

Designing Prognostic Factor Studies: Key Concepts and Practical Guidance

STRATOS Session 2: Practical Aspects of Medical Research

Peggy Sekula, Suzanne Cadarette, Mitch H Gail
on behalf of TG 5 Study Design

<https://tg5.stratosinit.org/>

October 1st, 2026

What is prognostic research?

- Predicting future events – a long-standing interest



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Prognostic model (often) combines several prognostic factors and allows to accurately calculate person's risk for a specific outcome.

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Open access

Communication

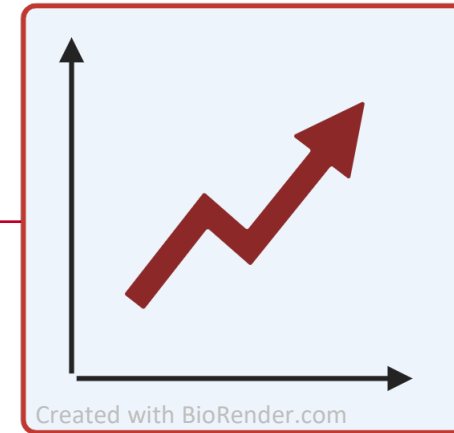
BMJ Open Design aspects for prognostic factor studies

Peggy Sekula ¹, Inga Steinbrenner ¹, Ulla T Schultheiss,^{1,2,3} Neus Valveny,⁴ Paola Rebora,^{5,6} Susan Halabi ⁷, Suzanne M Cadarette,⁸ Richard D Riley ^{9,10}, Gary S Collins ¹¹, Willi Sauerbrei,¹² Mitchell H Gail ¹³ for topic group 5 of the STRATOS initiative

Background

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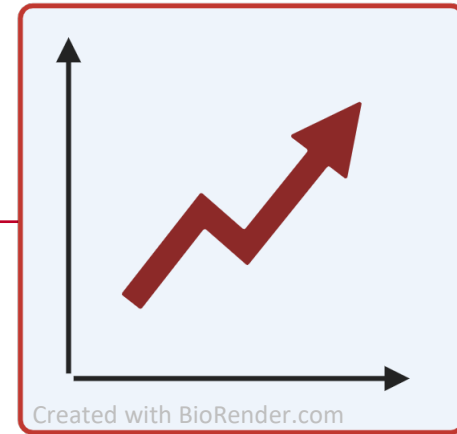
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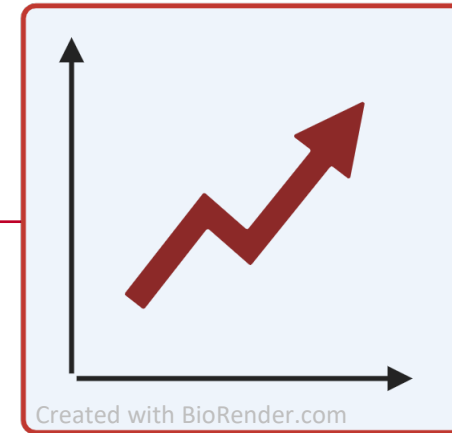
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Research: increasing value, reducing waste 2

Increasing value and reducing waste in research design, conduct, and analysis

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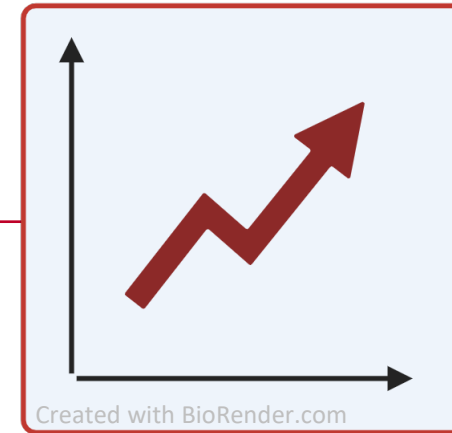
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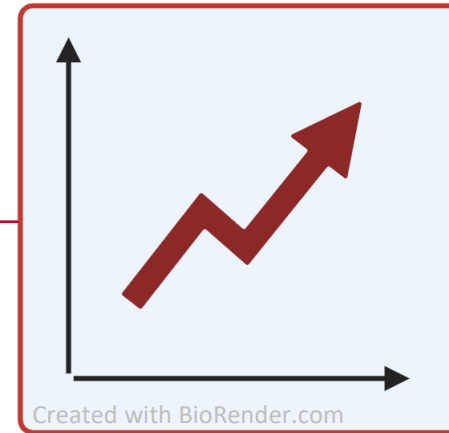
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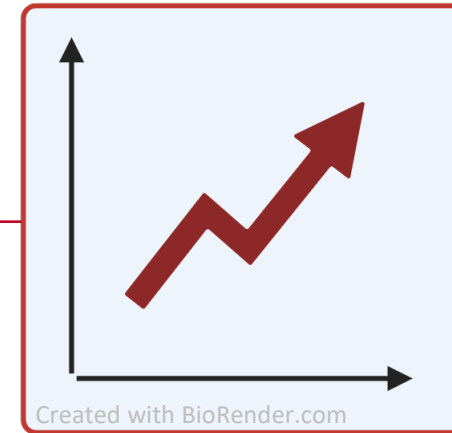
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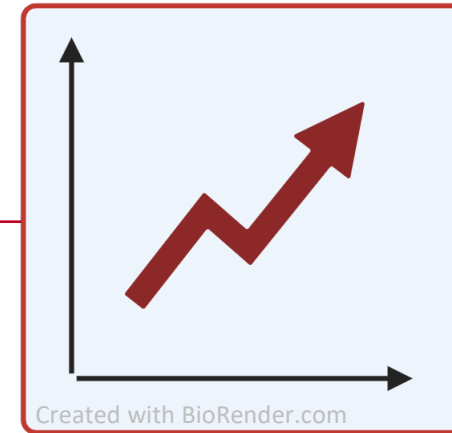
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Research Methods & Reporting

