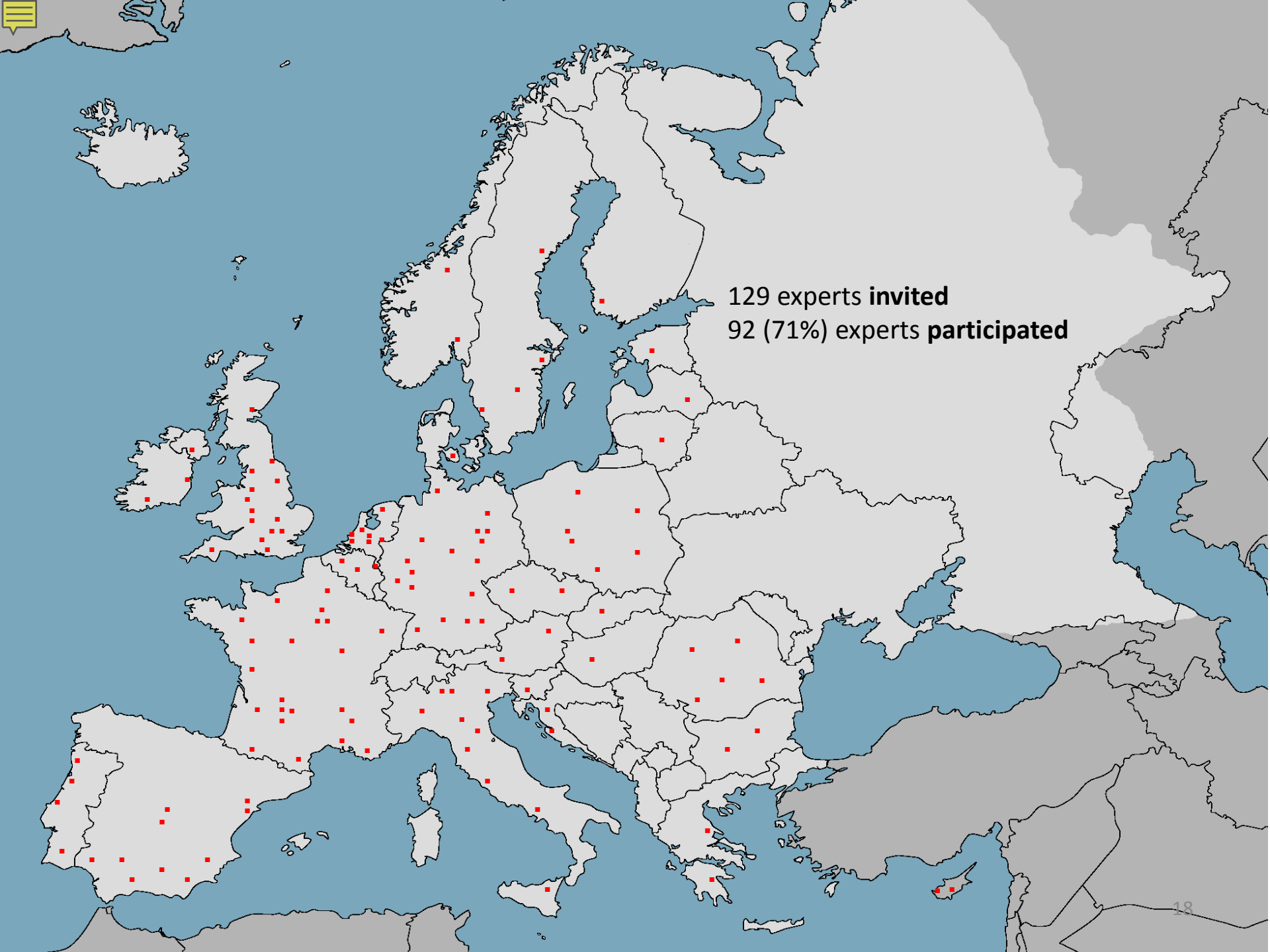
129 experts **invited**
92 (71%) experts **participated**

Questionnaire rounds

- **Round 1**
  - **226 included**
  - 81 no consensus
  - 24 new
  - 2 adapted

- **Round 2**
  - **18 included**
  - 73 excluded
  - 16 panel meeting (75-80% consensus)

