



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 **Treatment And Reporting of Missing** data in **Observational 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 imputation
- 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>

The screenshot shows a web browser displaying the STRATOS website. The browser's address bar shows the URL <https://www.lshtm.ac.uk/research/centres-projects-groups/missing-data#stratos>. The website's navigation menu includes links for Welcome, Introduction, People, Software, DIA Missing Data, Multilevel MI, Sensitivity Analysis, and STRATOS (which is highlighted). The main heading is "STRATOS". Below this, a paragraph describes the Missing Data Topic Group as one of the 9 groups within the STRENGTHENING Analytical Thinking for Observational Studies (STRATOS) Initiative, aimed at providing guidance to applied statisticians and data analysts. A sidebar on the left has a "Share" button. A central section lists four expandable items: "Aims of the Missing Data Topic Group", "Members", "Publications", and "Presentations", each with a plus sign. On the right, a "Contact us" section expresses gratitude to funding bodies like ESRC and MRC. At the bottom, it provides contact information for Katherine Lee and notes the site's former name, missingdata.org.uk.

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Welcome Introduction People Software DIA Missing Data Multilevel MI Sensitivity Analysis **STRATOS**

STRATOS

Share

The Missing Data Topic Group is one of the 9 topic groups within the [STRENGTHENING Analytical Thinking for Observational Studies \(STRATOS\) Initiative](#). The objective of STRATOS is to provide accessible and accurate guidance in the design and analysis of observational studies. The guidance is intended for applied statisticians and other data analysts with varying levels of statistical education, experience and interests.

- Aims of the Missing Data Topic Group +
- Members +
- Publications +
- Presentations +

Contact us

We are grateful to (in tin order) [ESRC Research M Programme](#), the [ESRC R Development Initiative](#), I Research Fellowship RES-063-27-0257, ESRC F Funding scheme (grant RES-189-25-0103), MRC G0900724 and MRC fello MR/K02180X/1 for supp development and maint of this site.

This site was formerly [missingdata.org.uk](#)

If you wish to contact the topic group, please email [Katherine Lee](#).

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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