

# Hannover Medical School

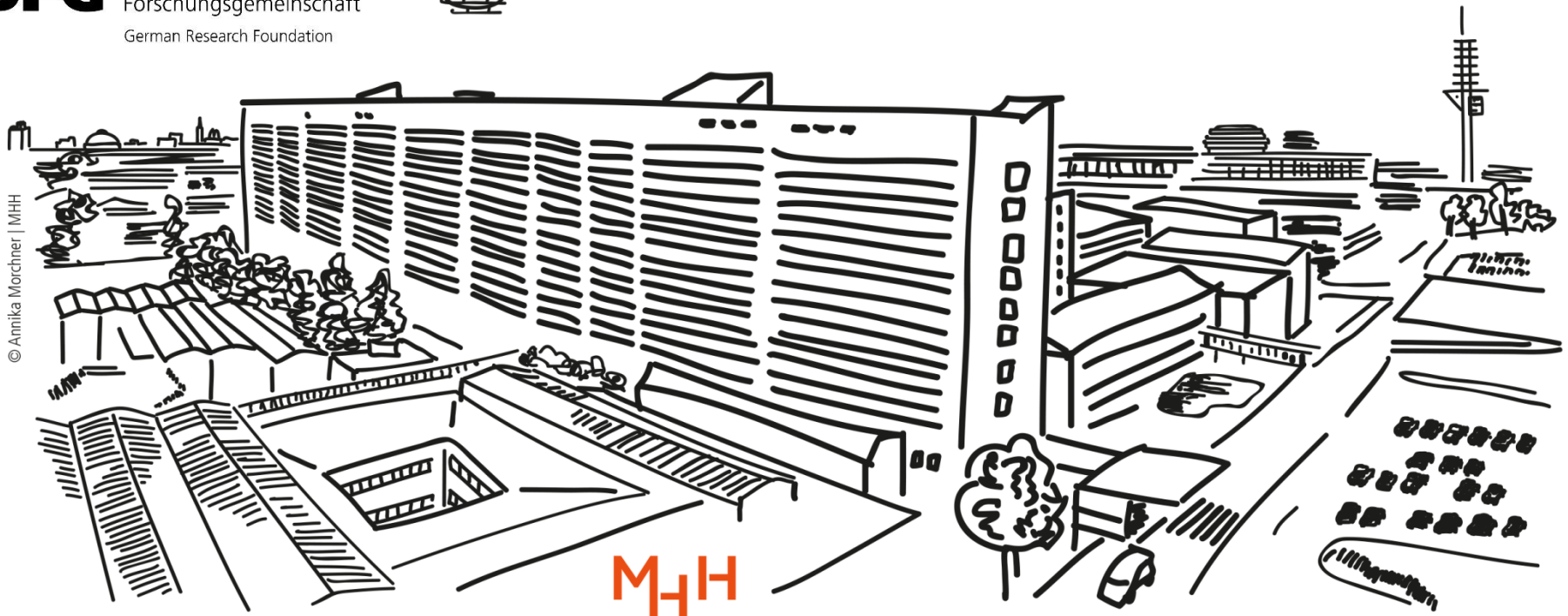
## Evaluating the quality of reporting the transitivity assumption in complex networks of interventions

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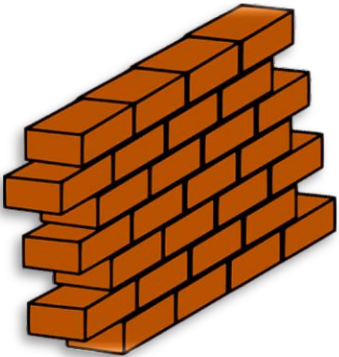
# Why is transitivity assumption important

## Network meta-analysis

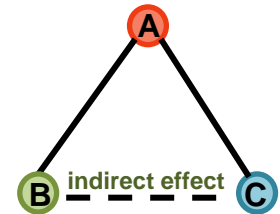


- The **cornerstone** of network meta-analysis (NMA)
- **Extension of the similarity assumption** in pairwise meta-analysis
  - Clinical and methodological similarity **across** the comparisons