- **Panel meeting**
  - **5 included**
  - 6 excluded
  - 5 adapted

- **Round 3**
  - **3 included**

252 learning outcomes

Knowledge
n= 192
(know what)

Skills n= 47
(know how)

Attitudes
n= 13
(know why)

Amount of learning outcomes

* 38

knowledge   skills   attitudes

21
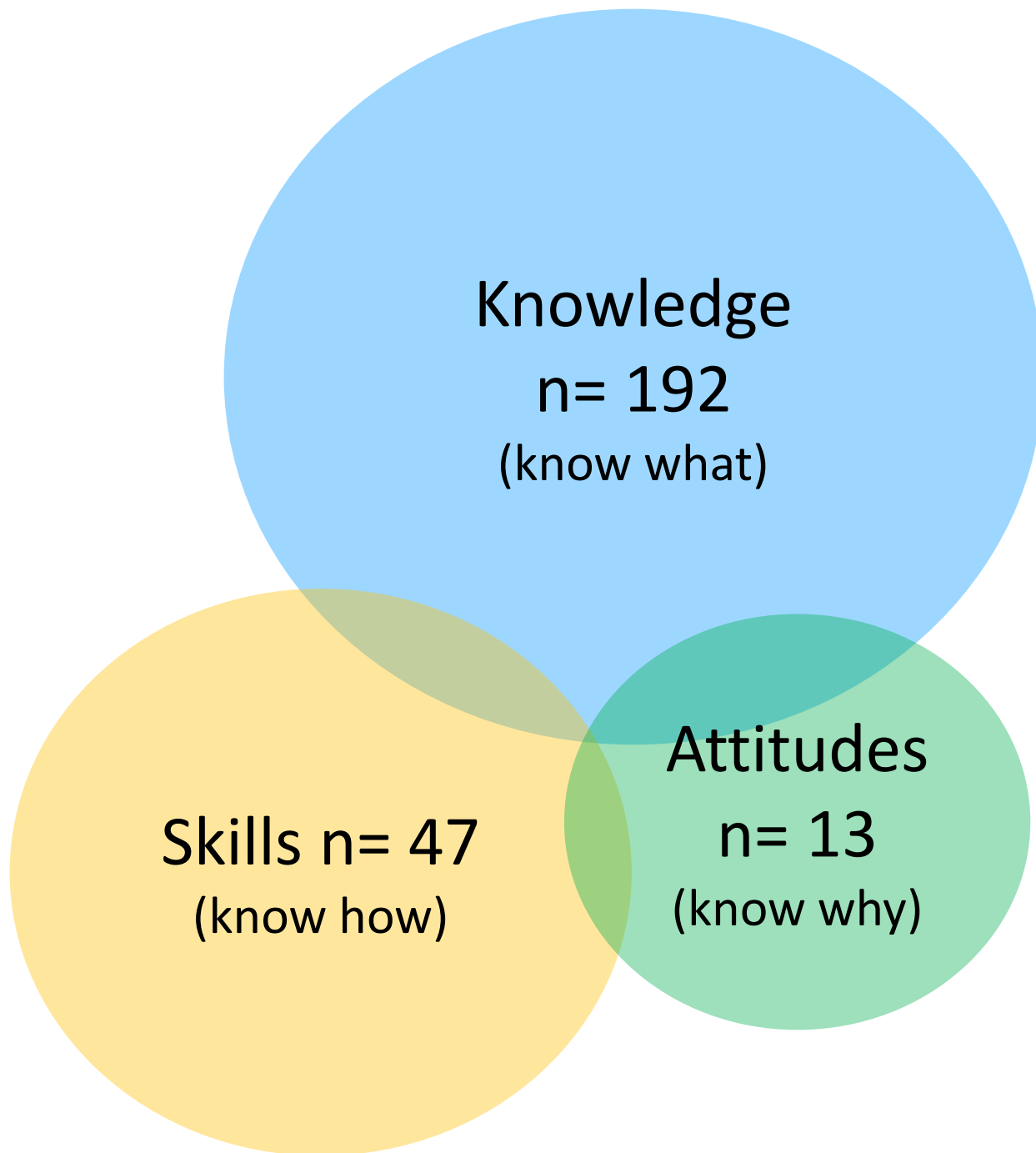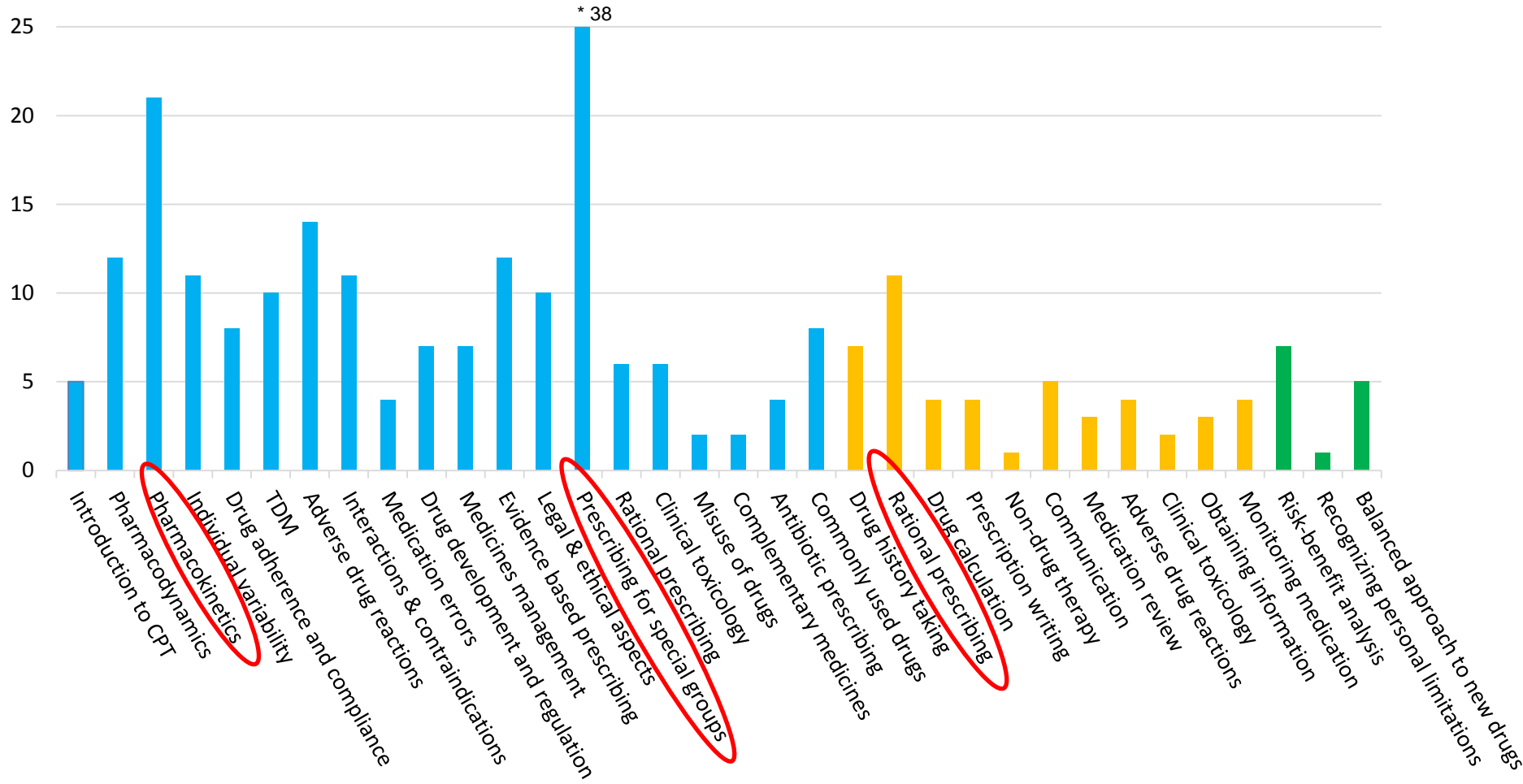
Amount of learning outcomes

