TG1: Missing Data

Co-chairs: Katherine Lee and James Carpenter

STRATOS meeting, November 2021

Activities

- TARMOS framework paper

- Sociological Methods and research manuscript

- Conference presentation

- Tutorial on MNAR manuscript

- Joint manuscript with TG3

- Website

TARMOS framework paper

- Framework for the **T**reatment **A**nd **R**eporting of **M**issing data in **O**bservational Studies
- Led by Kate Lee
- Aimed at level 1 / level 2
- Published in Journal of Clinical Epidemiology, Feb 21, https://doi.org/10.1016/j.jclinepi.2021.01.008
- 7 Citations so far…

1. **Plan the analysis**
   a) What is the analysis model of interest assuming there are no missing data?
   b) How are missing data going to be handled?
      - Is a complete records analysis likely to be valid?
      - Is MI likely to offer benefits over a complete records analysis?
      - Is a sensitivity analysis required, and if so how it should be framed?

2. **Conduct the analysis**
   a) Examine the data – are the features of the data consistent with the expectation outlined in the analysis plan?
   b) Conduct the analysis as per the plan – any amendments to the analysis plan should be acknowledged and justified.

3. **Report the analysis**
   a) Describe the missing data
   b) Describe how the missing data were handled in the primary and secondary analyses and provide a justification for the selected approach(es), including details of any non-standard issues e.g. non-linear terms, interactions etc.
   c) Report the results from all of the analyses and interpret in light of the missing data and the clinical relevance, commenting on any substantial differences in the inference if relevant

TARMOS: key messages:

- Presents a framework for handling and reporting analyses of incomplete data.

- The framework encourages researchers to think systematically about missing data.

- The framework puts a strong emphasis on preplanning the statistical analysis and encourages transparency when reporting the results of a study.

- Adoption of this framework will increase the reproducibility of research findings.

Sociological methods manuscript

- Title: A comparison of three popular methods for handling missing data: complete-case analysis, weighting and multiple imputaiton

- Led by Rod Little on behalf of TG1

- Aimed at level 1 / level 2

- Under revision following favourable first review.

- Key practical messages on when to use MI, CC or IPW, in particular
  - Use MI when (a) information on incomplete cases for parameter of primary interest is substantial; (b) MAR is plausible; (c) specification checks on imputation models show face validity.

Conference presentation

- TG1 (under Kate's leadership) Co-ordinated and presented a symposium on "Modern concepts in the handling and reporting of missing data" at the World Congress of Epidemiology, 4-6th September 2021.

- This symposium consisted of 4 talks (Kate Lee, Rod Little, Cattram Nguyen, Rosie Cornish) from researchers in missing data methodology.

- The talks presented practical guidance on how to select an appropriate method to handle missing data, how to report the results from such an analysis, and how to conduct sensitivity analyses in the multiple imputation framework.

MNAR tutorial manuscript

- TG1 is currently working on a tutorial paper on planning and conducting sensitivity analyses around the MAR assumption using a pattern mixture model when there is a single incomplete variable.

- In particular this paper will focus on how to frame and report the results from a sensitivity analysis and will use a worked example for illustration.

- Again this paper will be aimed at level 1 researchers and will be a follow-on from the TARMOS paper published in JCE.
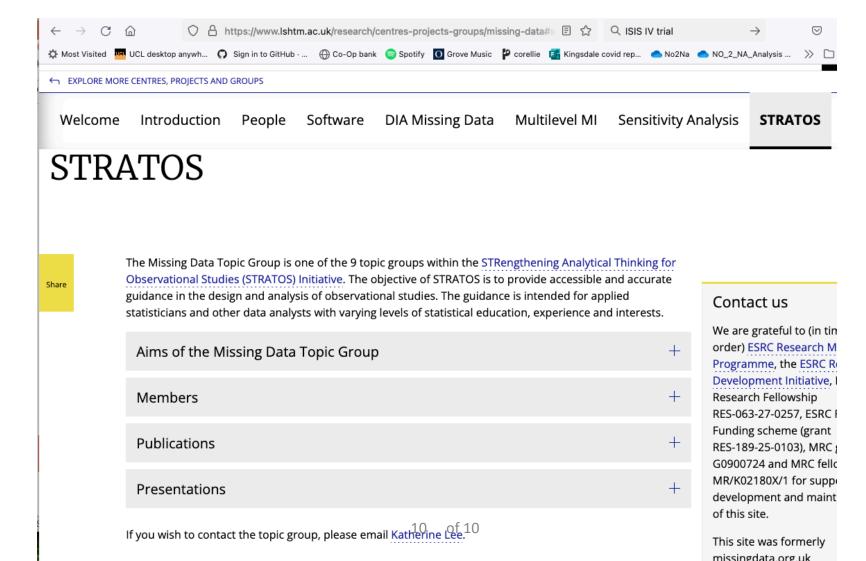
Joint manuscript with TG3

- Kate Lee is working with Lara Lusa and Marianne Huebner from TG3 on a paper on developing an initial data analysis plan for longitudinal studies.

- This is a level 1 paper which runs through the elements of an initial data analysis, including exploring the amount of and reasons for missing data, and illustrates this process with a case study.

- The aim is to encourage such a plan to increase the reproducibility of the research and to avoid explorations that can be hypothesis generating. We are planning to submit the paper to PLOS ONE.

Website: https://www.lshtm.ac.uk/research/centres-projects-groups/missing-data#stratos

Current TG members

- Kate Lee and James Carpenter (co-chairs)
- Melanie Bell, University of Arizona, USA
- Rosie Cornish, University of Bristol, Bristol, UK
- Els Goetghebeur, Ghent University, Belgium
- Joseph Hogan, Brown University, USA
- Rod Little, University of Michigan, USA
- Rheanna Mainzer, Murdoch Children's Research Institute, Melbourne, Australia
- Kate Tilling, University of Bristol, Bristol, UK