Ten steps towards improving prognosis research

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- **Now: STRATOS**

STRATOS
INITIATIVE

Design aspects for prognostic factor studies

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Aim of STRATOS contribution

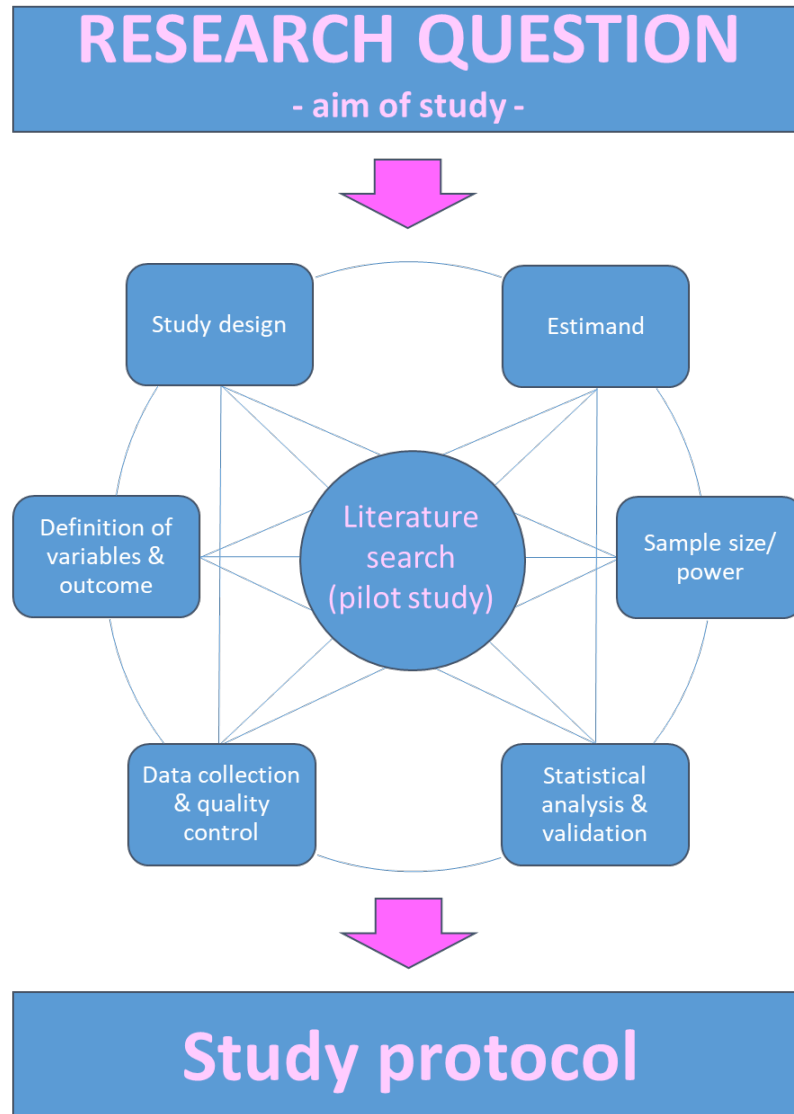
- Discussion of design options for prognostic factor studies
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- **Focus:** studies assessing the prognostic value of a single factor in diseased people for a pre-specified binary outcome

Content

- Designing a prognostic factor study
 - a complex task

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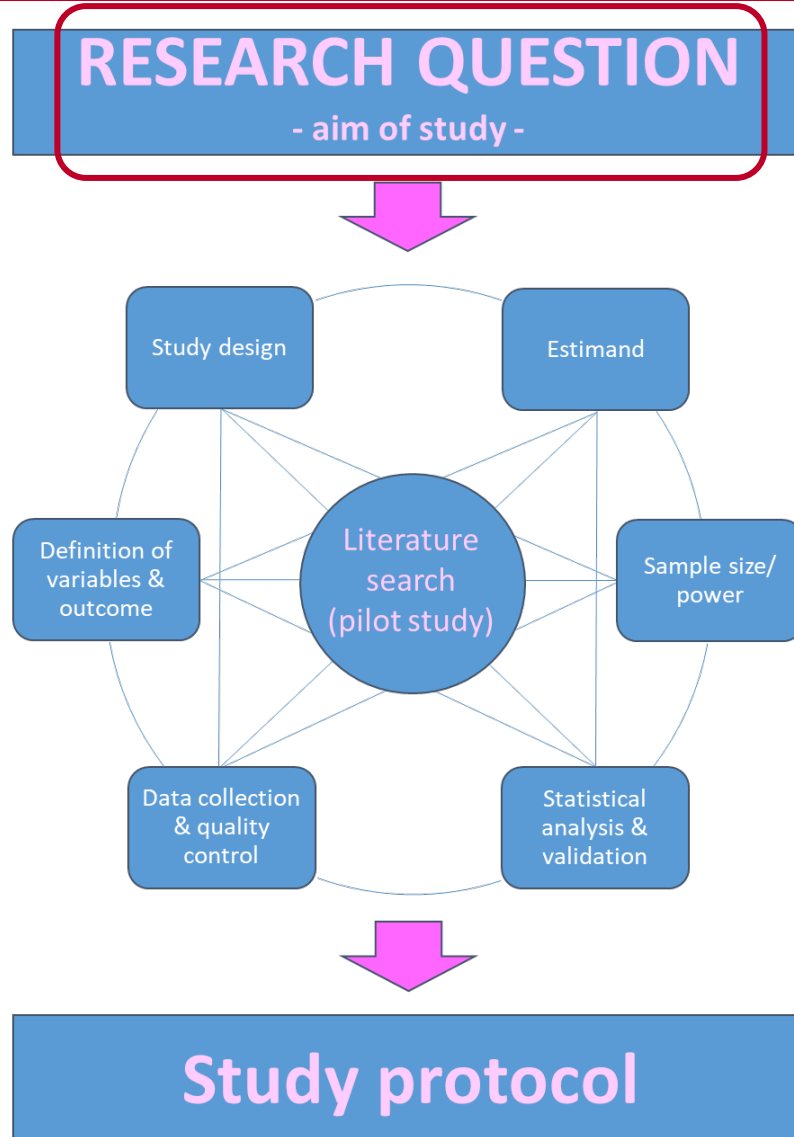
— **Figure 3:**
PMID: 40887130