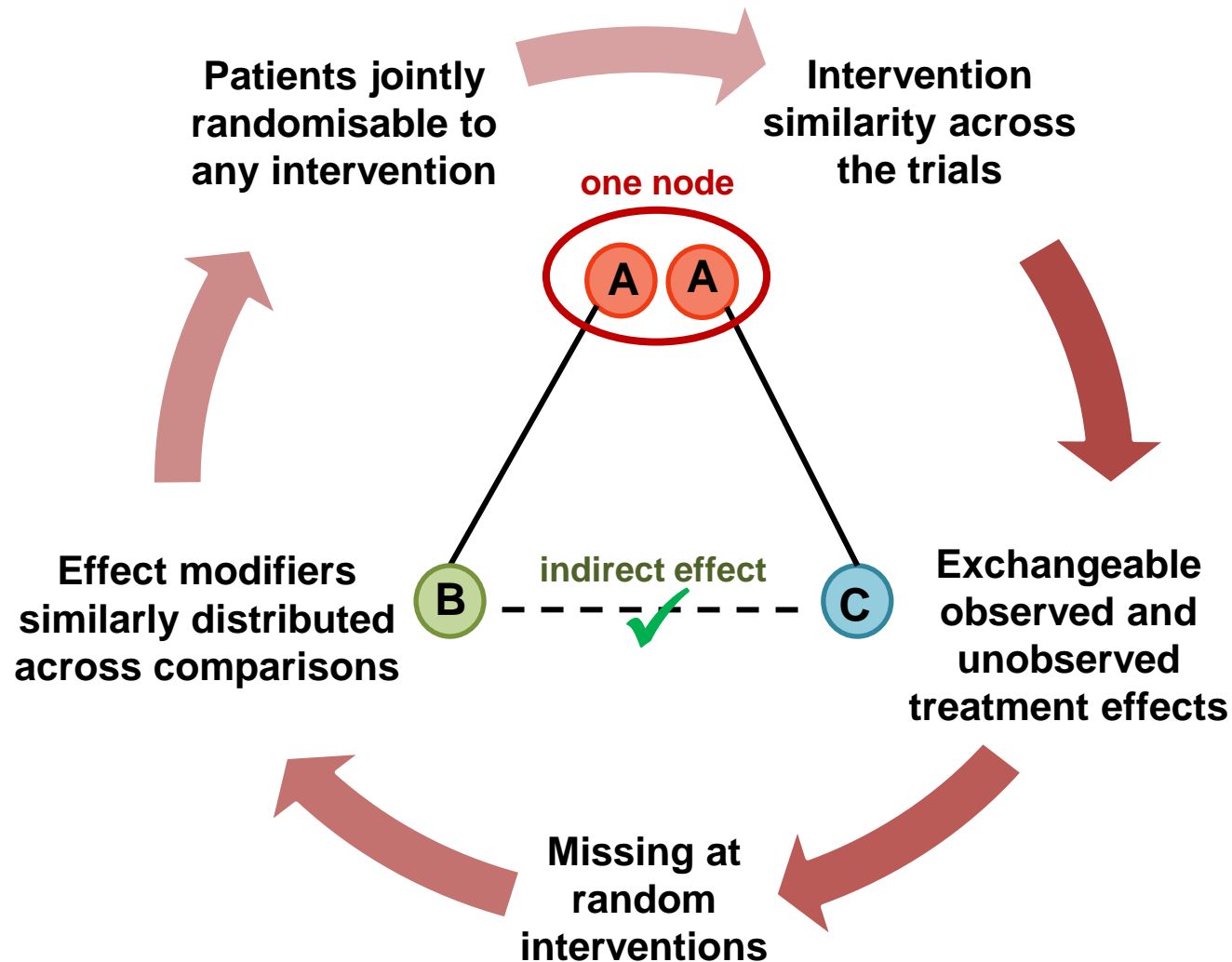
## Transitivity assumption



- Necessary to obtain **credible indirect estimates**
- **Violation** of transitivity compromises the NMA results
- **Validity** of transitivity rests on clinical and epidemiological grounds
  - ... and the reporting quality of the included trials



# Transitivity: interchangeable interpretations



# What motivated our study

- **Currently limited empirical evidence** on the transitivity evaluation
  - The quality of indirect estimates and consistency evaluation have attracted the most research!
- **To increase evidence on the reporting and evaluation** quality of transitivity assumption.