Mean % (very) important

* 38

knowledge skills attitudes

22
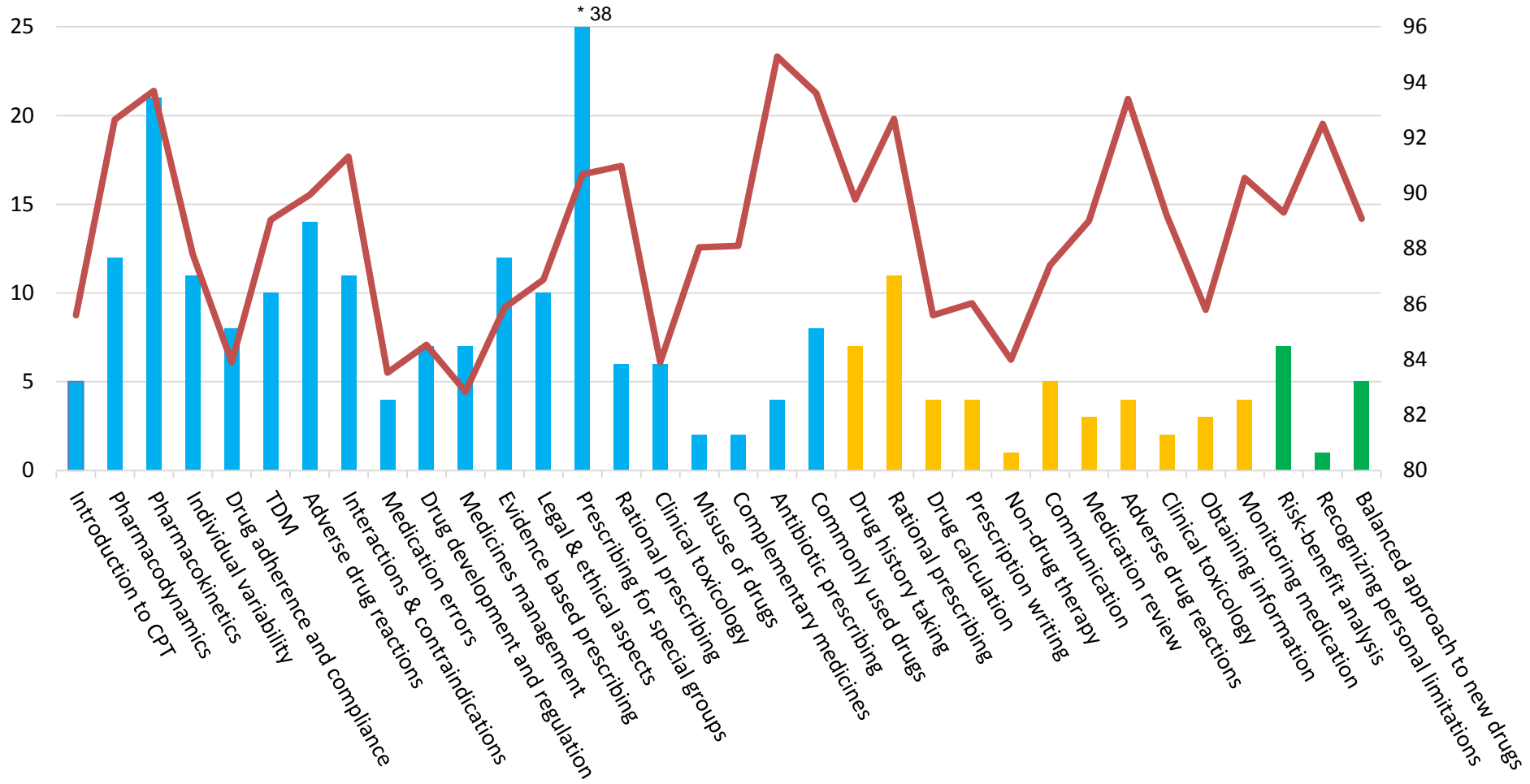
How do you **integrate** these outcomes in an already overcrowded medical curriculum?

European Core Curriculum

1. **What** CPT topics should be taught?

2. **When should CPT be taught and assessed**?

   - Longitudinal integrated programme
   - As early as possible
   - Preferably in every study year

3. **How** should CPT be taught and learned?

4. **How** should CPT be assessed?

5. **Who** should teach and assess CPT?