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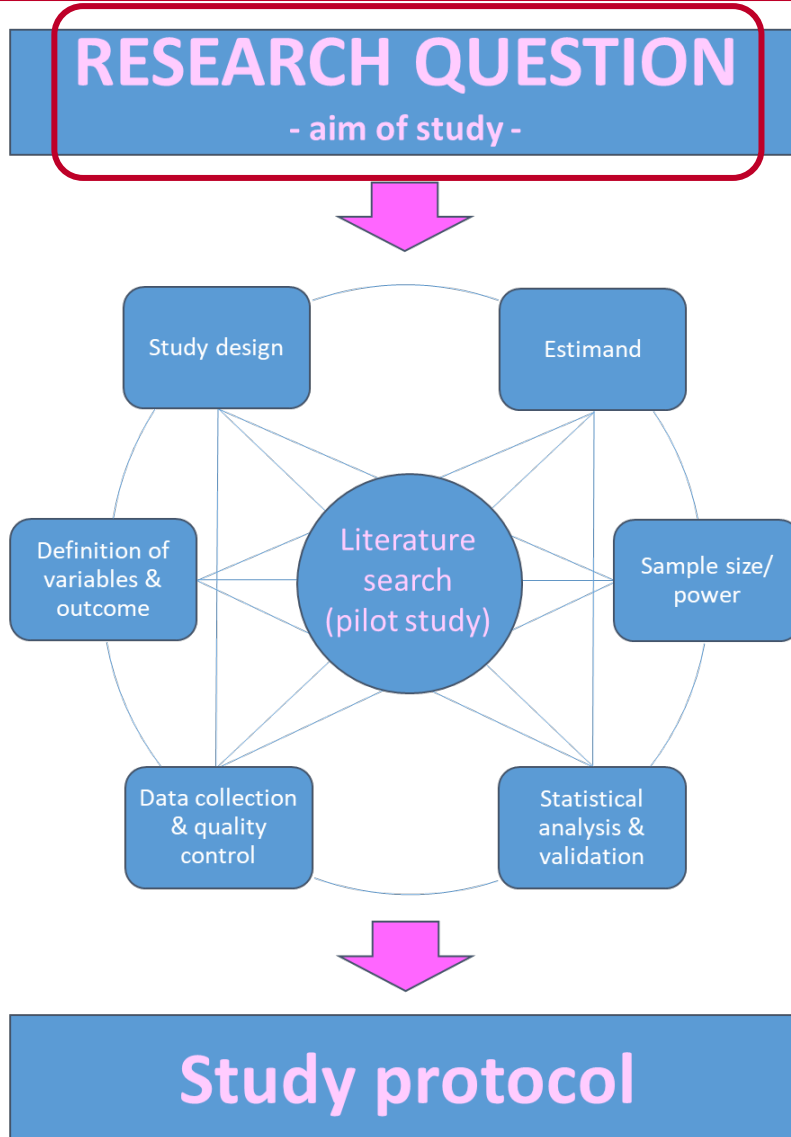
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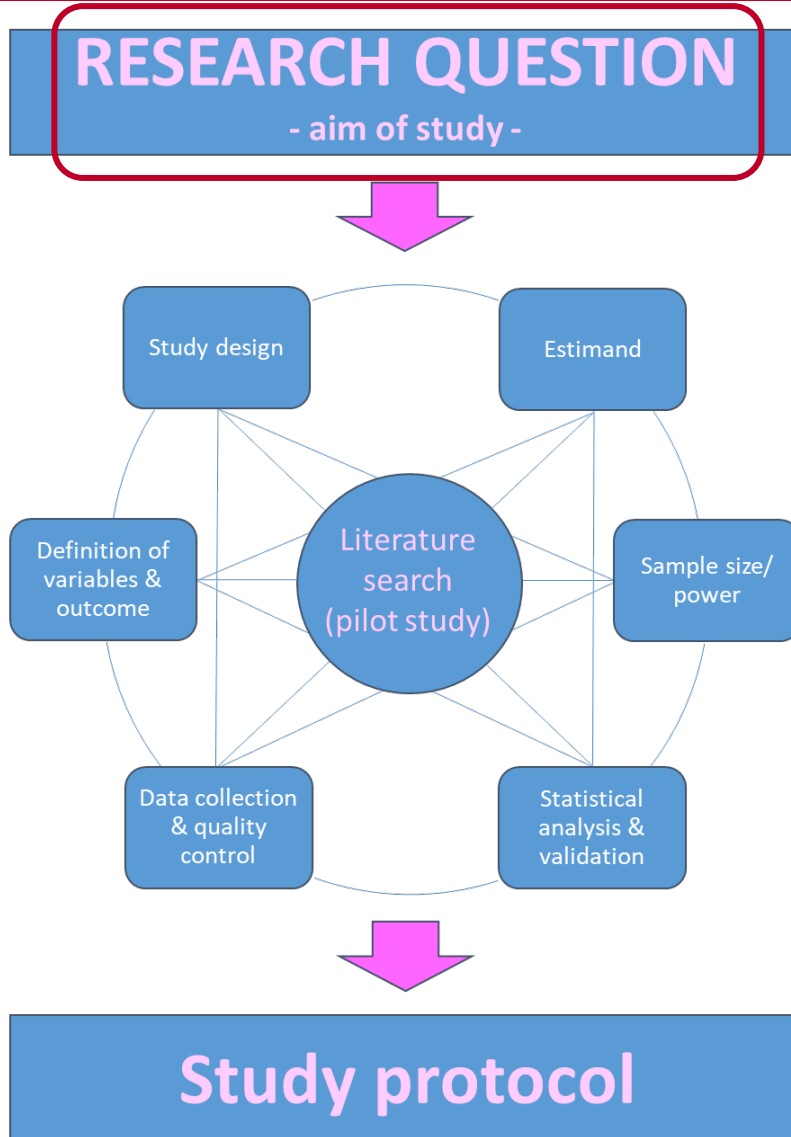
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