- **Are** authors of systematic review **aware** of the transitivity assumption?
- How do they **evaluate** the transitivity assumption?
- Do they **discuss** the NMA results in the context of transitivity assumption?
- How many systematic reviews have a **high-quality** transitivity evaluation?
  - More likely to provide **credible results** for the end-users!



# Setting & Methods (1)

- **356 systematic reviews** with NMA (collection from previous study)  
(Spineli et al. 2018)
  - **2011–2017**, at least three interventions, **any network structure**
- **Consider** the few relevant quality criteria of **Donegan et al. (2010)**:  
(they considered only triangles)



Was transitivity **defined**?

How transitivity was **evaluated** (if at all)?

Was there any **Table of characteristics** (PICO components)?

Are there any trials with **unreported characteristics**?

Were the characteristics reported to be **comparable** across the comparisons?

❖ A glimpse of the **reviewers' awareness** of transitivity assumption

# Setting & Methods (2)

- **356 systematic reviews** with NMA (collection from previous study)  
(Spineli et al. 2018)

➤ **2011–2017**, at least three interventions, **any network structure**

- **Expand** on the few relevant quality criteria of **Donegan et al. (2010)**:  
(they considered only triangles)



- Was transitivity **evaluation** planned **in the protocol**?

- Did the authors **conclude** transitivity?

- Did they **acknowledge the implications** of (in)transitivity to the NMA

results?

