MRC Clinical Trials Unit

UCL

STRATOS INITIATIVE

Panel Discussion on Future Directions

James Carpenter & Willi Sauerbrei

ISCB, Milan, August 2023

Smarter Studies
Global Impact
Better Health

Aims

- Overview of current STRATOS structure
- Successes
- Update on cross-initiative STRATOS projects
  - STRATOS glossary
  - STRATOS p-value paper
  - Simulation studies
- Challenges
- Structured discussion (45 minutes)

STRATOS: https://stratos-initiative.org/

Nine Topic Groups:

TG1 – missing data;

TG2 – selection of variables and functional forms;

TG3 – initial data analysis;

TG4 – measurement error and misclassification;

TG5 – study design;

TG6 – evaluating diagnostic tests and screening models;

TG7 – causal inference;

TG8 – survival analysis;

TG9 – high dimensional data.

12 cross-cutting panels:

Membership; Publications; Glossary; Website; Literature review; Bibliography; Simulation studies; Data sets; Knowledge translation, Contact organisations; Visualisation; Open science

Steering committee

Executive committee

UKRI MRC Clinical Trials Unit

UCL

Successes

- International collaborative network
  - Over 100 members, from all over the world
- Excellent collaborative spirit, fostered by two international meetings at Banff, Canada.
- Substantial, high-quality output & recognition:
  - ~30 peer reviewed publications
  - ~25 reports in Biometric bulletin
  - ~25 sessions or symposia at international conferences since 2018
  - Many more papers influenced by discussions at STRATOS meetings and written by STRATOS members, but are not formally STRATOS papers.
- Highlighted importance of initial data analysis to the research community
- STRATOS role in SISAQUOL
- General website and TG websites

STRATOS Glossary Panel

[Boeker et al. (2021) BiomBull 4/2020]

Objectives:

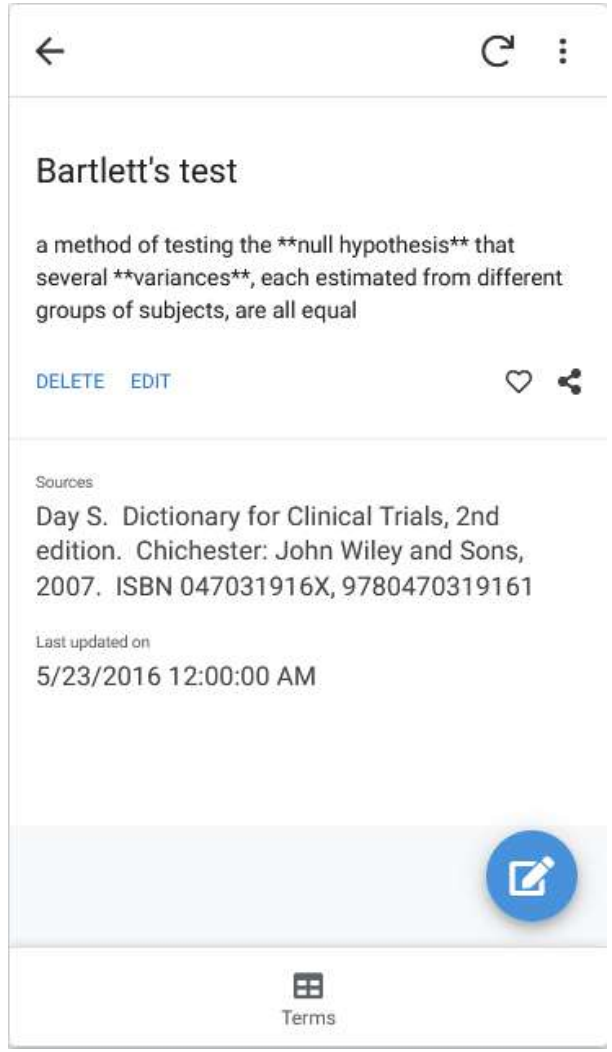
- unification and harmonization of statistical terms and definitions
- open access to the glossary

Sources and number of selected terms:

- The Dictionary for Clinical Trials, ~700
- NICE Glossary, ~100

For modifications and extensions it is intended that each topic group adds terms relevant in their area

- Web-based interface for collaborative harmonization
- Cooperation with interested partners needed



STRATOS p-value m/s

Working title: P-values and hypothesis testing –
beyond polemics to practical solutions

Drafted by: Michal Abrahamowicz, Victor Kipnis and James Carpenter

Key themes:

- Discussion of Amrhein, Greenland et al., who criticize the dichotomy in interpretation of p-values. This led to some proposals to abandon p-values.
- Because few (none) of us have Fisher's insights, the NP approach is unavoidable if we wish to be strictly objective.
- Reproducibility is key – but the p-value is not a reproducible statistic.
- Much can be learned from Trials (e.g. registry, planned SAP…)
- Drive to open science needs to be accelerated.

Manuscript is almost ready for circulation to wider group

Simulation studies

Detailed simulation studies are the key to developing methodological guidance.

Several important developments:

- concept of neutral comparison studies
- ADEMP structure to improve design and reporting
- Phases of simulation studies – following ideas from clinical research

Challenges I

- Overview of literature
  - Still missing for some TGs – but still helpful to see what's done (?)

- Initial plan was to create guidance papers
  - ❖This has proved hard…perhaps because it typically involves detailed simulation studies

Challenges II

- Progress is often slower than hoped, as work is (often) unfunded.
- Are we effectively changing practice among Level-1 & 2 researchers?
  - ❖ need continues to increase
  - ❖ still many gaps, and sometimes no ’state-of-the-art’, as shown by TG2 overview
- How can we co-operate better with journal editors to change practice?
- Progress needed on
  - open science (centre for open science started 2013 – should no longer be ‘early days’)
  - structured reporting of methodology

Structured discussion 1 (15 mins):

1. How to we get our ideas into practice?
   - initial data analysis framework; missing data (TARMOS framework), measurement error, simulations ….
   - improved co-operation with other groups/networks?
   - Improved co-operation with journal editors?
   - WHAT ABOUT YOU – are you interested in joining? Simple application form on website. You can apply for one or two topic groups or panels. Chairs decide on the applications.

2. How can we speed up our work?
   - seek funding for TG meetings/projects from ‘translational research’ streams

Structured discussion 2: (10 mins)

1. Open science, reproducibility & registration of observational research
   - how can we further support open science?

2. Structured reporting (at present methods reporting is poor and unstructured)
   - In medical research there are many reporting guidelines, and structured reporting has been proposed - how can we transfer this to methodological research?

Structured discussion 3: (10 minutes)

1. Machine learning and data science is leading to an emerging community of statistical ‘level-1’ researchers – how can we help them?

2. What should be our contribution to how generative AI (e.g. ChatGPT) is used in biostatistical research?

Structured discussion 4: (10 minutes)

Future structures and meetings:

- Are current structures working?
- How can we improve them?
- What about clinical advisors?
- What should be the focus of future STRATOS meetings?

Summary

- Its now ~10 years since the landmark series of *Lancet* papers on reducing research waste. Their question was 'how should medical research change?'

Methodology over metrics: current scientific standards are a disservice to patients and society

Ben Van Calster [a b c], Laure Wynants [a c d], Richard D Riley [e], Maarten van Smeden [f], Gary S Collins [g h i] (JCE 2021)

- For us, the question is 'how do we need to change methodological research?'
- STRATOS is now established, and has a key role to play.
- Here's to the next 10 years!