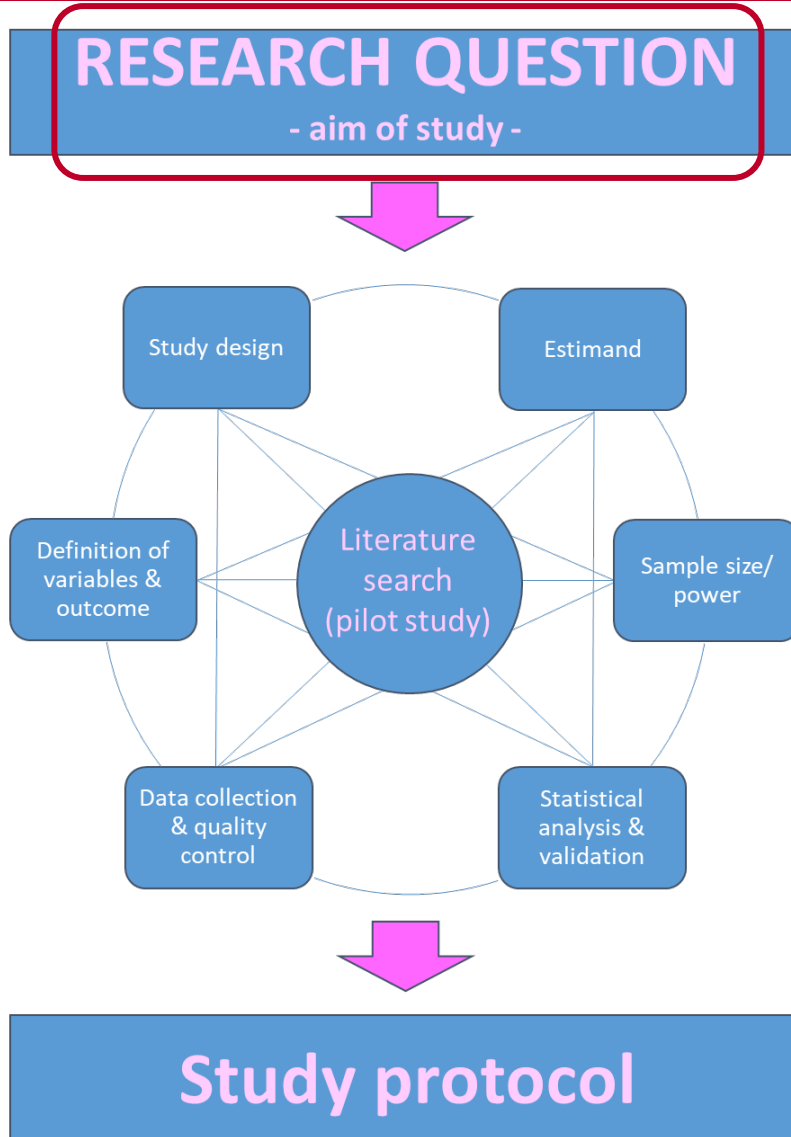
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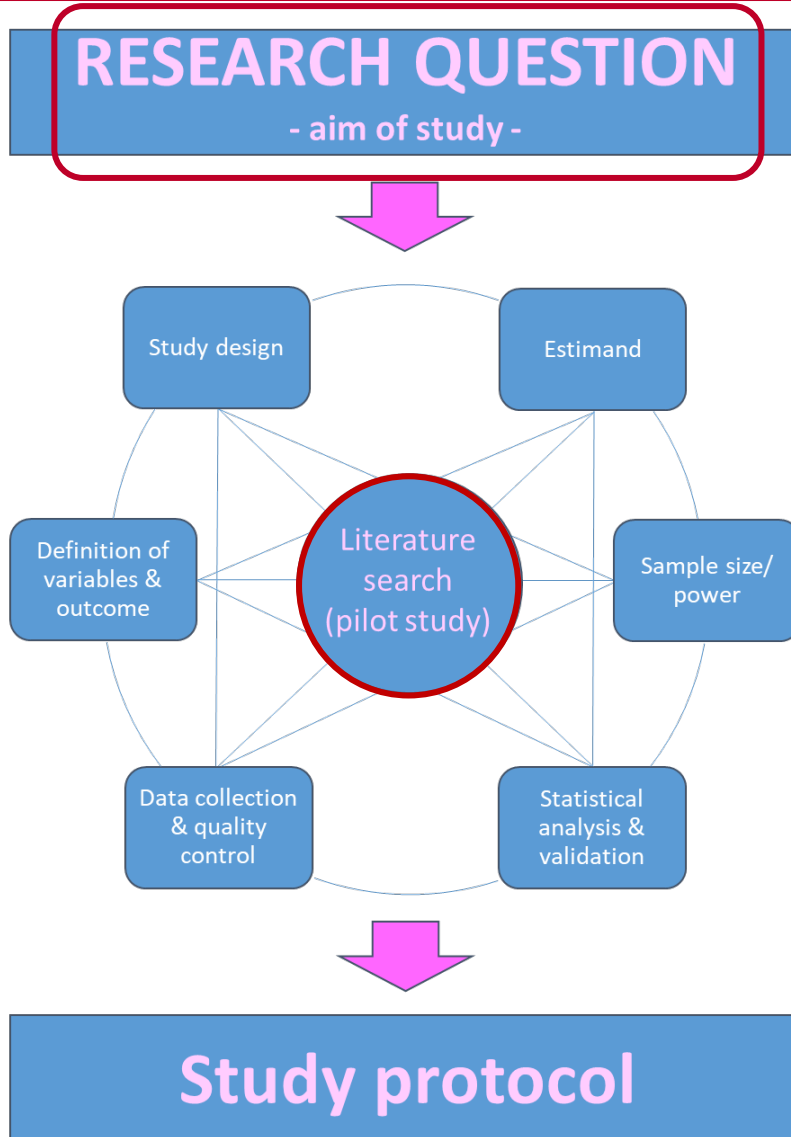
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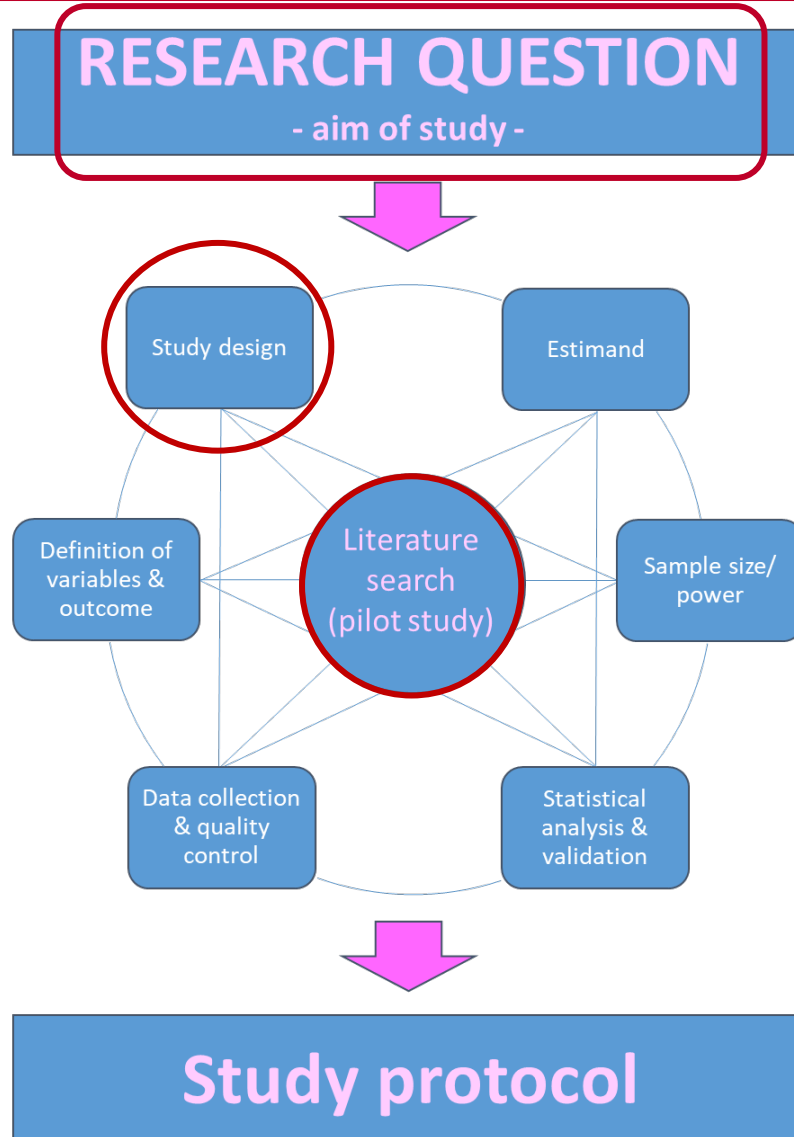