# Characteristics of *high-quality* transitivity evaluation



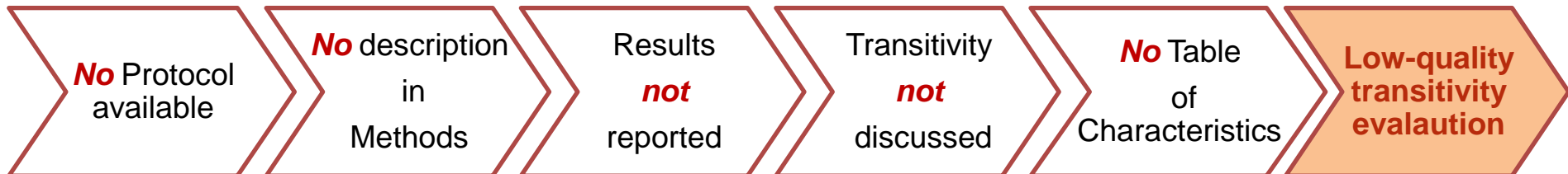
How many reviews with



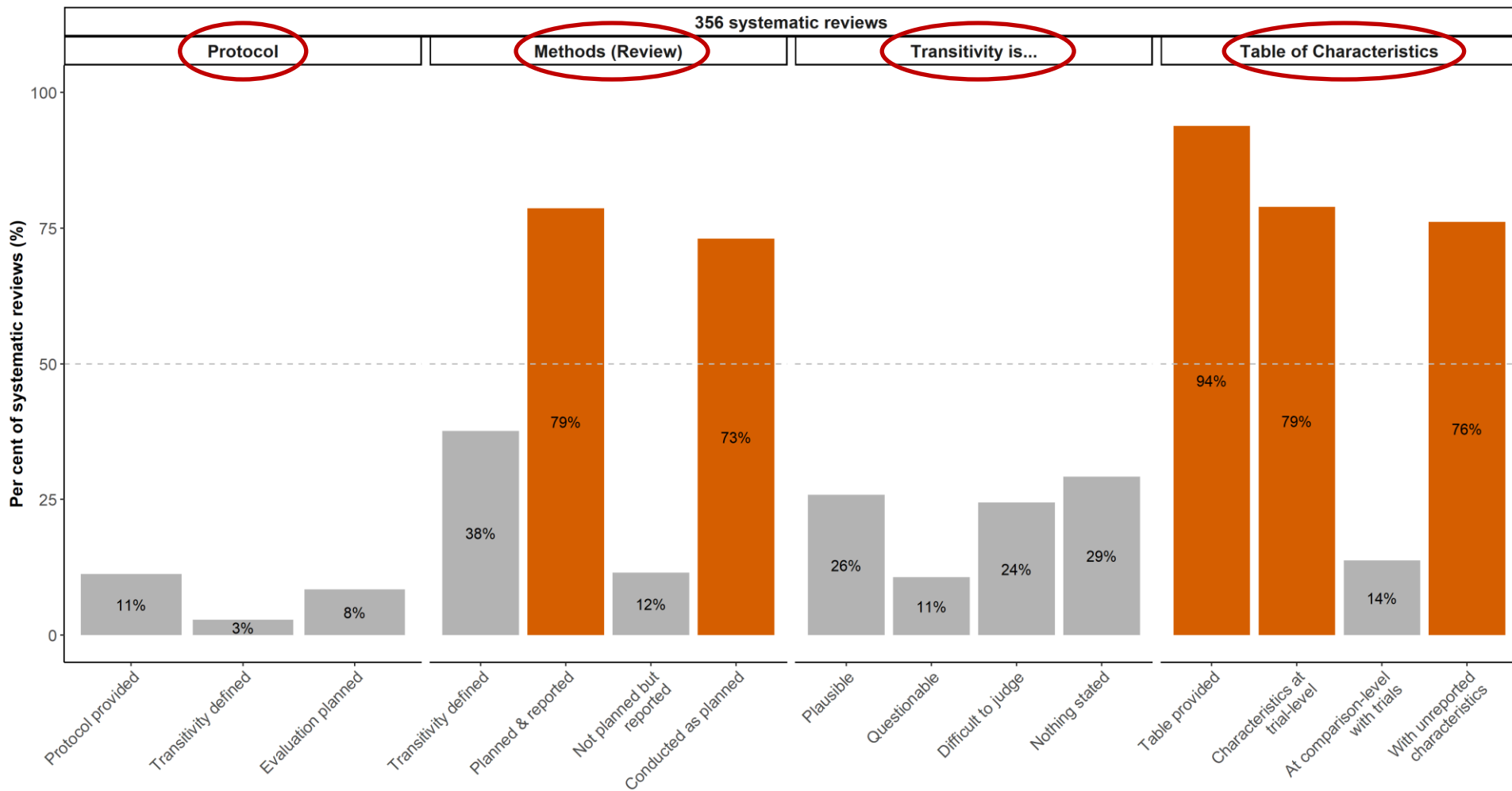
Low quality

Unclear quality

High quality

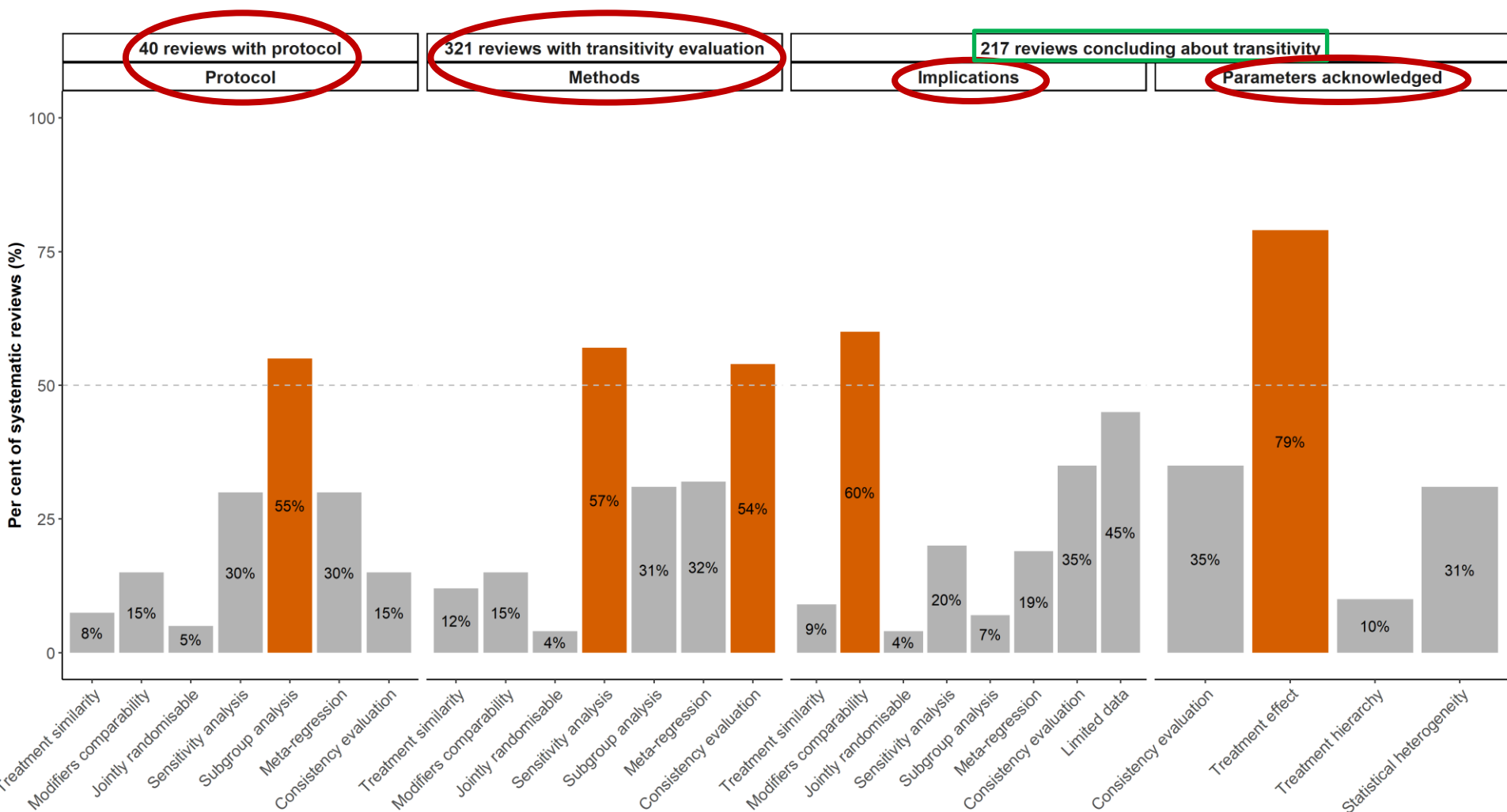


# All 356 systematic reviews



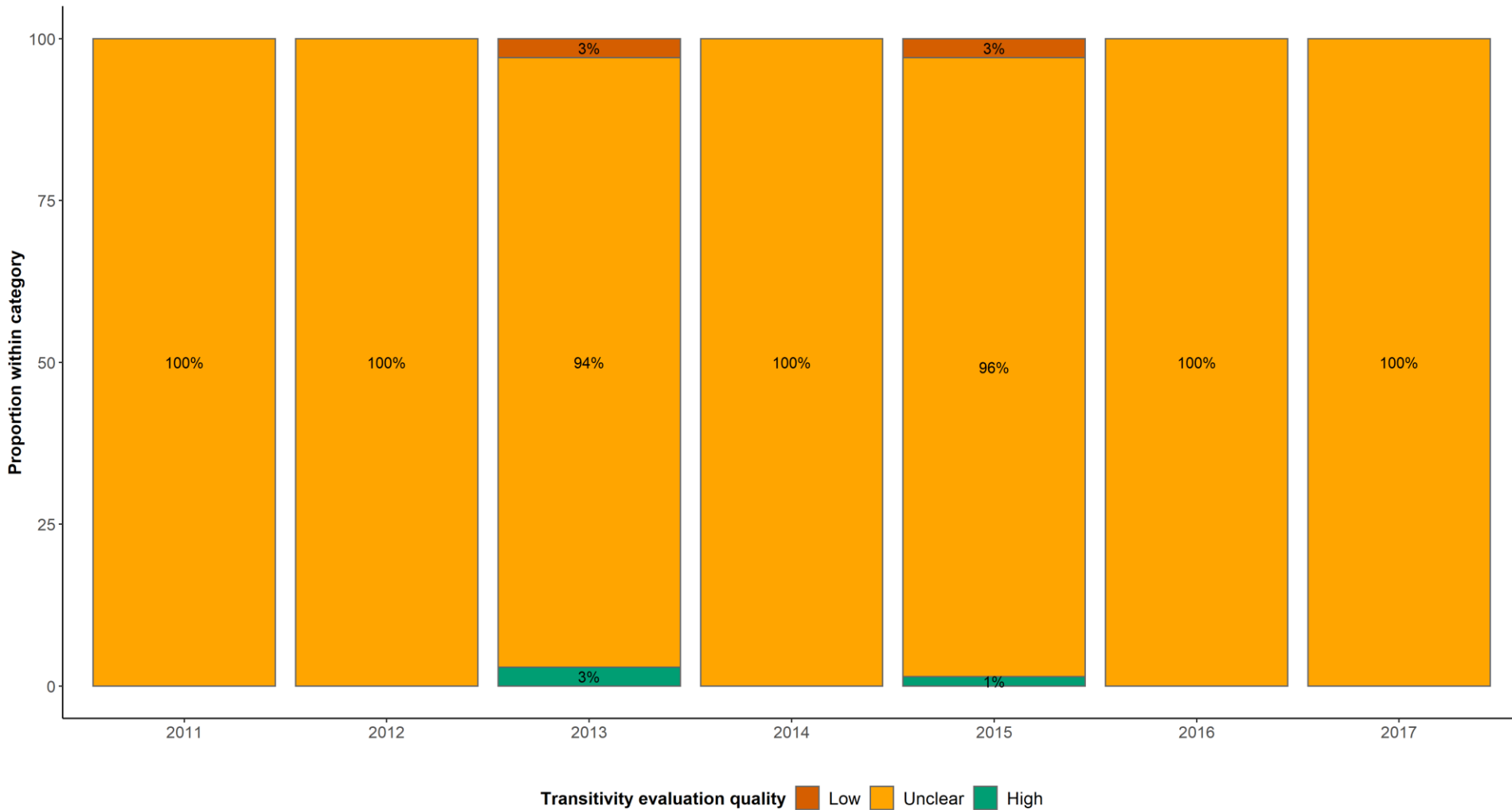


# Different groups of systematic reviews





# Quality of transitivity evaluation



# How our study compares to Donegan et al.

Criteria	Donegan et al (n=43 triangles)	Present study (n=356 any structure)
Transitivity stated	26%	38%
<b>Methods described for transitivity evaluation</b>	<b>0%</b>	<b>79%</b>
Methods used for transitivity evaluation*	44%	53% <sup>1</sup>
Table of characteristics presented	88%	94%

