SESSION
IMPROVING REPRODUCIBILITY

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Scientific progress requires that results are reproducible

- No data across science ...
- Open Science Collaboration (psychology): 36%
- Bayer HealthCare: 25%
- Amgen: 11%
- High quality randomized clinical trials: 85%
The scientific community is concerned about the current degree of non-reproducibility of important research findings.
Approaches to improving reproducibility: prevention

- Improve study methods
  - Researchers should strengthen quality control mechanisms through automation, guidelines, checklists, validation studies and internal replications.
  - Institutions should improve researchers’ skills in rigorous study design, analysis and interpretation of results.
  - Institutions should provide independent methodological support and oversight on studies.

- Improving study reporting
  - Institutions and funders should require pre-registration of hypothesis-testing studies.
  - Journals should issue detailed guidelines and checklist for how to report study methods.
  - Institutions and journals should require storage of study data and methods in a repository.

- Improve the organization and culture of research
  - Journals should publish more studies with ‘negative’ results.
  - Funders should provide more long-term funding for researchers.
  - Institutions should reward researchers’ peer review activities and efforts to improve rigorous study execution.
Approaches to improving reproducibility: replication

- A certain degree of non-reproducibility cannot be prevented
- Replication studies will therefore be necessary to:
  - assess to what extent results of an individual study can be reproduced
  - gain insight into and improve the functioning of science
Why, when and how to conduct replication studies?

• KNAW has installed a committee ‘Replication studies’ to advise on replication studies:
  • What replication studies are
  • Need for replication studies
  • Conditions for replication studies
  • Recommendations
• Report: October 2017