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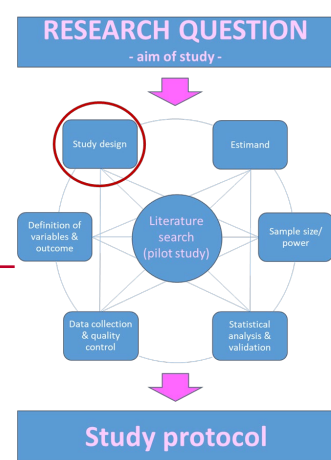


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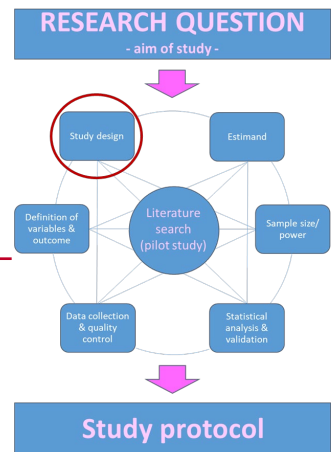
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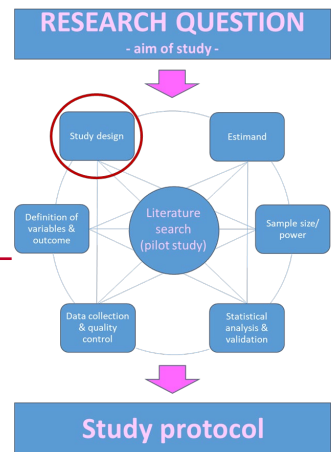