\*Emphasis placed on sensitivity analysis, meta-regression and subgroup analysis.

<sup>1</sup>At least one of the aforementioned statistical methods.

# Strengths

- **Extensive empirical evidence** on the quality of the transitivity evaluation
  - **Uncovered** conceptual and statistical methods of transitivity evaluation thoroughly
- **Provide** the reviewer with a comprehensive checklist for transitivity evaluation
  - **To be used** at the protocol stage, and when conducting and reporting the review
- **Defined** the **characteristics** of a good-quality transitivity evaluation
- **Revealed** the quality of transitivity evaluation in published systematic reviews

# Limitations

- **Collection did not** cover also recent systematic reviews (i.e., 04/2017 – 12/2021)
  - **Timeline limitation** to deliver the project
- **Challenging** to determine the **transitivity (im)plausibility**
  - Our judgements depended on the **clarity of the discussion** section
- **Challenging** to determine the statistical methods used (except for consistency)
  - **In a few systematic reviews**, it was impossible to make a clear distinction

# Conclusions

- **Low awareness** of the proper transitivity evaluation
- **Some concerns** about the credibility of the conclusions drawn
- **Optimism for a paradigm shift** in the evaluation of transitivity assumption
  - The reviewers can use the extraction items as a checklist alongside the criteria for the high-quality transitivity evaluation.





Brussels



Leiden

**Thank you for your attention!**



Hannover



Heidelberg