LEARNING OUTCOMES | TEACHING METHODS | ASSESSMENT METHODS

YEAR 1

Learning Outcomes:
- Introduction to CPT
- Pharmaco-dynamics
- Pharmaco-kinetics
- Individual variability
- Drug development & regulation
- Medicines managment
- Evidence-based prescribing
- Legal & ethical aspects
- Prescription writing
- Rational prescribing
- Obtaining information
- Communication
- Balanced approach to new drugs

Teaching Methods:
- Lectures & seminars
- E-learning
- Journal clubs
- Self-study
- Case-based discussion in small working group
- Prescribing simulation
- E-learning
- Student-run clinic

Assessment Methods:
- Written & computer-based assessment
- Oral examination
- Portfolio

YEAR 2

Learning Outcomes:
- Rational prescribing
- Interactions & contra-indications
- Commonly used & high risk drugs
- Prescribing for special groups
- Clinical toxicology
- Adverse drug reactions
- Misuse of drugs
- Prescription writing
- Rational prescribing
- Non-drug therapy
- Obtaining information
- Communication
- Risk-benefit analysis
- Balanced approach to new drugs

Teaching Methods:
- Lectures & seminars
- E-learning
- Journal clubs
- Self-study
- Case-based discussion in small working group
- Prescribing simulation
- E-learning
- Student-run clinic

Assessment Methods:
- Written & computer-based assessment
- OSCE
- Portfolio

YEAR 3

Learning Outcomes:
- Rational prescribing
- Interactions & contra-indications
- Commonly used & high risk drugs
- Prescribing for special groups
- Antibiotic prescribing & resistance
- Complementary medicine
- Prescription writing
- Rational prescribing
- Non-drug therapy
- Obtaining information
- Communication
- Drug calculation
- Risk-benefit analysis
- Balanced approach to new drugs

Teaching Methods:
- Lectures & seminars
- E-learning
- Journal clubs
- Self-study
- Case-based discussion in small working group
- Role playing session
- E-learning
- Student-run clinic

Assessment Methods:
- Written & computer-based assessment
- OSCE
- Portfolio

YEAR 4

Learning Outcomes:
- Prescribing for special groups
- Drug adherence & compliance
- Therapeutic drug monitoring
- Prescription writing
- Rational prescribing
- Non-drug therapy
- Drug history taking
- Communication
- Obtaining information
- Monitoring medication
- Medication review
- Balanced approach to new drugs
- Risk-benefit analysis
- Recognizing personal limitations

Teaching Methods:
- Prescribing tutorials
- Bedside teaching
- E-learning
- Self-study
- Real-world prescribing under supervision
- Bedside teaching
- E-learning
- Pre-prescribing seminar

Assessment Methods:
- Oral examination
- Workplace-based assessment
- Portfolio

YEAR 5/6

Learning Outcomes:
- Medication errors
- Therapeutic drug monitoring
- Prescription writing
- Rational prescribing
- Non-drug therapy
- Drug history taking
- Communication
- Obtaining information
- Monitoring medication
- Clinical toxicology
- Adverse drug reactions
- Balanced approach to new drugs
- Risk-benefit analysis
- Recognizing personal limitations

Teaching Methods:
- Prescribing tutorials
- Bedside teaching
- E-learning
- Self-study
- Real-world prescribing under supervision
- Pre-prescribing seminar
- Prescribing tutorial
- Student-run clinic

Assessment Methods:
- Computer-based assessment
- Workplace-based assessment
- Portfolio

Legend: ■ knowledge ■ skills ■ attitudes

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European Core Curriculum

1. **What** CPT topics should be taught?

2. **When** should CPT be taught and assessed?

3. **How should CPT be taught and learned?**

   - Focus on skills
   - Simulated and clinical setting
   - Real environment

4. **How** should CPT be assessed?

5. **Who** should teach and assess CPT?

European Core Curriculum

1. **What** CPT topics should be taught?

2. **When** should CPT be taught and assessed?

3. **How** should CPT be taught and learned?

4. **How should CPT be assessed?**

   - Seperate assessment

   - Final assessment at the end of the curriculum

5. **Who** should teach and assess CPT?

European Core Curriculum

1. **What** CPT topics should be taught?
2. **When** should CPT be taught and assessed?
3. **How** should CPT be taught and learned?
4. **How** should CPT be assessed?
5. **Who should teach and assess CPT?**
   - (Young!) Clinical pharmacologists
   - Junior doctors
   - Medical & pharmacy students (interprofessional)

Clinical pharmacology training

- Similar method to identify learning outcomes for postgraduate clinical pharmacology training in EU

- Additional learning outcomes (e.g. teaching and training, drug research, patient safety)

EU funding application

- 'European Prescribing License (EPL)'

- 8 EU medical schools

- Period 2019-2022

Research team

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Thanks to **all** 92 CPT teachers from 25 European countries who participated in this study!

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full article