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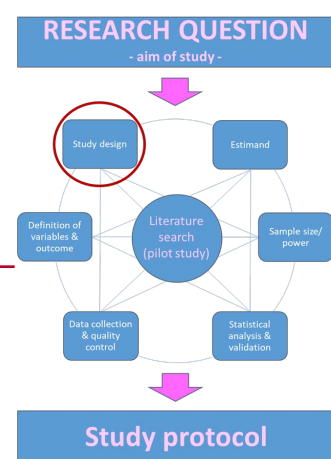
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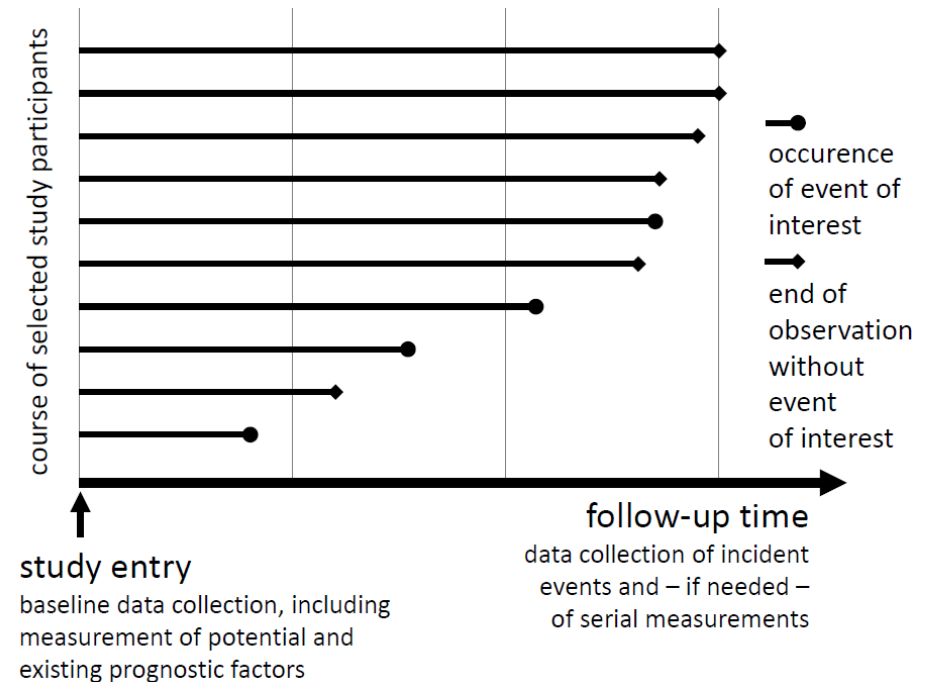
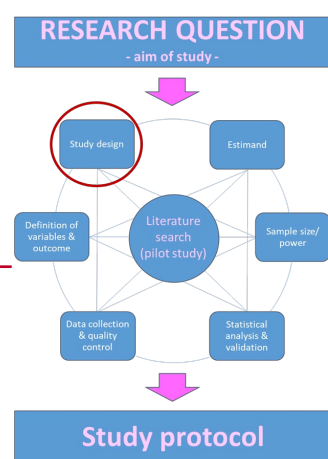
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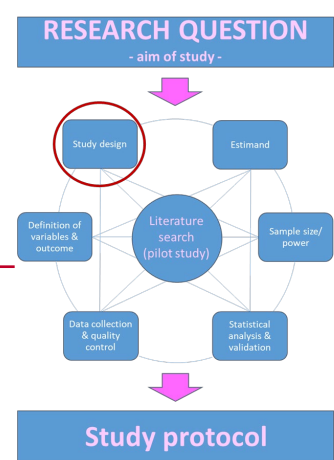
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- **Often observed design:**
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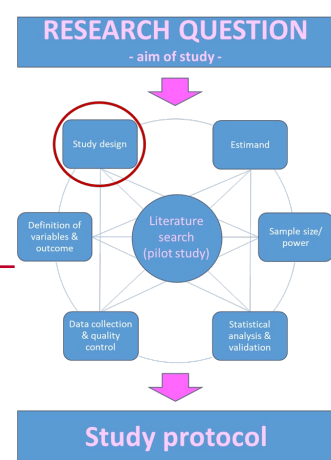


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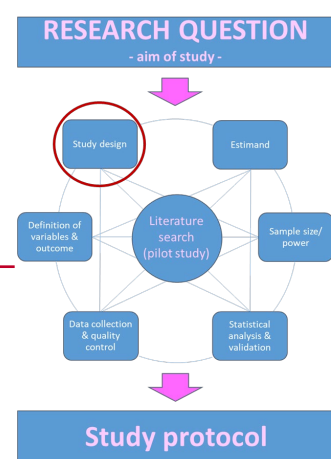
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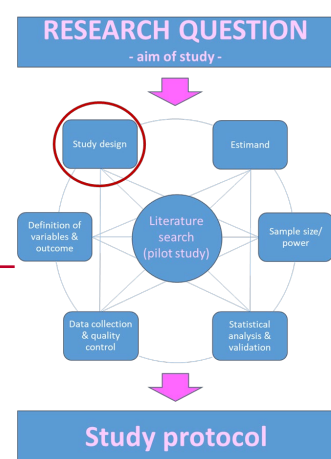
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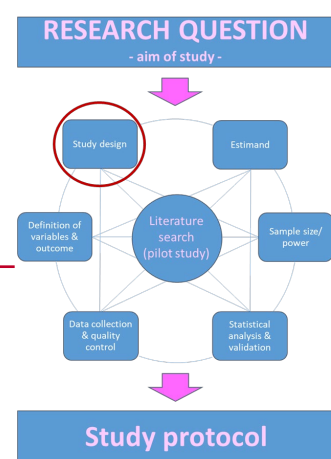
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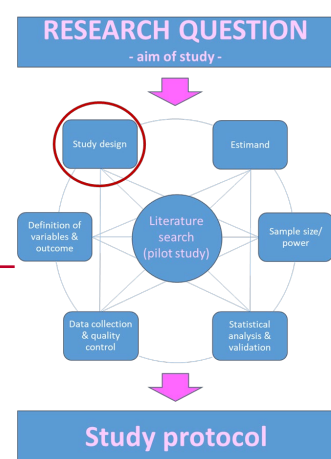
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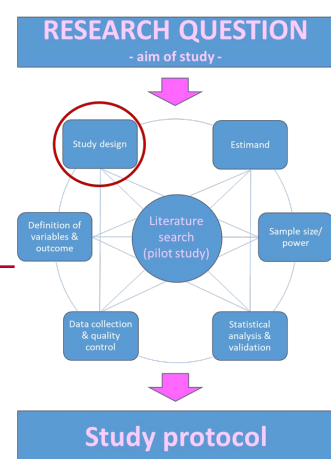
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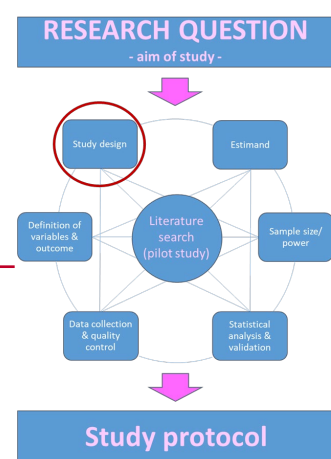
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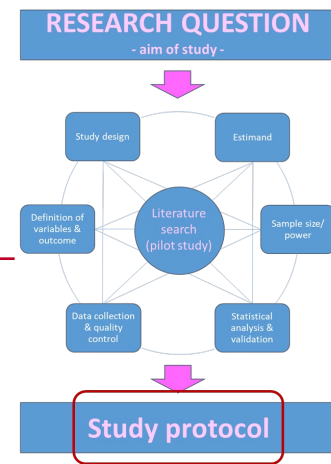
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To do: *check appropriateness before prognostic factor study starts*



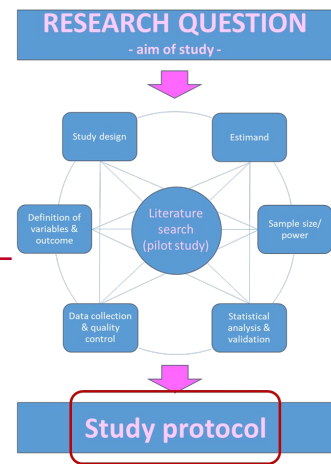
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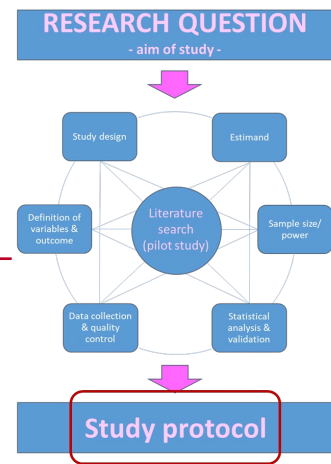
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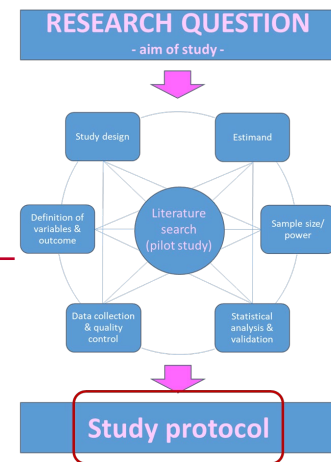
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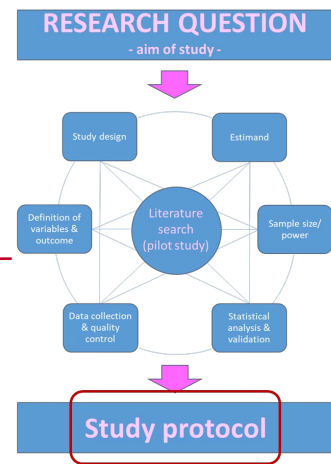
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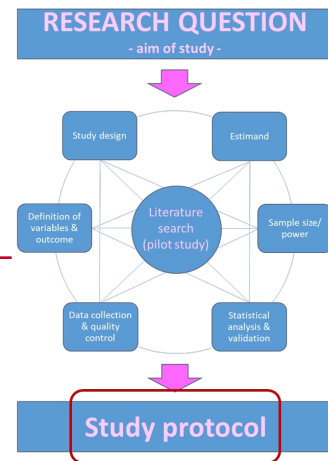
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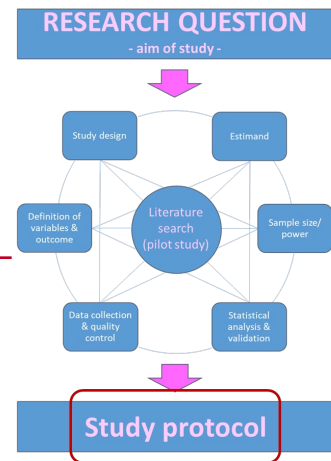
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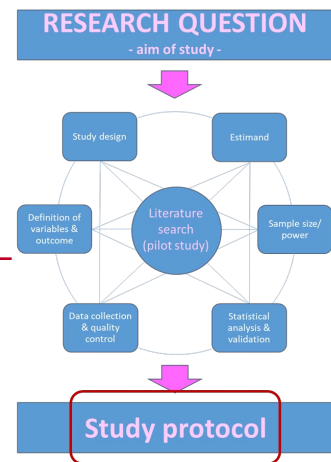


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Example: too small →
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attitude*

Study protocol and related aspects

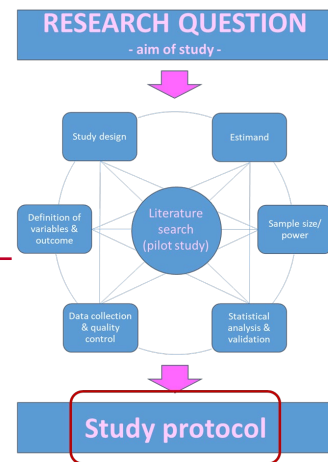
- **Study protocol** – an essential element of a good design
 - Helpful to clarify aims, definitions and methods
 - Templates for different settings available
 - Own contribution – list of relevant questions and aspects
 - Also, useful to avoid mistakes that cannot be corrected during the course

- **Ethics**

- Any study should follow ethical standards!

- **Registration**

- Registration of any epidemiological study is recommended.



Requested:
*change in
attitude*

Example: too small →
UNETHICAL

Summary

- On behalf of TG 5 and for the non-specialists

Open access

Communication

BMJ Open Design aspects for prognostic factor studies

Peggy Sekula ,¹ Inga Steinbrenner ,¹ Ulla T Schultheiss,^{1,2,3} Neus Valveny,⁴ Paola Rebora,^{5,6} Susan Halabi ,⁷ Suzanne M Cadarette,⁸ Richard D Riley ,^{9,10} Gary S Collins ,¹¹ Willi Sauerbrei,¹² Mitchell H Gail ,¹³ for topic group 5 of the STRATOS initiative

Summary

- On behalf of TG 5 and for the non-specialists
- Discussion of aspect for designing a prognostic factor study
- Addressing many important but not all aspects

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Summary

BMJ Open Design aspects for prognostic factor studies

- On behalf of TG 5 and for the non-specialists
- Discussion of aspect for designing a prognostic factor study
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- Ultimate goal – to avoid shortcomings in design and methodology in future studies
- In addition to other contributions, we hope to give a further push towards that goal, to raise awareness

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- All stakeholders in this context need to be involved

STRATOS TG 5 ,Study design'

Members

- **Chairs:** Suzanne Cadarette (CAN), Rima Izem (CHE)
- **Full Members:** Gary Collins (GBR), Mitchell Gail (USA), Susan Halabi (USA), Thomas Lumley (NZL), Paola Rebora (ITA), Peggy Sekula (DEU), Neus Valveny (ESP)
- **Early Career Members:** Nicholas Bakewell (CAN), Janie Coulombe (CAN)

Ongoing and planned projects

- Guidance on study design to estimate **long-term safety** of medications (responsible: NB, SC)
- Guidance on study design and analysis with **irregular visits** (responsible: JC, SC)
- Guidance on **sample size** calculation to inform study design (responsible: NV, SH, RI)
- Tutorial on handling **dynamic treatment** landscape (sequential target trial emulation; responsible: RI, SC)
- In plan:
 - Data quality and usage of **patient registries** (responsible: PS, RI)
 - Guidance on study design to avoid **immortal time bias** (responsible: SC)